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(54) **PHARMACEUTICAL CO-CRYSTAL COMPOSITIONS**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

2,665,277	A	1/1954	Homeyer et al.
2,711,411	A	6/1955	Holbert etal.
3,028,420	A	4/1962	Petrow et al.
3,598,123	A	8/1971	Zaffaroni
3,845,770	A	11/1974	Theeuwes etal.
3,916,899	A	11/1975	Theeuwes etal.
3,970,651	A	7/1976	Kaplan et al.
4,008,321	A	2/1977	Kamishita et al.
4,008,719	A	2/1977	Theeuwes et al.
4,198,507	A	4/1980	Barry et al.
4,267,179	A	5/1981	Heeres et al.
4,368,197	A	1/1983	Shefter et al.
4,513,006	A	4/1985	Maryanoff et al.
4,764,604	A	8/1988	Muller
4,853,379	A	8/1989	Shroot et al.
4,916,134	A	4/1990	Heeres et al.
4,925,674	A	5/1990	Giannini et al.
4,927,855	A	5/1990	Lafon
4,994,604	A	2/1991	Tung et al.
3,536,809	A	4/1991	Schaller et al.

(Continued)

FOREIGN PATENT DOCUMENTS

EP 0310122 B1 4/1989

(Continued)

OTHER PUBLICATIONS

Angelo Gavezzotti, Are Crystal Structures Predictable?, 1994, Acc. Chem. Res., vol. 27, pp. 309-314.*

(Continued)

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(57) **ABSTRACT**

A pharmaceutical composition comprising a co-crystal of an API and a co-crystal former; wherein the API has at least one functional group selected from ether, thioether, alcohol, thiol, aldehyde, ketone, thioketone, nitrate ester, phosphate ester, thiophosphate ester, ester, thioester, sulfate ester, carboxylic acid, phosphonic acid, phosphinic acid, sulfonic acid, amide, primary amine, secondary amine, ammonia, tertiary amine, sp2 amine, thiocyanate, cyanamide, oxime, nitrile diazo, organohalide, nitro, s-heterocyclic ring, thiophene, n-heterocyclic ring, pyrrole, o-heterocyclic ring, furan, epoxide, peroxide, hydroxamic acid, imidazole, pyridine and the co-crystal former has at least one functional group selected from amine, amide, pyridine, imidazole, indole, pyrrolidine, carbonyl, carboxyl, hydroxyl, phenol, sulfone, sulfonyl, mercapto and methyl thio, such that the API and co-crystal former are capable of co-crystallizing from a solution phase under crystallization conditions.

36 Claims, 66 Drawing Sheets

U.S. PATENT DOCUMENTS

5,006,513	A	4/1991	Hector et al.
5,023,092	A	6/1991	DuRoss
5,059,595	A	10/1991	Le Grazie
5,073,543	A	12/1991	Marshall et al.
5,120,548	A	6/1992	McClelland et al.
5,177,262	A	1/1993	Taylor et al.
5,242,942	A	9/1993	Costanzo et al.
5,273,760	A	12/1993	Oshlack et al.
5,286,493	A	2/1994	Oshlack et al.
5,324,351	A	6/1994	Oshlack et al.
5,332,834	A	7/1994	Bhattacharya et al.
5,338,644	A	8/1994	Taylor et al.
5,354,556	A	10/1994	Sparks et al.
5,356,467	A	10/1994	Oshlack et al.
5,366,738	A	11/1994	Rork et al.
5,380,867	A	1/1995	Bhattacharya et al.
5,384,327	A	1/1995	Costanzo et al.
5,412,094	A	5/1995	Amos et al.
5,414,997	A	5/1995	Tailer
5,466,823	A	11/1995	Talley et al.
5,472,712	A	12/1995	Oshlack et al.
5,474,997	A	12/1995	Gray et al.
5,510,496	A	4/1996	Talley et al.
5,521,207	A	5/1996	Graneto
5,523,090	A	6/1996	Znaiden et al.
5,563,165	A	10/1996	Talley et al.
5,591,767	A	1/1997	Mohr et al.
5,614,342	A	3/1997	Molaire et al.
5,631,250	A	5/1997	Bunnell et al.
5,633,015	A	5/1997	Gilis et al.
5,633,272	A	5/1997	Talley et al.
5,639,476	A	6/1997	Oshlack et al.
5,641,512	A	6/1997	Cimiluca
5,661,151	A	8/1997	Saksena et al.
5,674,533	A	10/1997	Santus et al.
5,703,232	A	12/1997	Bunnell et al.
5,707,975	A	1/1998	Francois et al.
5,733,566	A	3/1998	Lewis
5,736,541	A	4/1998	Bunnell et al.
5,753,688	A	5/1998	Talley et al.
5,753,693	A	5/1998	Shank
5,760,007	A	6/1998	Shank et al.
5,760,068	A	6/1998	Talley et al.
5,932,598	A	8/1999	Talley et al.
5,935,933	A	8/1999	Shank et al.
5,952,187	A	9/1999	Stenglein et al.
5,972,986	A	10/1999	Seibert et al.
5,985,902	A	11/1999	Talley et al.
5,994,365	A	11/1999	Zaworotko et al.
5,998,380	A	12/1999	Ehrenberg et al.
5,998,413	A	12/1999	Heeres et al.
6,001,996	A	12/1999	Amos et al.
6,054,136	A	4/2000	Farah et al.
6,071,537	A	6/2000	Shank
6,132,420	A	10/2000	Dionne et al.
6,156,781	A	12/2000	Talley et al.
6,191,117	B1	2/2001	Kozachuk
6,201,010	B1	3/2001	Cottrell
6,245,357	B1	6/2001	Edgren et al.
6,268,385	B1	7/2001	Whittle et al.
6,270,787	B1	8/2001	Ayer
6,283,953	B1	9/2001	Ayer et al.
6,287,295	B1	9/2001	Chen et al.
6,294,192	B1	9/2001	Patel et al.
6,319,903	B1	11/2001	Carrazana et al.
6,323,266	B2	11/2001	Phillips
6,333,050	B2	12/2001	Wong et al.
6,342,249	B1	1/2002	Wong et al.
6,348,458	B1	2/2002	Hamied et al.
6,365,185	B1	4/2002	Ritschel et al.
6,368,626	B1	4/2002	Bhatt et al.
6,375,978	B1	4/2002	Kleiner et al.
6,384,034	B2	5/2002	Simitchieva et al.
6,403,640	B1	6/2002	Stoner et al.
6,413,965	B1	7/2002	Mylari
6,420,394	B1	7/2002	Supersaxo
6,488,962	B1	12/2002	Berner et al.
6,503,884	B1	1/2003	Ehrenberg et al.
6,559,293	B1 *	5/2003	Almarsson et al. 536/18.7
6,570,036	B1	5/2003	Reuter
6,579,895	B2	6/2003	Karim et al.
6,613,790	B2	9/2003	Carter
6,699,840	B2	3/2004	Almarsson et al.
7,078,526	B2 *	7/2006	Remenar et al. 544/336
7,132,570	B2	11/2006	Neckebrock et al.
7,172,769	B2	2/2007	Kararli et al.
7,205,413	B2	4/2007	Morissette et al.
7,446,107	B2	11/2008	Remenar et al.
7,452,555	B2	11/2008	Childs
7,459,449	B2	12/2008	Keltjens
2002/0006951	A1	1/2002	Hageman et al.
2002/0013357	A1	1/2002	Nadkarni et al.
2002/0015735	A1	2/2002	Hedden et al.
2002/0034542	A1	3/2002	Thombre et al.
2002/0037925	A1	3/2002	Dewey et al.
2002/0042446	A1	4/2002	Dewey et al.
2002/0071857	A1	6/2002	Kararli et al.
2002/0107250	A1	8/2002	Hariharan et al.
2002/0119193	A1	8/2002	Le et al.
2003/0069190	A1	4/2003	Abdel-Magid et al.
2003/0072802	A1	4/2003	Cutler
2003/0096014	A1	5/2003	Sherman
2003/0162226	A1	8/2003	Cima et al.
2003/0166581	A1	9/2003	Almarsson et al.
2003/0224006	A1	12/2003	Zaworotko et al.
2004/0019211	A1	1/2004	Remenar et al.
2004/0029946	A1	2/2004	Arora et al.
2004/0053853	A1	3/2004	Almarsson et al.
2004/0106052	A1	6/2004	Molaire
2004/0106053	A1	6/2004	Molaire et al.
2004/0106055	A1	6/2004	Molaire et al.
2004/0154890	A1	8/2004	Liu
2004/0171062	A1	9/2004	Hirth et al.
2004/0176335	A1 *	9/2004	Childs 514/165
2004/0242640	A1	12/2004	Desai et al.
2005/0070551	A1 *	3/2005	Remenar et al. 514/254.07
2005/0169982	A1	8/2005	Almarsson et al.
2005/0181041	A1	8/2005	Goldman
2005/0252649	A1	11/2005	Chiu et al.
2005/0256127	A1	11/2005	Ku et al.
2006/0223794	A1 *	10/2006	Bourghol Hickey et al. . 514/220
2007/0015841	A1	1/2007	Tawa et al.
2007/0021510	A1 *	1/2007	Hickey et al. 514/618
2007/0059356	A1 *	3/2007	Almarsson et al. 424/464
2007/0293674	A1	12/2007	Scoppettuolo et al.

FOREIGN PATENT DOCUMENTS

EP	0283992	B1	9/1992
EP	413528	B1	11/1995
EP	1167355	A1	1/2002
EP	1364649	A1	11/2003
FR	769586		6/1934
FR	2849029		6/2004
GB	1 297 261	A	11/1972
GB	2 169 601		7/1986
IN	182620		12/1994
IT	01303251		11/2000
JP	B 46-33588		10/1971
JP	54-16494		2/1979
JP	54-095589		7/1979
WO	WO 94/16733	A1	8/1994
WO	WO 95/17407	A1	6/1995
WO	WO 95/23596	A1	9/1995
WO	WO 96/07331	A1	3/1996
WO	WO 96/33193		10/1996
WO	WO 98/57967	A1	12/1998
WO	WO 00/07583	A2	2/2000
WO	WO 00/32189	A1	6/2000
WO	WO 00/50020	A2	8/2000
WO	WO 00/53283	A1	9/2000
WO	WO 00/72841	A1	12/2000
WO	WO 01/13904	A2	3/2001
WO	WO 01/41536	A2	6/2001
WO	WO 01/41760	A3	6/2001
WO	WO 01/42221	A1	6/2001
WO	WO 01 42222	A1	6/2001
WO	WO 01/42222	A1	6/2001

WO	WO 01/45706		6/2001
WO	WO 01/51919	A2	7/2001
WO	WO 01 51919	A2	7/2001
WO	WO 01/78724	A1	10/2001
WO	WO 01/91750	A1	12/2001
WO	WO 01/97853	A1	12/2001
WO	WO 02/00627	A1	1/2002
WO	WO 02/10125		2/2002
WO	WO 02/056878	A2	7/2002
WO	WO 02/056915		7/2002
WO	WO 02/062318	A2	8/2002
WO	WO 02/102376		12/2002
WO	WO 03/033462	A2	4/2003
WO	WO 03 033462	A2	4/2003
WO	WO 03/070738	A2	8/2003
WO	WO 03/074474	A2	9/2003
WO	WO 03074474	A2 *	9/2003
WO	WO 03/101392	A2	12/2003
WO	WO 2004/054571	A1	7/2004
WO	WO 2004/078161	A1	9/2004
WO	WO 2004/078163	A2	9/2004
WO	WO 2004/089313	A2	10/2004
WO	WO 2005/023198	A2	3/2005
WO	WO 2005/037424	A1	4/2005
WO	WO 2005/053612		6/2005
WO	WO 2005/055983	A2	6/2005
WO	WO 2005/060968	A1	7/2005
WO	WO 2005/089375	A2	9/2005
WO	WO 2005/094804	A1	10/2005
WO	WO 2006/024930	A1	3/2006

OTHER PUBLICATIONS

Oswald et al, The Formation of Paracetamol (Acetaminophen) Adducts with Hydrogen-Bond Acceptors, 2002, Acta Crystallographica, vol. B58, pp. 1057-1066.*

Remenar et al, Crystal Engineering of Novel Cocrystals of a Triazole Drug with 1,4-Dicarboxylic Acids, 2003,JACS, vol. 125, pp. 8456-8457.*

Fleischman et al, Crystal Engineering of the Composition of Pharmaceutical Phases: Multiple-Component Crystalline Solids Involving Carbamazepine, 2003, Crystal Growth and Design, vol. 3, No. 6, pp. 909-919.*

Dvorkin et al, Crystal and Molecular Structure of a Complex of 18-crown-6 with 6-chloror-7-sulfamido-3,4-dihydro-1,2,4-benzothiadiazine-1,1-dioxide (hypothiazide) of 1:1 Composition, 1990, Kristallografiya, vol. 35, No. 3, pp. 682-686 (with English abstract.).*

Ammar et al. Effect of aromatic hydrotopes on the solubility of carbamazepine. Part II: Effect of nicotinamide, sodium salts of benzoic, naphthoic and nicotinic acids. Egypt J. Pharm. Sci. 35, No. 1-6, pp. 209-223.*

de Jong et al. et al. Dystrophic psoriatic fingernails treated with 1% 5-Fluorouracil in a nail penetration-enhancing vehicle: a double-blind study. Dermatology 1999; 199: 313-318.*

Brader, M.L. et al. *Nature Biotechnol.*, 2002, 20 :800-804.

El-Nahhas, S.A. *Pharmazie*, 1996, 51(12):960-963.

Fleischman, S.G. et al. *Crystal Growth & Design.*, 2003, 3(6): 909-919.

Oswald, I.D.H. et al. *Acta Cryst*., 2002, B58:1057-1066.

Reynolds, J.E.F. (ed). Martindale, The Extra Pharmacopoeia, 1993, The Pharmaceutical Press, London, England, 13th Edition, pp. 1431 (e.g., Acetaminophen, Aspirin, and Caffeine Tablets), 1465 (e.g., Aspirin plus C), 1521 (Codafen Continus), 1610 (Gaboril Complex).

Walsh, R.D. Bailey et al. *Chem. Commun.*, 2003, 2003:186-187.

Weissbuch, I. et al., "Understanding and Control of Nucleation, Growth, Habit, Dissolution and Structure . . . ," Acta Cryst. (1995), pp. 115-148, vol. B51.

Aakeröy, C. et al. "Crystal engineering of hydrogen-bonded assemblies- a progress report" *Aust. J. Chem.*, 2001, pp. 409-421, vol. 54.

Bingham, A. et al. "Over one hundred solvates of sulfathiazole" *Chem. Commun.*, 2001, pp. 603-604.

Byriel, K., et al. "Molecular cocrystals of carboxylic acids. IX' Carboxylic acid interactions with organic heterocyclic bases. The crystal structures of the adducts of (2,4-dichlorophenoxy) acetic acid with 3-hydroxypyridine, 2,4,6,-trinitrobenzoic acid with 2-aminopyrimidine, and 4-nitrobenzoic acid with 3-amino-1,2,4-triazole" *Aust. J. Chem.*, 1992, pp. 969-981, vol. 45, No. 6.

Salmon, J. et al. "Supramolecular chemistry of boronic acids (Abstract)" 38th Midwest Regional Meeting of the American Chemical Society in Columbia, MO., Nov. 5-7, 2003, published by the American Chemical Society, Washington, D.C.

Urbina, J. et al. "Supramolecular design of inorganic/organic networks using flexible ligands with self-complementary hydrogen bonds (Abstract)" 38th Midwest Regional Meeting of the American Chemical Society in Columbia, MO., Nov. 5-7, 2003, published by the American Chemical Society, Washington, D.C.

Smith, D. et al. "Structure confirmation by single crystal X-ray diffraction of a series of new schiff bases and theoretical computations on 3-(N-2-α, α, α-triflourotoluylidene amino) tetrahydrothiophene-1, 1-dioxide (Abstract)" 216th ACS National Meeting in Boston, MA., Aug. 23-27, 1998, published by the American Chemical Society, Washington, D.C.

Desiraju, G. "Supramolecular synthons in crystal engineering- A new organic synthesis" *Angew. Chem. Int. Ed. Engl.*, 1995, pp. 2311-2327, vol. 34.

Fritchie, C. et al. "The configuration of phenothiazine in various molecular complexes" *Chem. Commun.*, 1968, pp. 833-834.

Huang, C.-M. et al. "Molecular packing modes. Part XI. Crystal structures of the 2:1 complexes of benzamide with succinic acid and furamide with oxalic acid" *J. Chem. Soc. Perkins Trans. 2: Physical Organic Chemistry*, 1973, pp. 503-508, vol. 5.

Jackisch, M. et al. "Structures of three related biphenyl compounds: 4,4'-biphenyldiol, 3, 3',5,5'-tetra-*tert*-butyl-4,4'-biphenyldiol, and 3,3',5,5'- tetra-*tert*-butyl-1,1'-bicyclohexa-2,5-dienylidene-4,4'-dione" *Acta Cryst.*, 1990, pp. 919-922, vol. C46.

Kim, S. et al. "The structure of a crystalline complex containing one phenobarbital molecule and two adenine derivatives" *Proc. Natl. Acad. Sci. USA*, 1968, pp. 402-408, vol. 60.

Kobayashi, H. et al. "Sinusoidal structure of the 1:1 complex of phenothiazine and 7,7,8,8-tetracyanoquinodimethane, PTZ-TCNQ" *Acta Cryst.*, 1974, pp. 1010-1017, vol. B30.

Ermer, O. et al. "Molecular recognition among alcohols and amines: super-tetrahedral crystal architectures of linear diphenol-diamine complexes and aminophenols" *J. Chem. Soc. Perkins Trans. 2*, 1994, pp. 925-944.

Martin, R. et al. "Polyphenal-caffeine complexation" *J. Chem. Soc., Chem. Commun.*, 1986, pp. 105-106.

Lehn, J.-M. et al. "Molecular recognition directed self-assembly of ordered supramolecular strands by cocrystallization of complementary molecular components" *Chem. Soc., Chem. Commun.*, 1990, pp. 479-481.

Lynch, D. et al. "Molecular cocrystals of carboxylic acids. XV' Preparation and characterization of heterocyclic base adducts with a series of carboxylic acids, and the crystal structures of the adducts of 2-aminopyrimidine with 2,6-dihydroxybenzoic acid, 4-aminobenzoic acid, phenoxyacetic acid, (2,4-dichlorophenoxy) acetic acid, (3,4-dichlorophenoxy)- acetic acid and salicylic acid, and 2-aminopyridmine with 2,6- dihydroxybenzoic acid" *Aust. J. Chem.*, 1994, pp. 1097-1115, vol. 47.

McIntosh, J. et al. "Chemotherapeutic drugs in anaerobic infections of wounds" *The Lancet*, Jun. 26, 1943, pp. 793-795.

McIntosh, J. et al. "Zinc peroxide, proflavine and penicillin in experimental *cl. welchii* infections" *The Lancet*, Dec. 26, 1942, pp. 750-752.

Smith, G. et al. "Molecular cocrystals of carboxylic acids. XXI' The role of secondary group interactions in adduct formation between 2-aminopyramidine and substituted benzoic acids: the crystal structures of the adducts with *o*-phthalic acid, *o*-nitrobenzoic acid, *o*-aminobenzoic acid and *m*-aminobenzoic acid" *Aust. J. Chem.*, 1995, pp. 1151-1166, vol. 48.

Weissbuch, I. et al. "Crystal morphology control with tailor-made additives; a stereochemical approach" *Advances in Crystal Growth Research*, 2001, pp. 381-400.

McMahon, J. et al. "Crystal engineering of the composition of pharmaceutical phases. 3[1]. Primary amide supramolecular heterosynthons and their role in the design of pharmaceutical co-crystals" *Z. Kristallogr.*, 2005, pp. 340-350, vol. 220.

Meejoo, S. et al. "The interplay of aryl-perfluoroaryl stacking interactions and interstack hydrogen bonding in controlling the structure of a molecular cocrystal" *Chemphyschem*, 2003, pp. 766-769, vol. 4.
Mirmehrabi, M. et al. "Improving the filterability and solid density of ranitidine hydrochloride form 1" *Journal of Pharmaceutical Sciences*, Jul. 2004, pp. 1692-1700, vol. 93, No. 7.
Morris, K. et al. "Theoretical approaches to physical transformations of active pharmaceutical ingredients during manufacturing processes" *Advanced Drug Delivery Reviews*, 2001, pp. 91-114, vol. 48.
Nakanishi, I. et al. "X-ray structural studies on two forms of β-cyclodextrin barbital complexes" *Journal of Inclusion Phenomena*, 1984, pp. 689-699, vol. 2.
Nakao, S. et al. "The crystal and molecular structure of the 2:1 molecular complex of theophylline with phenobarbital" *Acta Cryst.*, 1977, pp. 1373-1378, vol. B33.
Natarajan, S. et al. "Reinvestigation of the crystal structure of diglycine hydrochloride" *Zeitschrift für Kristallographic*, 1992, pp. 265-270, vol. 198.
Olenik, B. et al. "Cooperative and anticooperative effects in the cocrystals of mono- and diazanaphthalenes with *meso*-1, 2-diphenyl-1,2-ethanediol" *Crystal Growth & Design*, 2003, pp. 175-181, vol. 3, No. 2.
Olenik, B. et al. "Supramolecular synthesis by cocrystallization of oxalic and fumaric acid with diazanaphthalenes" *Crystal Growth & Design*, 2003, pp. 183-188, vol. 3, No. 2.
Groth, P. "*d*-Glucose-sodium chloride-monohydrate (glucose-sodium chloride) = $2C_6H_{12}O_6.NaCl.H_2O$" *Chemische Krystallographie*, 1910, pp. 438-439.
Oswald, I. et al. "Rationalisation of co-crystal formation through knowledge-mining" *Crystallography Reviews*, 2004, pp. 57-66, vol. 10, No. 1.
Ouyang, X. et al. "Single-crystal-to-single-crystal topochemical polymerizations of a terminal diacetylene: two remarkable transformations give the same conjugated polymer" *J. Am. Chem. Soc.*, 2003, pp. 12400-12401, vol. 125.
Patel, U. et al. "Structure of the 1:1 complex between 4-amino-*N*-(4,6-dimethyl-2-pyrimidinyl)- benzenesulfonamide (sulfadimidine) and 2-hydroxybenzoic acid (salicylic acid)" *Acta Cryst.*, 1988, pp. 1264-1267, vol. C44.
Reddy, L. et al. "Phenyl-perfluorophenyl synthon mediated cocrystallization of carboxylic acids and amides" *Crystal Growth & Design*, 2004, pp. 89-94, vol. 4., No. 1.
Remenar, J. et al. "Crystal engineering of novel cocrystals of a triazole drug with 1,4-dicarboxylic acids" *J. Am. Chem. Soc.*, 2003, pp. 8456-8457, vol. 125.
Schmidt, G. "Photodimerization in the solid state" *Pure Appl. Chem.*, 1971, pp. 647-678, vol. 27.
Shan, N. et al. "Co-crystal of 4,7-phenanthroline and carboxylic acids: synthon competition and prediction" *Tetrahedron Letters*, 2002, pp. 8721-8725, vol. 43.
Shan, N. et al. "Crystal engineering using 4,4'-bipyridyl with di- and tricarboxylic acids" *Crystal Engineering*, 2002, pp. 9-24, vol. 5.
Shan, N. et al "Supramolecular synthons in the co-crystal structures of 2-aminopyrimdine with diols and carboxylic acids" *Tetrahedron Letters*, 2002, pp. 3101-3104, vol. 43.
McIntosh, J. et al. "Further observations on the chemotherapy of experimental gas gangrene: flavazole, marfanil, V187 and V335" *British Journal of Experimental Pathology*, 1946, pp. 46-54, vol. 27.
Shaviv, R. et al. "Magnetochemistry of the tetrahaloferrate (III) ions 6. Crystal structure and magnetic ordering in $[(pyH)_3Cl]$ $[FeCl_4]_2$" *Inorganica Chimica Acta*, 1992, pp. 613-621, vol. 198-200.
Shefter, E. "Structural studies on complexes IV: Crystal structure of a 1:1 5-chlorosalicylic acid and theophylline complex" *Journal of Pharmaceutical Sciences*, 1969, pp. 710-714, vol. 58.
Shimizu, N. et al. "Structure of 2,4-diamino-5-(3,4,5-trimethoxybenzyl) pyrimidine-5,5-diethylbarbituric acid (1:1)" *Acta Cryst.*, 1982, pp. 2309-2311, vol. B38.
Singh, N. B. et al. "Solid state reaction between 8-hydroxyquinoline and *p*-nitrobenzoic acid" *Indian Journal of Chemistry*, May 1988, pp. 429-432, vol. 37B.
Smith, G. et al. "The 1:1 adduct of 4-aminobenzoic acid with 4-aminobenzonitrile" *Acta Cryst.*, 2000, pp. 1155-1156, vol. C56.
Steiner, T. "Donor and acceptor strengths in C-H•••O hydrogen bonds quantified from crystallographic data of small solvent molecules" *New. J. Chem.*, 1998, pp. 1099-1103.
Storey, R. et al. "Automation of solid form screening procedures in the pharmaceutical industry- how to avoid the bottlenecks" *Crystallography Reviews*, 2004, pp. 45-56, vol. 10, No. 1.
Szafran, M. et al. "Molecular structures and hydrogen bonding in the 1:1 and 1:2 complexes of pyridine betaine with 2,6-dichloro-4-nitrophenol; an example of strongly coupled hydrogen bonds, O-H•••O=C-O-H•••O-" *Journal of Molecular Structure*, 1997, pp. 145-160, vol. 416.
Takeuchi, M. et al. "Synchrotron radiation SAXS/WAXS study of polymorph-dependent phase behavior of binary mixtures of saturated monoacid triacylglycerols" *Crystal Growth & Design*, 2003, pp. 369-374, vol. 3, No. 3.
Tang, C. P. et al. "Reaction pathways in crystalline host-guest inclusion complexes: rotation by a net 180° of the acetyl group on photoaddition of guest- acetophenone and—*m*-Chloroacetophenone to the atom C5 of host deoxycholic acid" *J. Am. Chem. Soc.*, 1985, pp. 4058-4070, vol. 107.
Taylor, R. et al. "Rules governing the crystal packing of mono- and dialcohols" *Acta Crystallographica Section B, Structural Science*, 2001, pp. 815-827, vol. B57.
Thallapally, P. et al. "Polymorphism of 1,3,5-trinitrobenzene induced by a trisindane additive" *Angew. Chem. Int. Ed.*, 2004, pp. 1149-1155, vol. 43.
Timmerman, P. et al. "Noncovalent Assembly of functional groups on calix[4]arene molecular boxes" *Chem. Eur. J.*, 1997, pp. 1823-1832, vol. 3., No. 11.
Shan, N. et al. "Mechanochemistry and co-crystal formation: effect of solvent on reaction kinetics" *Chem. Commun.*, 2002, pp. 2372-2373.
Caira, M. et al. "X-ray structure and thermal analysis of a 1:1 complex between (S)-naproxen and heptakis (2,3,6-tri-*O*-methyl)-β-cyclodextrin" *Journal of Inclusion Phenomena and Molecular Recognition in Chemistry*, 1995, pp. 277-290, vol. 20.
Trask, A. et al. "Crystal engineering of organic cocrystals by the solid-state grinding approach" *Top Curr. Chem.*, 2005, pp. 41-70, vol. 254.
Trask, A. et al. "Pharmaceutical cocrystallization: engineering a remedy for caffeine hydration" *Crystal Growth & Design*, 2005, pp. 1013-1021, vol. 5, No. 3.
Trask, A. et al. "Solvent-drop grinding: green polymorph control of cocrystallisation" *Chem. Commun.*, 2004, pp. 890-891 in addition to supplemental materials.
Trowbridge, L. et al. "Composites for nonlinear optics: Crystal growth and polymorphism" *University of Sussex, Falmer Brighton UK, School of Chemistry and Molecular Sciences*, pp. 272, 1994.
Uno, T. et al. "Structure of 5,5-diphenylhydantoin-1-(4-bromophenyl)-4-dimethylamino-2,3-dimethyl-3-pyrazolin-5-one (1:1)" *Acta Cryst.*, 1980, pp. 2794-2796, vol. B36.
Van Roey, P. et al. "Structure-activity studies of non-steroidal aromatase inhibitors: the crystal and molecular structures of CGS 16949A and CGS 18320B" *J. Enzyme Inhibition*, 1991, pp. 119-132, vol. 5.
Van Roey, P. et al. "Structure of *cis*1-{[4-(1-imidazolylmethyl) cyclohexyl] methyl} imidazole- succinic acid complex" *Acta Cryst.*, 1991, pp. 1015-1018, vol. C47.
Vishweshwar, P. et al. "Crystal engineering of pharmaceutical cocrystals from polymorphic active pharmaceutical ingredients" *Chem. Commun.*, 2005, pp. 4601-4603.
Vishweshwar, P. et al. "Recurrence of carboxylic acid- pyridine supramolecular synthon in the crystal structures of some pyrazinecarboxylic acids" *J. Org. Chem.*, 2002, pp. 556-565, vol. 67.
Vishweshwar, P. et al. "Supramolecular synthons based on N-H•••N and C-H•••O hydrogen bonds. Crystal engineering of a helical structure with 5,5-diethylbarbituric acid" *Chem. Commun.*, 2002, pp. 1830-1831.
Vishweshwar, P. et al. "Supramolecular synthons in phenol-isonicotinamide adducts" *Cryst. Eng. Comm.* 2003, pp. 164-168, vol. 5, No. 31.

Voet, D. et al. "The crystal and molecular structure of the intermolecular complex 9-ethyladenine-5, 5-diethylbarbituric acid" *Journal of the American Chemical Society*, Nov. 15, 1972, pp. 8213-8222, vol. 94, No. 23.

Voet, D. et al. "The structure of an intermolecular complex between cytosine and 5-fluorouracil" *Journal of the American Chemical Society*, May 21, 1969, pp. 3069-3075, vol. 91, No. 11.

Stezowski, J. J. et al. "Characterization of a 1:1 complex of an unusual structure in the phenothiazine/phenazine binary phase diagram" *Zeitschrift fur Kristallographie* in *International Journal for Structural, Physical, Chemical Aspects of Crystalline Materials*, 1983, pp. 213-215, vol. 162, No. 1-4.

Wang, A. et al. "Crystal structure of 1:1 complex of barbital with 1-methylimidazole" *Journal of Pharmaceutical Sciences*, Mar. 1979, pp. 361-363, vol. 68, No. 3.

Alberola, S. et al. "Crystalline and Molecular Structure of Sulfanilimide-Antipyrine" *Acta Cryst*, 1977, pp. 3337-3341, vol. B33.

Wood, R. A. et al. "2,5-O-methylene-D-mannitol sodium-chloride, C_7 H_{14} O_6. NaCl" *Cryst. Struct. Comm.*, 1976, 207-210, vol. 5.

Xu, J. et al. "Effect of composition distribution on miscibility and co-crystallization phenomena in the blends of low density polyethylene with conventional and metallocene-based ethylene-butene copolymers" *Polymer*, 2001, pp. 3867-3874, vol. 42.

Yoo, J. et al. "Cocrystallization of a dinuclear platinum complex as a monomer and a one-dimensional polymer" *Polyhedron*, 2002, pp. 715-719, vol. 21.

Zaitu, S. et al. "A 2:1 molecular complex of theophylline and 5-fluorouracil as the monohydrate" *Acta Cryst.*, 1995, pp. 1857-1859, vol. C51.

Zaman, M. B. et al. "Linear hydrogen-bonded molecular tapes in the cocrystals of squaric acid with 4,4'-dipyridylacetylene and 1,2-bis(4-pyridyl) ethylene" *Acta Cryst.*, 2001, pp. 621-624, vol. C57.

Zerkowski, J. et al. "Design of organic structures in the solid state: hydrogen-bonded molecular "tapes"[1]" *J. Am. Chem. Soc.*, 1990, pp. 9025-9026, vol. 112.

Zerkowski, J. et al. "Investigations into the robustness of secondary and tertiary architecture of hydrogen-bonded crystalline tapes" *Chem. Mater.*, 1994, pp. 1250-1257, vol. 6.

Zerkowski, J. et al. "New varieties of crystalline architecture produced by small changes in molecular structure in tape complexes of melamines and barbiturates" *J. Am. Chem. Soc.*, 1994, pp. 4305-4315, vol. 116.

Zerkowski, J. et al. "Polymorphic packing arrangements in a class of engineered organic crystals" *Chem. Mater.*, 1997, pp. 1933-1941, vol. 9.

Zerkowski, J. et al. "Solid-state structures of "Rosette" and "Crinkled Tape" motifs derived from the cyanuric acid-melamine lattice" *J. Am. Chem. Soc.*, 1992, pp. 5473-5475, vol. 114.

Zhang, R. et al. "Atmospheric new particle formation enhanced by organic acids" *Science*, Jun. 4, 2004, pp. 1487-1490 with additional supporting online material, vol. 304.

Zhu, H. et al. "Influence of water activity in organic solvent + water mixtures on the nature of the crystallizing drug phase. 1. theophylline" *International Journal of Pharmaceutics*, 1996, pp. 151-160, vol. 135.

Aakeröy, C. et al. "Aromatic dicarboxylic acids as building blocks of extended hydrogen-bonded architectures" *Supramolecular Chemistry*, 1998, pp. 127-135, vol. 9.

Aakeröy, C. et al. "Assembly of 2-D inorganic/organic lamellar structures through a combination of copper (I) coordination polymers and self-complimentary hydrogen bonds" *J. Chem. Soc., Dalton Trans.*, 2000, pp. 3869-3872.

Aakeröy, C. et al. "Building organic assemblies with 2-pyridone and dicarboxylic acids: relating molecular conformation and synthon stability to crystal structure" *Crystal Engineering*, 1998, pp. 225-241, vol. 1, No. 3-4.

Aakeröy, C. et al. "The C-H•••C1 hydrogen bond: does it exist?" *New J. Chem.*, 1999, pp. 145-152.

Aakeröy, C. et al. "Crystal engineering of ionic solids" *Modular Chemistry* (ed. by Michl, J.), 1997, pp. 153-162, Kluwer Academic Publishers, The Netherlands.

Aakeröy, C. et al. "Crystal engineering: strategies and architectures" *Acta Cryst.*, 1997, pp. 569-586, vol. B53.

Aakeröy, C. et al. "Crystal engineering using intermolecular hydrogen-bonded connectors and classic coordination chemistry" *Transactions ACA*, 1998, pp. 97-103, vol. 33.

Aakeröy, C. et al. "The crystal structure of the molecular cocrystal *L*-malic acid *L*-tartaric acid (1/1)" *Supramolecular Chemistry*, 1996, pp. 153-156, vol. 7.

Aakeröy, C. et al. "Deliberate combination of coordination polymers and hydrogen bonds in a supramolecular design strategy for inorganic/organic hybrid networks" *Chem. Commun.*, 2000, pp. 935-936.

Aakeröy, C. et al. "Di-hydroxy malonic acid as a building block of hydrogen-bonded 3-dimensional architectures" *Journal of Chemical Crystallography*, 1998, pp. 111-117, vol. 28, No. 2.

Aakeröy, C. et al. "Do polymorphic compounds make good cocrystallizing agents? A structural case study that demonstrates the importance of synthon flexibility" *Crystal Growth & Design*, 2003, 159-165, vol. 3, No. 2.

Aakeröy, C. et al. "Heteromeric intermolecular interactions as synthetic tools for the formation of binary co-crystals" *Cryst. Eng. Comm.*, 2004, pp. 19-24, vol. 6, No. 5.

Aakeröy, C. et al. "A high-yielding supramolecular reaction" *J. Am. Chem. Soc.*, 2002, 14425-14432, vol. 124.

Aakeröy, C. et al. "The hydrogen bond and crystal engineering" *Chemical Society Reviews*, 1993, pp. 397-407.

Aakeröy, C. et al. "Hydrogen-bond assisted assembly of organic and organic-inorganic solids" *Crystal Engineering: From Molecules and Crystals to Materials*, 1999, pp. 89-106, Kluwer Academic Publishers, The Netherlands.

Aakeröy, C. et al. "Hydrogen-bonding in solids" *Crystal Engineering* (ed. by Seddon, K. R. et al.), 1999, pp. 303-324, Kluwer Academic Publishers, The Netherlands.

Aakeröy, C. et al. "Low-dimensional architectures of silver coordination compounds assembled via amide-amide hydrogen bonds" *Crystal Engineering*, 1998, pp. 39-49, vol. 1, No. 1.

Aakeröy, C. et al. "Molecular mechanics and crystal engineering" *Crystal Engineering* (ed. by Seddon, K. R. et al.), 1999, pp. 69-82, Kluwer Academic Publishers, The Netherlands.

Aakeröy, C. et al. "New building blocks for crystal engineering. Syntheses and crystal structures of oxime-substituted pyridines" *Cryst. Eng. Comm.*, 2000, pp. 1-6, vol. 27.

Aakeröy, C. et al. "Novel colorless composite materials for nonlinear optics" *Adv. Mater.*, 1993, pp. 364-367, vol. 5, No. 5.

Aakeröy, C. et al. "Organic assemblies of 2-pyridones with dicarboxylic acids" *Tetrahedron*, 2000, pp. 6693-6699, vol. 56.

Aakeröy, C. et al. "Pitfalls in the supramolecular assembly of silver(I) coordination compounds" *Journal of Molecular Structure*, 1999, pp. 91-101, vol. 474.

Aakeröy, C. et al. "A structural study of 2-amino-5-nitropyridine and 2-amino-3-nitropyridine: intermolecular forces and polymorphism" *J. Mater. Chem.*, 1998, pp. 1385-1389, vol. 8, No. 6.

Aakeröy, C. et al. "Supramolecular assembly of low-dimensional silver (I) architectures via amide-amide hydrogen bonds" *Chem. Commun.*, 1998, pp. 1067-1068.

Aakeröy, C. et al. "'Total synthesis' supramolecular style: design and hydrogen-bond-directed assembly of ternary supermolecules" *Angew. Chem. Int. Ed.*, 2001, pp. 3240-3242, vol. 40, No. 17.

Aakeröy, C. et al. "Two-fold interpenetration of 3-D nets assembled via three-co-ordinate silver(I) ions and amide-amide hydrogen bonds" *J. Chem. Soc., Dalton Trans.*, 1998, pp. 1943-1945.

Ahn, S. et al. "Polymorphs of a 1:1 cocrystal with tunnel and layer structures: *p,p'*-biphenol/dimethyl sulfoxide" *Crystal Growth & Design*, 2001, pp. 107-111, vol. 1, No. 2.

Akazome, M. et al. "Enantioselective inclusion of methyl phenyl sulfoxides and benzyl methyl sulfoxides by (*R*)-phenylglycyl-(*R*)-phenylglycine and the crystal structures of the inclusion cavities" *J. Org. Chem.*, 2000, pp. 68-76, vol. 65.

Akhtaruzzaman, M.D. et al. "One-dimensional hydrogen-bonded molecular tapes in 1,4-bis[(4-pyridinio) ethynyl]benzene chloranilate" *Acta. Cryst.*, 2001, pp. o353-o355, vol. E57.

Allen, F. et al. "Systematic analysis of structural data as a research technique in organic chemistry" *Acc. Chem. Res.*, 1983, pp. 146-153, vol. 16.

Almarsson, Ö. et al. "Crystal engineering of the composition of pharmaceutical phases. Do pharmaceutical co-crystals represent a new path to improved medicines?" *Chem. Commun.*, 2004, pp. 1889-1896.

Amai, M. et al. "1:1 complex of octadecanoic acid and 3-pyridinecarboxamide" *Acta Cryst.*, 1998, pp. 1367-1369, vol. C54.

Anderson, N. et al. "Sulfonation with inversion by mitsunobu reaction: an improvement on the original conditions" *J. Org. Chem.*, 1996, pp. 7955-7958, vol. 61.

Aoki, K. et al. "A 1:1 complex of theophylline and *p*-nitrophenol" *Acta Cryst.*, 1978, pp. 2333-2336, vol. B34.

Ashton, P. et al. "Combining different hydrogen-bonding motifs to self-assemble interwoven superstructures" *Chem. Eur. J.*, 1998, pp. 577-589, vol. 4, No. 4.

Barker, P. A. et al. "Effect of crystallization temperature on the cocrystallization temperature on the cocrystallization of hydroxybutyrate/ hydroxyvalerate copolymers" *Polymer*, pp. 913-919, vol. 38, No. 4.

Berkovitch-Yellin, Z. et al. "Electron density distribution in cumulenes: an x-ray study of the complex allenedicarboxylic acid-acetamide (1:1) at -150°C." *Acta Cryst.*, 1977, pp. 3670-3677, vol. B33.

Berkovitch-Yellin, Z. et al. "The role played by C-H•••O and C-H•••N interactions in determining molecular packing and conformation" *Acta Cryst.*, 1984, pp. 159-165, vol. B40.

Berl, V. et al. "Induced fit selection of a barbiturate receptor from a dynamic structural and conformational/configurational library" *Eur. J. Org. Chem.*, 1999, pp. 3089-3094.

Bertolasi, V. et al. "Competition between hydrogen bonding and donor-acceptor interactions in co-crystals of 1,3-dimethylbarbituric acid with aromatic amines" *New J. Chem.*, 2001, pp. 408-415, vol. 25.

Bertolasi, V. et al. "General rules for the packing of hydrogen-bonded crystals as derived from the analysis of squaric acid anions: aminoaromatic nitrogen base co-crystals" *Acta Cryst.*, 2001, pp. 591-598, vol. B57.

Bettinetti, G. et al. "Structure and solid-state chemistry of anhydrous and hydrated crystal forms of the trimethoprim-sulfamethoxypyridazine 1:1 molecular complex" *Journal of Pharmaceutical Sciences*, Apr. 2000, pp. 478-489, vol. 89, No. 4.

Bettinetti, G. et al. "Thermal analysis of binary systems of the pharmaceuticals trimethoprim and benzoic acid" *Journal of Thermal Analysis*, 1983, pp. 285-294, vol. 28.

Bettis, J. et al. "Biopharmaceutics and dosage form design" *Amer. J. Hosp. Pharm.*, Mar. 1973, pp. 240-243, vol. 30.

Bolton, S. et al. "Complexes formed in solution by homologs of caffeine" *Journal of the American Pharmaceutical Association*, Jan. 1957, pp. 38-41, vol. XLVI, No. 1.

Bond, A. "In situ co-crystallisation as a tool for low-temperature crystal engineering" *Chem. Commun.*, 2003, pp. 250-251, vol. 2.

Bonin, M. et al. "Urotropin azelate: a rather unwilling co-crystal" *Acta Cryst.*, 2003, pp. 72-86, vol. B59.

Bosshard, C. et al. "Microscopic nonlinearities of two-component organic crystals" *J. Opt. Soc. Am. B*, Nov. 2001, pp. 1620-1626, vol. 18, No. 11.

Gluzman, M. Kh. et al. "Investigation of Eutectic Melting in Systems Composed of Organic Salts and Acids" *Journal of Physical Chemistry*, 1960, pp. 2742-2747, vol. 34.

Braga, D. et al. "Hydrogen bonding interactions between ions: a powerful tool in molecular crystal engineering" *Structure and Bonding*, 2004, pp. 1-32, vol. 111.

Brierley, C. et al. "Preparation and structure of the 1:2 π-molecular complex of phenothiazine with pyromellitic dianhydride" *J. Chem. Phys.*, Feb. 1, 1985, pp. 1522-1528, vol. 82, No. 1.

Burgi, H. et al. "Crystallisation of supramolecular materials" *Current Opinion in Solid State & Materials Science*, 1998, pp. 425-430, vol. 3.

Byrn, S. R. et al. "Solid-state pharmaceutical chemistry" *Chem. Mater.*, 1994, pp. 1148-1158, vol. 6.

Caira, M. "Molecular complexes of sulfonamides. Part 1. 1:1 complexes between sulfadimidine [4-amino-N-(4,6-dimethyl-2-pyrimidinyl) benzenesulfonamide] and 2- and 4-aminobenzoic acids" *Journal of Crystallographic and Spectroscopic Research*, 1991, pp. 641-648, vol. 21, No. 5.

Caira, M. "Molecular complexes of sulfonamides. Part 2. 1:1 complexes between drug molecules: sulfadimidine -acetylsalicylic acid and sulfadimidine-4-aminosalicylic acid" *Journal of Crystallographic and Spectroscopic Research*, 1992, pp. 193-200, vol. 22, No. 2.

Caira, M. "Molecular complexes of sulfonamides. 3. Structure of 5-methoxysulfadiazine (Form II) and its 1:1 complex with acetylsalicylic acid" *Journal of Chemical Crystallography*, 1994, pp. 695-701, vol. 24, No. 10.

Caira, M. et al. "Order-disorder enantiotropy, monotropy, and isostructurality in a tetroxoprim-sulfametrole 1:1 molecular complex: crystallographic and thermal studies" *Journal of Pharmaceutical Sciences*, Nov. 2003, pp. 2164-2176, vol. 92, No. 11.

Caira, M. et al. "Selective formation of hydrogen bonded cocrystals between a sulfonamide and aromatic carboxylic acids in the solid state" *J. Chem. Soc. Perkin Trans. 2*, 1995, pp. 2213-2216.

Caira, M. et al. "Structure of a 1:1 complex between the anthelmintic drug mebendazole and propionic acid" *Journal of Chemical Crystallography*, 1998, vol. 28, No. 1.

Camerman, A. et al. "Hydrogen bonding interaction of diphenylbarbituric acid and 9-ethyladenine. Crystal structure of a 1:1 complex" *Can. J. Chem.*, 2000, pp. 1045-1051, vol. 78.

Camerman, A. et al. "Molecular structure of acetylacetone. A crystallographic determination" *J. Am. Chem. Soc.*, 1983, pp. 1584-1586, vol. 105, No. 6.

Cannon, A. et al. "Noncovalent derivatization: green chemistry applications of crystal engineering" *Crystal Growth & Design*, 2002, pp. 255-257, vol. 2. No. 4.

Chinnakali, K. et al. "2-aminopyrimidine and *p*-phenylene-diacetic acid (1:1) co-crystal" *Acta Cryst.*, 1999, pp. 399-401, vol. C55.

Choi, C. et al. "Cocrystallization of melaminium levulinate monohydrate" *Acta Cryst.*, 2004, pp. o295-o296, vol. C60.

Chow, Y. P. et al. "Complexation of acetaminophen with methyl xanthines" *Journal of Pharmaceutical Sciences*, 1972, pp. 1454-1458, vol. 61.

Christian, S. et al. "Activity coefficient effects in spectral and solubility studies of molecular complex equilibria" *Journal of the American Chemical Society*, Sep. 20, 1972, pp. 6861-6862, vol. 94, No. 19, Communications to the editor.

Coll, M. et al. "Molecular structure of the complex formed between the anticancer drug cisplatin and d(pGpG): $C222_1$ crystal form" *Journal of Biomolecular Structure & Dynamics*, 1990, pp. 315-330, vol. 8, No. 2.

Copp, S. et al. "Supramolecular chemistry of $[Mn(CO)_3(\mu_3\text{-}OH)]_4$: Assembly of a cubic hydrogen-bonded diamondoid network with 1,2-diamineothane" *J. Am. Chem. Soc.*, 1992, pp. 8719-8720, vol. 114.

Cordi, A. et al. "(S)-Spiro [(1, 3-diazacyclopent-1-ene)-5, 2' -(7'-methyl-1',2',3',4'-tetrahydronaphthalene)]: resolution, stereospecific synthesis, and preliminary pharmacological characterization as a partial α-adrenergic agonist" *J. Med. Chem.*, 1997, pp. 2931-2935, vol. 40.

Craven, M. et al. "The 2:1 crystal complex of 5, 5-diethylbarbituric acid (barbital) and caffeine" *Acta Cryst.*, 1974, pp. 1191-1195, vol. B30.

Craven, M. et al. "The crystal structures of two polymorphs of 5,5'-diethylbarbituric acid (barbital)" *Acta Cryst.*, 1969, pp. 1978-1993, vol. B25.

Cudney, B. et al. "Screening and optimization strategies for macromolecular crystal growth" *Acta Cryst.*, 1994, pp. 414-423, vol. D50.

Datta, S. et al. "Molecular complex formation between riboflavin and salicylate in an aqueous medium" *Bull. Chem. Soc. Jpn.*, 2003, pp. 1729-1734, vol. 76.

Davey, R. J. et al. "Crystal engineering- nucleation, the key step" *Cryst. Eng. Comm.*, 2002, pp. 257-264, vol. 4, No. 47.

Davey, R. J. et al. "Crystallisation in polymer films: control of morphology and kinetics of an organic dye in a polysilicone matrix" *J. Mater. Chem.*, 1997, pp. 237-241, vol. 7, No. 2.

Debernardis, J. et al. "Conformationally defined adrenergic agents. 5. Resolution, absolute configuration, and pharmacological characterization of the enantiomers of 2-(5,6-dihydroxy-1,2,3,4-tetrahydro-1-naphthyl) imidazoline: a potent agonist at α-adrenoceptors" *J. Med. Chem.*, 1987, pp. 1011-1017, vol. 30.

Desiraju, G. et al. "Crystal and co-crystal" *Cryst. Eng. Comm.*, 2003, pp. 466-467, vol. 5, No. 82.

Desiraju, G. et al. "Crystal engineering: outlook and prospects" *Current Science*, Oct. 25, 2001, pp. 1038-1042, vol. 81, No. 8.

Duax, W. et al. "The structure of the crystalline complex estradiol. Urea (1:1)" *Acta Cryst.*, 1972, pp. 1864-1871, vol. B28.

Dunitz, J. "Crystal and co-crystal: a second opinion" *Cryst. Eng. Comm.*, 2003, pp. 506, vol. 5, No. 91.

Dunitz, J. "New light on an old story: the solid-state transformation on ammonium cyanate into urea" *J. Am. Chem. Soc.*, 1998, pp. 13274-13275, vol. 120.

Enright, G. et al. "Thermally programmable gas storage and release in single crystals of an organic van der Waals host" *J. Am. Chem. Soc.*, 2003, pp. 9896-9897, vol. 125.

Epstein, R. et al. "The x-ray crystal structure of the molecular complex 8-bromo-9-ethyladenine-5-allyl-5-isobutylbarbituric acid" *Acta Cryst.*, 1976, pp. 2180-2188, vol. B32.

Etter, M. "Encoding and decoding hydrogen-bond patterns of organic compounds" *Acc. Chem. Res.*, 1990, pp. 120-126, vol. 23.

Etter, M. et al. "Graph-set analysis of hydrogen-bond patterns in organic crystals" *Acta Cryst.*, 1990, pp. 256-262, vol. B46.

Etter, M. et al. "Hydrogen bond directed cocrystallization and molecular recognition properties of acyclic imides" *J. Am. Chem. Soc.*, 1991, pp. 2586-2598, vol. 113.

Etter, M. "Hydrogen bonds as design elements in organic chemistry" *J. Phys. Chem.*, 1991, pp. 4601-4610, vol. 95.

Fabian, L. et al. "Volumetric measure of isostructurality" *Acta Cryst.*, 1999, pp. 1099-1108, vol. B55.

Fallon III, L. "The crystal and molecular structure of 5-fluorouracil" *Acta Cryst.*, pp. 2549-2556, vol. B29, 1973.

Feibush, B. et al. "Chiral separation of heterocyclic drugs by HPLC: solute-stationary phase base-pair interactions" *J. Am. Chem. Soc.*, 1986, pp. 3310-3318, vol. 108.

Fifer, E. et al. "Fentanyl analogues 3. 2-(1,2,3,4-tetrahydro)-naphthyl substituted 4-anilidopiperidines" *Eur. J. Med. Chem.—Chim. Ther.*, 1984, pp. 519-524, vol. 19, No. 6.

Reck, G. et al. "Crystal structures of the carbamazepine/ammonium chloride and carbamazepine/ammonium bromide adducts and their transformation into carbamazepine dihydrate" *Pharmazie*, 1991, pp. 509-512, vol. 46, No. 7.

Foxman, B. M. et al. "Environmentally benign synthesis using crystal engineering: steric accommodation in non-covalent derivatives of hydroquinones" *Crystal Engineering*, 1998, pp. 109-118, vol. 1, No. 1.

Foxman, B. M. et al. "Noncovalent derivatives of hydroquinone: *BIS*-(*N,N*-dialkyl) bicyclo[2.2.2]octane-1,4-dicarboxamide complexes" *Crystal Engineering*, 1999, pp. 55-64, vol. 2. No. 1.

Fujii, S. et al. "Crystal and molecular structure of a 1:1 molecular complex of adenine and riboflavin" *Archives of Biochemistry and Biophysics*, 1977, pp. 363-370, vol. 181.

Gao, X. et al. "Supramolecular construction of molecular ladders in the solid state" *Angew. Chem. Int. Ed.*, 2004, pp. 232-236, vol. 43.

Gartland, G. L. et al. "Hydrogen bonding NH•••O=C of barbiturates: the (1:1) crystal complex of urea and 5,5-diethylbarbituric acid (barbital)" *Acta Cryst.*, 1974, pp. 980-987, vol. B30.

Ghosh, M. "Structure and conformation of the 1:1 molecular complex sulfaproxyline-caffeine" *Acta Cryst.*, 1991, pp. 577-580, vol. C47.

Giuseppetti, G. P. et al. "The crystal structure of a sulfamethoxazole-trimethoprim 1:1 molecular compound" *II Farmaco- Ed. Sc.*, pp. 138-151, vol. 35, 1980.

Goswami, S. et al. "2-aminopyrimidine-fumaric acid cocrystal" *Acta Cryst.*, 1999, pp. 583-585, vol. C55.

Haynes, D. "Supramolecular synthon competition in organic sulfonates: A CSD survey" *Cryst. Eng. Comm.*, 2004, pp. 584-588, vol. 6, No. 95.

Goswami, S. et al. "1:1 Hetero-assembly of 2-amino-pyramidine and (+)-camphoric acid" *Acta Cryst.*, 2000, pp. 477-478, vol. C56.

Goswami, S. et al. "Molecular recognition induced supramolecular array of 2-aminopyrimidine with terephthalic acid, 1,4-phenylenediacetic acid and furmaric acid in solid state via H-bonding and π-stacking interactions" *Supramolecular Chemistry*, 1999, pp. 25-33, vol. 11.

Graja, A. et al. "Interplay of acceptor molecule shape, crystal structure and physical properties of a new molecular complex C_{70} • 2[(Ph_3P) AuCI]" *Chemical Physics Letters*, Nov. 19, 1999, pp. 725-732. vol. 313.

Haixin, L. et al. "Structure of the 1:1 complex of 6,6'-diquinolyl ether with 5,5-diethylbarbituric acid" *Acta Cryst.*, 1992, pp. 2096-2098, vol. C48.

Henck, J. et al. "Disappearing and reappearing polymorphs. The benzocaine:picric acid system" *J. Am. Chem. Soc.*, 2001, pp. 1834-1841, vol. 123.

Higuchi, T. et al. "Complexation of organic substances in aqueous solution by hydroxyaromatic acids and their salts" *J. Pharm. Sci.*, 1961, pp. 905-909, vol. 50.

Hino, T. et al. "Assessment of nicotinamide polymorphs by differential scanning calorimetry" *Thermochimica Acta*, 2001, pp. 85-92, vol. 374.

Högberg, T. et al. "Crystallographic, theoretical and molecular modelling studies on the conformations of the salicylamide, raclopride, a selective dopamine-D_2 antagonist" *J. Pharm. Pharmacol.*, 1987, pp. 787-796, vol. 39.

Hsu, I. et al. "The 2:1 crystal complex of 2-aminopyridine and 5,5-diethylbarbituric acid (barbital)" *Acta Cryst.*, 1974, pp. 994-997, vol. B30.

Hsu, I. et al. "The 1:1 crystal complex of *N*-methyl-2-pyridone and 5,5-diethylbarbituric acid (barbital)" *Acta Cryst.*, 1974, pp. 998-1001, vol. B30.

Hsu, I. et al. "The crystalline complex (1:1) of salicylamide and 5-ethyl-5-isoamylbarbituric acid (amobarbital)" *Acta Cryst.*, 1974, pp. 843-846, vol. B30.

Hsu, I. et al. "The crystal structure of the 1:1 complex of acetamide with 5,5-diethylbarbituric acid (barbital)" *Acta Cryst.*, 1974, pp. 974-979, vol. B30.

Hsu, I. et al. "The crystal structure of the triclinic 1:2 complex of hexamethylphosphoramide with 5,5-diethylbarbituric acid (barbital)" *Acta Cryst.*, 1974, pp. 1299-1304, vol. B30.

Hsu, I. et al. "Hydrogen bonding NH . . . N of barbiturates: The 1:1 crystal complex of imidazole and 5,5-diethylbarbituric acid (barbital)" *Acta Cryst.*, 1974, pp. 988-993, vol. B30.

Ibragimov, B. "A simple correlation between the structures of different crystal modifications of a given host-guest complex and their crystallization temperatures" *Journal of Inclusion of Phenomena and Macrocyclic Chemistry*, 1999, pp. 345-353, vol. 34.

Ishida, T. et al. "Structural study of histamine H_2-receptor antagonists. Five 3-[2-(diamino-methyleneamino)-4-thiazolymethylthio] propionamidine and -amide derivatives" *Acta Cryst.*, 1989, pp. 505-512, vol. B45.

Katakai, R. et al. "Stepwise synthesis of oligopeptides with *N*-carboxy-α-amino acid anhydrides. IV. Glycine NCA" *J. Org. Chem.*, 1972, pp. 327-329, vol. 37, No. 2.

Kawakami, Y. et al. "The rationale for E2020 as a potent acetylcholinesterase inhibitor" *Bioorganic & Medicinal Chemistry*, 1996, pp. 1429-1446, vol. 4, No. 9.

Kelders, H. et al. "Automated protein crystallization and a new crystal form of a subtilisin: eglin complex" *Protein Engineering*, 1987, pp. 301-303, vol. 1, No. 4.

Khalil, R. M. "Complexation of paracetamol with xanthine derivatives" *Egypt. J. Pharm. Sci.*, 1992, pp. 757-769, vol. 33, No. 5-6.

Kim, S. "Crystal structure of the 1:1 complex of 5-fluorouracil and 9-ethylhypoxanthine" *Science*, Nov. 24, 1967, pp. 1046-1048, vol. 158, No. 3804.

Kiryu, S. et al. "Crystal structure of a 1:1 aminopyrine-barbital complex" *Journal of Pharmaceutical Sciences*, May 1971, pp. 699-703, vol. 60, No. 5.

Kiryu, S. et al. "Crystal structure of a 1:1 aminopyrine-cyclobarbital complex" *Chem. Pham. Bull.*, 1974, pp. 1588-1592, vol. 22.

Klein, C. et al. "Molecular structure of two conformationally restrained fentanyl analogues: cis- and trans-isomers of *N*-{3-methyl-1-[1,2,3,4-tetrahydro) naphthyl]-4-piperidinyl}-*N*-phenylpropanamide" *Journal of Pharmaceutical Sciences*, Nov. 1985, pp. 1147-1151, vol. 74, No. 11.

Koshima, H. et al. "Photoreactivities of two kinds of bimolecular crystals formed from acridine and phenothiazine" *J. Chem. Soc., Perkins Trans. 2*, 1997, pp. 2033-2038.

Koshima, H. et al. "Polymorphs of a cocrystal with achiral and chiral structures prepared by pseudoseeding: tryptamine/hydrocinnamic acid" *Crystal Growth & Design*, 2001, pp. 355-357, vol. 1, No. 5.

Krishnamohan Sharma, C. V. et al."X-ray crystal structure of $C_6H_3(CO_2H)_3$-1,3,5•1.5(4,4'-bipy): a 'super trimesic acid' chicken-wire grid" *Chem. Commun.*, 1996, pp. 2655-2656.

Kuroda, R. et al. "Generation of a co-crystal phase with coloristic properties via solid state grinding procedures" *Chem. Commun.*, 2002, pp. 2848-2849.

Leiserowitz, L. et al. "The molecular packing modes and hydrogen-bonding properties of amide: dicarboxylic acid complexes" *Acta Cryst.*, 1977, pp. 2719-2733, vol. B33.

Leiserowitz, L. "Molecular packing modes. Carboxylic acids" *Acta Cryst.*, 1976, pp. 775-802, vol. B32.

Lynch, D. et al. "Molecular cocrystals of carboxylic acids. XXXI' adducts of 2-aminopyrimidine and 3-amino-1,2,4-triazole with heterocyclic carboxylic acids" *Aust. J. Chem.*, 1998, pp. 403-408, vol. 51.

MacGillivray, L. et al. "Supramolecular control of reactivity in the solid state using linear molecular templates" *J. Am. Chem. Soc.*, 2000, pp. 7817-7818, vol. 122.

Mathias, J. et al. "Structural preferences of hydrogen-bonded networks in organic solution- the cyclic CA_3• M_3 'rosette'" *J. Am. Chem. Soc.*, 1994, pp. 4316-4325, vol. 116.

Mastropaolo, D. et al. "Hydrogen bonding interaction of diphenylhydantoin and 9-ethyladenine" *Molecular Pharmacology*, 1983, pp. 273-277, vol. 23.

Maryanoff, B. "Stereochemistry in a medium-sized ring. Highly diastereoselective N-oxidation of a substituted 3-benzazonine. X-ray crystal structure of an unusual complex between an amine *N*-oxide and saccharin" *J. Org. Chem.*, 1990, pp. 760-764, vol. 55.

Martin, R. et al. "The caffeine-potassium chlorogenate molecular complex" *Phytochemistry*, 1987, pp. 273-279, vol. 26, No. 1.

Anderson, J. "Constitution of aurous compounds: Gold mirrors" *Nature*, Oct. 2, 1937, pp. 583-584, Letters to the Editor.

Robbins, A. H. et al. "The crystal structure of the 1:2 adduct of potassium triiodide and 5,5-diethylbarbituric acid (barbital)" *American Crystallographic Association- Series 2, Papers and Abstracts*, 1973, p. 87.

Beerges, P. et al. "Phenothiazine tetracyanoethylene" *Private Communication*, 1994.

Madarasz, J. et al. "Thermal, ftir and xrd study on some 1:1 molecular compounds of theophylline" *Journal of Thermal Analysis and Calorimetry*, 2002, pp. 281-290, vol. 69.

Caronna, T. et al. "Halogen bonding and π•••π stacking control reactivity in the solid state" *J. Am. Chem. Soc.*, 2004, pp. 4500-4501, vol. 126.

Zerkowski, J. et al. "Steric control of secondary, solid-state architecture in 1:1 complexes of melamines and barbiturates that crystallize as crinkled tapes" *J. Am. Chem. Soc.*, 1994, pp. 4298-4304, vol. 116.

Zaitu, S. et al. "1:1 Molecular complex of theophylline and *p*-nitroaniline" *Acta Cryst.*, 1995, pp. 2390-2392, vol. C51.

Kofler, L. et al., *Thermal micromethods for the study of organic compounds and their mixtures*, pp. 1-145, 148-351, 354-386, Innsbruck, Austria, 1980.

Quehenberger, H. "Concerning organic molecular compounds and their polymorphism" *Monatshefte für Chemie*, 1949, pp. 595-606, vol. 80, No. 5.

Wiedenfeld, H. et al. "The crystal structure of the theophylline-urea complex" *Arch. Pharm.*, 1986, pp. 654-659, vol. 319.

Bunick, G. et al. "The crystal and molecular structure of the complex 2,6-diamino-9-ethylpurine 5,5-diethylbarbituric acid" *American Crystallographic Association, Abstract Papers* Winter 1976, p. 30.

Buczak, G. et al. "Crystal structure and vibrational spectra of the 1:1 and 1:2 complexes of pyridine betaine with pentachlorophenol" *Journal of Molecular Structure*, 1997, pp. 143-151, vol. 436-437.

Tomura, M. et al. "One-dimensional zigzag chain structures with intermolecular C-H••• π and C-H•••O interactions consisted of phthalic acid and pyridine derivatives" *Chemistry Letters*, 2001, pp. 532-533.

Zerkowski, J. et al. "Design of organic structures in the solid state: molecular tapes based on the network of hydrogen bonds present in the cyanuric acid•melamine complex" *J. Am. Chem. Soc.*, 1994, pp. 2382-2391, vol. 116.

Harkema, S. et al. "The crystal structure of urea oxalic acid (2:1)" *Acta Cryst.*, 1972, pp. 1646-1648, vol. B28.

Krantz, J. et al. "Sodium theophylline glycinate" *Journal of the American Pharmaceutical Association*, 1946, pp. 248-250.

Datta, S. et al. "Crystal structures of drugs: advances in determination, prediction and engineering" *Nature*, Jan. 2004, pp. 42-57, vol. 3.

Aakeröy, C. et al. "Charge-assisted hydrogen bonds and halogen-halogen interactions in organic salts: benzylammonium benzoates and pentaflourobenzoates" *Structural Chemistry*, 1999, pp. 229-242, vol. 10, No. 3.

Childs, S. et al. "Crystal engineering approach to forming cocrystals of amine hydrochlorides with organic acids. Molecular complexes of fluoxetine hydrochloride with benzoic, succinic, and fumaric acids" *J. Am. Chem. Soc.*, 2004, pp. 13335-13342, vol. 126.

Aakeroy, C. et al. "Modular supramolecular synthesis based on a dominance hierarchy of intermolecular interactions (Abstract)" 223*rd* ACS National Meeting in Orlando, FL., Apr. 7-11, 2002, published by the American Chemical Society, Washington, D.C.

Helfrich, B. et al. "Polymorphism as an indication of structural versatility (Abstract)" 223*rd* ACS National Meeting in Orlando, FL., Apr. 7-11, 2002, published by the American Chemical Society, Washington, D.C.

Weber, E. et al. "Synthesis of new Schiff bases: reaction of monofluorobenzaldehydes with 3-aminosulfolane hydrochloride (Abstract)" 216*th* ACS National Meeting in Boston, MA., Aug. 23-27, 1998, published by the American Chemical Society, Washington, D.C.

Scarbrough, F. et al. "Crystal structure of a complex between lumiflavin and 2,6-diamino-9-ethylpurine: a flavin adenine dinucleotide model exhibiting charge-transfer interactions" *Proc. Natl. Acad. Sci. USA*, Nov. 1976, pp. 3807-3811, vol. 73, No. 11.

Munn, R. et al. "A Model for resonance-assisted hydrogen bonding in crystals and its graph set analysis" *J. Phys. Chem. A*, 2001, pp. 6938-6942, vol. 105.

Lynch, D. et al. "1:1 Molecular complexes of 4-amino-N-(4,6-dimethylpyrimidin-2-yl) benzene-sulfonamide (sulfamethazine) with indole-2-carboxylic acid and 2,4-dinitrobenzoic acid" Aust. J. Chem., 2000, pp. 383-387, vol. 53.

Aakeroy, C. et al. "Solid state, crystal engineering and hydrogen bonds" *Comprehensive Coordination Chemistry II* (ed. by McCleverty, J. et al.), pp. 679-688, Elsevier Ltd., Oxford, UK., 2004.

Levin, B. et al. "The not-so-trivial synthesis and characterization of heterocyclic boronic acids (Abstract)" 38*th* Midwest Regional Meeting of the American Chemical Society in Columbia, MO., Nov. 5-7, 2003, published by the American Chemical Society, Washington, D.C.

Smith, G. et al. "Interactions of aromatic carboxylic acids with quinolin-8-ol (oxine): Synthesis and the crystal structures of the proton-transfer compounds with the nitro-substituted benzoic acids" *Aust. J. Chem.*, 2001, pp. 171-175, vol. 54.

Stalker, R. et al. "Asymmetric synthesis of two new conformationally constrained lysine derivatives" *Tetrahedron*, 2002, pp. 4837-4849, vol. 58.

Voet, D. et al. "Barbiturates and adenine derivatives. Molecular structure of a hydrogen-bonded complex" *Journal of the American Chemical Society*, Aug. 9, 1972, pp. 5888-5891, vol. 94, No. 16.

Vishweshwar, P. et al. "Molecular complexes of homologous alkanedicarboxylic acids with isonicotinamide: X-ray crystal structures, hydrogen bond synthons, and melting point alternation" *Crystal Growth & Design*, 2003, pp. 783-790, vol. 3, No. 5.

Le Jeunne, C. et al. "Comparative efficacy and safety of calcium carbasalate plus metoclopramide versus ergotamine tartrate plus caffeine in the treatment of acute migraine attacks" *Eur. Neurol.*, 1999, pp. 37-43, vol. 41.

Aakeröy, C. et al. "Hydrogen-bonded layers of hydrogentartrate anions: two-dimensional building blocks for crystal engineering" *J. Mater. Chem.*, 1993, 1129-1135, vol. 3, No. 11.

Hu, Z. et al. "Separation of 4-aminobenzoic acid by cocrystallization: Crystal structure of the complex of 4-aminobenzoic acid with (2*R*,3*R*)-tartaric acid" *Journal of Chemical Crystallography*, Dec. 2002, pp. 525-529, vol. 32, No. 12.

Guarrera, D. et al. "Molecular self-assembly in the solid state. The combined use of solid state NMR and differential scanning calorimetry for the determination of phase constitution" *Chem. Mater.*, 1994, pp. 1293-1296, vol. 6.

Doi, M. et al. "Conformational study of a potent human renin inhibitor: x-ray crystal structure of isopropyl (2*R*, 3*S*) -4-cyclohexyl-2-hydroxy-3-{*N*-[(2*R*)-2-morpholinocarbonylmethyl-3-(1-naphthyl) propionyl] -L-histidylamino}butyrate (KRI-1314), a pentapeptide analogue with amino acid sequence corresponding to the cleavage site of angiotensinogen" *J. Chem. Soc. Perkin Trans. 1*, 1991, pp. 1153-1158.

Crihfield, A. et al. "Crystal engineering through halogen bonding. 2. Complexes of diacetylene-linked heterocycles with organic iodides" *Crystal Growth & Design*, 2003, pp. 313-320, vol. 3, No. 3.

Aakeröy, C. et al. "A versatile route to porous solids: organic-inorganic hybrid materials assembled through hydrogen bonds" *Angew. Chem. Int. Ed.*, 1999, pp. 1815-1819, vol. 38, No. 12.

Shefter, E. et al., ACS, Abstr. Papers (Summer), 1970, 35, compound name: sulfathiazole-theophylline complex.

Shefter, E. et al., ACS, Abstr. Papers (Summer), 1970, 35, compound name: sulfathiazole-sulfanilamide complex.

Wiedenfeld, H. et al. "Solubilization of aminophenazone" *Arch. Pharm.*, 1982, pp. 633-641, vol. 315.

Cacciapuoti, A. et al. "In vitro and in vivo activities of SCH 56592 (Posaconazole), a new triazole antifungal agent, against *Aspergillus* and *Candida" Antimicrobial Agents and Chemotherapy*, Aug. 2000, pp. 2017-2022, vol. 44, No. 8.

Callahan, J.C. et al. "Equilibrium moisture content of pharmaceutical excipients" *Drug Development and Industrial Pharmacy*, 1982, pp. 355-369, vol. 8, No. 3.

Dannaoui, E. et al. "Acquired itraconazole resistance in *Aspergillus fumigatus" Journal of Antimicrobial Chemotherapy*, 2001, pp. 333-340, vol. 47.

Denning, D. W. et al. "In vitro activity of Saperconazole (R66 905) compared with Amphotericin B and Itraconazole against *Aspergillus* species" *Eur. J. Clin. Microbial. Infect. Dis.*, 1990, pp. 693-697, vol. 9.

Dressman, J. B. et al. "Dissolution testing as a prognostic tool for oral drug absorption: immediate release dosage forms" *Pharmaceutical Research*, 1998, pp. 11-22, vol. 15, No. 1.

Ebert, W. R. "Soft elastic gelatin capsules: a unique dosage form" *Pharmaceutical Technology*, Oct. 1977, pp. 44-50, vol. 1, No. 5.

Gascon, M. -P. et al. "In vitro forecasting of drugs which may interfere with the biotransformation of midazolam" *Eur. J. Clin. Pharmacol.*, 1991, pp. 573-578, vol. 41.

Heeres, J. et al. "Antimycotic azoles. 7. Synthesis and antifungal properties of a series of novel triazol-3-ones" *J. Med. Chem.*, 1984, pp. 894-900, vol. 27.

Honig, P. K. et al. "Itraconazole affects single-dose Terfenadine pharmacokinetics and cardiac repolarization pharmacodynamics" *J. Clin. Pharmacol.*, 1993, pp. 1201-1206, vol. 33.

Imai, T. et al. "Successful treatment of cerebral Aspergillosis with a high oral dose of Itraconazole after excisional surgery" *Internal Medicine*, Oct. 1999, pp. 829-832, vol. 38, No. 10.

Kovacs, J. et al. "New type of bridged monoamino-β-cyclodextrins" *Journal of Inclusion Phenomena and Molecular Recognition in Chemistry*, 1996, pp. 53-56, vol. 25.

Lavrijsen, A. P. M. et al. "Hepatic injury associated with itraconazole" *The Lancet*, Jul. 25, 1992, pp. 251-252, vol. 340.

Neuvonen, P. J. et al. "Itraconazole drastically increases plasma concentrations of Iovastatin and Iovastatin acid" *Clinical Pharmacology & Therapeutics*, 1996, pp. 54-61, vol. 60, No. 1.

Nomeir, A. A. et al. "Pharmacokinetics of SCH 56592, a new azole broad-spectrum antifungal agent, in mice, rats, rabbits, dogs, and cynomolgus monkeys" *Antimicrobial Agents and Chemotherapy*, Mar. 2000, pp. 727-731, vol. 44, No. 3.

Odds, F. C. "Antifungal activity of saperconazole (R 66 905) in vitro" *Journal of Antimicrobial Chemotherapy*, 1989, pp. 533-537, vol. 24.

Remenar, J. F. et al. "Crystal engineering of novel cocrystals of a triazole drug with 1,4-dicarboxylic acids" *J. Am. Chem. Soc.*, 2003, pp. 8456-8457, vol. 125.

Saksena, A. K. et al. "Advances in the chemistry of novel broad-spectrum orally active azole antifungals: recent studies leading to the discovery of SCH 56592" in *Advances in the Chemistry of Novel Broad-Spectrum Orally Active Azole Antifungals* (Royal Soc. Chem., Cambridge), 1997, pp. 180-199.

Saksena, A. K. et al. "Concise asymmetric routes to 2,2,4-trisubstituted tetrahydrofurans via chiral titanium imide enolates: key intermediates towards synthesis of highly active azole antifungals SCH 51048 and SCH 56592" *Tetrahedron Letters*, 1996, pp. 5657-5660, Vol. 37, No. 32.

Hepperle, M. et al. "Mono *N*-arylation of piperazine(III): metal-catalyzed *N*-arylation and its application to the novel preparations of the antifungal posaconazole and its advanced intermediate" *Tetrahedron Letters*, 2002, pp. 3359-3363, vol. 43.

Cutsem, J. V. et al. "Oral and parenteral therapy with saperconazole (R 66905) of invasive aspergillosis in normal and immunocompromised animals" *Antimicrobial Agents and Chemotheraphy*, Dec. 1989, pp. 2063-2068, vol. 33, No. 12.

Villa, L. A. et al. "Central nervous system paracoccidioidomycosis. Report of a case successfully treated with itraconazol" *Rev. Inst. Med. Trop. S. Paulo*, Jul.-Aug. 2000, pp. 231-234, vol. 42, No. 4.

West, A. R., "Solid Solutions" In: *Solid State Chemistry and its Applications*, 1988, p. 358, p. 365, Wiley, NY.

Aronhime, J. et al. "Crystalline forms of pharmaceuticals and characterization thereof", Oral Presentation, Mar. 8, 2005, USPTO, Alexandria, VA.

Desiraju, G. R. "Chemistry beyond the molecule" *Nature*, Jul. 26, 2001, pp. 397-400, vol. 412.

Gavezzotti, A. "Are crystal structures predictable?" *Acc. Chem. Res.*, 1994, pp. 309-314, vol. 27.

Physician's Desk Reference, 56th Ed., pp. 1800-1804, 2002.

Kim, H. et al. "High-performance liquid chromatographic analysis of the anti-fungal agent SCH 56592 in dog serum" *Journal of Chromatography B*, 2000, pp. 93-98, vol. 738.

Vippagunta, S. R. et al. "Crystalline solids" *Advanced Drug Delivery Reviews*, 2001, pp. 3-26, vol. 48.

McCrone, W. C. "Polymorphism", In: *The Physics and Chemistry of the Organic Solid State*, vol. II, Fox, D. et al. (eds.), 1965, pp. 725-767, Interscience, New York.

Leger, J.M. et al. "Crystal Structure of the 1:1 Sulfacetamide-Caffeine Complex" *Acta Cryst.*, 1977, pp. 1455-1459, vol. B33.

Simonov, Y. et al. "Structure of the caffeine-copper(II) acetate additional compound", *Izvestiya Akademii Nauk Moldavskoi SSR, Seriya Fiziko-Tekhnicheskikh i Matematicheskikh Nauk*, 1972, vol. 3, pp. 83-84, abstract only.

Weissbuch, I. et al. "Understanding and control of nucleation, growth, habit, dissolution and structure of two- and three-dimensional crystals using 'tailor-made' auxiliaries" *Acta Cryst.*, 1995, B51:115-148.

Faught, E. et al. "Topiramate Dose-Ranging Trial in Refractory Partial Epilepsy", *Amer. Epilepsy Soc. Proc.*, (1995), p. 33, vol. 36, Supp. 4.

Privitera, M. et al. "Dose-Ranging Trial with Higher Doses of Topiramate in Patients with Resistant Partial Seizures", *Amer. Epilepsy Soc. Proc.*, 1995, p. 33, vol. 36, Supp. 4.

Sachdeo, S. K. et al. "Topiramate: Double-Blind Trial as Monotherapy", *Amer. Epilepsy Soc. Proc.*, 1995, p. 33, vol. 36, Supp. 4.

Press Release. "Clinical Development of Topiramate for Obesity Extended to Simplify Dosing, Improve Tolerability". http://www.orthomcneil.com/news/article020402.html (Feb. 4, 2002), N.J.

Rosenfeld, W. E. "Topiramate: A Review of Preclinical, Pharmacokinetic, and Clinical Data", *Clinical Therapeutics*, 1997, pp. 1294-1308, vol. 19, No. 6.

Physician's Desk Reference, 56th Edition, 2002, pp. 2590-2595.
Database WPI, Section Ch, Week 197936, Derwent Publishing Ltd., London, Great Britain, AN 1979-65538B, XP002282989 and JP 54 095589A (Sumitomo) 1979 Abstract.
Fung et al., "Solvent Effects on Comparative Dissolution of Pharmaceutical Solvates," *Chem. Farm. Bull.*, 22(2), pp. 454-458 (1974).
Rubino et al., "Influence of Solvent Composition on the Solubilities and Solid-State Properties of the Sodium Salts of Some Drugs", *Int. J. of Pharma*, 65, pp. 141-145 (1990).
Fitzgerald, G. A. "The Coxibs, Selective Inhibitors of Cyclooxygenase-2", *New England Journal of Medicine*, vol. 345, No. 6, Aug. 9, 2001.
Wunderlich, H. F. et al. "The Derivatives of carbamazepine with ammonium halogenides and formahide" *Pharmazie*, 1991, pp. 507-509, vol. 46, No. 7, Not in English.
El-Nahhas, S. A. "Physico-chemical characteristics of carbamazepine-β-cyclodextrin inclusion compounds and carbamazepine-PEG solid dispersions" *Pharmazie*, 1996, pp. 960-963, vol. 51, No. 12.
Reynolds, J. E. F. (ed). Martindale, The Extra Pharmacopoeia, 1993, The Pharmaceutical Press, London, England, 13th edition, p. 1610.
Pedireddi, V. R. et al. "Layered Structures Formed by Dinitrobenzoic Acids" *Tetrahedron Letters*, 1998, pp. 9831-9834, vol. 39.
Zaman, M. B. et al. "Crystal Engineering Using Anilic Acids and Dipyridyl Compounds through a New Supramolecular Synthon" *J. Org. Chem.*, 2001, pp. 5987-5995, vol. 66.
Japanese Notice of Reasons for Rejection dated Oct. 8, 2009, Japanese Application No. 2003-572946.
Ball, P. "Scandal of crystal design . . ." *Nature*, Jun. 20, 1996, pp. 648-650, vol. 381.
Bastin, R. J. et al. "Salt Selection and Optimization Procedures for Pharmaceutical New Chemical Entities" *Organic Process Research & Development*, 2000, pp. 427-435, vol. 4, No. 5.
Bernstein, J. et al. "Concomitant Polymorphs" *Angew. Chem. Int. Ed.*, 1999, pp. 3440-3461, vol. 38.
Boucher, E. et al. "Use of Hydrogen Bonds to Control Molecular Aggregation. Behavior of Dipyridones and Pyridone-Pyrimidones Designed to Form Cyclic Triplexes" *J. Org. Chem.*, 1995, pp. 1408-1412, vol. 60.
Brittain, H. G., *Polymorphism in Pharmaceutical Solids*, Marcel Dekker, Inc., 1999, pp. 183, 202-208 and 219.
Chang, Y. et al. "An Approach to the Design of Molecular Solids. Strategies for Controlling the Assembly of Molecules into Two-Dimensional Layered Structures" *J. Am. Chem. Soc.*, 1993, pp. 5991-6000, vol. 115.
Cowan, J. A. et al. "Neutron diffraction studies of the 1:1 and 2:1 cocrystals of benzene-1,2,4,5-tetracarboxylic acid and 4,4'-bipyridine" Acta Cryst., 2006, pp. o157-o161, vol. C62.
Davidovich, M. et al. "Detection of Polymorphism by Powder X-Ray Diffraction: Interference by Preferred Orientation" *American Pharmaceutical Review*, 2004, pp. 10, 12, 14, 16, and 100, vol. 7, Issue 1.
Davies, N. M. et al. "Clinical Pharmacokinetics and Pharmacodynamics of Celecoxib. A Selective Cyclo-Oxygenase-2 Inhibitor" *Clin. Pharmacokinet.*, Mar. 2000, pp. 225-242, vol. 38, No. 3.
Dean, J A., *Analytical Chemistry Handbook*, McGraw-Hill, Inc., 1995, pp. 10.24-10.26.
Definition of solvate, The Free Dictionary, http://www.thefreedictionary.com/solvate, accessed online on Jul. 21, 2009, pp. 1-3.
Desiraju, G.R. "Solid-State Chemistry: Crystal Gazing: Structure Prediction and Polymorphism" *Science*, Oct. 17, 1997, pp. 404-405, vol. 278, No. 5337.
Doelker, E. "Physicochemical behavior of active substances. Consequences for the feasibility and stability of pharmaceutical forms" *STP Pharma Pratiques*, 1999, pp. 399-409, vol. 9, No. 5.
Doelker, E. "Cystalline modifications and polymorphism changes during drug manufacturing" *Annales Pharmaceutiques Francaises*, 2002, pp. 161-176, vol. 60, No. 3.
Dunitz, J. D. "Are crystal structures predictable?" *Chem Commun.*, 2003, pp. 545-548.
Feynman, R. P. "There's Plenty of Room at the Bottom" *Engineering and Science*, Feb. 1960, pp. 22-36.
Jain, N. K. et al. "Polymorphism in Pharmacy" *Indian Drugs*, 1986, pp. 315-329, vol. 23, No. 6.
Kirchner, M. T. et al., Co-crystals with Acetylene: Small is not Simple! *Chem. Eur. J.*, 2010, pp. 2131-2146, vol. 16.
Moulton, B. et al. "From Molecules to Crystal Engineering: Supramolecular Isomerism and Polymorphism in Network Solids" *Chem. Rev.*, 2001, pp. 1629-1658, vol. 101.
Muzaffar, N. A. et al. "Polymorphism and Drug Availability" *Journal of Pharmacy*, 1979, pp. 59-66, vol. 1, No. 1.
Osorio-Lozada, A. et al. "Synthesis and determination of the absolute stereochemistry of the enantiomers of adrafinil and modafinil" *Tetrahedron: Asymmetry*, 2004, pp. 3811-3815, vol. 15.
Otsuka, M. et al. "Effect of Polymorphic Forms of Bulk Powders on Pharmaceutical Properties of Carbamazepine Granules" *Chem. Pharm. Bull.*, 1999, pp. 852-856, vol. 47, No. 6.
Shattock, T. R, et al. "Hierarchy of Supramolecular Synthons: Persistent Carboxylic Acid•••Pyridine Hydrogen Bonds in Cocrystals That also Contain a Hydroxyl Moiety" *Cryst. Growth Des.*, 2008, pp. 4533-4545, vol. 8, No. 12.
Thayer, A. M. "Form and Function: The choice of pharmaceutical crystalline form can be used to optimize drug properties, and cocrystals are emergiing as new alternatives" *Chemical & Engineering News*, Jun. 18, 2007, pp. 17-30, vol. 85, No. 25.
U.S. Pharmacopia #23, 1995, p. 1843.
Villa, L. A. et al. "Central Nervous System Paracoccidioidomycosis. Report of a Case Successfully Treated with Itraconazol" *Rev. Inst. Med. Trop. S. Paulo*, Jul.-Aug. 2000, pp. 231-234, vol. 42, No. 4.
Zaworotko, M. J. "Crystal Engineering of Diamondoid Networks" *Chemical Society Reviews*, 1994, pp. 283-288, vol. 23.
Klein, C. L. et al. "Molecular Structure of Two Conformationally Restrained Fentanyl Analogues: cis- and trans-Isomers of N-{3-Methyl-1-[2-(1,2,3,4-tetrahydro)naphthyl]-4-piperidinyl}-N-phenylpropanamide" *Journal of Pharmaceutical Sciences*, Nov. 1985, pp. 1147-1151, vol. 74, No. 11.
Felthouse, T. R. et al. "Maleic Anhydride, Maleic Acid and Fumaric Acid", Apr. 26, 2001, submitted for *Kirk Online*, http://www.huntsman.com/performance_products/media/komaleic.pdf.
Salem, M.S. et al. "Preparation, characterisation and transformation of terfenadine polymorphic forms" *International Journal of Pharmacuetics*, 1996, pp. 257-259, vol. 141.
Office Action dated Feb. 2, 2010 in U.S. Appl. No. 10/546,963, filed Aug. 26, 2005.
Pending claims in U.S. Appl. No. 10/546,963, filed Aug. 26, 2005.
Heinrich Stahl P Ed-Wermuth C G: "The Practice of Medicinal Chemistry; 35 Preparation of water-soluble compounds through salt formation" Jan. 1, 2003, The Practice of Medicinal Chemistry, Elsevier, NL, pp. 601-615, XP002566271ISBN: 978-0-12-744481-9.

* cited by examiner

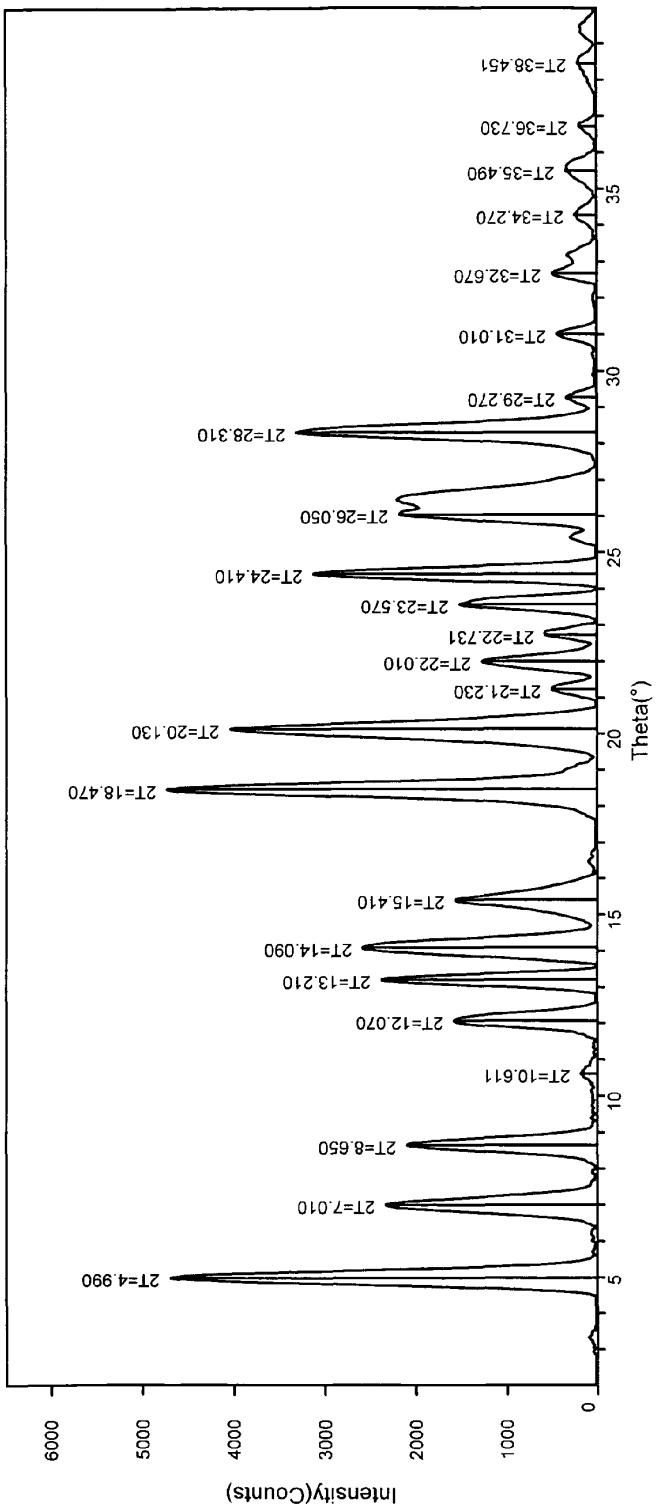

Intensity(Counts)
0
1000
2000
3000
4000
5000
6000
Theta(°)
5
10
15
20
25
30
35
2T=4.990
2T=7.010
2T=8.650
2T=10.611
2T=12.070
2T=13.210
2T=14.090
2T=15.410
2T=18.470
2T=20.130
2T=21.230
2T=22.010
2T=22.731
2T=23.570
2T=24.410
2T=26.050
2T=28.310
2T=29.270
2T=31.010
2T=32.670
2T=34.270
2T=35.490
2T=36.730
2T=38.451

FIG. 1

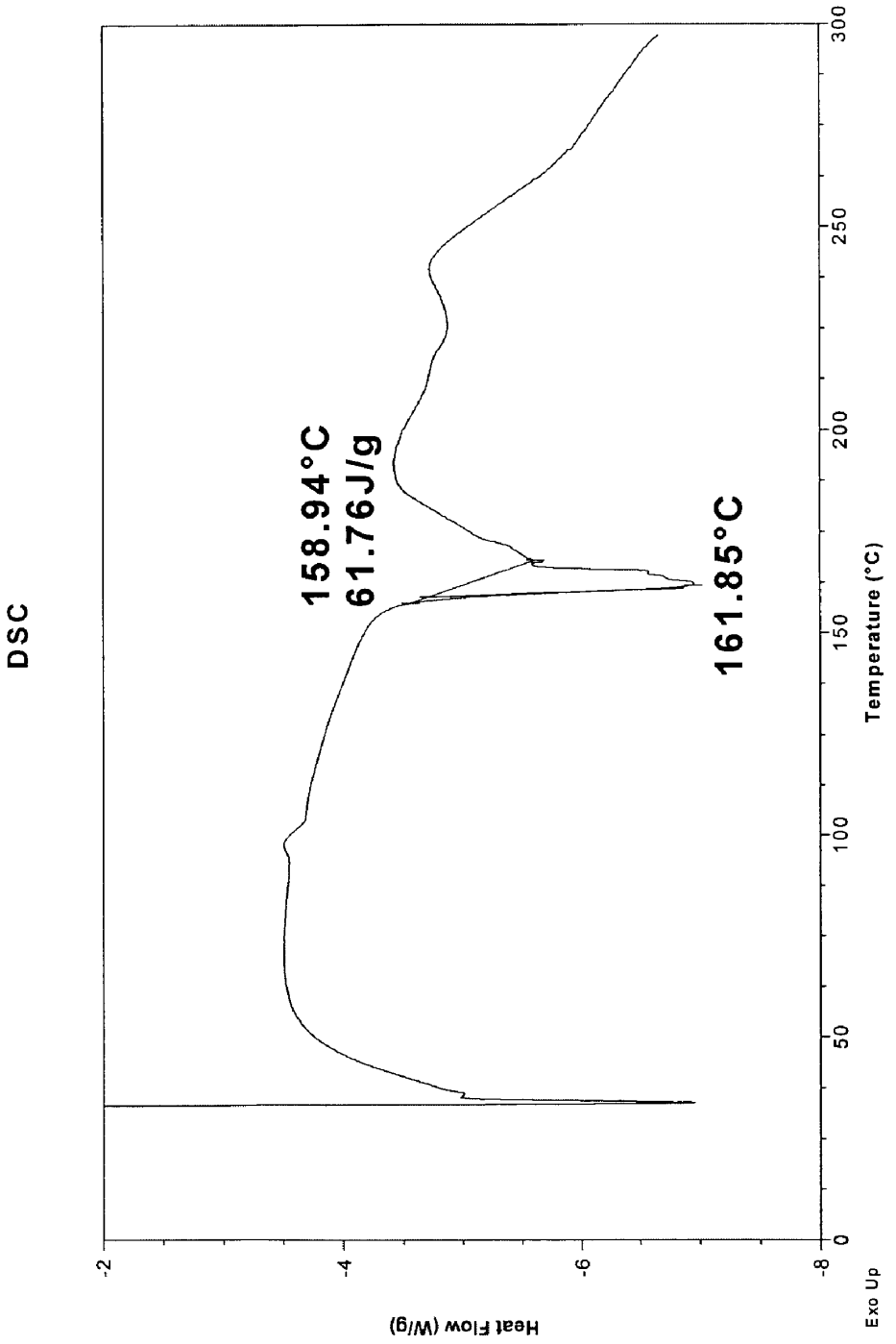

DSC
158.94°C
61.76J/g
161.85°C
Heat Flow (W/g)
-2
-4
-6
-8
Exo Up
0
50
100
150
200
250
300
Temperature (°C)

FIG. 2

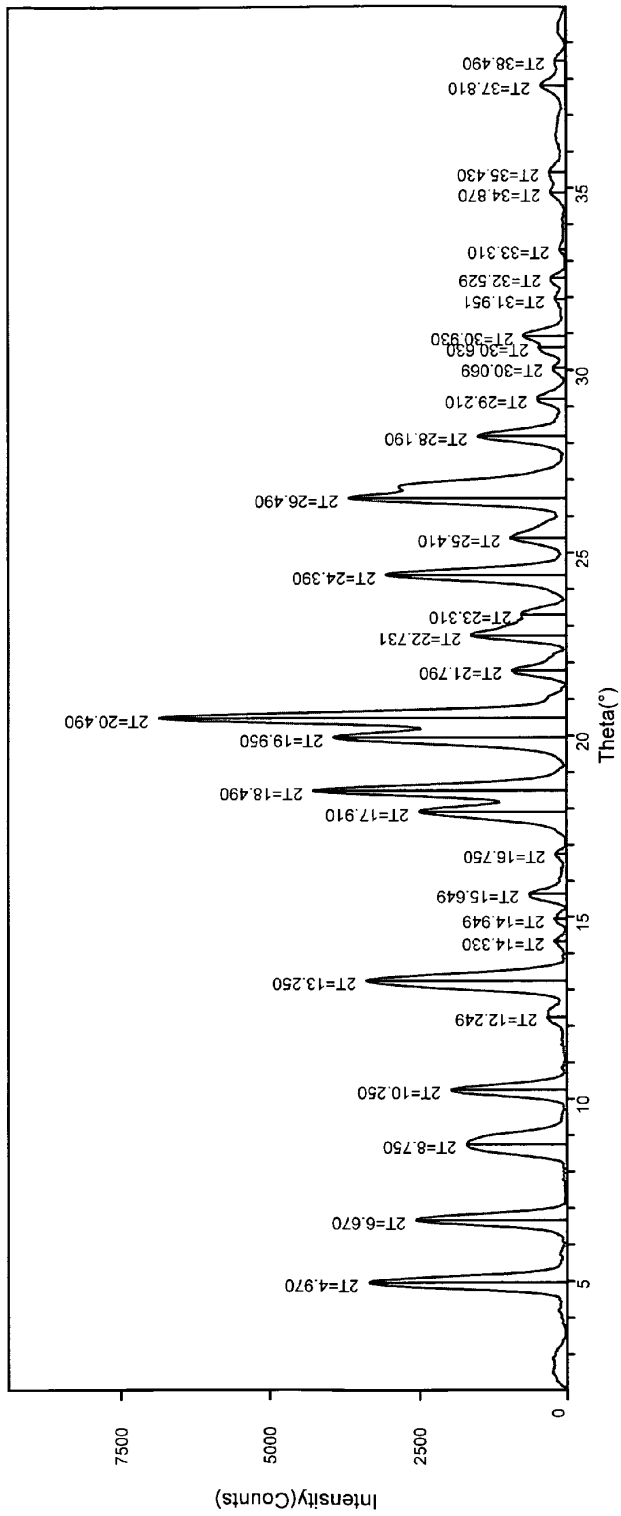

Intensity(Counts)
0
2500
5000
7500
Theta(°)
5
10
15
20
25
30
35
2T=4.970
2T=6.670
2T=8.750
2T=10.250
2T=12.249
2T=13.250
2T=14.330
2T=14.949
2T=15.649
2T=16.750
2T=17.910
2T=18.490
2T=19.950
2T=20.490
2T=21.790
2T=22.731
2T=23.310
2T=24.390
2T=25.410
2T=26.490
2T=28.190
2T=29.210
2T=30.069
2T=30.630
2T=30.930
2T=31.951
2T=32.529
2T=33.310
2T=34.870
2T=35.430
2T=37.810
2T=38.490

FIG. 3

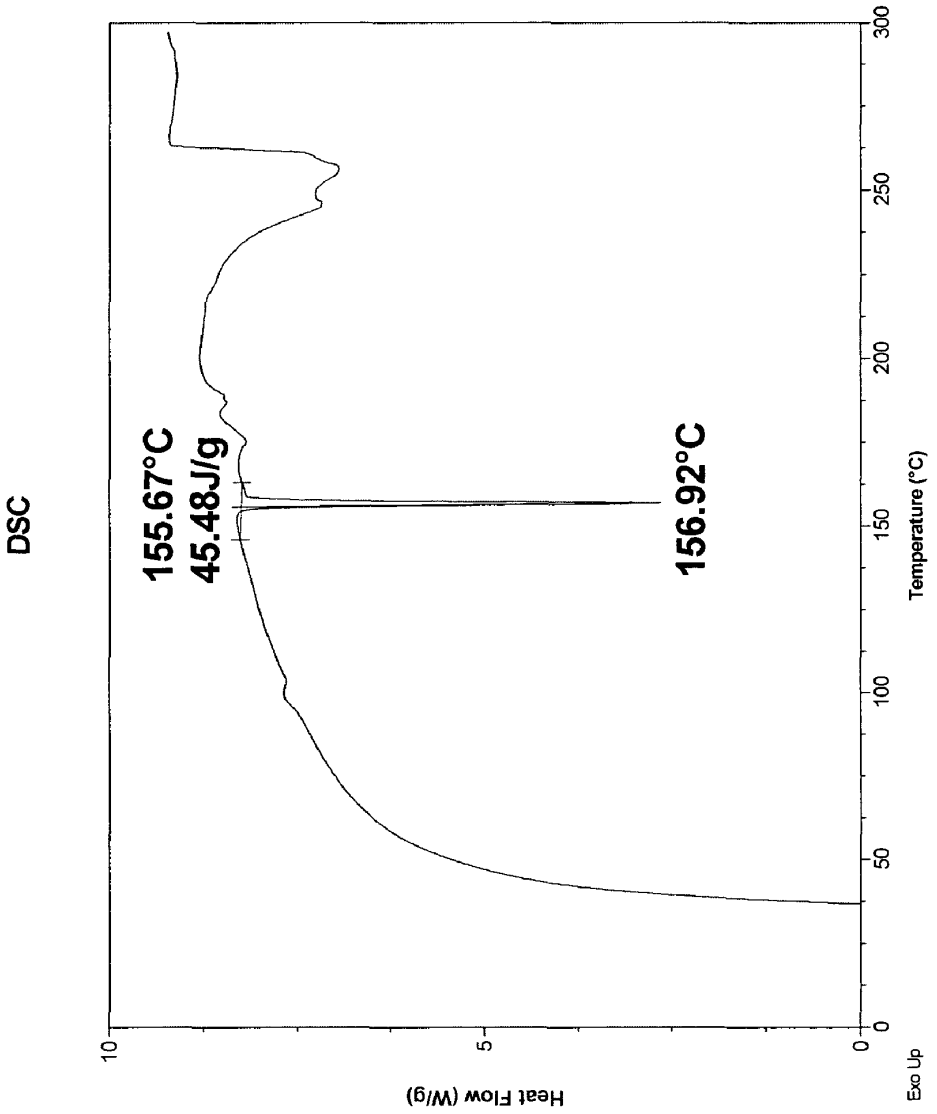

DSC
155.67°C
45.48J/g
156.92°C
Heat Flow (W/g)
Exo Up
Temperature (°C)
10
5
0
0
50
100
150
200
250
300

FIG. 4

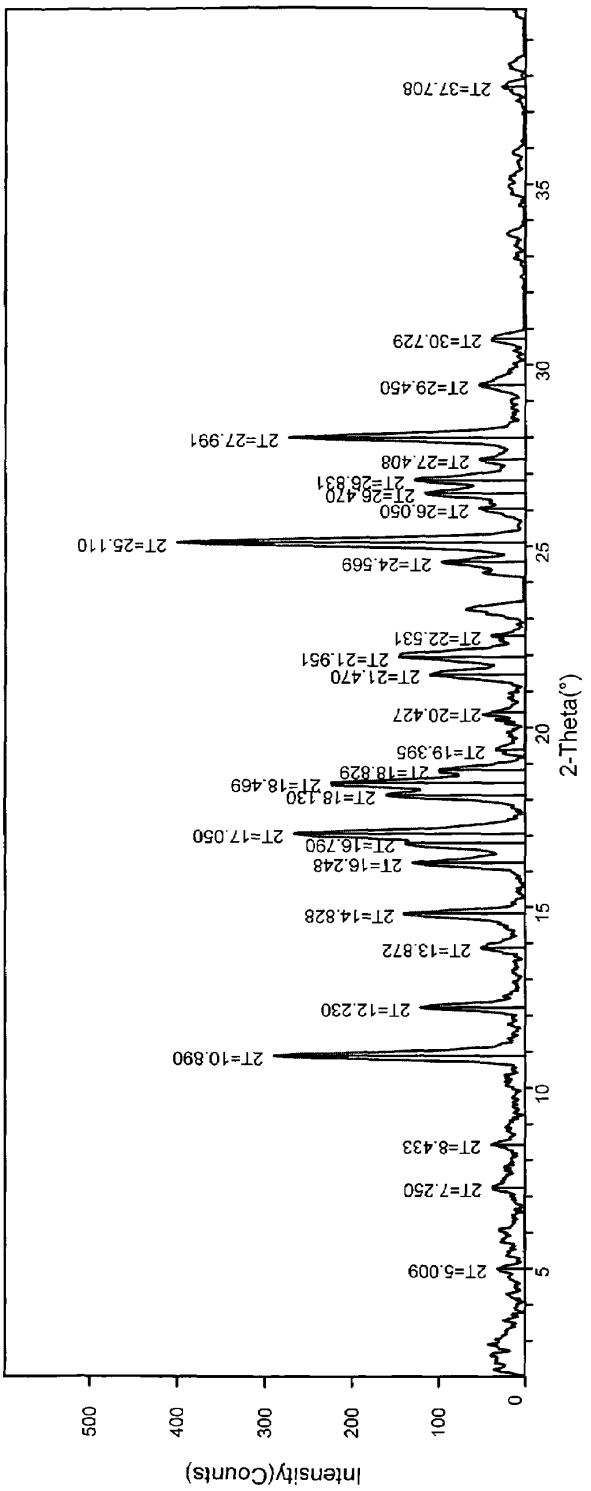

Intensity(Counts)
0
100
200
300
400
500
2-Theta(°)
5
10
15
20
25
30
35
2T=5.009
2T=7.250
2T=8.433
2T=10.890
2T=12.230
2T=13.872
2T=14.828
2T=16.248
2T=16.790
2T=17.050
2T=18.130
2T=18.469
2T=18.829
2T=19.395
2T=20.427
2T=21.470
2T=21.951
2T=22.531
2T=24.569
2T=25.110
2T=26.050
2T=26.470
2T=26.831
2T=27.408
2T=27.991
2T=29.450
2T=30.729
2T=37.708

FIG. 5

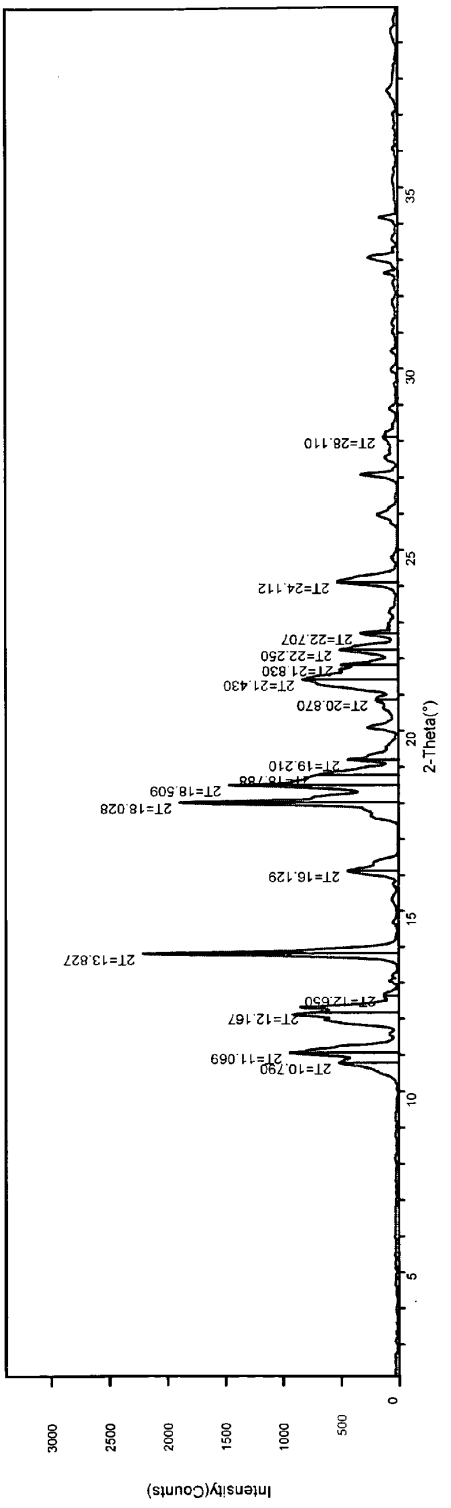

Intensity(Counts)
3000
2500
2000
1500
1000
500
0
2-Theta(°)
5
10
15
20
25
30
35
2T=10.790
2T=11.069
2T=12.167
2T=12.650
2T=13.827
2T=16.129
2T=18.028
2T=18.509
2T=18.788
2T=19.210
2T=20.870
2T=21.430
2T=21.830
2T=22.250
2T=22.707
2T=24.112
2T=28.110

FIG. 6

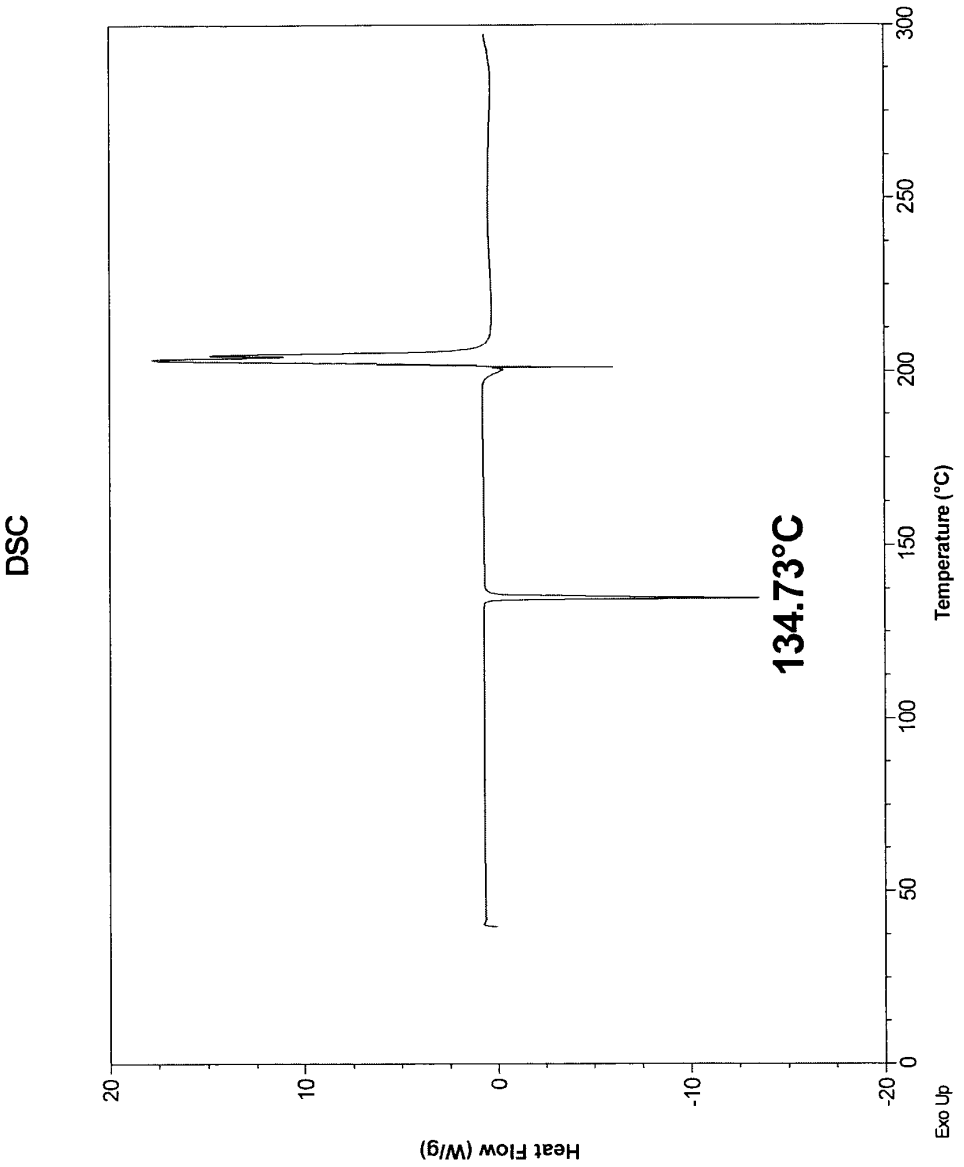

DSC
134.73°C
Heat Flow (W/g)
20
10
0
-10
-20
Exo Up
0
50
100
150
200
250
300
Temperature (°C)

FIG. 7

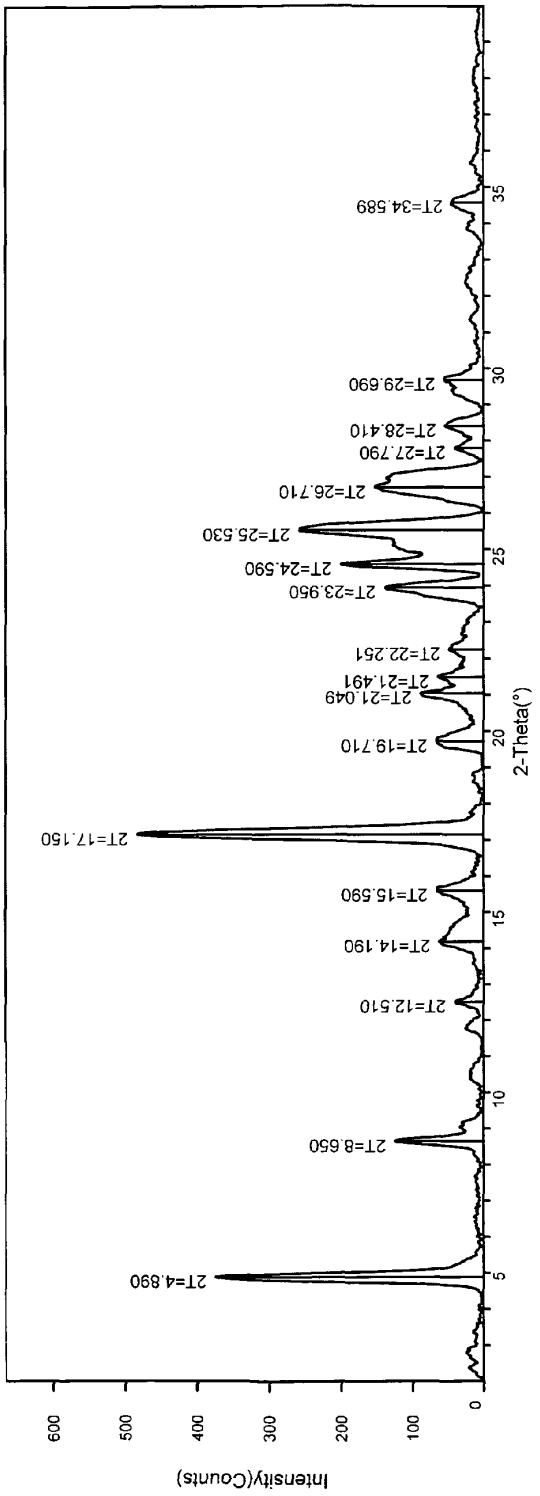

Intensity(Counts)
2-Theta(°)
2T=4.890
2T=8.650
2T=12.510
2T=14.190
2T=15.590
2T=17.150
2T=19.710
2T=21.049
2T=21.491
2T=22.251
2T=23.950
2T=24.590
2T=25.530
2T=26.710
2T=27.790
2T=28.410
2T=29.690
2T=34.589

FIG. 8

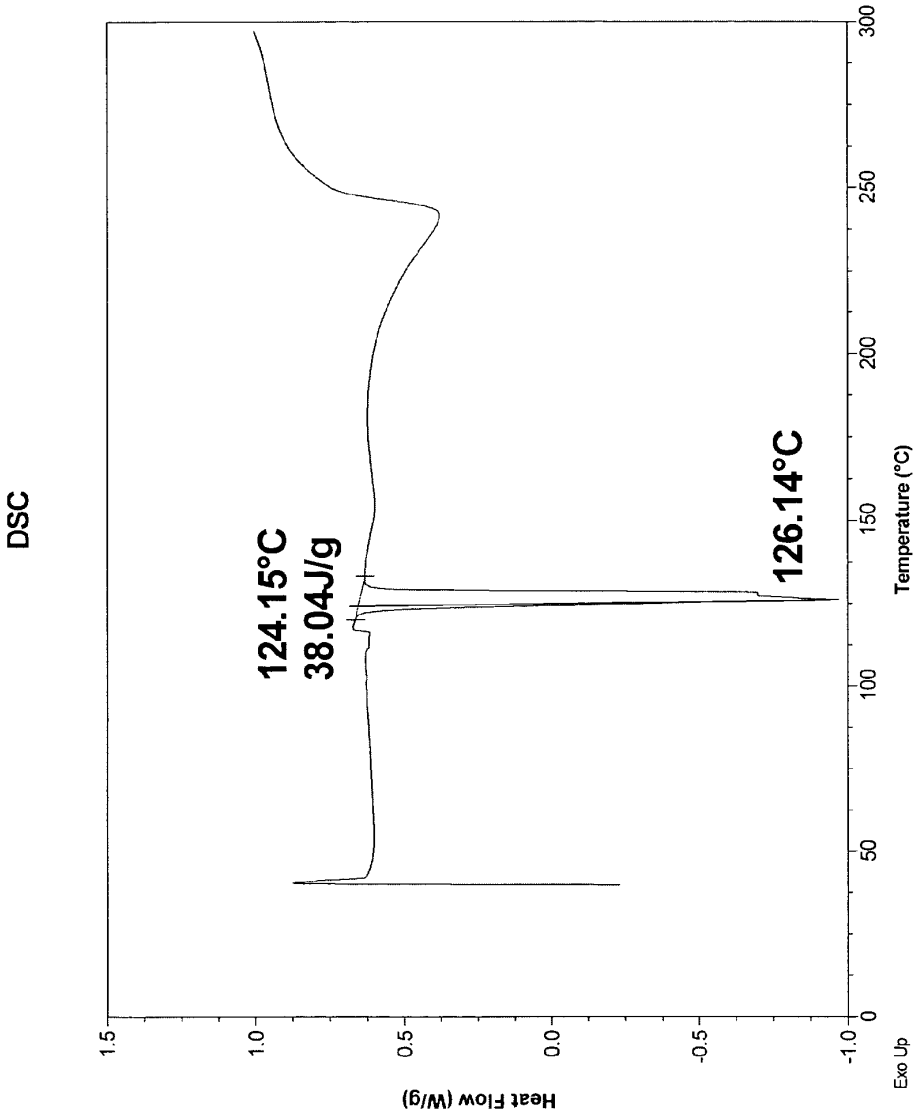

DSC
124.15°C
38.04J/g
126.14°C
Heat Flow (W/g)
Temperature (°C)
Exo Up
1.5
1.0
0.5
0.0
-0.5
-1.0
0
50
100
150
200
250
300

FIG. 9

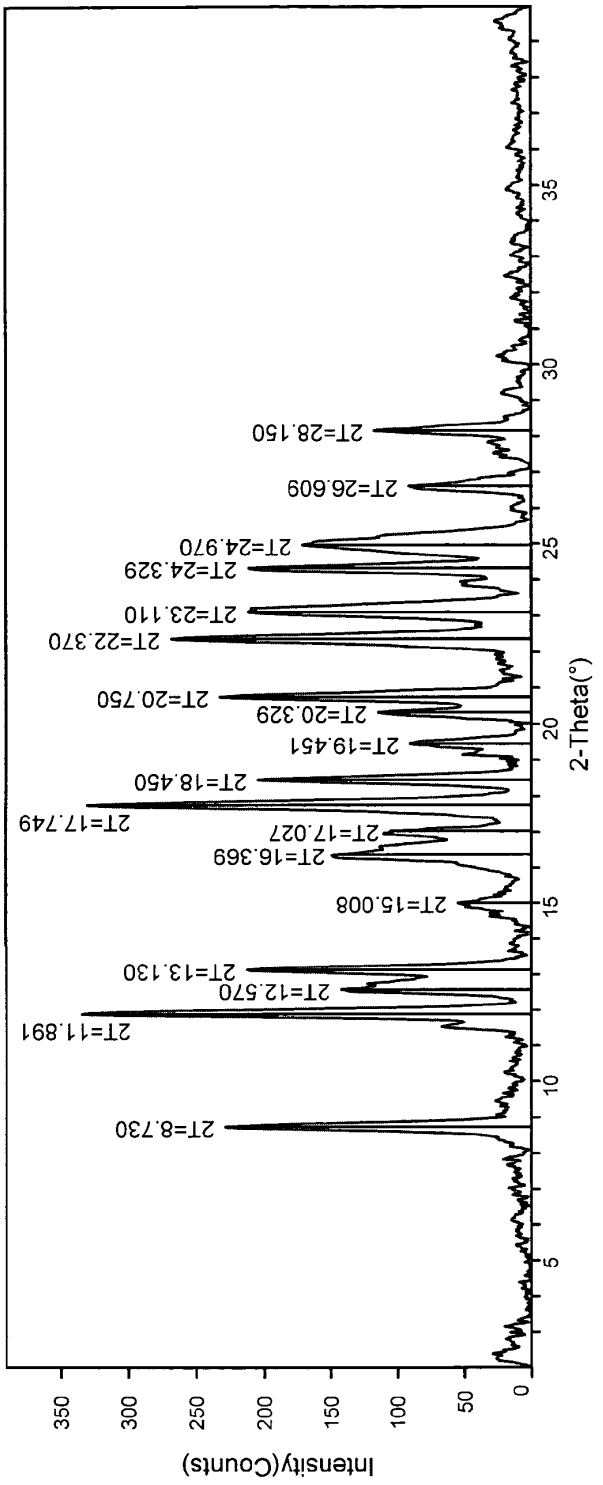

Intensity(Counts)
0
50
100
150
200
250
300
350
2-Theta(°)
5
10
15
20
25
30
35
2T=8.730
2T=11.891
2T=12.570
2T=13.130
2T=15.008
2T=16.369
2T=17.027
2T=17.749
2T=18.450
2T=19.451
2T=20.329
2T=20.750
2T=22.370
2T=23.110
2T=24.329
2T=24.970
2T=26.609
2T=28.150

FIG. 10

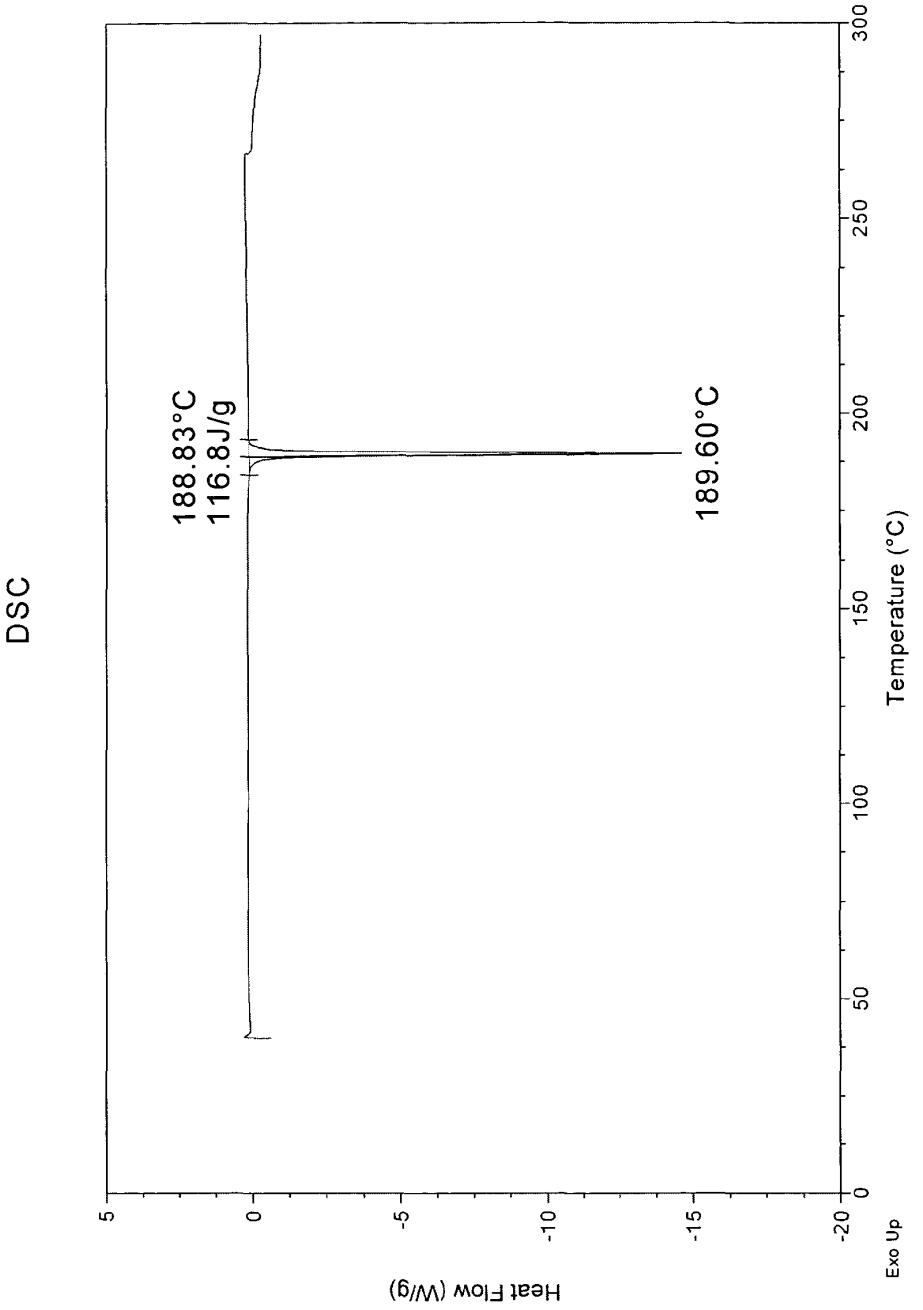

DSC
188.83°C
116.8J/g
189.60°C
Heat Flow (W/g)
5
0
-5
-10
-15
-20
Exo Up
0
50
100
150
200
250
300
Temperature (°C)

FIG. 11

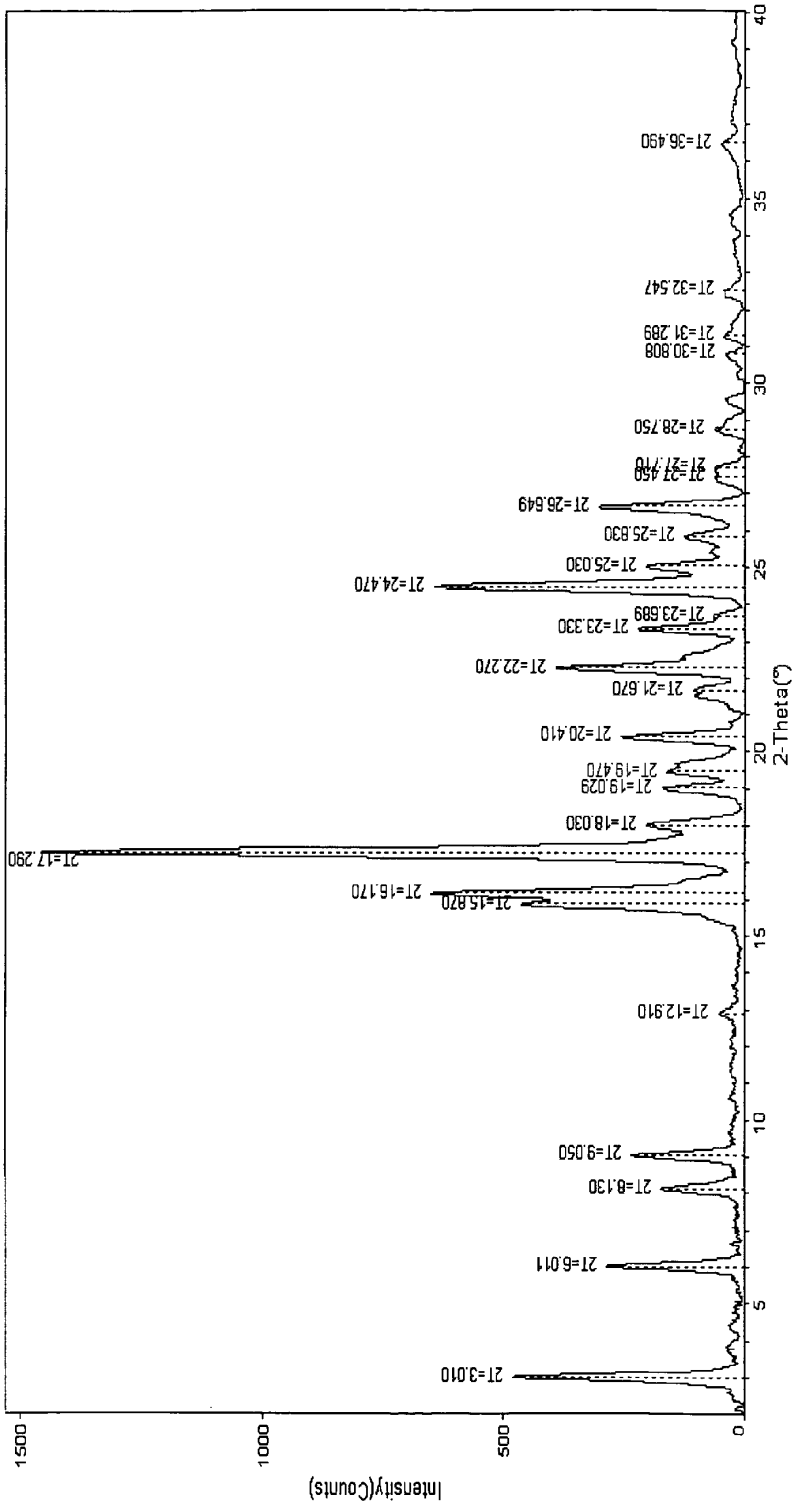

Intensity(Counts)
0
500
1000
1500
2-Theta(°)
5
10
15
20
25
30
35
40
2T=3.010
2T=6.011
2T=8.130
2T=9.050
2T=12.910
2T=15.820
2T=16.170
2T=17.290
2T=18.030
2T=19.029
2T=19.470
2T=20.410
2T=21.670
2T=22.270
2T=23.330
2T=23.589
2T=24.470
2T=25.030
2T=25.830
2T=26.849
2T=28.750
2T=30.808
2T=31.289
2T=32.547
2T=36.450

FIG. 12

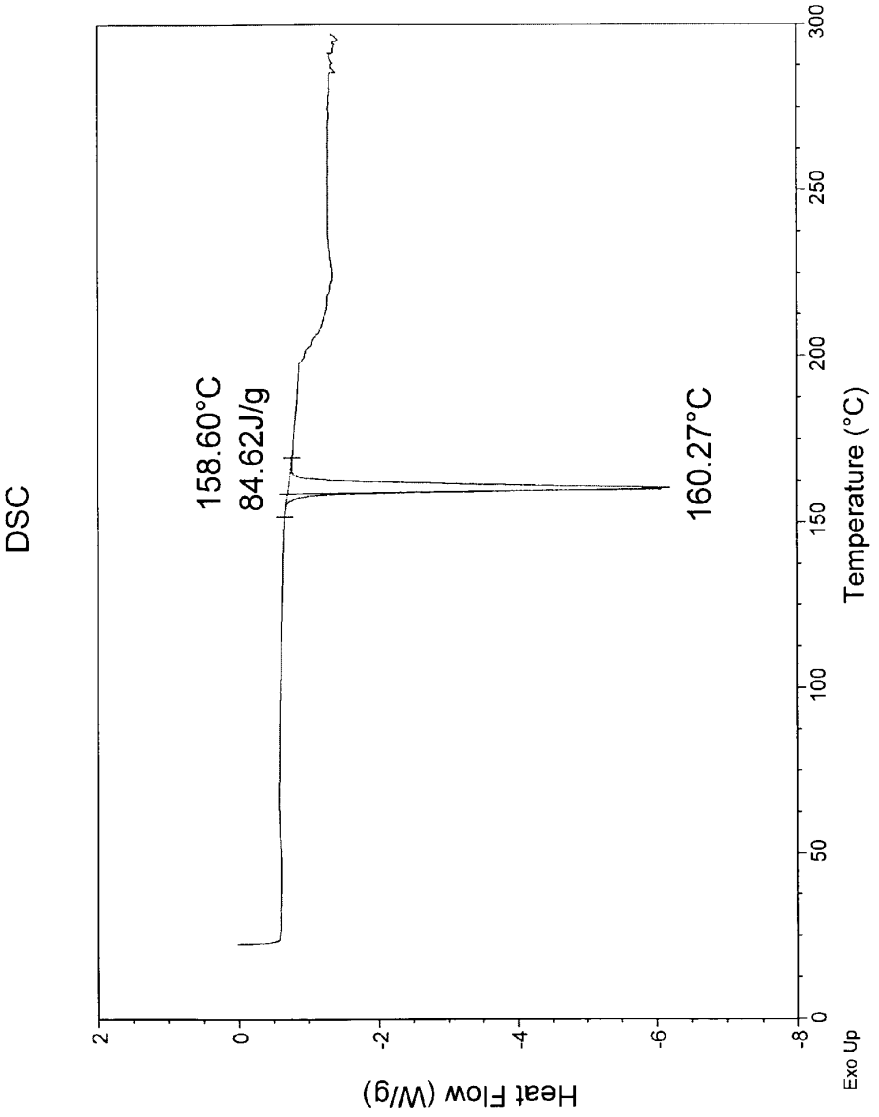

DSC
158.60°C
84.62J/g
160.27°C
Heat Flow (W/g)
Exo Up
Temperature (°C)
2
0
-2
-4
-6
-8
0
50
100
150
200
250
300

FIG. 13

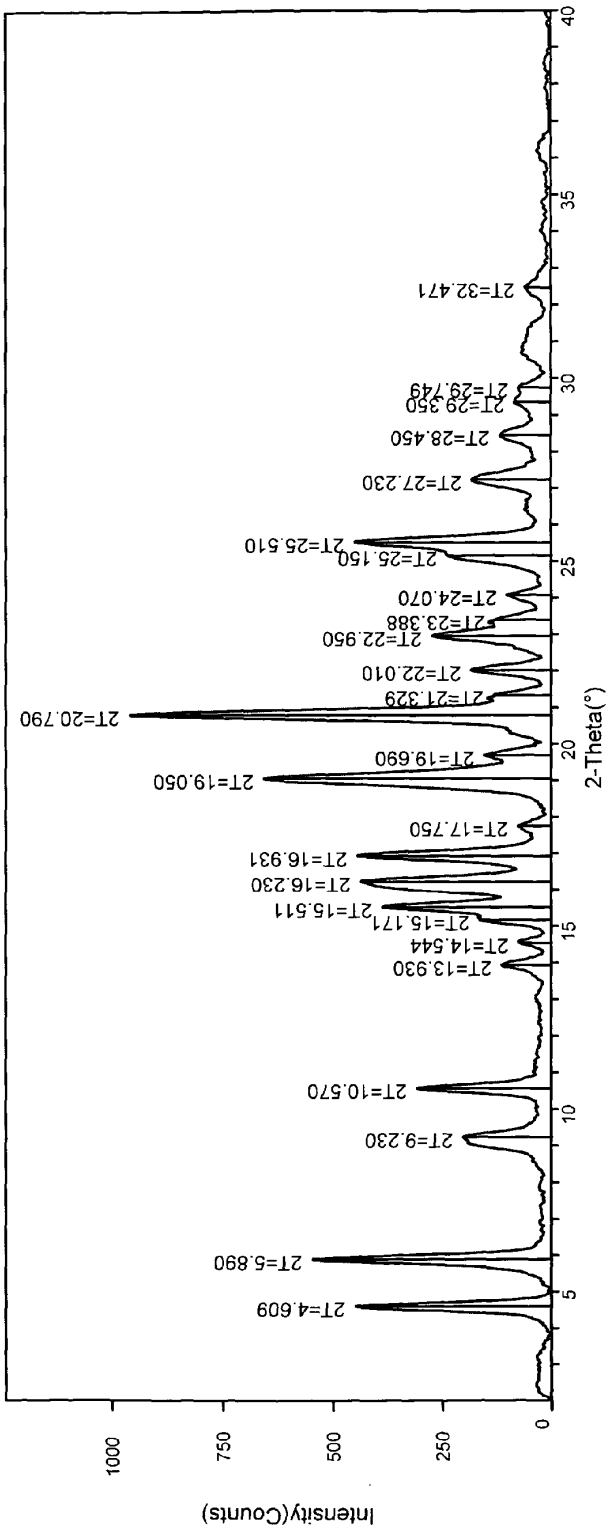

Intensity(Counts)
0
250
500
750
1000
2-Theta(°)
5
10
15
20
25
30
35
40
2T=4.609
2T=5.890
2T=9.230
2T=10.570
2T=13.930
2T=14.544
2T=15.171
2T=15.511
2T=16.230
2T=16.931
2T=17.750
2T=19.050
2T=19.690
2T=20.790
2T=21.329
2T=22.010
2T=22.950
2T=23.388
2T=24.070
2T=25.150
2T=25.510
2T=27.230
2T=28.450
2T=29.350
2T=29.749
2T=32.471

FIG. 14

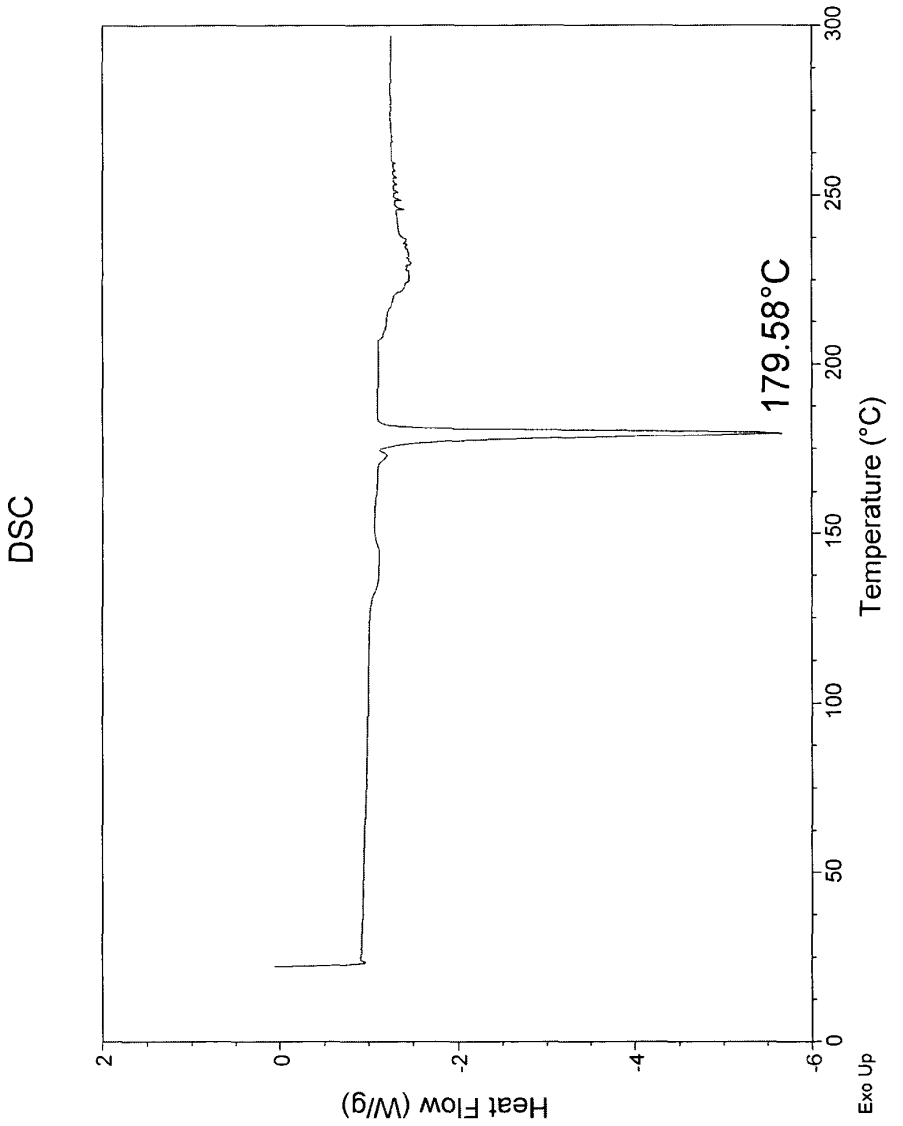

DSC
179.58°C
Heat Flow (W/g)
Temperature (°C)
Exo Up
2
0
-2
-4
-6
0
50
100
150
200
250
300

FIG. 15

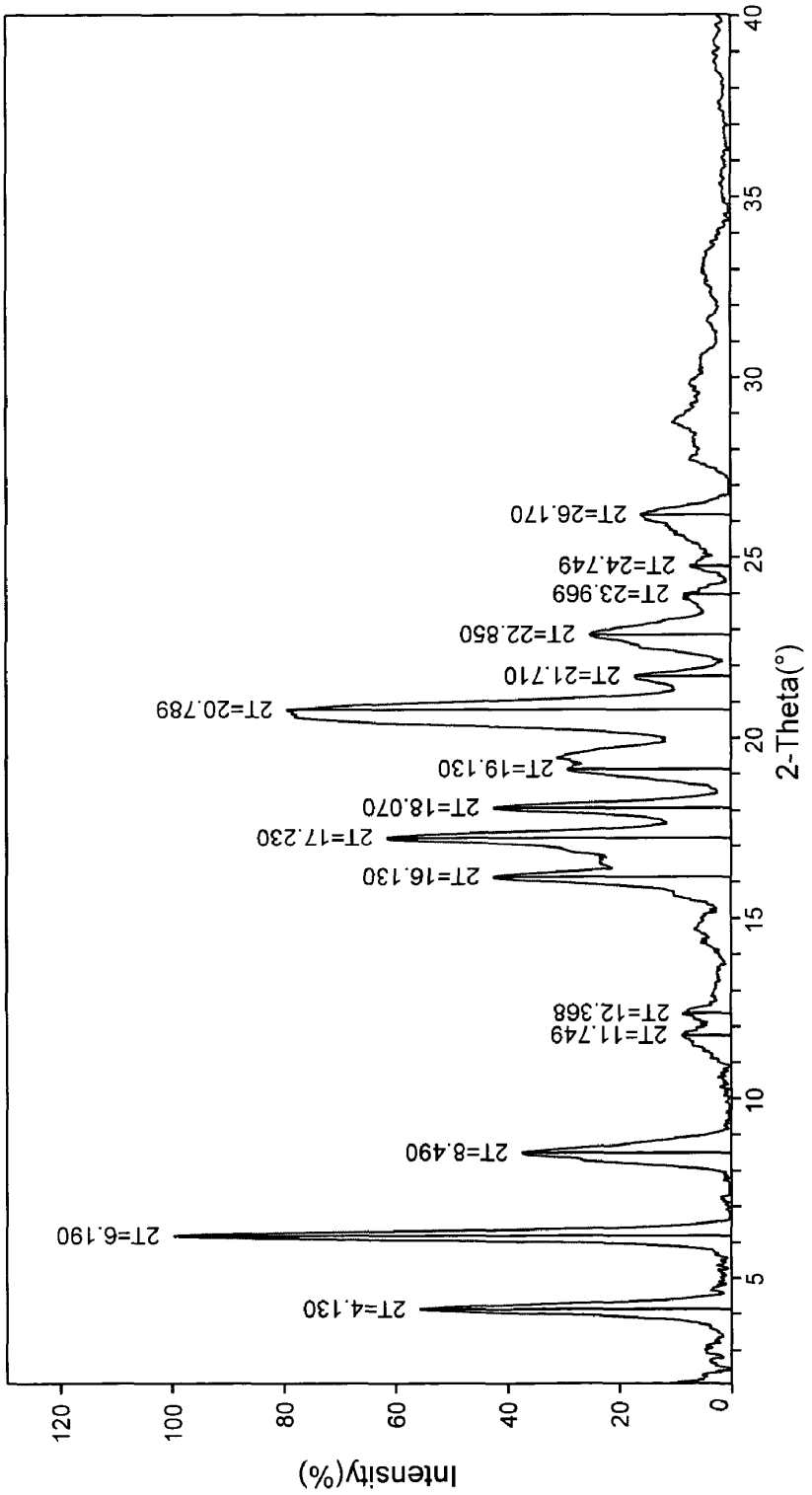

Intensity(%)
0
20
40
60
80
100
120
2-Theta(°)
0
5
10
15
20
25
30
35
40
2T=4.130
2T=6.190
2T=8.490
2T=11.749
2T=12.368
2T=16.130
2T=17.230
2T=18.070
2T=19.130
2T=20.789
2T=21.710
2T=22.850
2T=23.969
2T=24.749
2T=26.170

FIG. 16

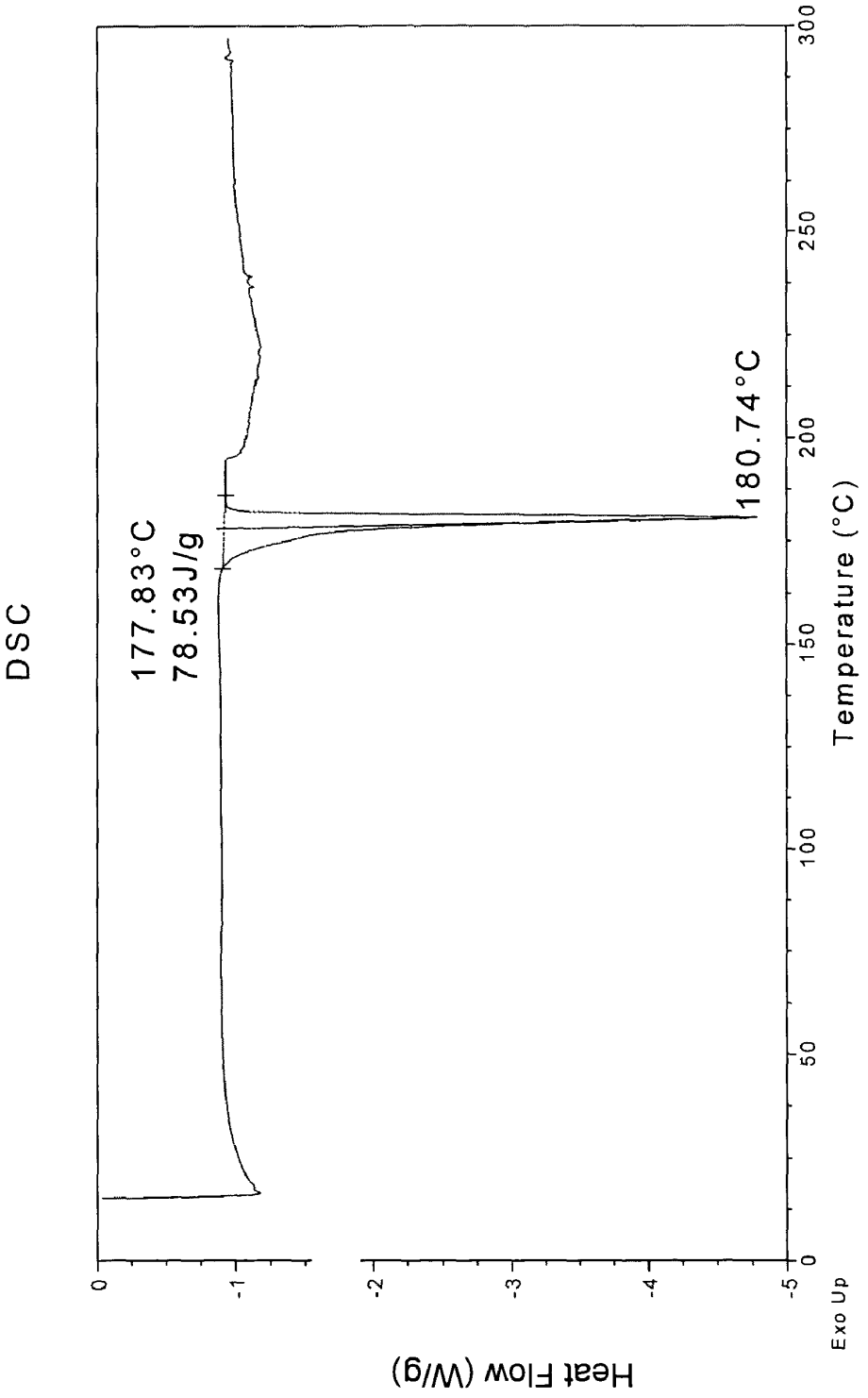

DSC
177.83°C
78.53J/g
180.74°C
Heat Flow (W/g)
Temperature (°C)
Exo Up
0
-1
-2
-3
-4
-5
0
50
100
150
200
250
300

FIG. 17

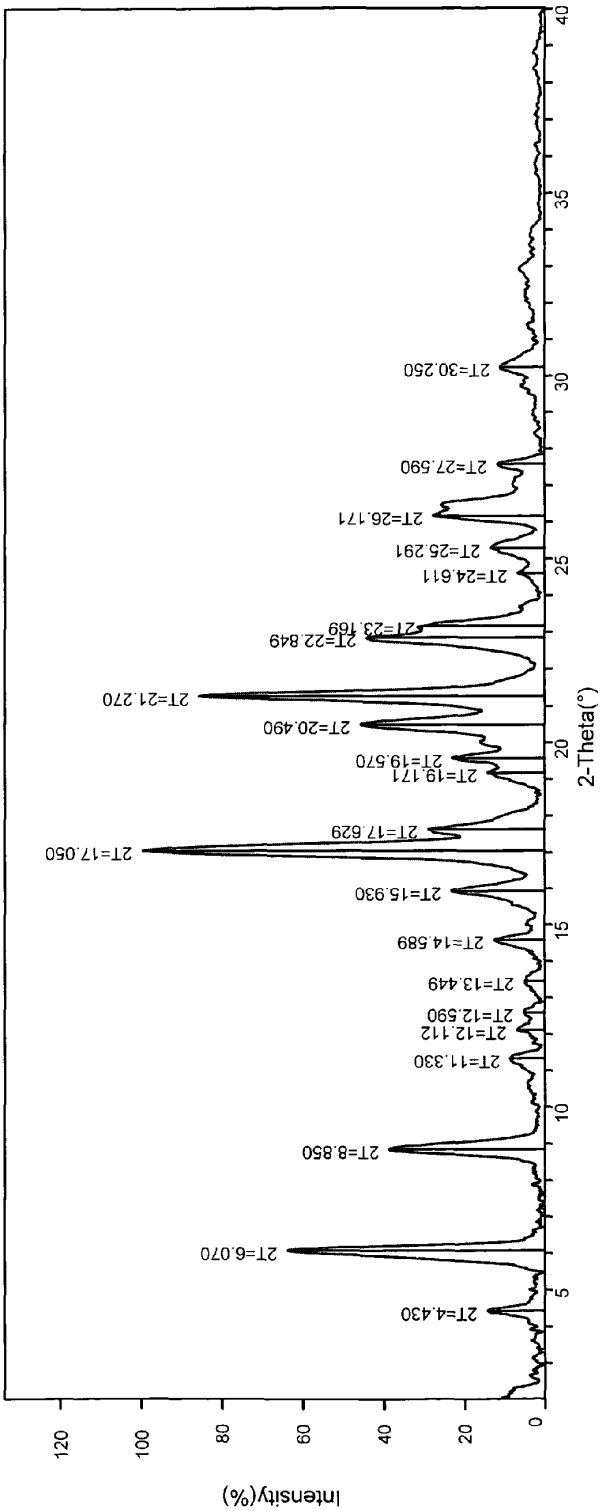

Intensity(%)
0
20
40
60
80
100
120
2-Theta(°)
0
5
10
15
20
25
30
35
40
2T=4.430
2T=6.070
2T=8.850
2T=11.330
2T=12.112
2T=12.590
2T=13.449
2T=14.589
2T=15.930
2T=17.050
2T=17.629
2T=19.171
2T=19.570
2T=20.490
2T=21.270
2T=22.849
2T=23.169
2T=24.611
2T=25.291
2T=26.171
2T=27.590
2T=30.250

FIG. 18

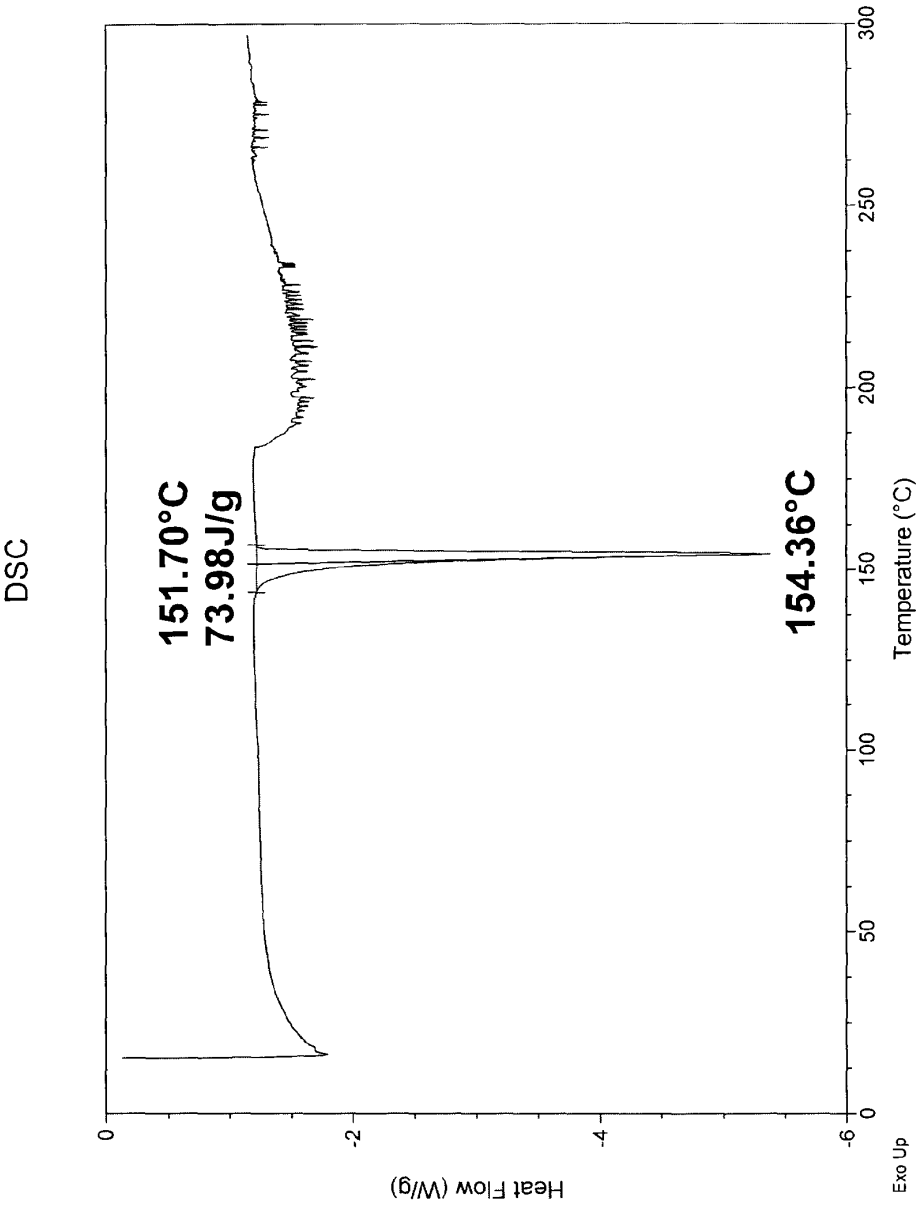

DSC
151.70°C
73.98J/g
154.36°C
Heat Flow (W/g)
0
-2
-4
-6
Exo Up
0
50
100
150
200
250
300
Temperature (°C)

FIG. 19

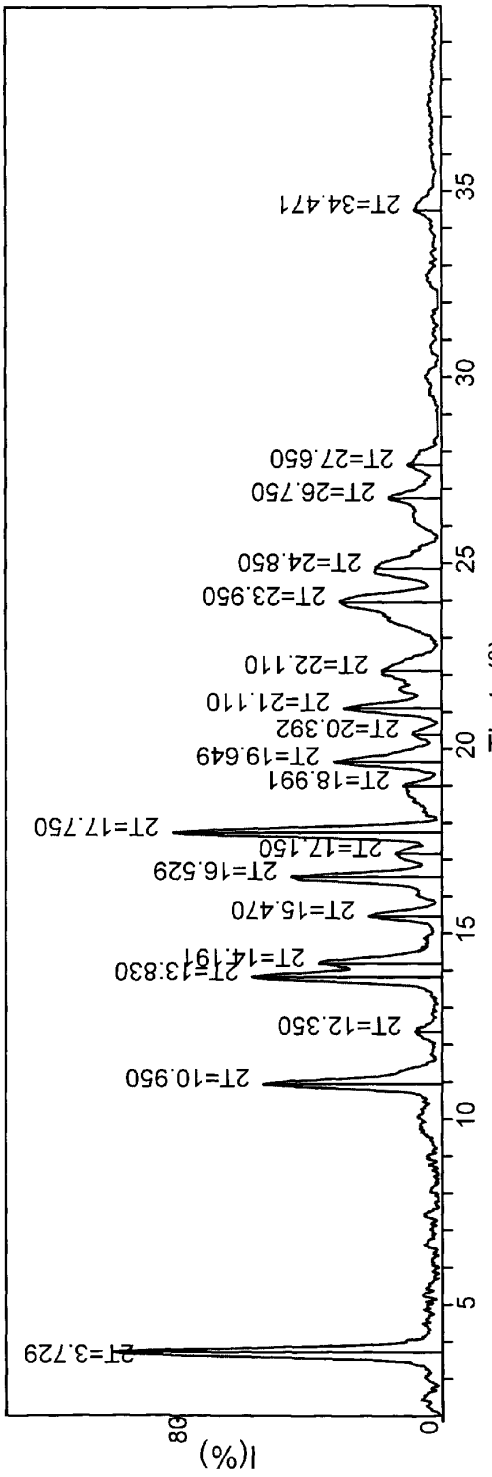

2T=3.729
2T=10.950
2T=12.350
2T=13.830
2T=14.191
2T=15.470
2T=16.529
2T=17.150
2T=17.750
2T=18.991
2T=19.649
2T=20.392
2T=21.110
2T=22.110
2T=23.950
2T=24.850
2T=26.750
2T=27.650
2T=34.471
I(%)
Theta(°)

FIG. 20

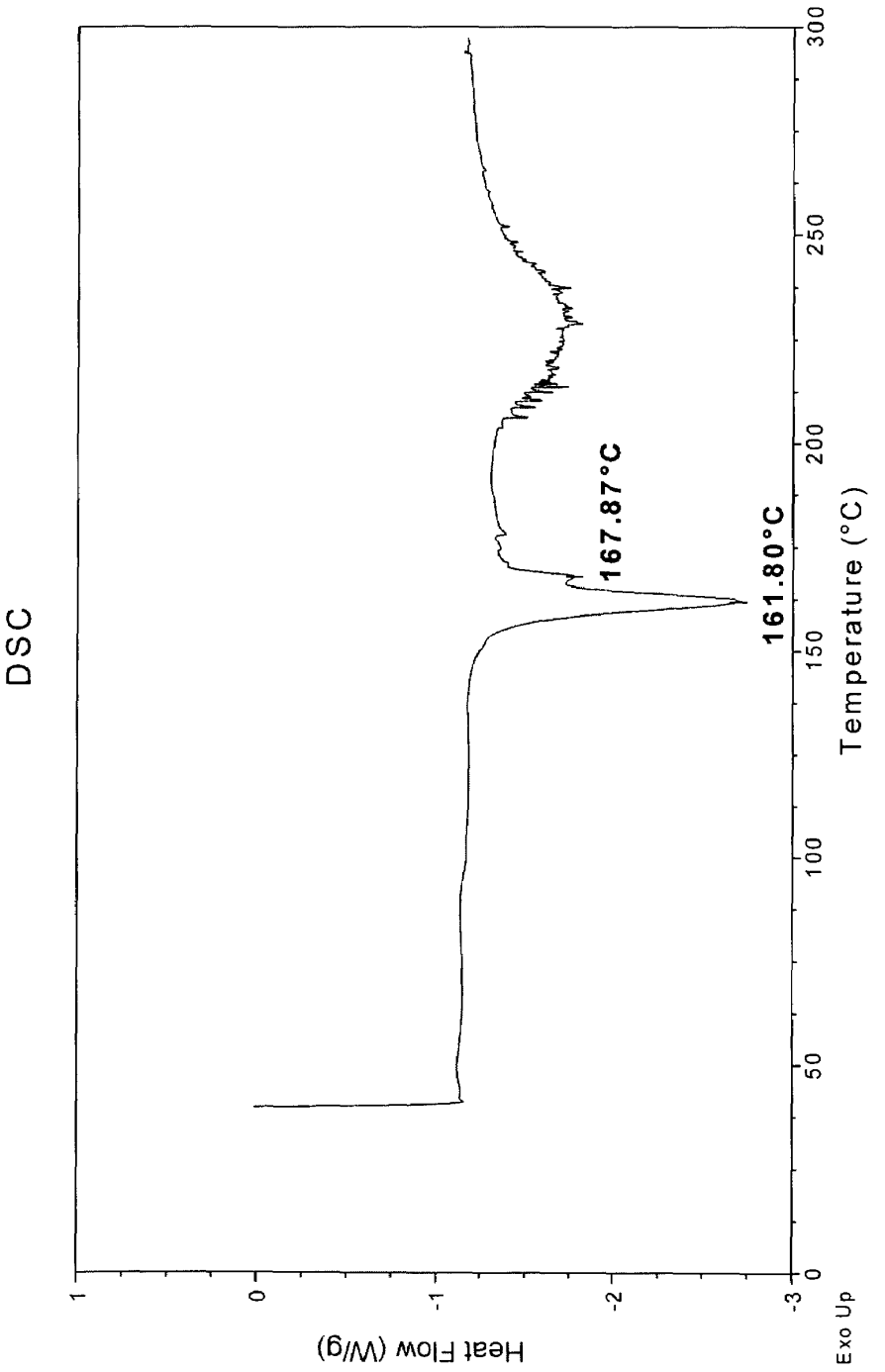

DSC
167.87°C
161.80°C
Temperature (°C)
Heat Flow (W/g)
Exo Up
1
0
-1
-2
-3
0
50
100
150
200
250
300

FIG. 21

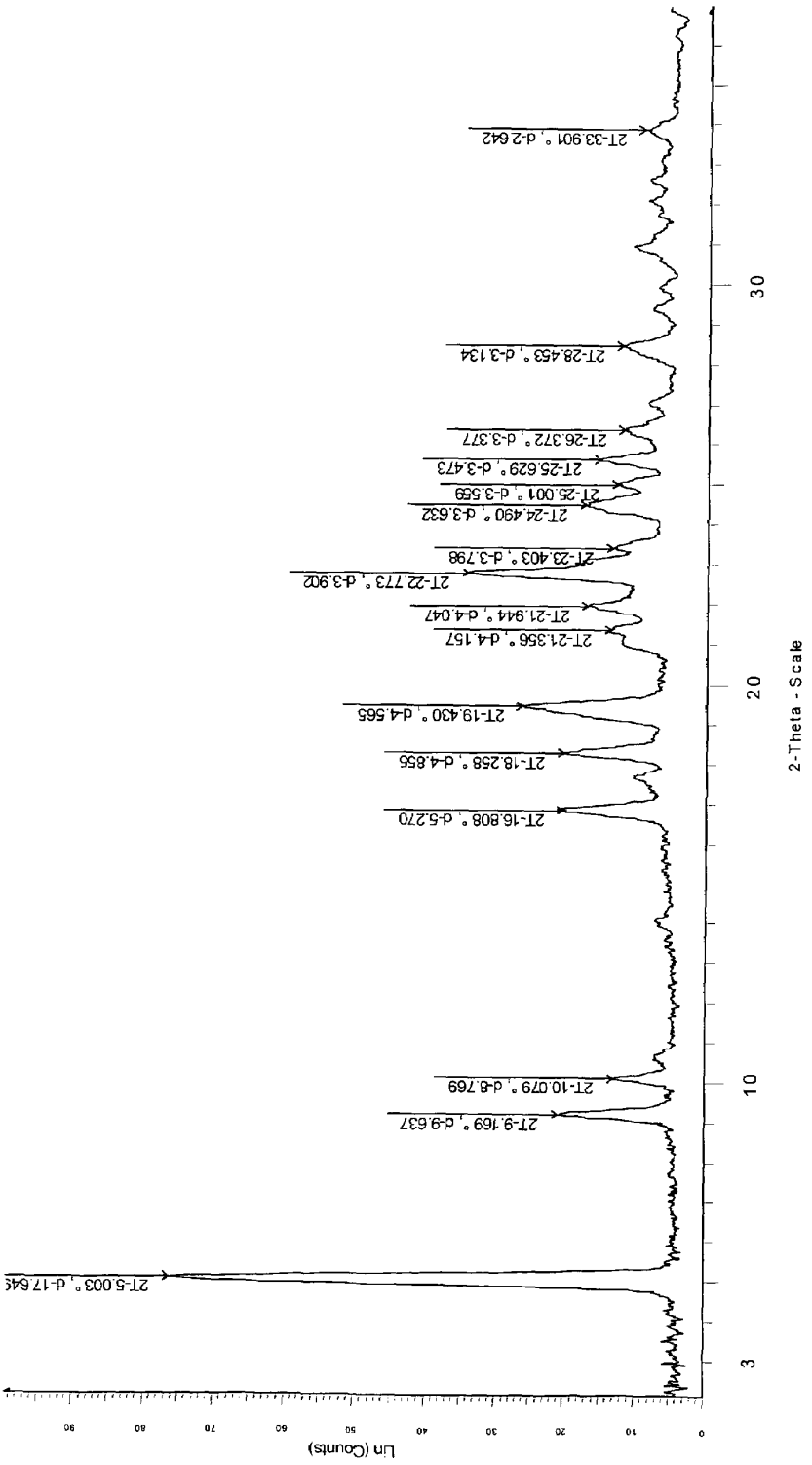

2T-5.003°, d-17.64
2T-9.169°, d-9.637
2T-10.079°, d-8.769
2T-16.808°, d-5.270
2T-18.258°, d-4.856
2T-19.430°, d-4.565
2T-21.356°, d-4.157
2T-21.944°, d-4.047
2T-22.773°, d-3.902
2T-23.403°, d-3.798
2T-24.490°, d-3.632
2T-25.001°, d-3.569
2T-25.629°, d-3.473
2T-26.372°, d-3.377
2T-28.453°, d-3.134
2T-33.901°, d-2.642
Un (Counts)
2-Theta - Scale

FIG. 22

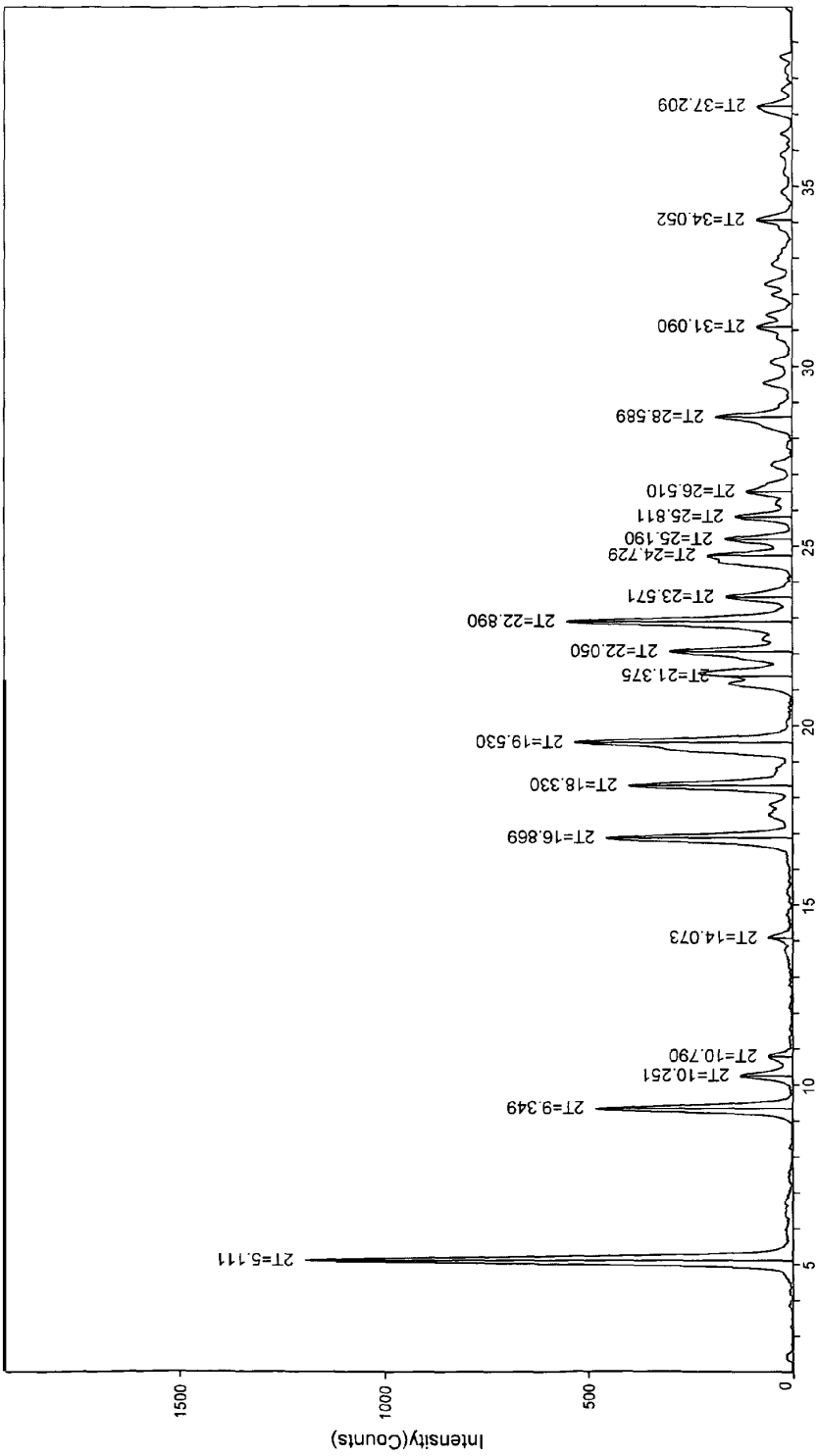

Intensity(Counts)
0
500
1000
1500
2-Theta(°)
5
10
15
20
25
30
35
2T=5.111
2T=9.349
2T=10.251
2T=10.790
2T=14.073
2T=16.869
2T=18.330
2T=19.530
2T=21.375
2T=22.050
2T=22.890
2T=23.571
2T=24.729
2T=25.190
2T=25.811
2T=26.510
2T=28.589
2T=31.090
2T=34.052
2T=37.209

FIG. 23

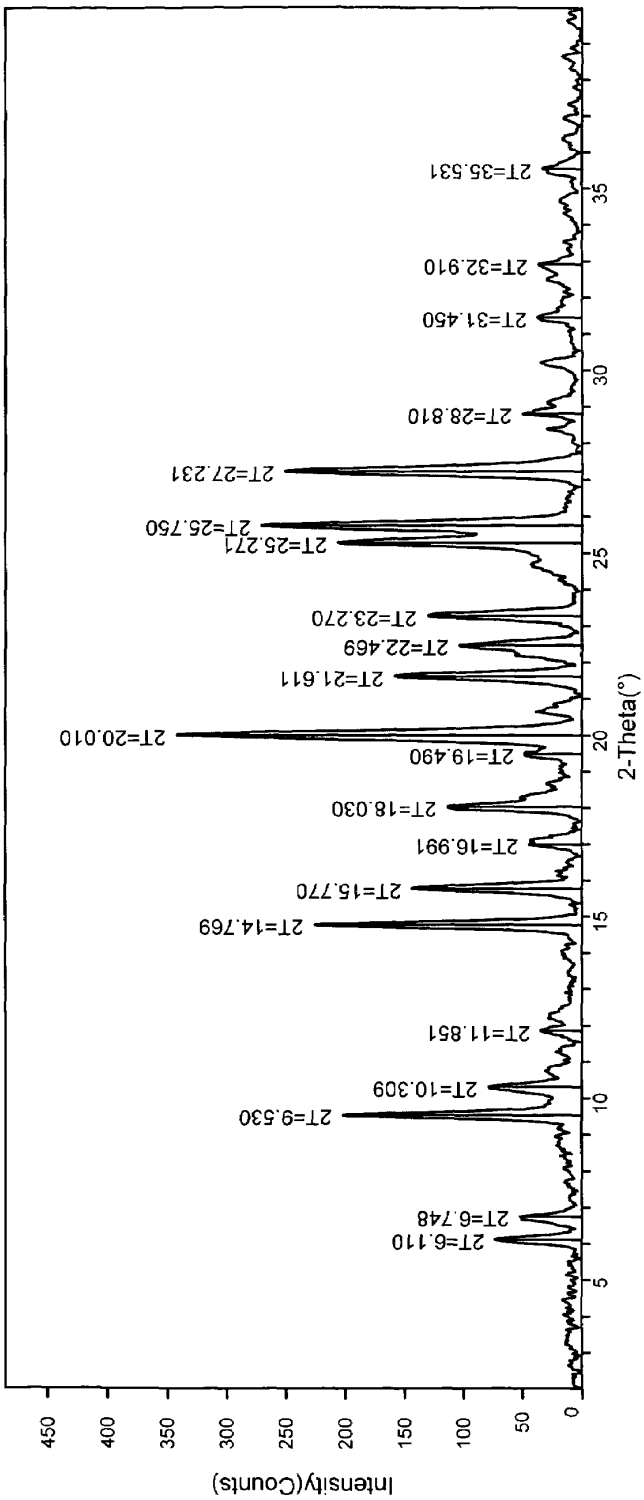

Intensity(Counts)
0
50
100
150
200
250
300
350
400
450
2-Theta(°)
5
10
15
20
25
30
35
2T=6.110
2T=6.748
2T=9.530
2T=10.309
2T=11.851
2T=14.769
2T=15.770
2T=16.991
2T=18.030
2T=19.490
2T=20.010
2T=21.611
2T=22.469
2T=23.270
2T=25.271
2T=25.750
2T=27.231
2T=28.810
2T=31.450
2T=32.910
2T=35.531

FIG. 24

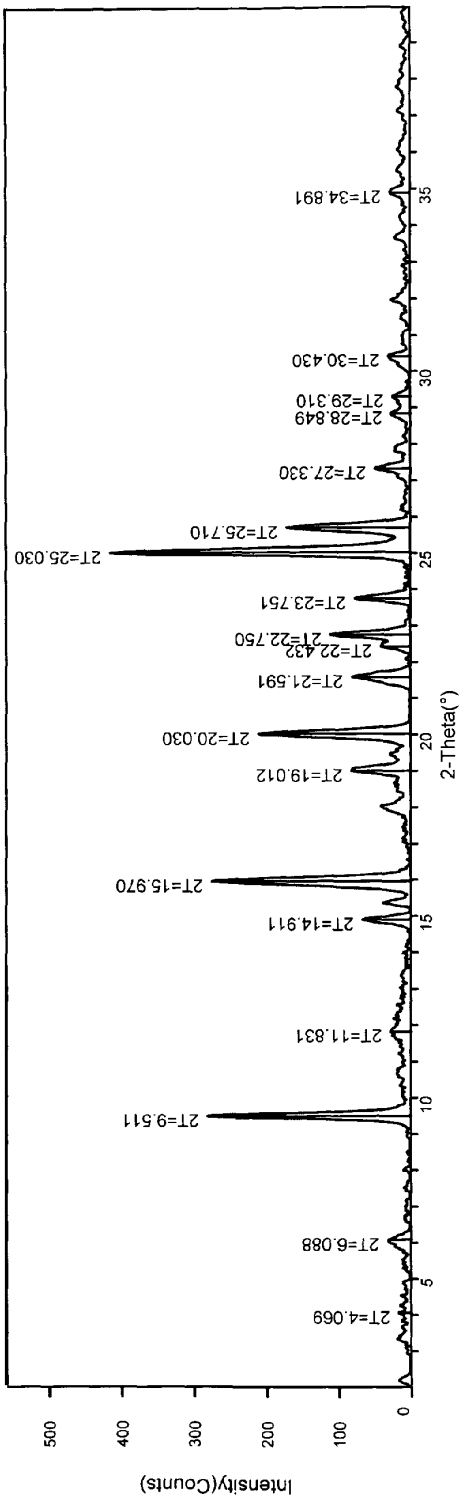

Intensity(Counts)
0
100
200
300
400
500
2-Theta(°)
5
10
15
20
25
30
35
2T=4.069
2T=6.088
2T=9.511
2T=11.831
2T=14.911
2T=15.970
2T=19.012
2T=20.030
2T=21.591
2T=22.432
2T=22.750
2T=23.751
2T=25.030
2T=25.710
2T=27.330
2T=28.849
2T=29.310
2T=30.430
2T=34.891

FIG. 25

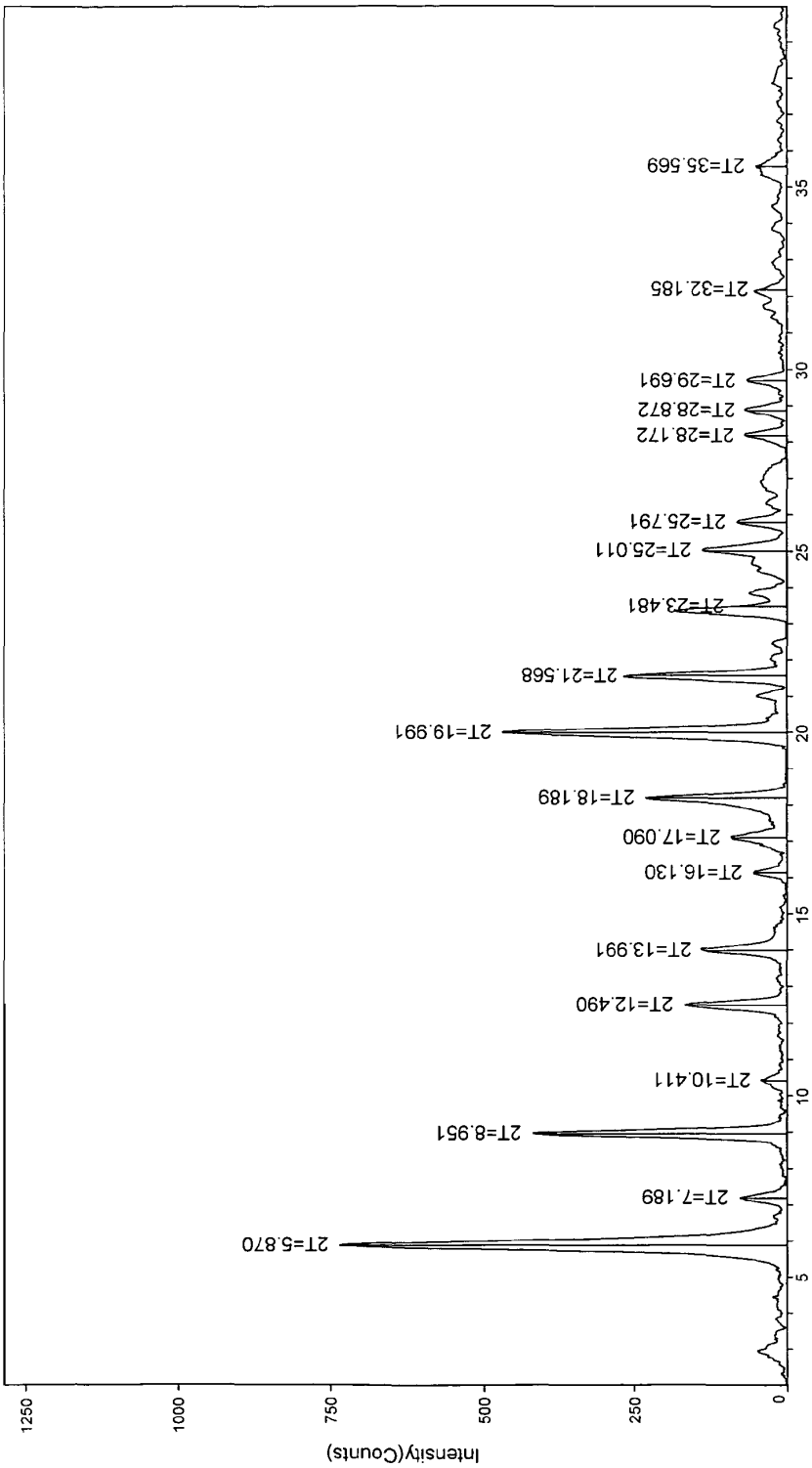

Intensity(Counts)
0
250
500
750
1000
1250
2-Theta(°)
5
10
15
20
25
30
35
2T=5.870
2T=7.189
2T=8.951
2T=10.411
2T=12.490
2T=13.991
2T=16.130
2T=17.090
2T=18.189
2T=19.991
2T=21.568
2T=23.481
2T=25.011
2T=25.791
2T=28.172
2T=28.872
2T=29.691
2T=32.185
2T=35.569

FIG. 26

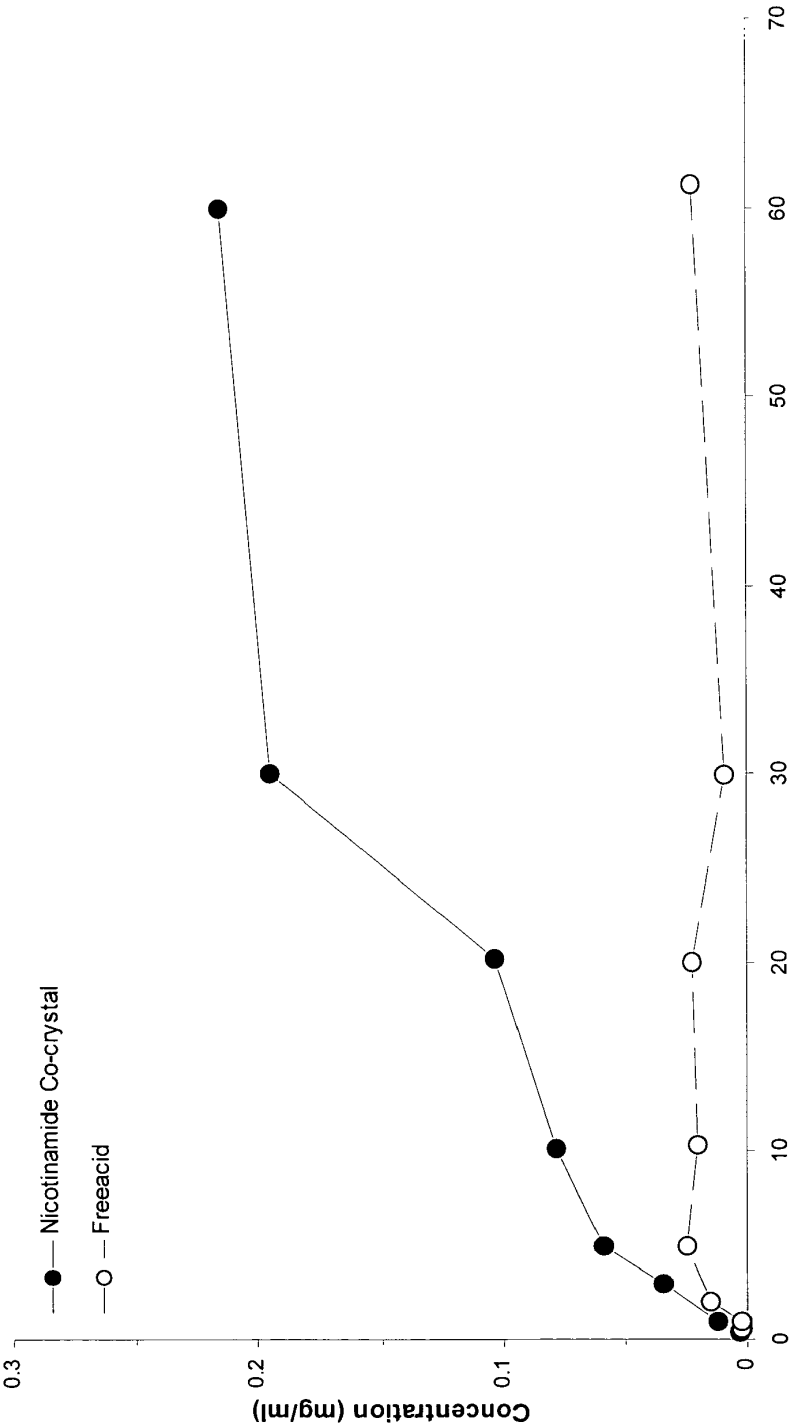

Nicotinamide Co-crystal
Freeacid
Concentration (mg/ml)
0.3
0.2
0.1
0
0
10
20
30
40
50
60
70
Time (min)

FIG. 27

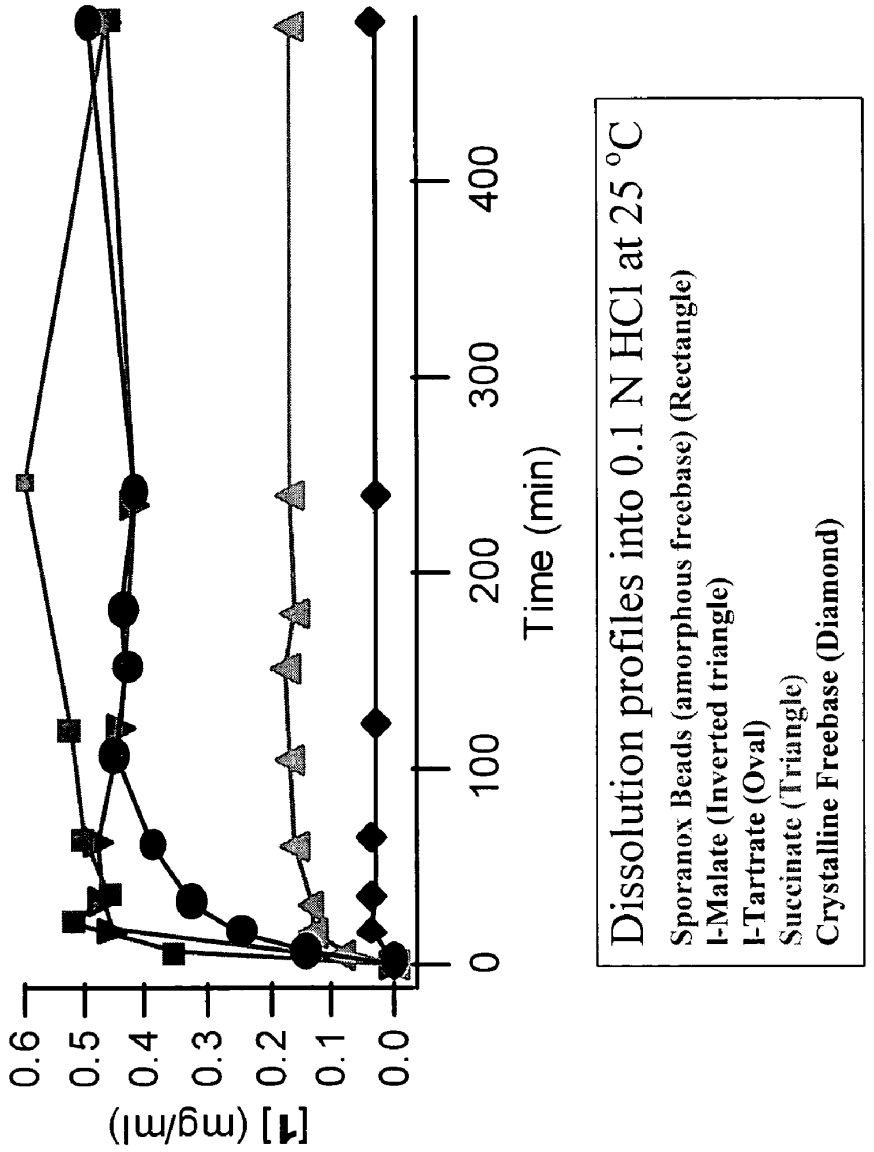

Dissolution profiles into 0.1 N HCl at 25 °C
Sporanox Beads (amorphous freebase) (Rectangle)
l-Malate (Inverted triangle)
l-Tartrate (Oval)
Succinate (Triangle)
Crystalline Freebase (Diamond)
[1] (mg/ml)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
100
200
300
400
Time (min)

FIG. 28

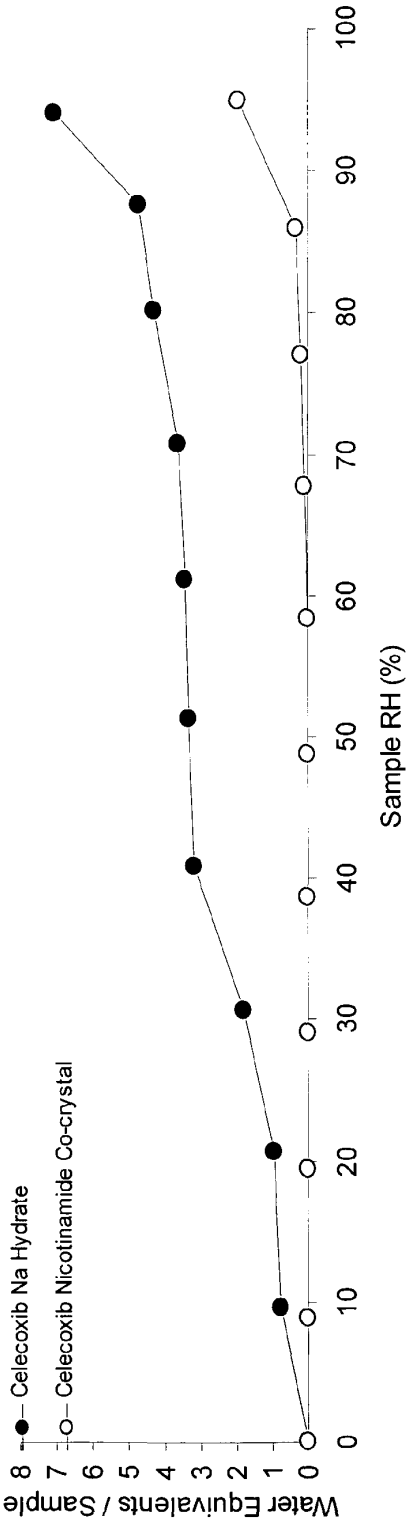

Celecoxib Na Hydrate
Celecoxib Nicotinamide Co-crystal
Water Equivalents / Sample
0
1
2
3
4
5
6
7
8
0
10
20
30
40
50
60
70
80
90
100
Sample RH (%)

FIG. 29

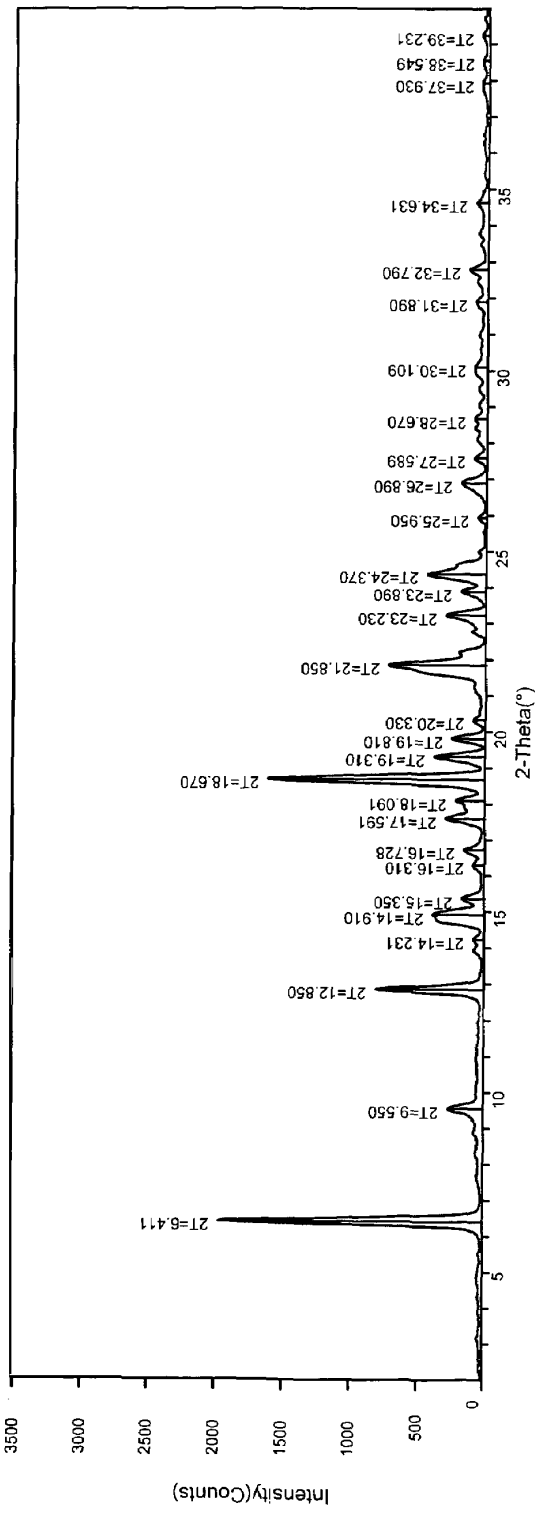

Intensity(Counts)
3500
3000
2500
2000
1500
1000
500
0
2-Theta(°)
5
10
15
20
25
30
35
2T=6.411
2T=9.550
2T=12.850
2T=14.231
2T=14.910
2T=15.350
2T=16.310
2T=16.728
2T=17.591
2T=18.091
2T=18.670
2T=19.310
2T=19.810
2T=20.330
2T=21.850
2T=23.230
2T=23.890
2T=24.370
2T=25.950
2T=26.890
2T=27.589
2T=28.670
2T=30.109
2T=31.890
2T=32.790
2T=34.631
2T=37.930
2T=38.549
2T=39.231

FIG. 30

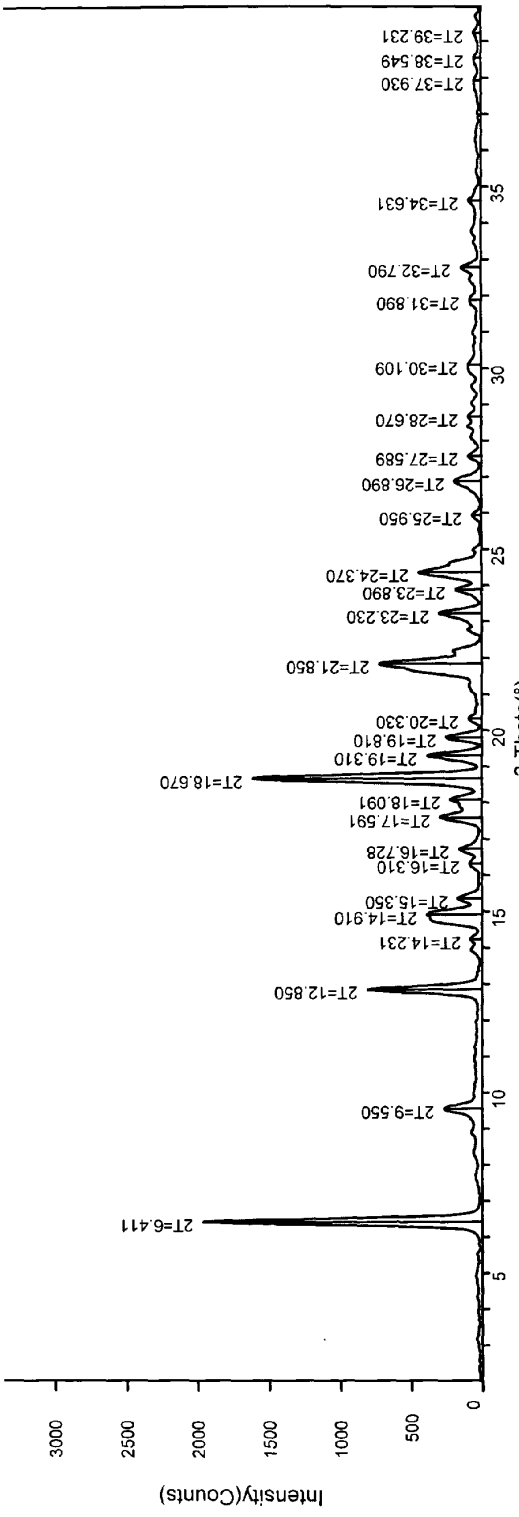

Intensity(Counts)
3000
2500
2000
1500
1000
500
0
2-Theta(°)
0
5
10
15
20
25
30
35
2T=6.411
2T=9.550
2T=12.850
2T=14.231
2T=14.910
2T=15.350
2T=16.310
2T=16.728
2T=17.591
2T=18.091
2T=18.670
2T=19.310
2T=19.810
2T=20.330
2T=21.850
2T=23.230
2T=23.890
2T=24.370
2T=25.950
2T=26.890
2T=27.589
2T=28.670
2T=30.109
2T=31.890
2T=32.790
2T=34.631
2T=37.930
2T=38.549
2T=39.231

FIG. 31

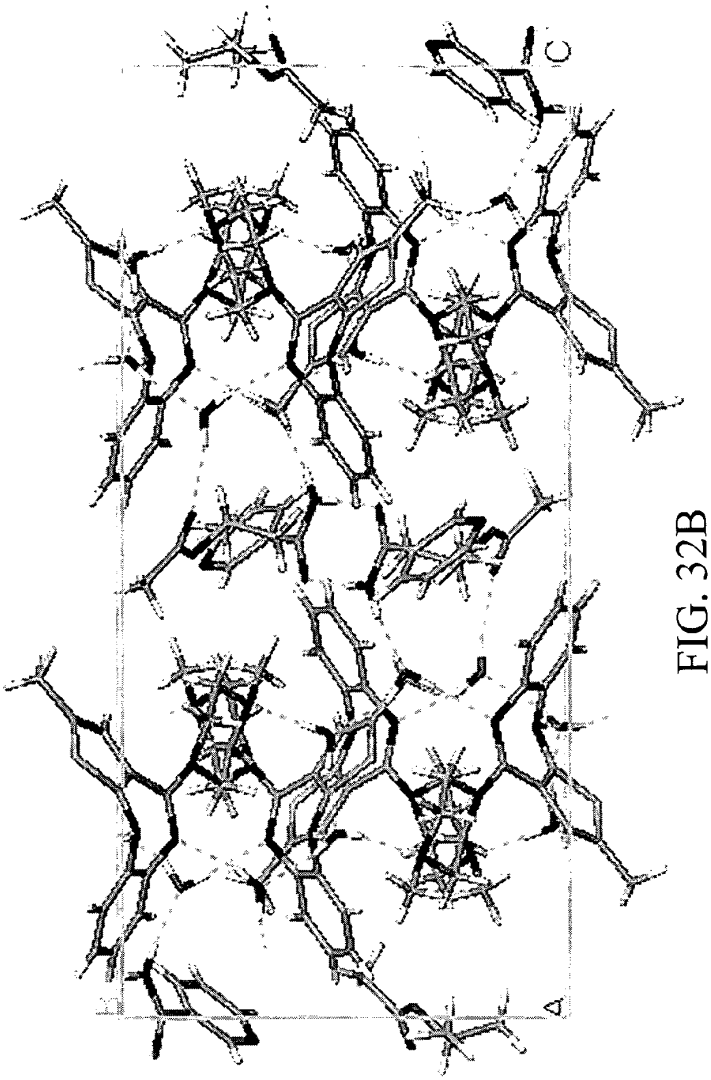


FIG. 32B

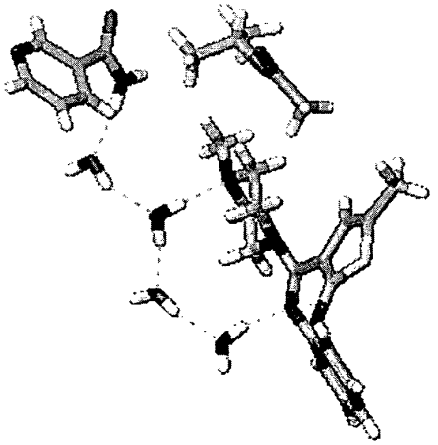


FIG. 32A

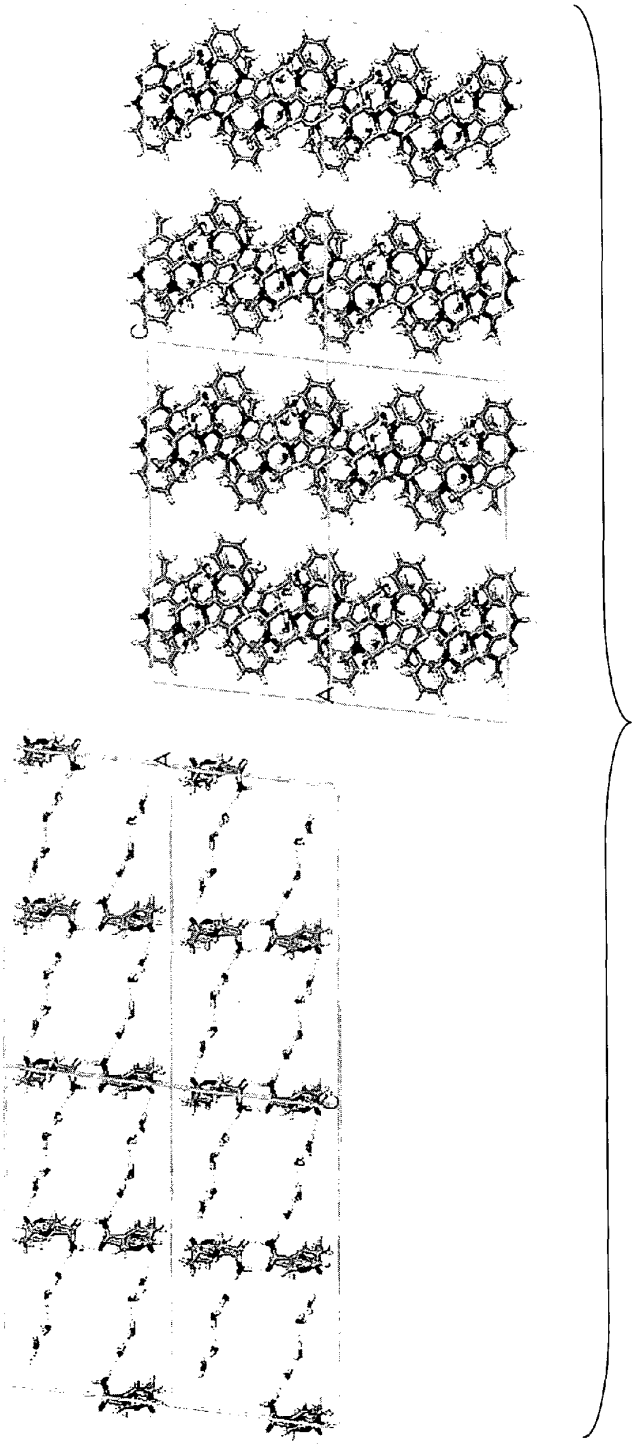


FIG. 32C

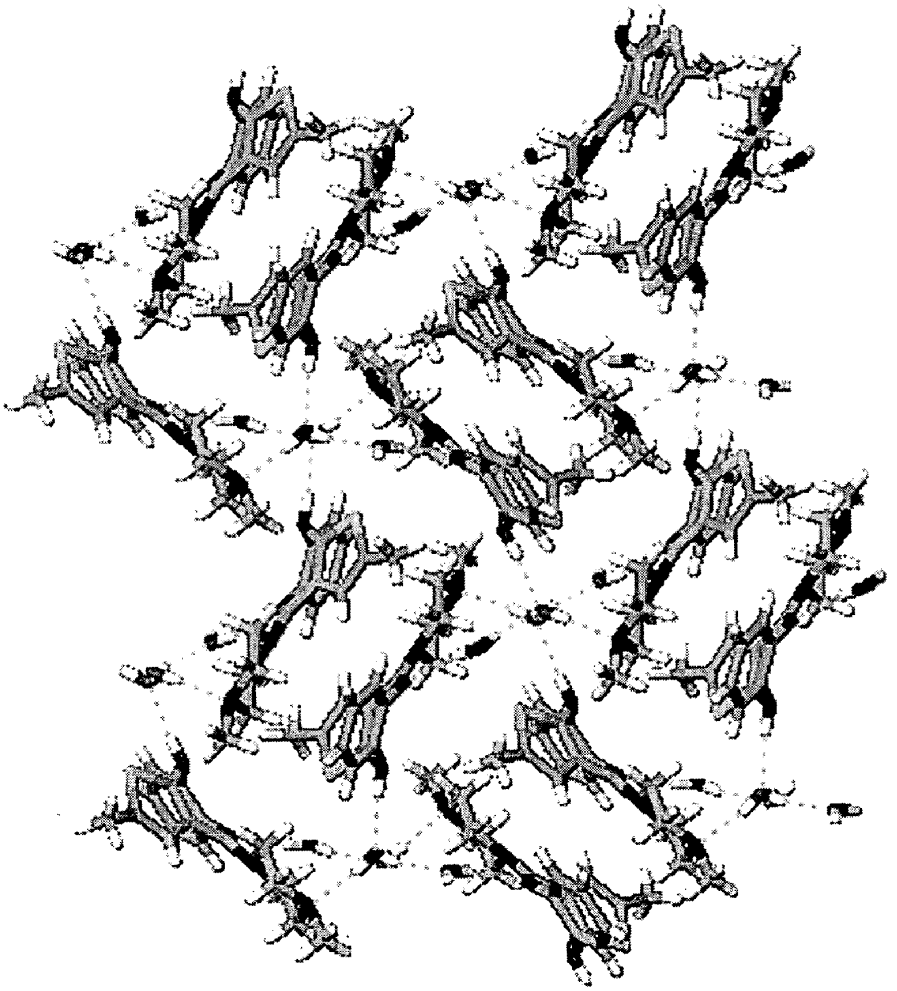


FIG. 32D

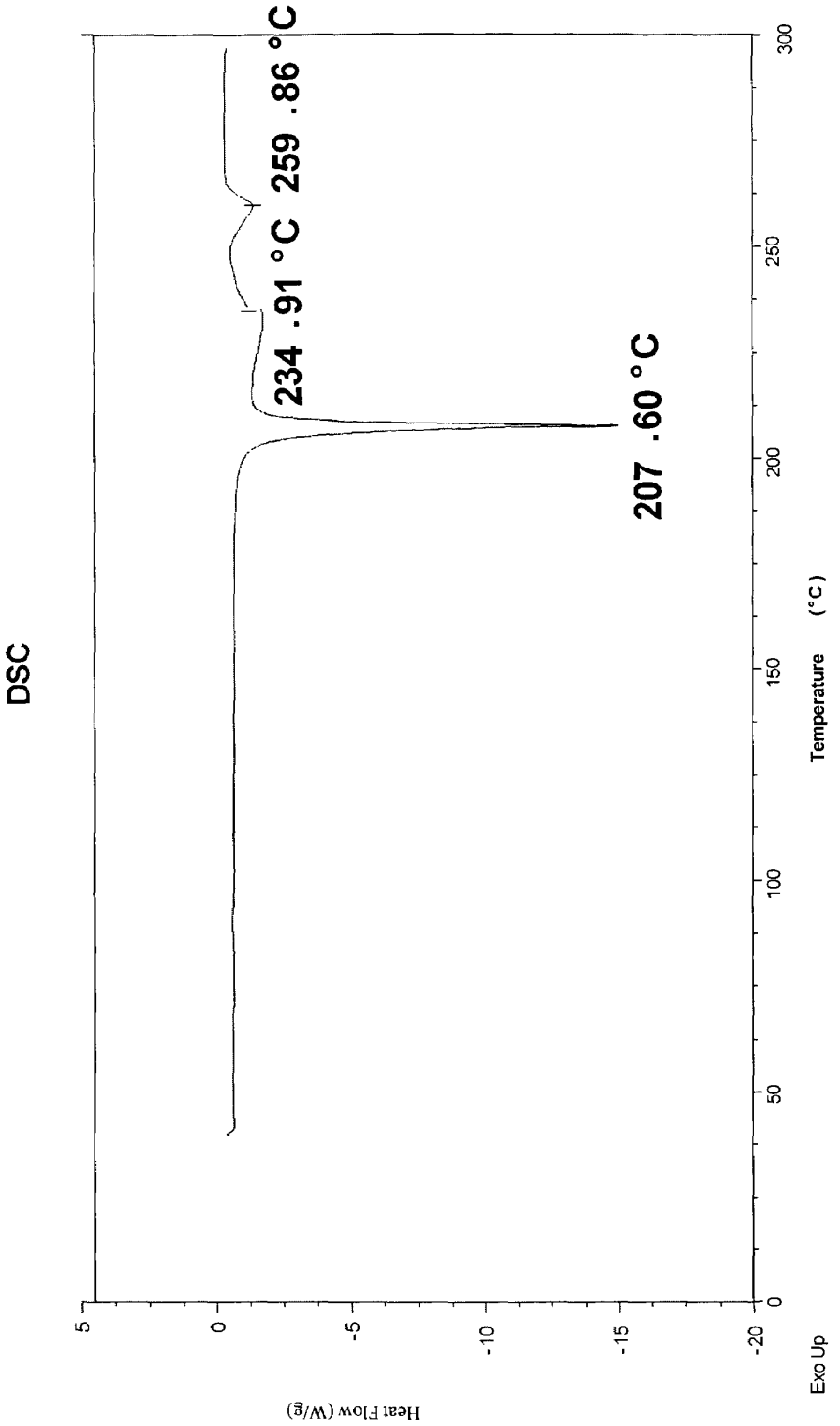

DSC
234 .91 °C
259 .86 °C
207 .60 °C
Heat Flow (W/g)
5
0
-5
-10
-15
-20
Exo Up
0
50
100
150
200
250
300
Temperature (°C)

FIG. 33

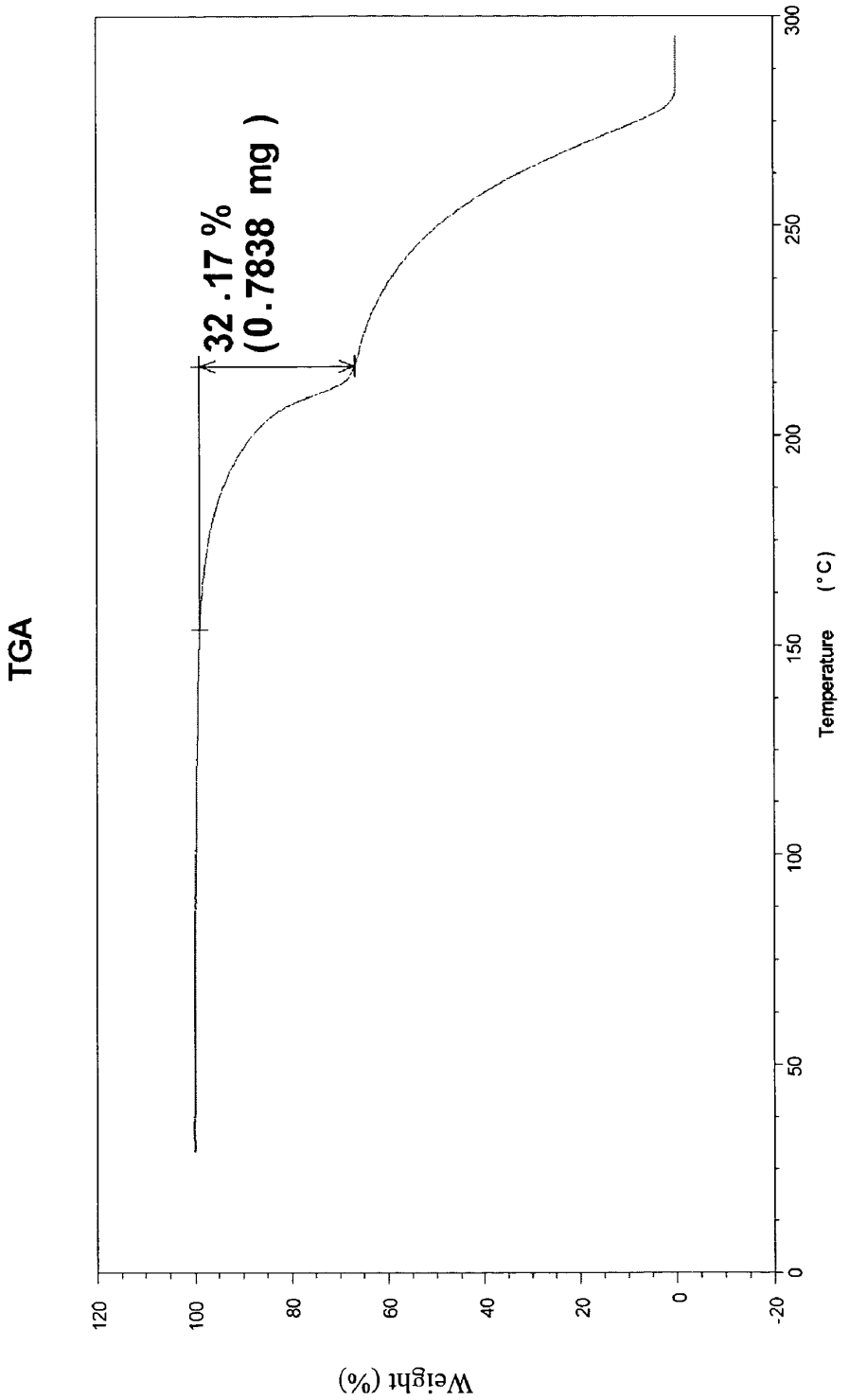

TGA
32 .17 %
(0.7838 mg)
Weight (%)
120
100
80
60
40
20
0
-20
0
50
100
150
200
250
300
Temperature (°C)

FIG. 34

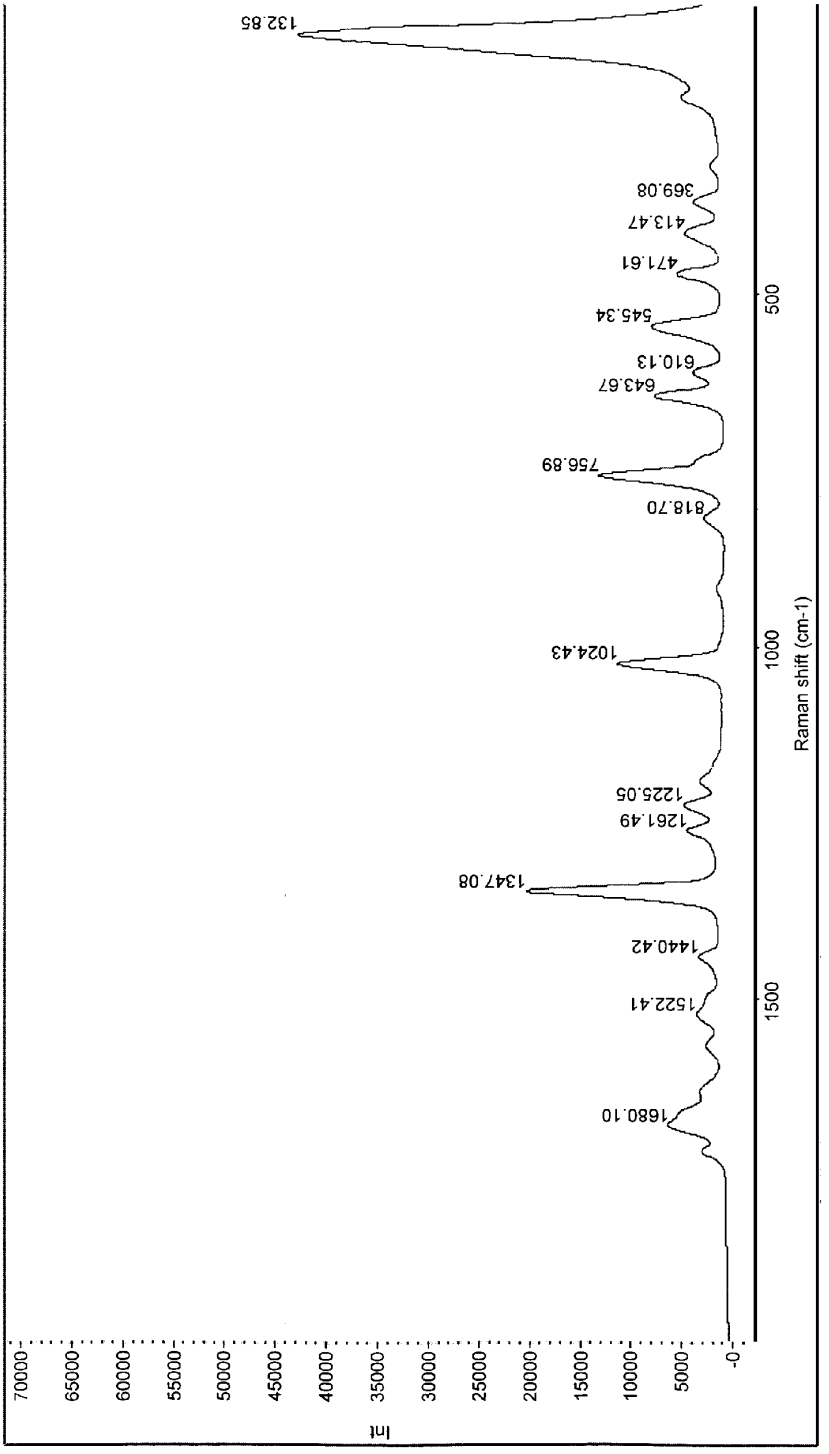

132.85
369.08
413.47
471.61
545.34
610.13
643.67
756.89
818.70
1024.43
1225.05
1261.49
1347.08
1440.42
1522.41
1680.10
Int
70000
65000
60000
55000
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
-0
500
1000
1500
Raman shift (cm-1)

FIG. 35

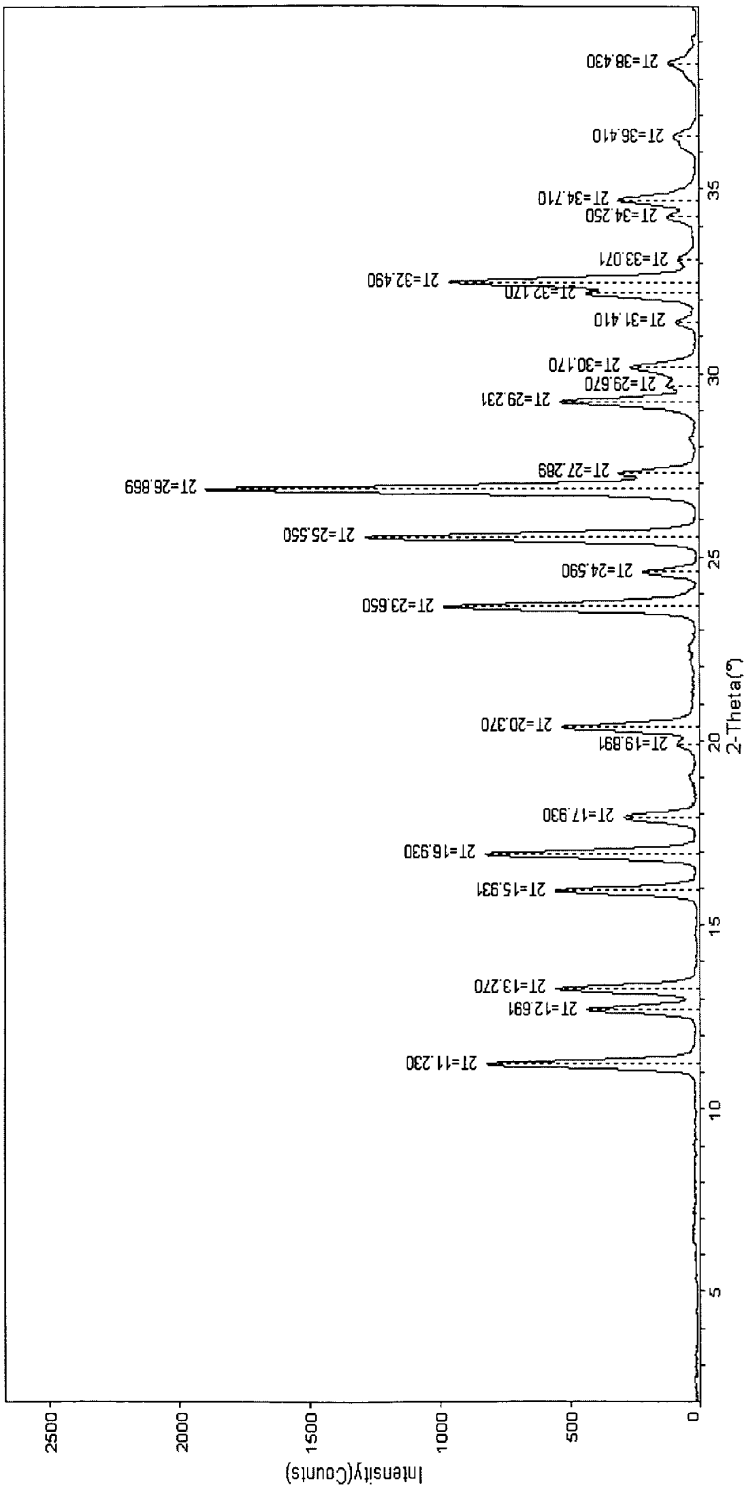

Intensity(Counts)
2-Theta(°)
2T=11.230
2T=12.691
2T=13.270
2T=15.931
2T=16.930
2T=17.930
2T=19.891
2T=20.370
2T=23.650
2T=24.590
2T=25.550
2T=26.869
2T=27.289
2T=29.231
2T=29.670
2T=30.170
2T=31.410
2T=32.170
2T=32.490
2T=33.071
2T=34.250
2T=34.710
2T=36.410
2T=38.430

FIG. 36

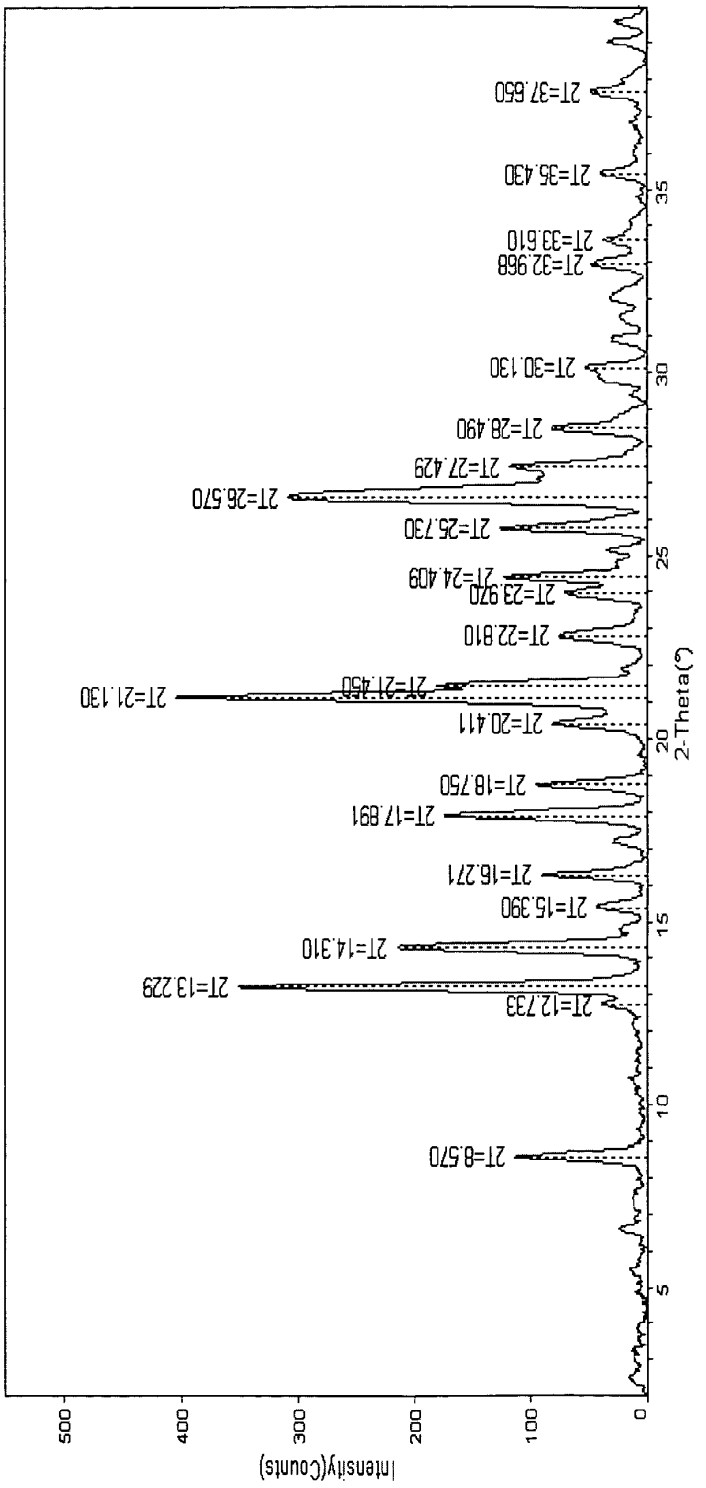

Intensity(Counts)
0
100
200
300
400
500
2-Theta(°)
5
10
15
20
25
30
35
2T=8.570
2T=12.733
2T=13.229
2T=14.310
2T=15.390
2T=16.271
2T=17.891
2T=18.750
2T=20.411
2T=21.130
2T=21.450
2T=22.810
2T=23.920
2T=24.409
2T=25.730
2T=26.570
2T=27.429
2T=28.490
2T=30.130
2T=32.968
2T=33.610
2T=36.430
2T=37.650

FIG. 37

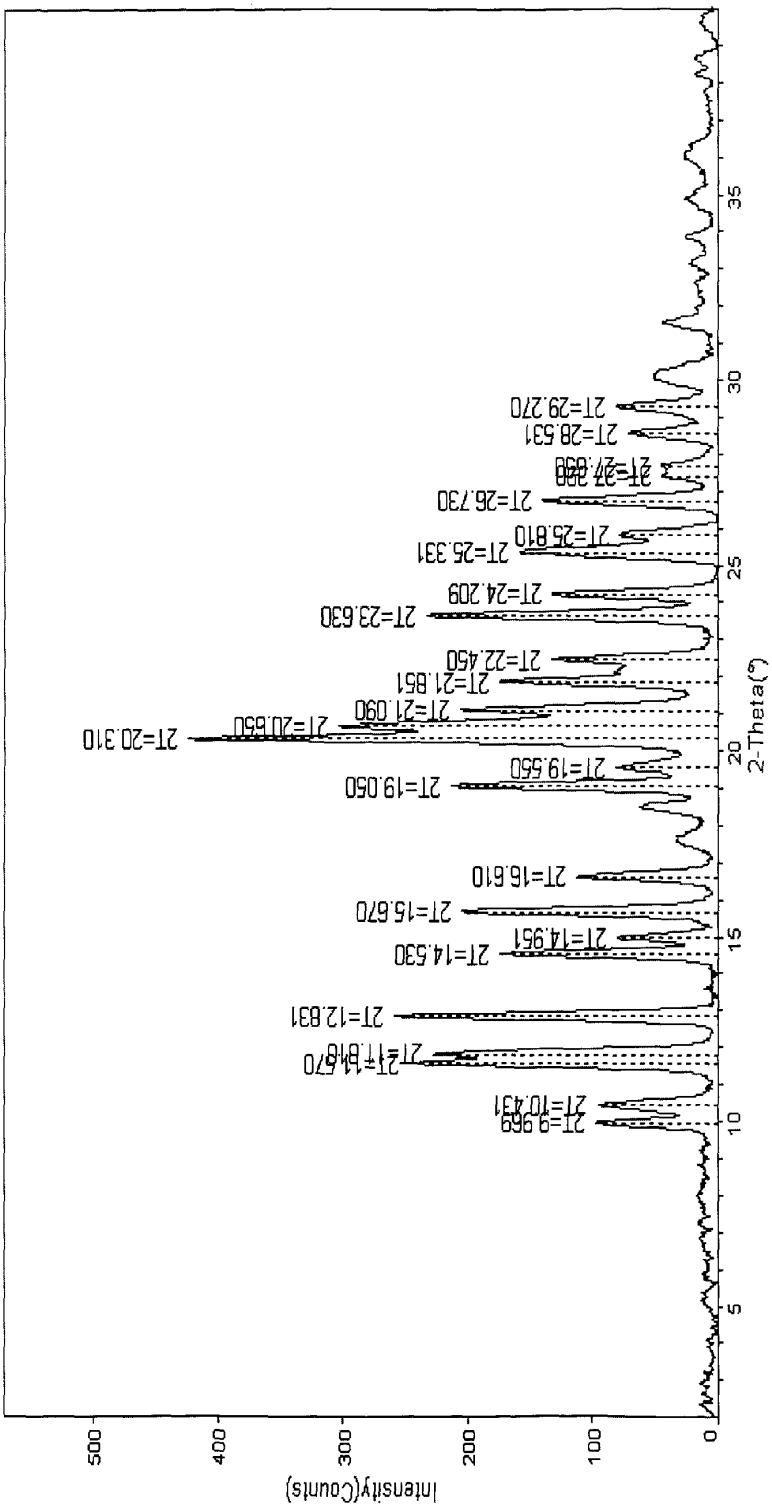

Intensity(Counts)
2-Theta(°)
2T=9.969
2T=10.431
2T=11.870
2T=12.831
2T=14.530
2T=14.961
2T=15.670
2T=16.610
2T=19.050
2T=19.550
2T=20.310
2T=20.650
2T=21.090
2T=21.851
2T=22.450
2T=23.630
2T=24.209
2T=25.331
2T=25.810
2T=26.730
2T=28.531
2T=29.270

FIG. 38

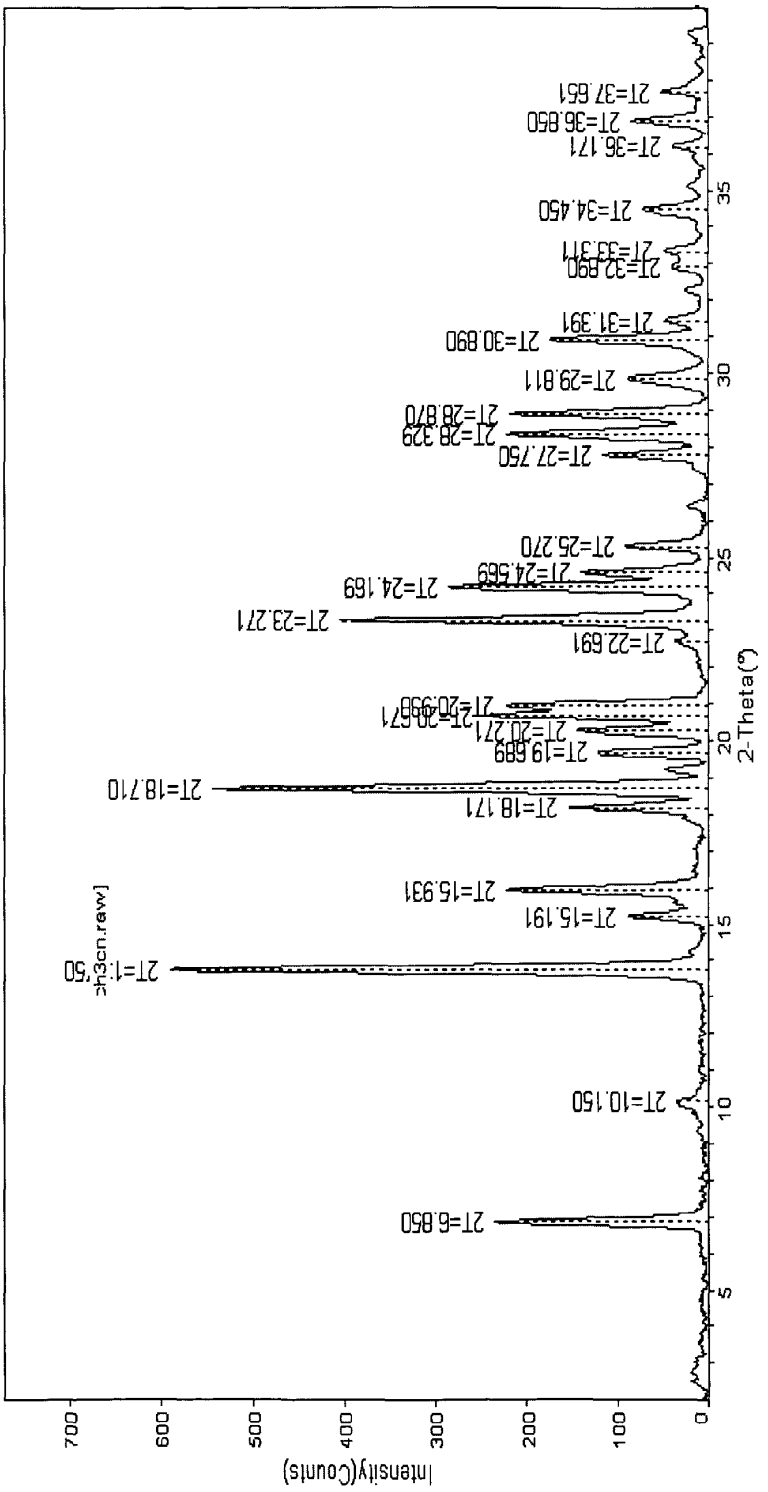

Intensity(Counts)
2-Theta(°)
2h3cn.raw]
2T=6.850
2T=10.150
2T=15.191
2T=15.931
2T=18.171
2T=18.710
2T=19.689
2T=20.271
2T=20.938
2T=22.691
2T=23.271
2T=24.169
2T=24.569
2T=25.270
2T=27.750
2T=28.329
2T=28.870
2T=29.811
2T=30.890
2T=31.391
2T=32.890
2T=33.311
2T=34.450
2T=36.171
2T=36.850
2T=37.651

FIG. 39

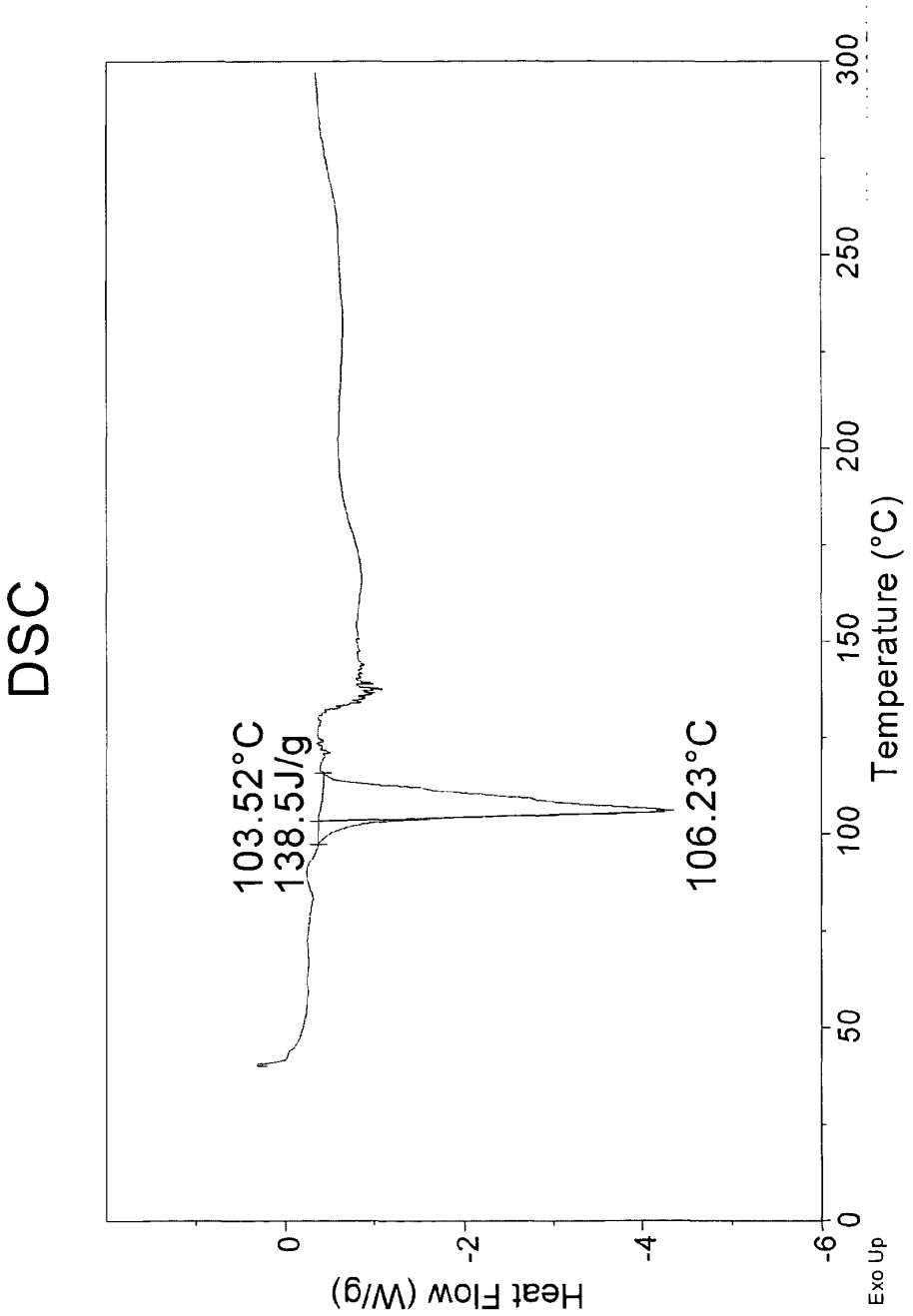

DSC
103.52°C
138.5J/g
106.23°C
Heat Flow (W/g)
Exo Up
Temperature (°C)
0
-2
-4
-6
0
50
100
150
200
250
300

FIG. 40

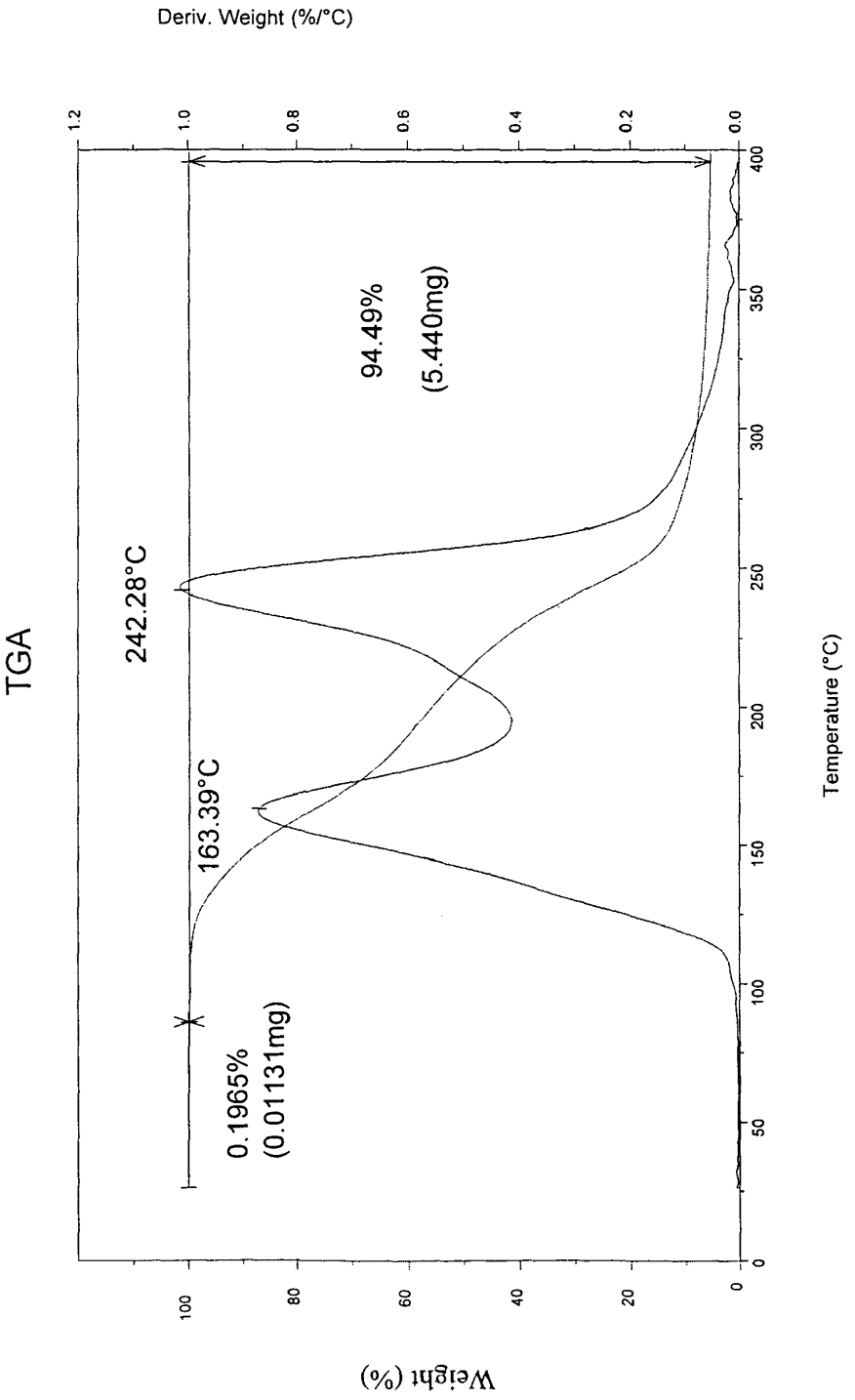

TGA
Deriv. Weight (%/°C)
Weight (%)
Temperature (°C)
242.28°C
163.39°C
94.49%
(5.440mg)
0.1965%
(0.01131mg)

FIG. 41

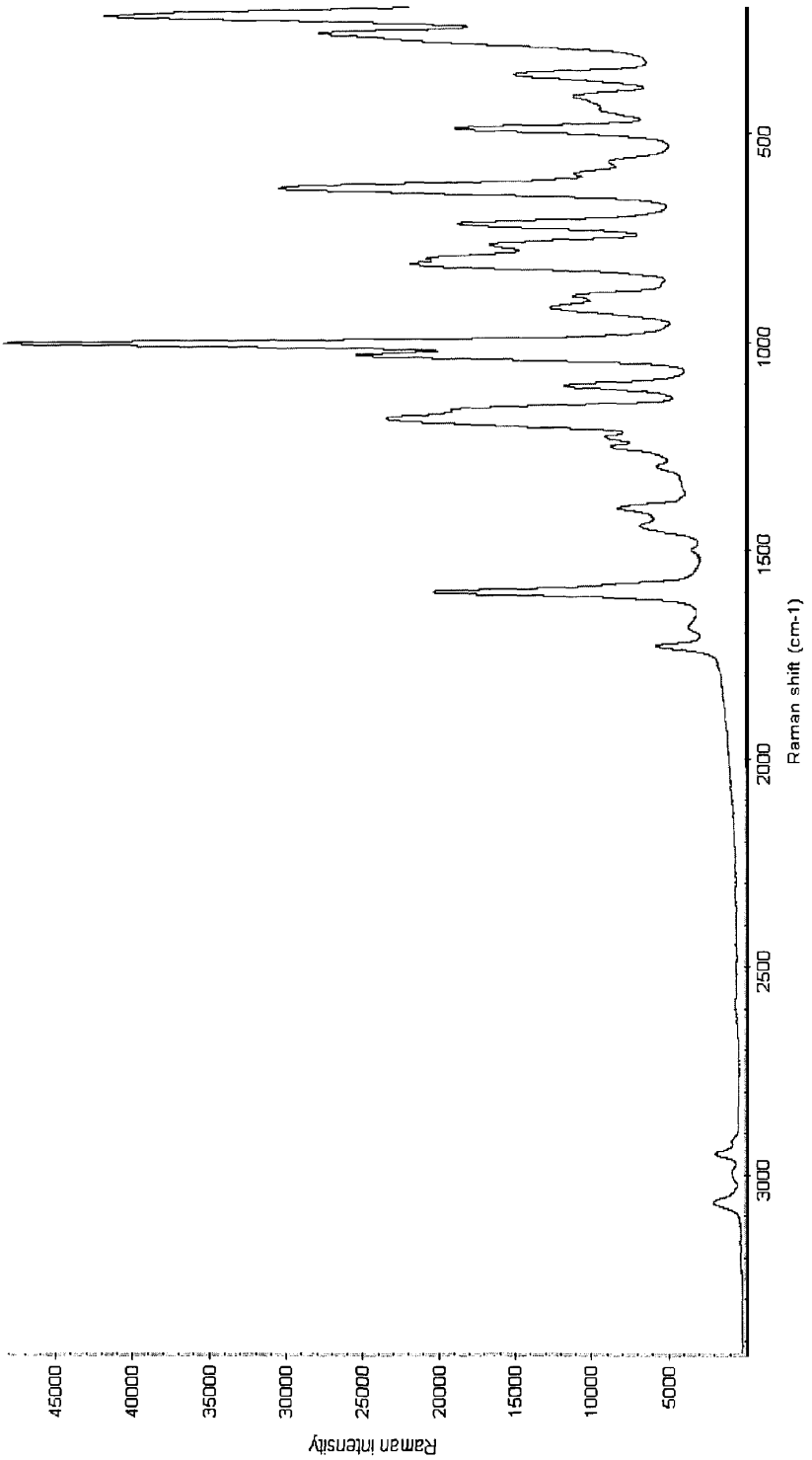

Raman intensity
45000
40000
35000
30000
25000
20000
15000
10000
5000
Raman shift (cm-1)
500
1000
1500
2000
2500
3000

FIG. 42A

```
FIND PEAKS:
  Spectrum:    MO-157-72C_Modafinil-Malonic_
  Region:  3432   200
  Absolute threshold:     580.428
  Sensitivity:    66
  Peak list:
      Position:   1004    Intensity:   48530.113
      Position:    222    Intensity:   41931.176
      Position:    833    Intensity:   30431.455
      Position:    265    Intensity:   27932.348
      Position:   1032    Intensity:   25424.109
      Position:   1183    Intensity:   23455.441
      Position:    814    Intensity:   21886.129
      Position:   1601    Intensity:   20374.211
      Position:    480    Intensity:   18917.486
      Position:    718    Intensity:   18779.322
      Position:    787    Intensity:   16891.541
      Position:    361    Intensity:   15080.872
      Position:    817    Intensity:   12651.283
      Position:   1104    Intensity:   11708.740
      Position:    869    Intensity:   11172.833
      Position:    412    Intensity:   11137.415
      Position:   1225    Intensity:    9027.109
      Position:   1251    Intensity:    8844.833
      Position:   1388    Intensity:    8252.702
      Position:   1442    Intensity:    6738.884
      Position:   1731    Intensity:    5730.559
      Position:   1288    Intensity:    5700.056
      Position:   3085    Intensity:    1935.514
      Position:   2048    Intensity:    1912.835
```

FIG. 42B

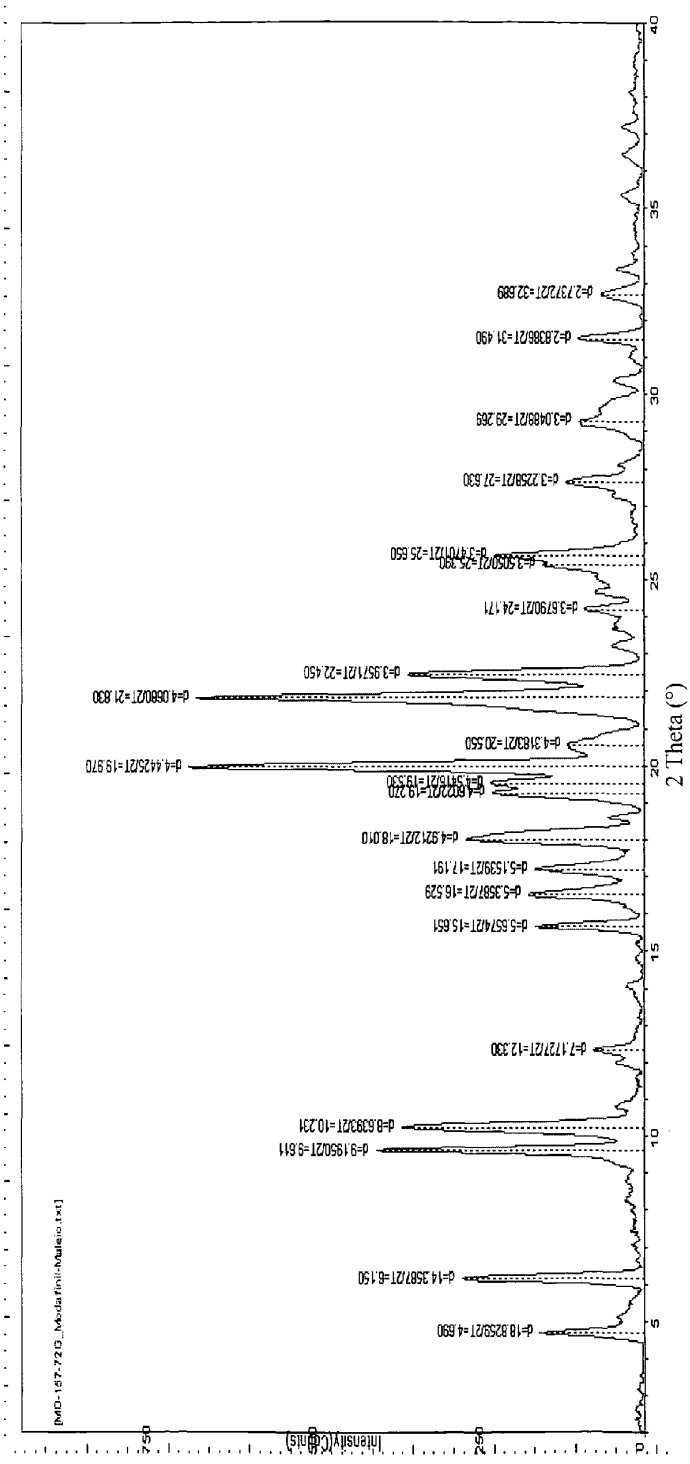

d=18.8258/21=4.690
d=14.3587/21=6.150
d=9.1950/21=9.611
d=8.5393/21=10.231
d=7.1727/21=12.330
d=5.6574/21=15.651
d=5.3587/21=16.529
d=5.1539/21=17.191
d=4.9212/21=18.010
d=4.8002/21=19.220
d=4.4425/21=19.970
d=4.3183/21=20.550
d=4.0880/21=21.830
d=3.9571/21=22.450
d=3.5790/21=24.171
d=3.4705/21=25.650
d=3.3258/21=27.530
d=3.0489/21=29.269
d=2.8386/21=31.490
d=2.7372/21=32.689
Intensity(Counts)
2 Theta (°)

FIG. 43

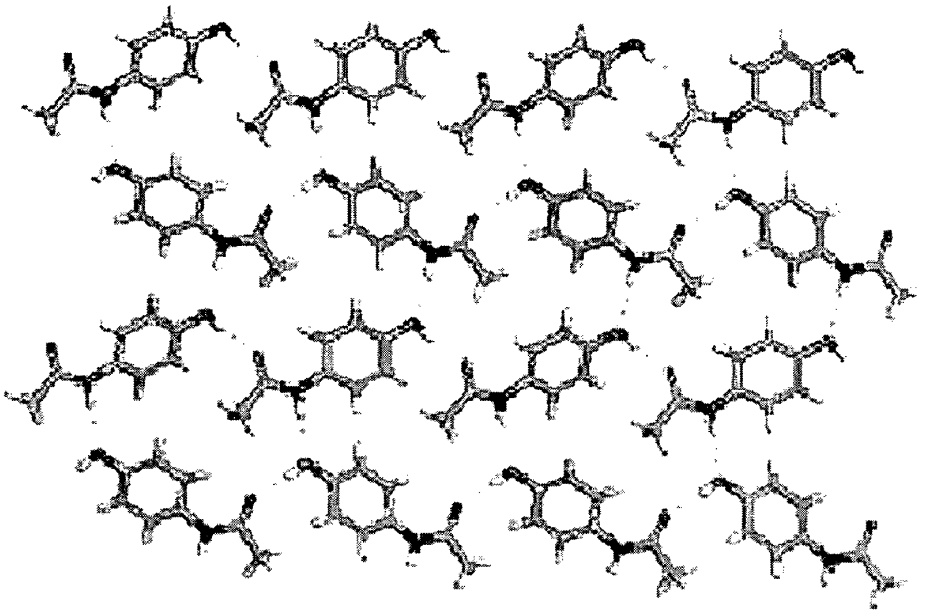


Figure 44A

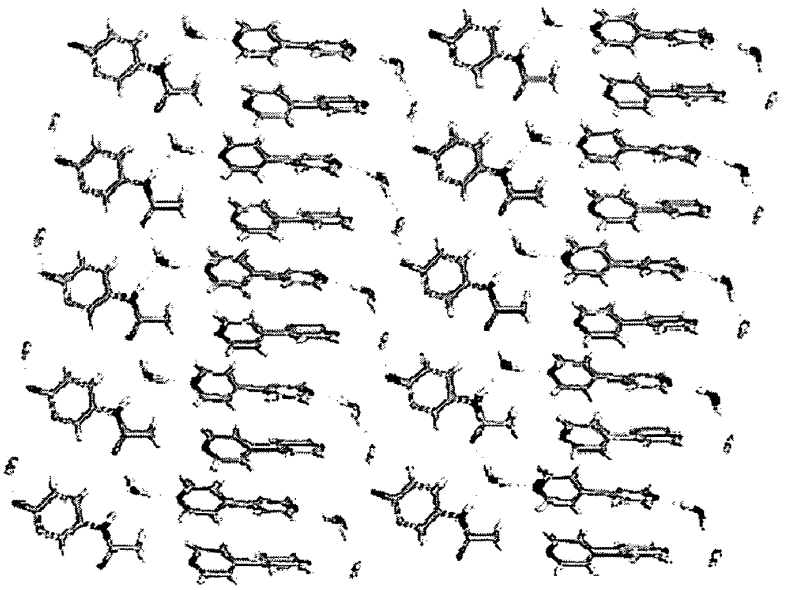


Figure 44B

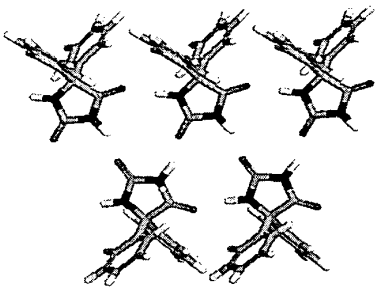


Figure 45A

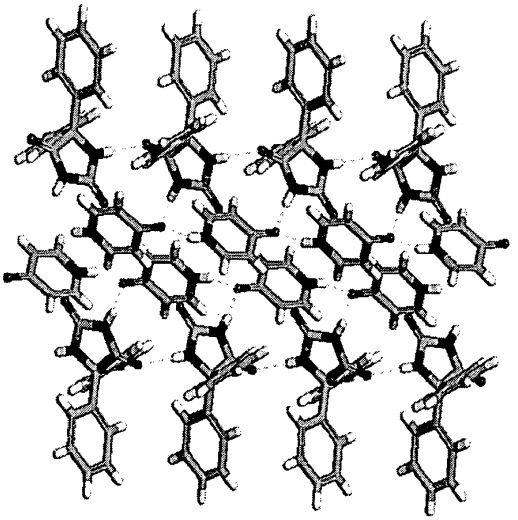


Figure 45B

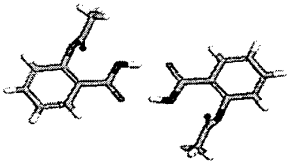


Figure 46A

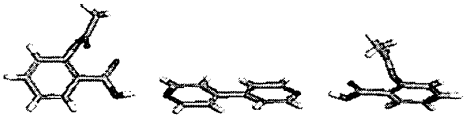


Figure 46C

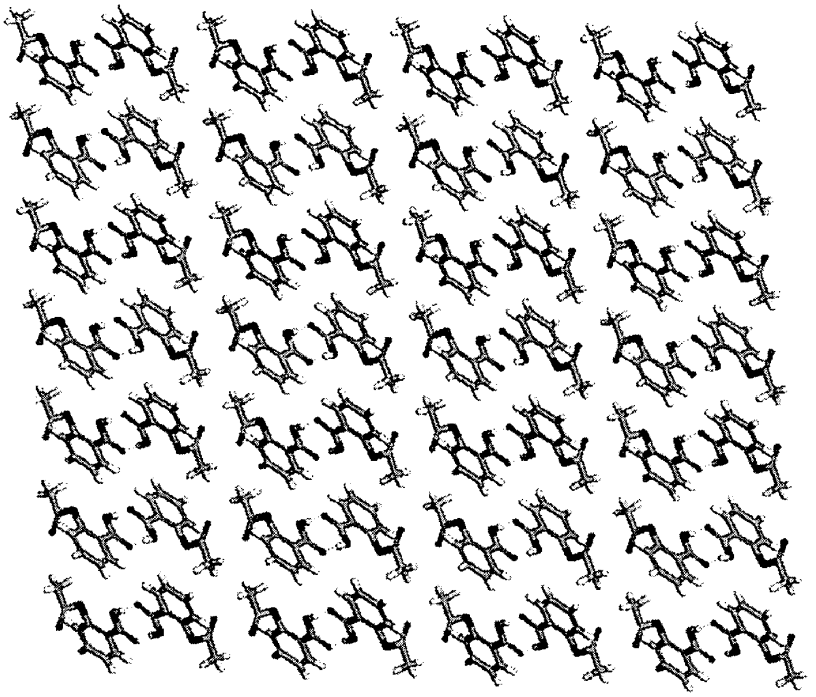


Figure 46B

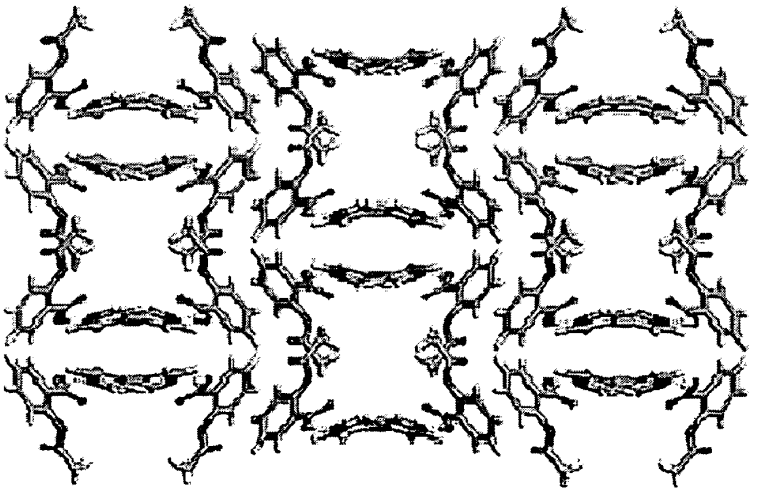


Figure 46D

Figure 47A

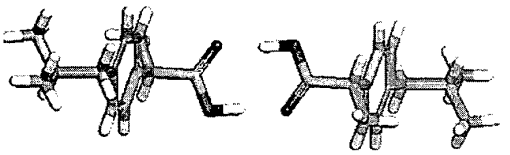
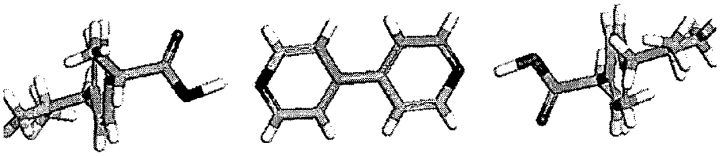


Figure 47C



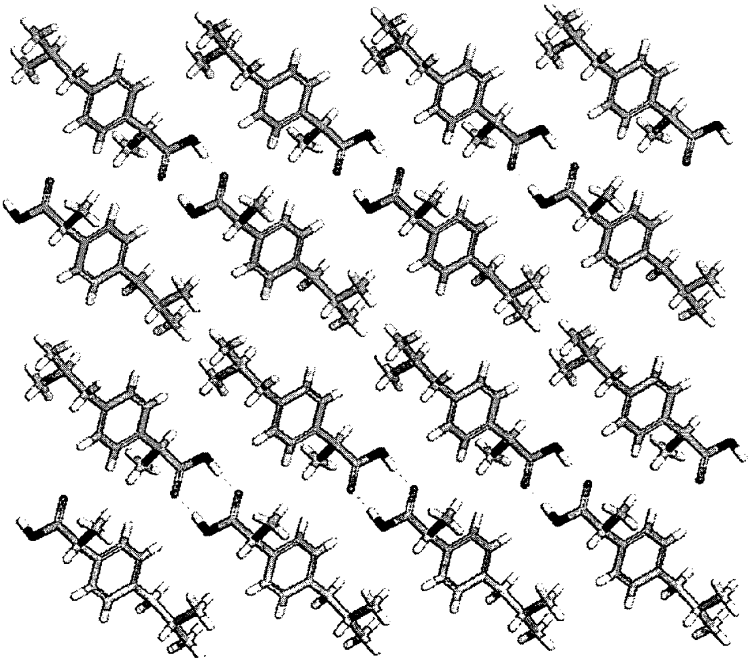


Figure 47B

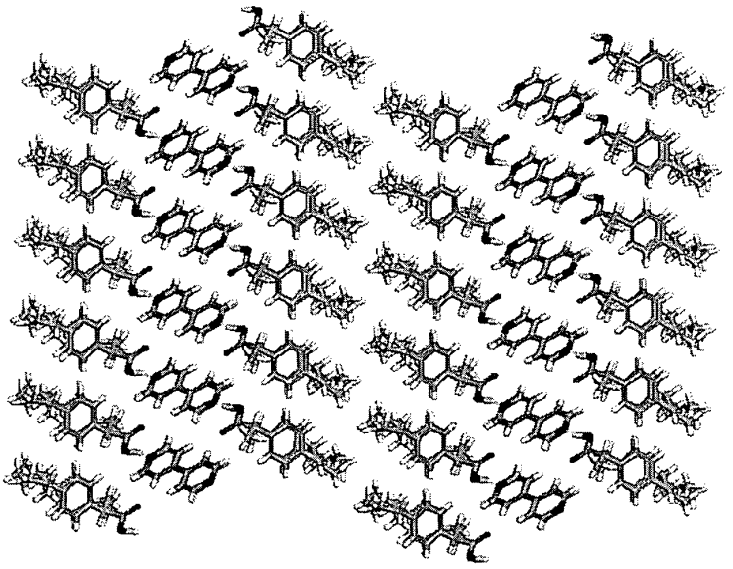


Figure 47D

Figure 48A

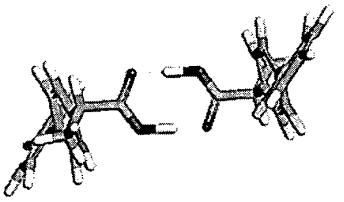
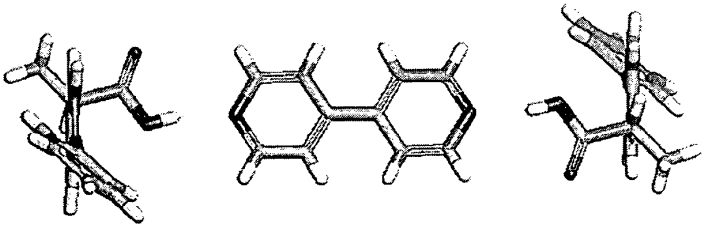


Figure 48C



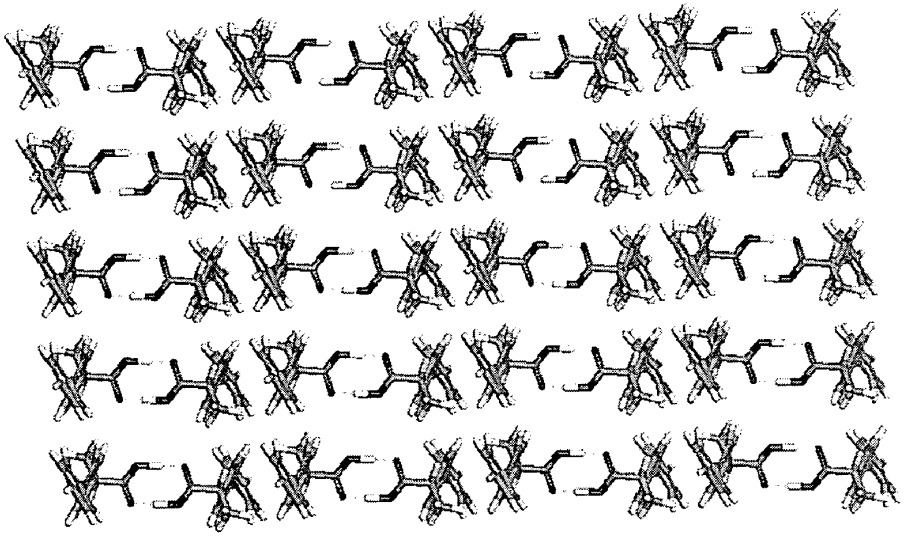


Figure 48B

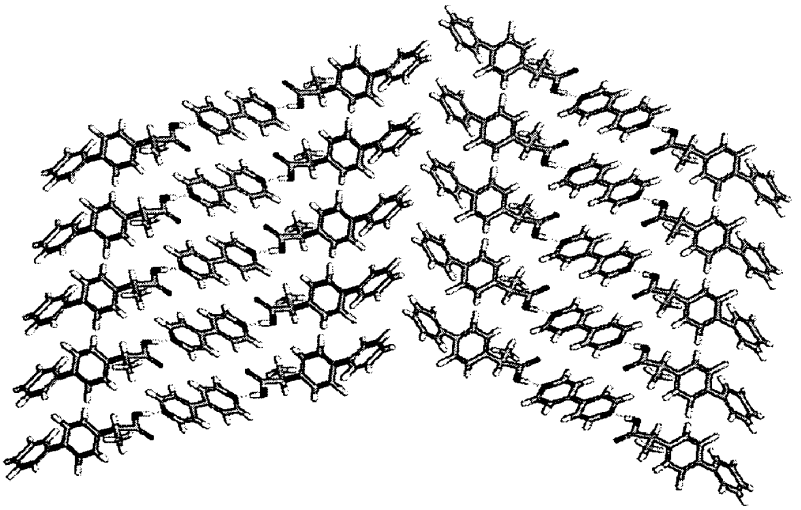


Figure 48D

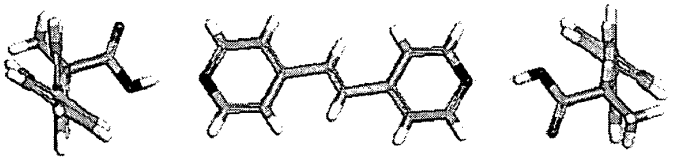


Figure 49A

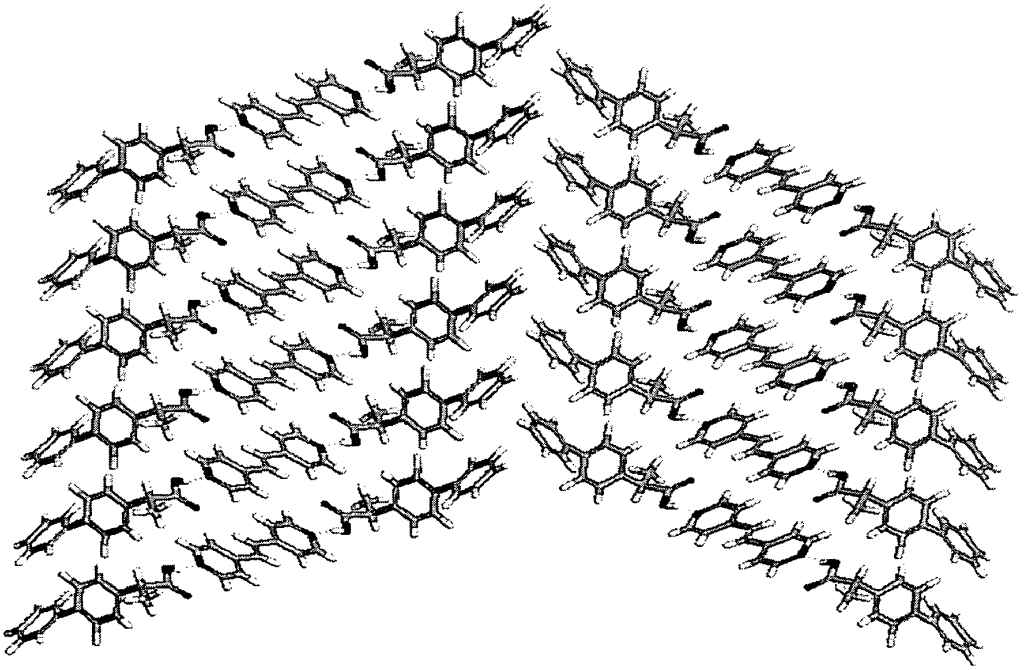


Figure 49B

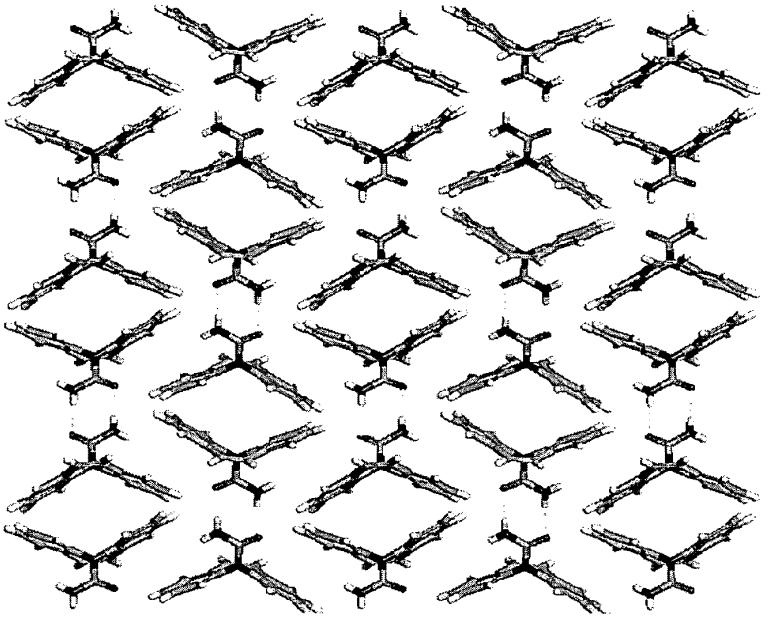


Figure 50A

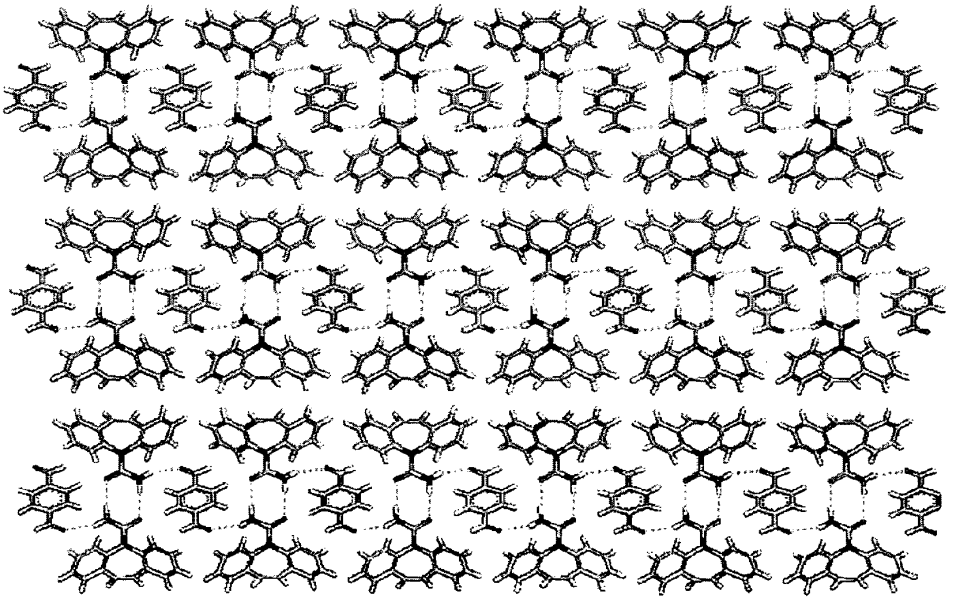


Figure 50B

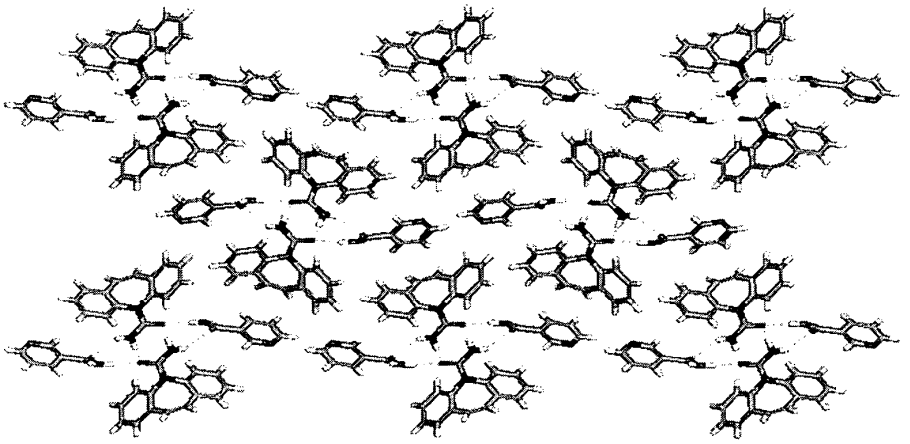


Figure 51

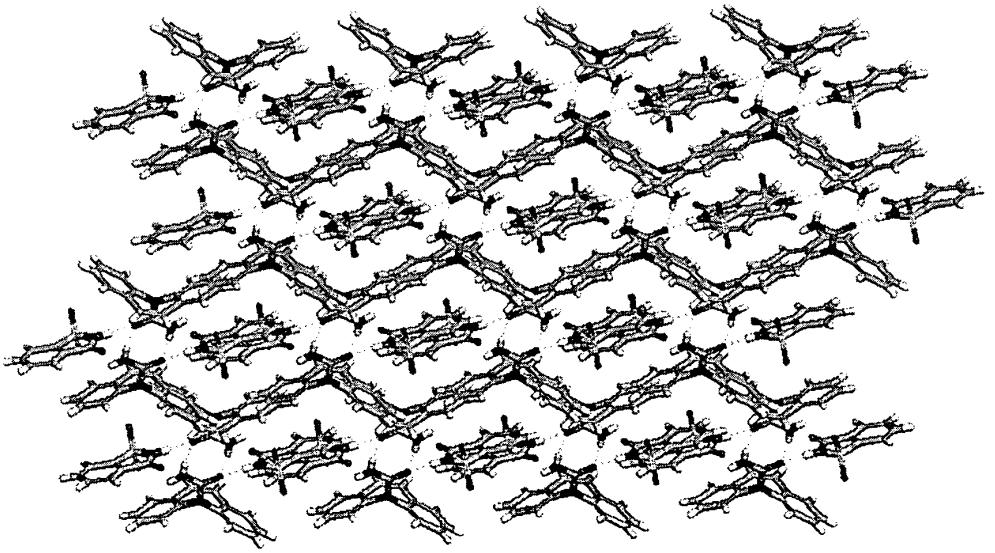


Figure 52

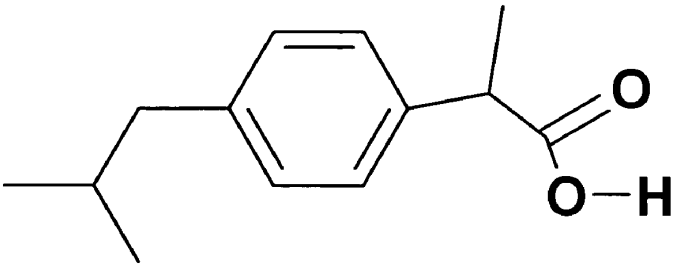


Figure 53A

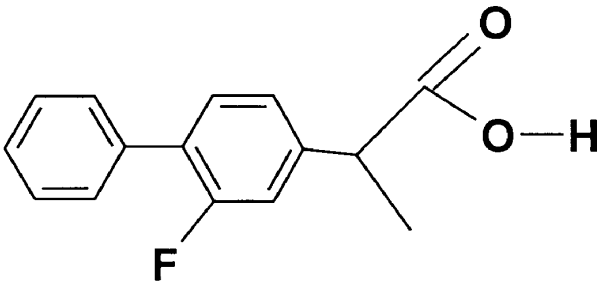


Figure 53B

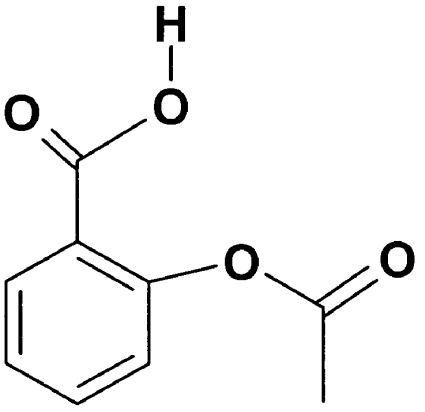


Figure 53C

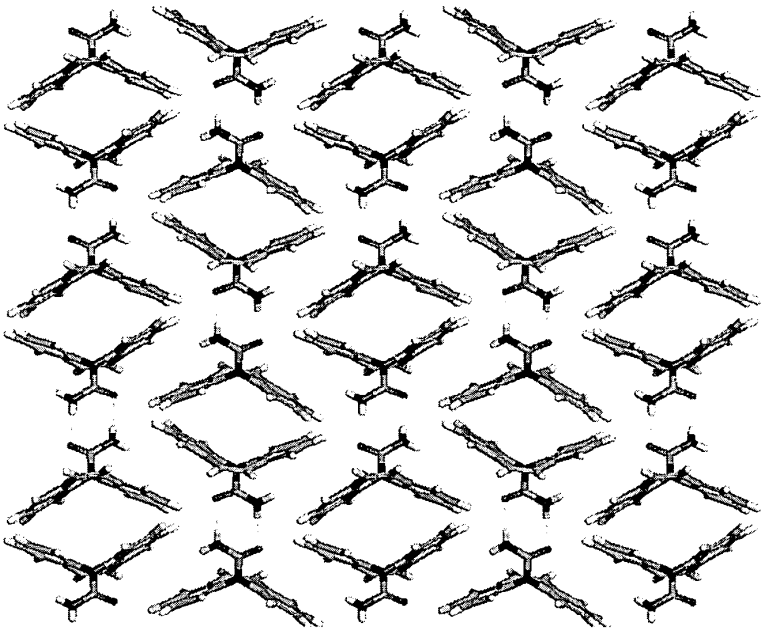


Figure 54A

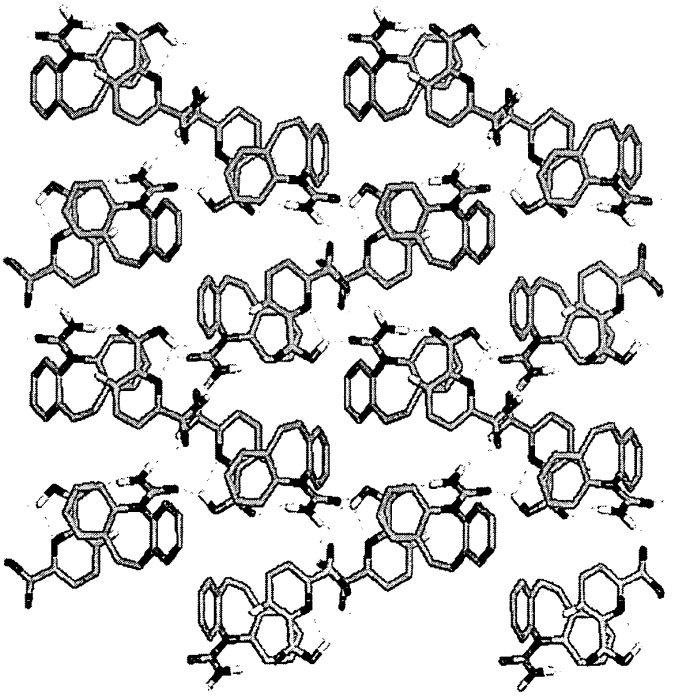


Figure 54B

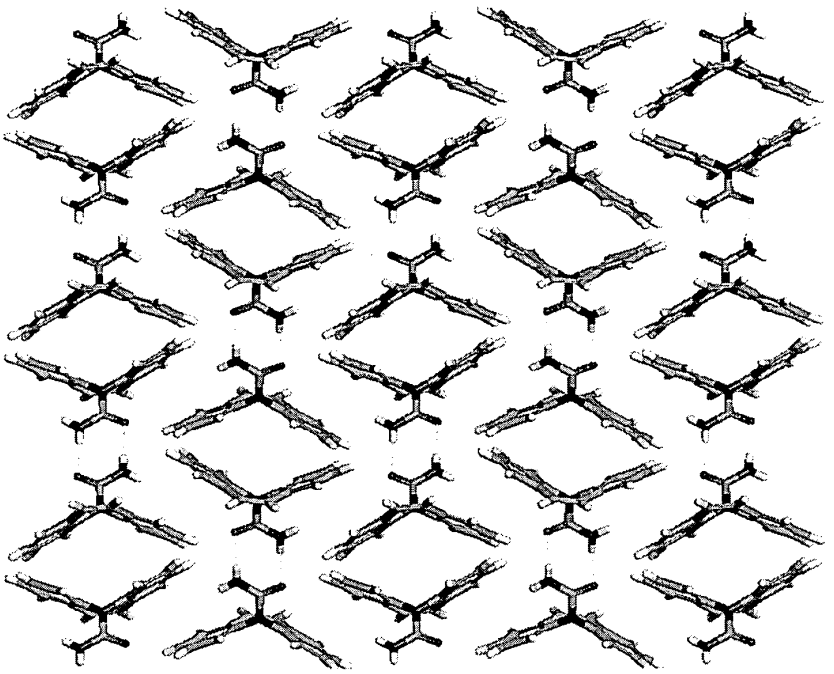


Figure 55A

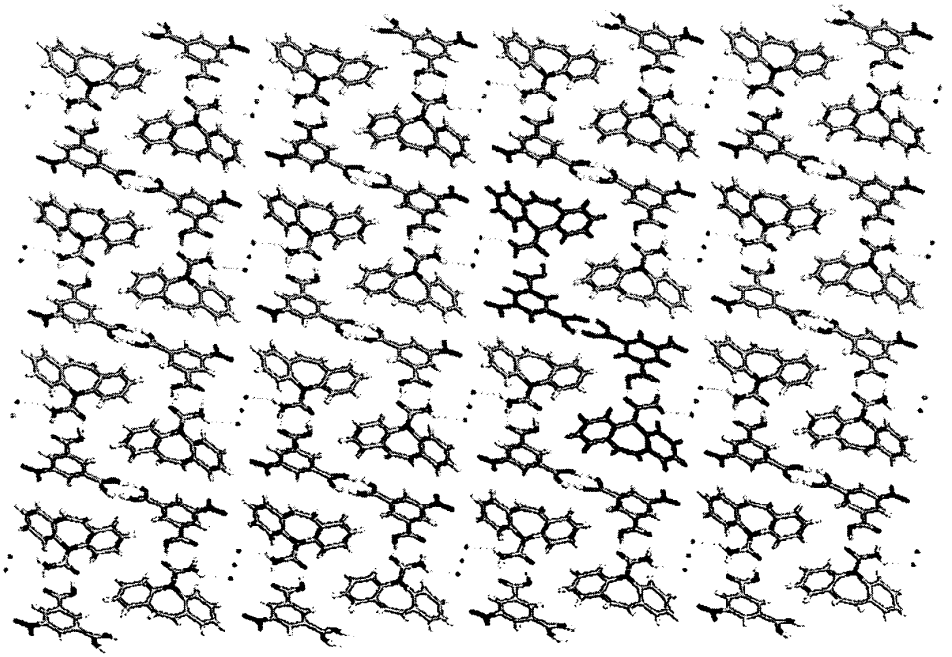


Figure 55B

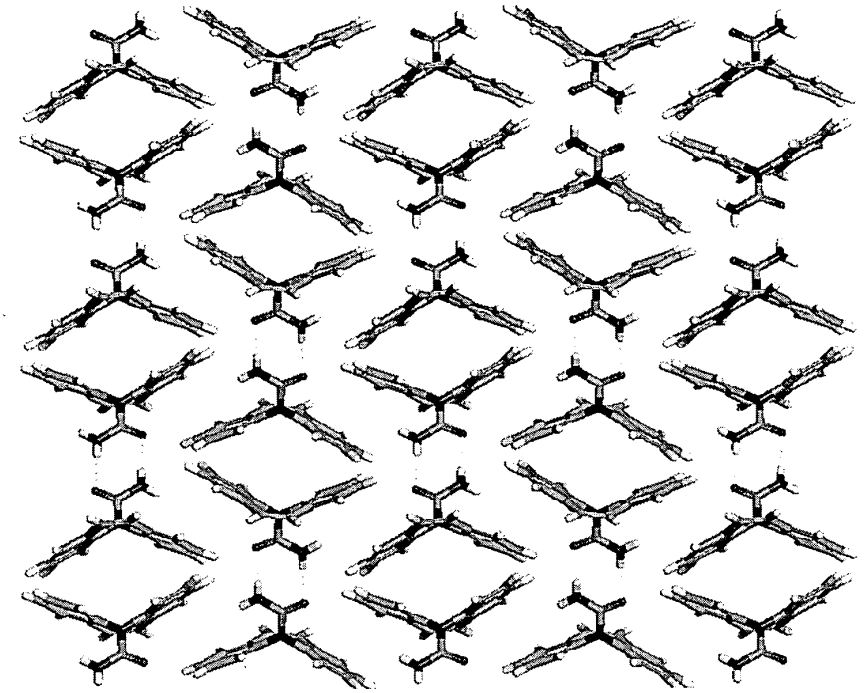


Figure 56A

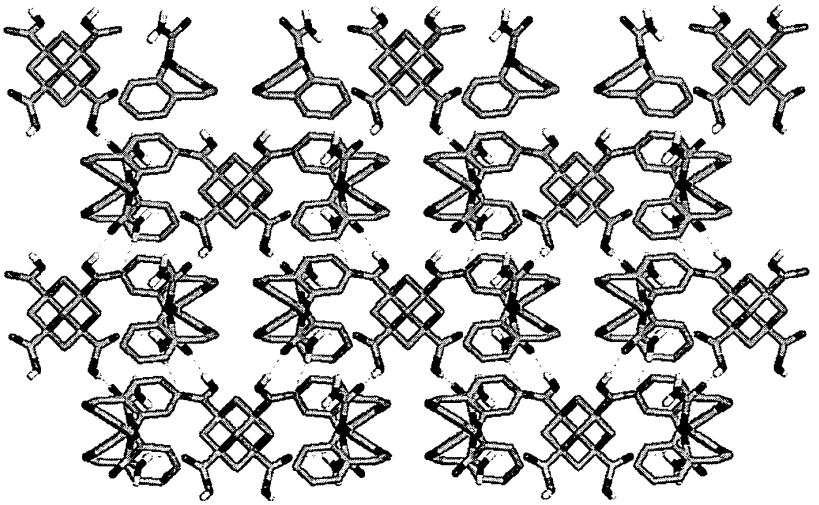


Figure 56B

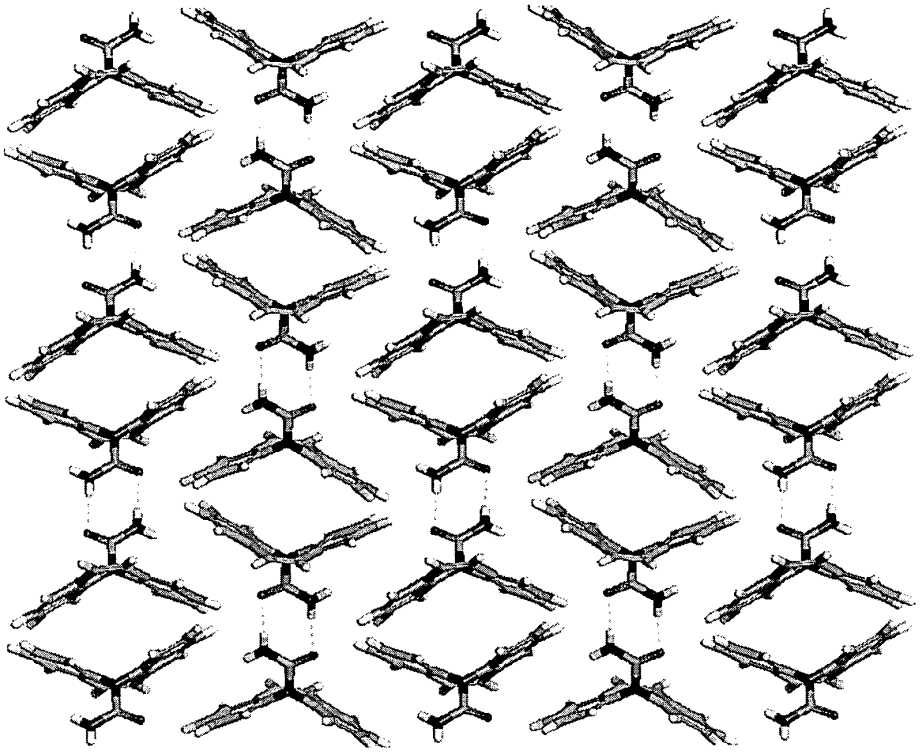


Figure 57A

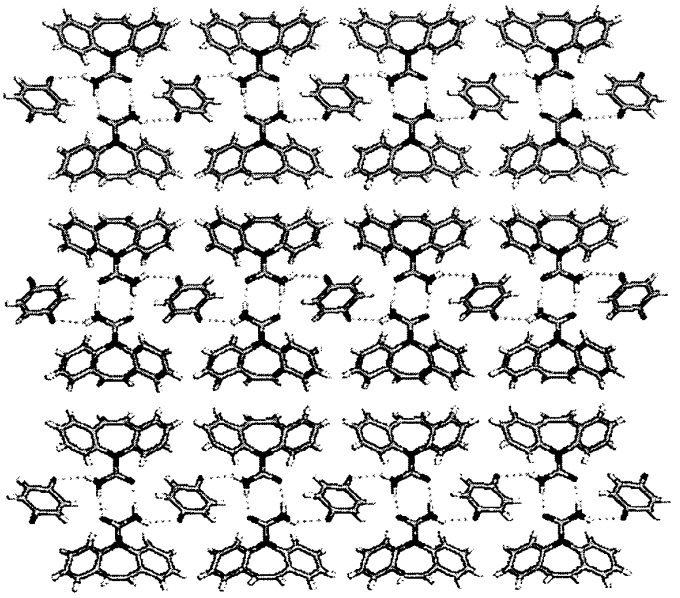


Figure 57B

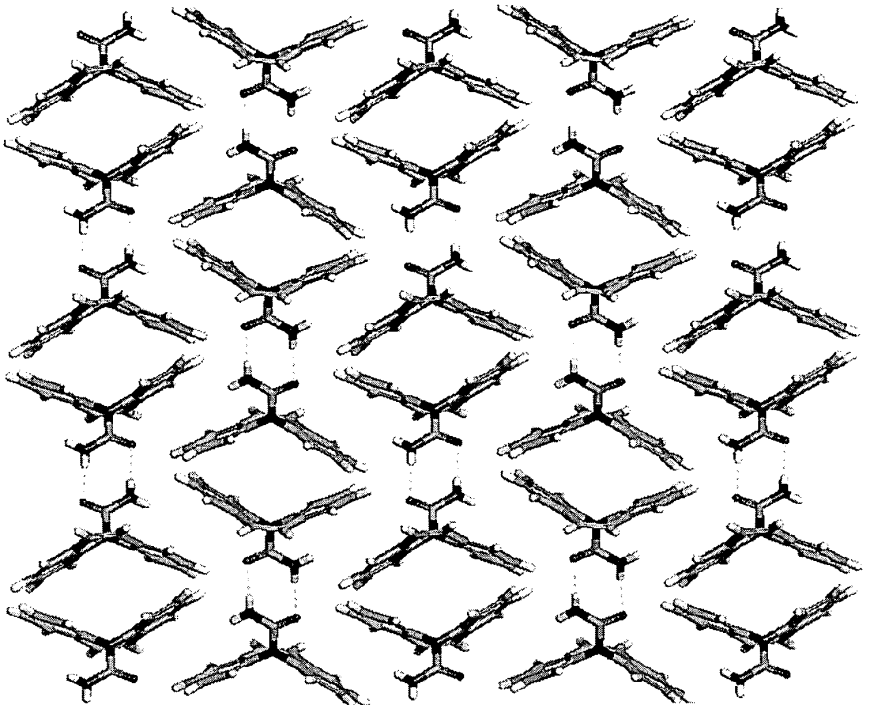


Figure 58A

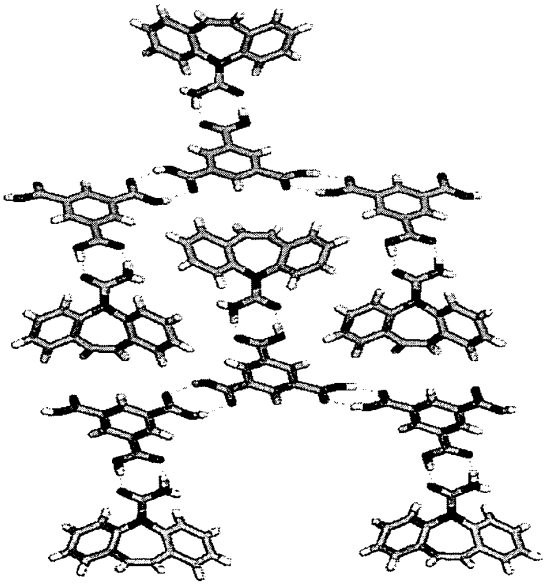


Figure 58B

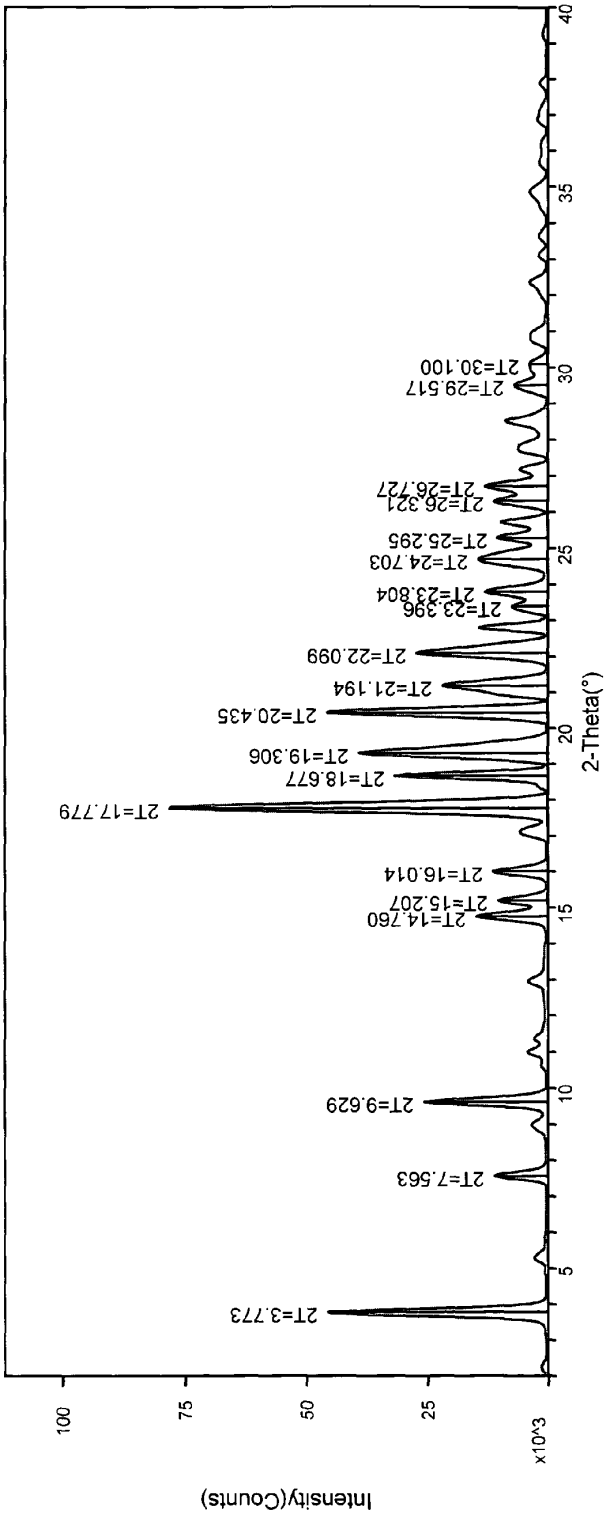

Intensity(Counts)
x10^3
100
75
50
25
2-Theta(°)
5
10
15
20
25
30
35
40
2T=3.773
2T=7.563
2T=9.629
2T=14.760
2T=15.207
2T=16.014
2T=17.779
2T=18.677
2T=19.306
2T=20.435
2T=21.194
2T=22.099
2T=23.396
2T=23.804
2T=24.703
2T=25.295
2T=26.321
2T=26.727
2T=29.517
2T=30.100

FIG. 59

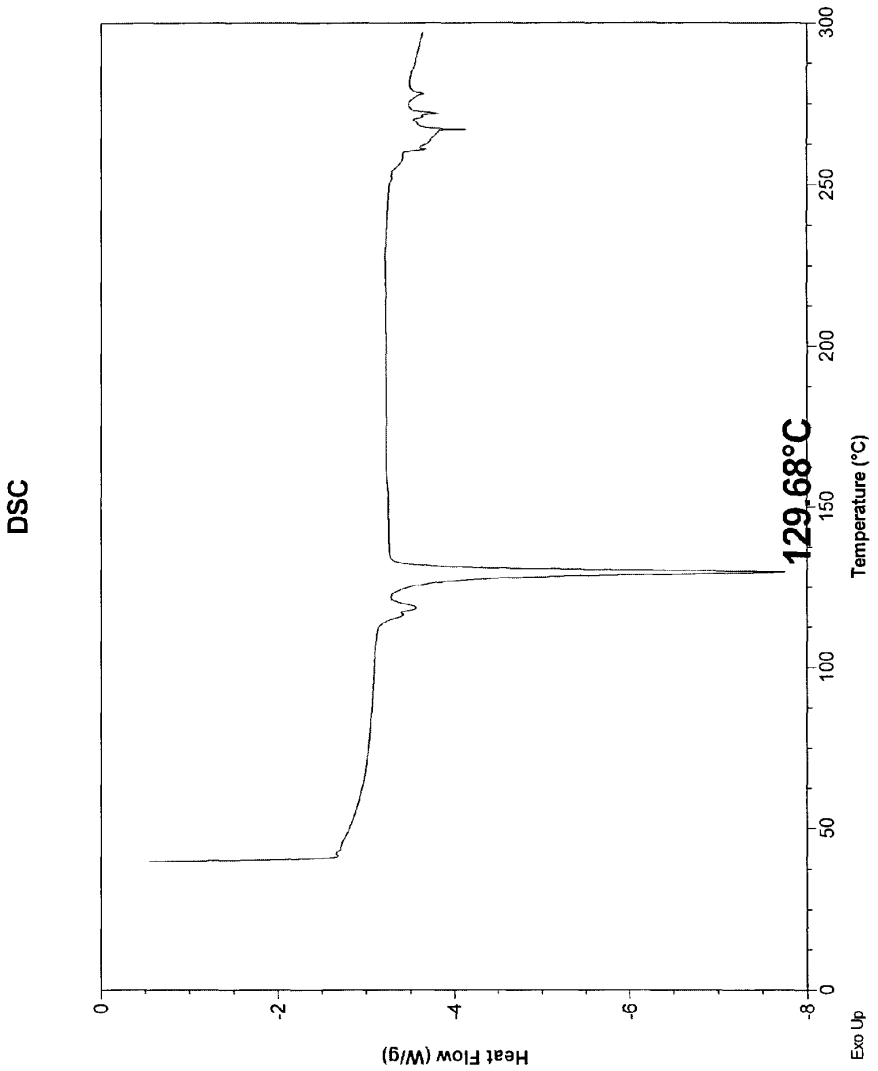

DSC
129.68°C
Heat Flow (W/g)
Temperature (°C)
Exo Up
0
-2
-4
-6
-8
0
50
100
150
200
250
300

FIG. 60

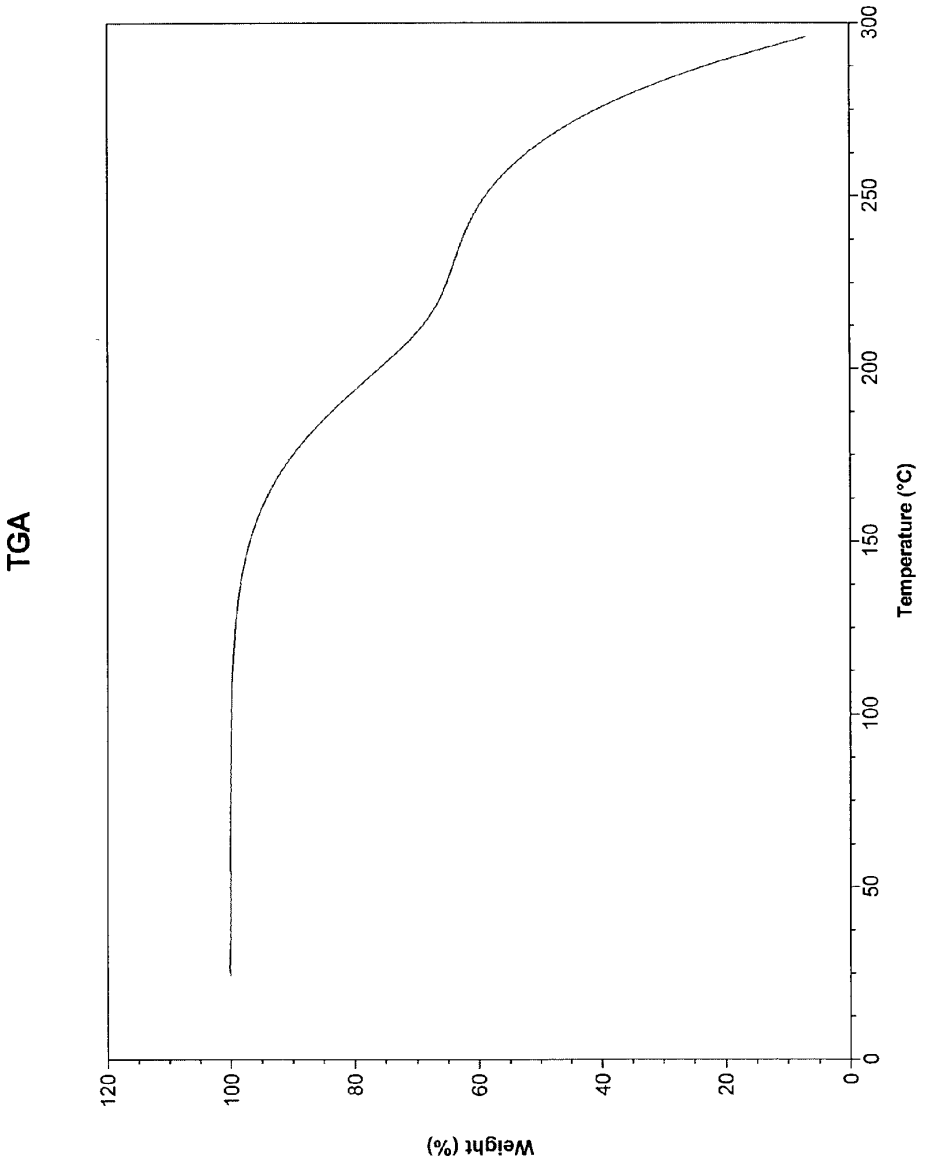

TGA
Weight (%)
120
100
80
60
40
20
0
Temperature (°C)
0
50
100
150
200
250
300

FIG. 61

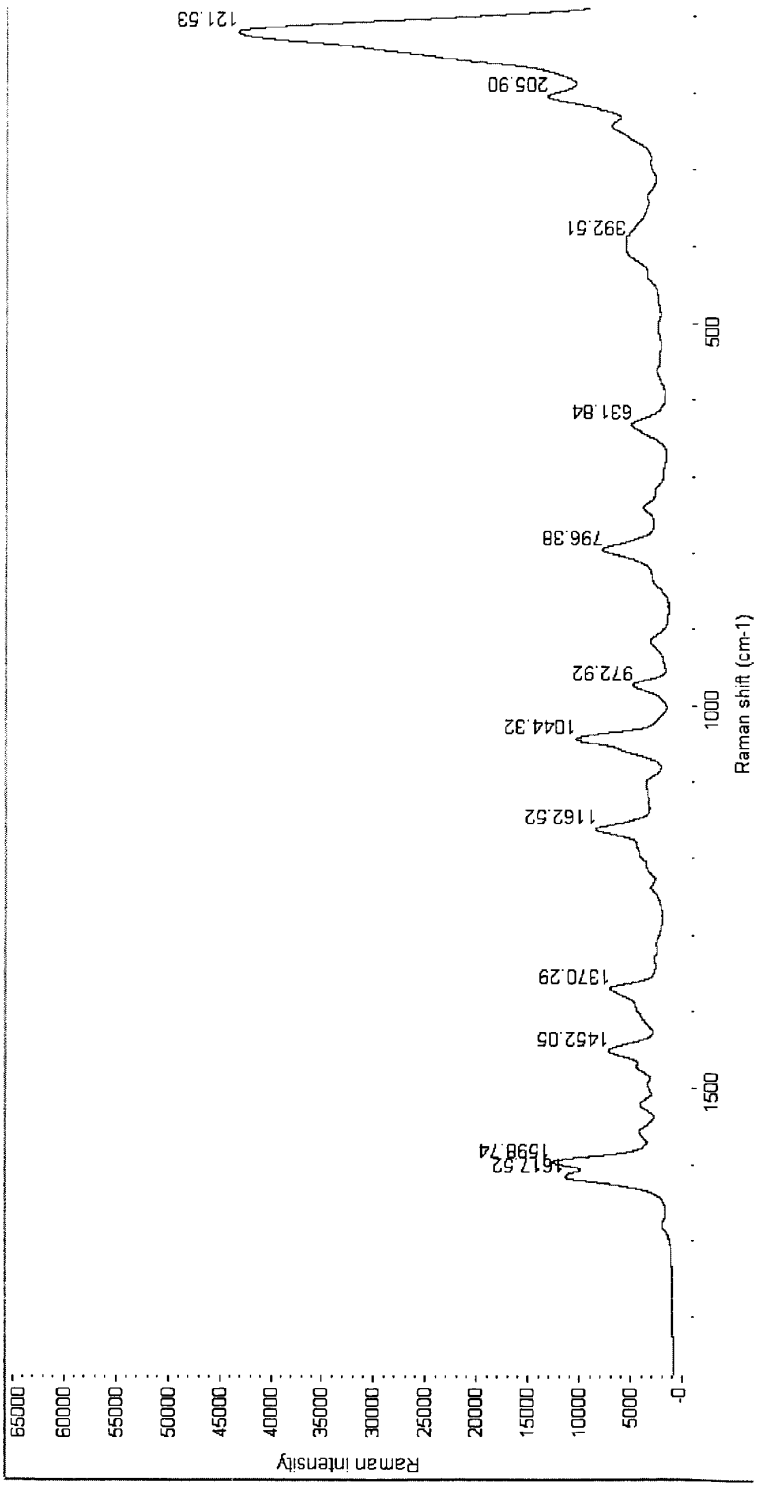
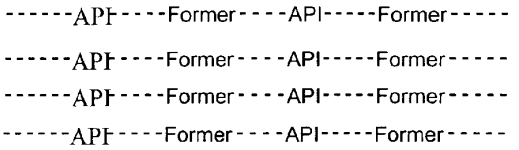
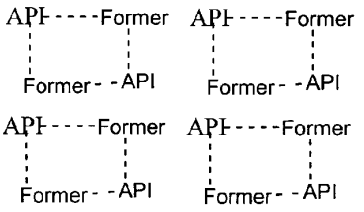

121.53
205.90
392.51
631.84
796.38
972.92
1044.32
1162.52
1370.29
1452.05
1598.74
1612.52
Raman shift (cm-1)
Raman intensity

FIG. 62

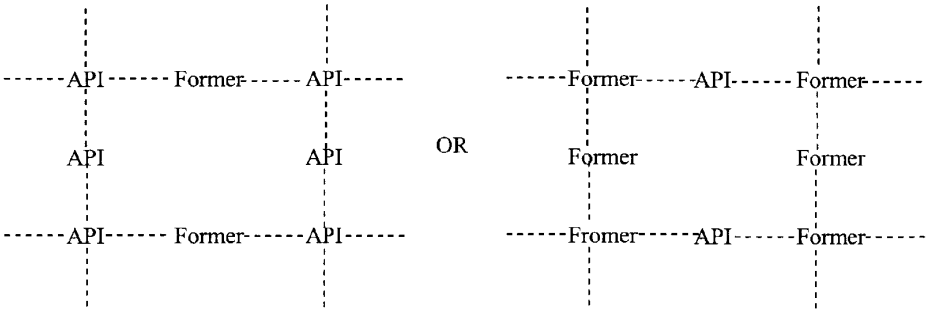
1. One-dimentional (linear) hydrogen-bonded chains:



2. Isolated rings:



3. Extended Networks:



4. Isolated triads:

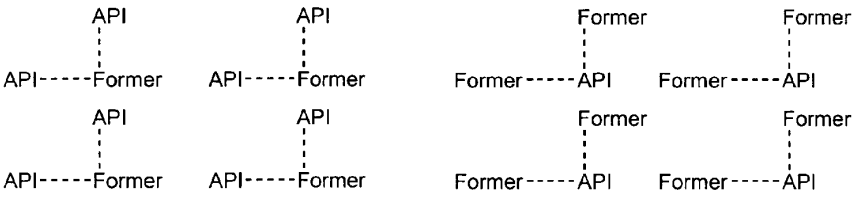


FIG. 63

PHARMACEUTICAL CO-CRYSTAL COMPOSITIONS

INCORPORATION BY REFERENCE

This application claims the benefit of U.S. Provisional Patent Application No. 60/451,213 filed on Feb. 28, 2003; U.S. Provisional Patent Application No. 60/463,962, filed on Apr. 18, 2003; and U.S. Provisional Application No. 60/487,064, filed on Jul. 11, 2003 each of which incorporated herein by reference in its entirety. This application is also a continuation-in-part of PCT/US03/27772, filed on Sep. 4, 2003 which is a continuation-in-part of U.S. patent application Ser. No. 10/378,956, filed Mar. 3, 2003, which claims the benefit of U.S. Provisional Application No. 60/360,768, filed Mar. 1, 2002; said PCT/US03/27772 also claims the benefit of U.S. Provisional Patent Application No. 60/451,213 filed on Feb. 28, 2003; U.S. Provisional Patent Application No. 60/463,962, filed on Apr. 18, 2003; and U.S. Provisional Application No. 60/487,064, filed on Jul. 11, 2003. This application is also a continuation-in-part of U.S. patent application Ser. No. 10/601,092, filed Jun. 20, 2003. Each of these applications is hereby incorporated by reference in their entireties, including all figures, tables and formulae.

FIELD OF THE INVENTION

The present invention relates to co-crystal API-containing compositions, pharmaceutical compositions comprising such APIs, and methods for preparing the same.

BACKGROUND OF THE INVENTION

Active pharmaceutical ingredients (API or APIs (plural)) in pharmaceutical compositions can be prepared in a variety of different forms. Such APIs can be prepared so as to have a variety of different chemical forms including chemical derivatives or salts. Such APIs can also be prepared to have different physical forms. For example, the APIs may be amorphous, may have different crystalline polymorphs, or may exist in different solvation or hydration states. By varying the form of an API, it is possible to vary the physical properties thereof. For example, crystalline polymorphs typically have different solubilities from one another, such that a more thermodynamically stable polymorph is less soluble than a less thermodynamically stable polymorph. Pharmaceutical polymorphs can also differ in properties such as shelf-life, bioavailability, morphology, vapour pressure, density, colour, and compressibility. Accordingly, variation of the crystalline state of an API is one of many ways in which to modulate the physical properties thereof.

It would be advantageous to have new forms of these APIs that have improved properties, in particular, as oral formulations. Specifically, it is desirable to identify improved forms of APIs that exhibit significantly improved properties including increased aqueous solubility and stability. Further, it is desirable to improve the processability, or preparation of pharmaceutical formulations. For example, needle-like crystal forms or habits of APIs can cause aggregation, even in compositions where the API is mixed with other substances, such that a non-uniform mixture is obtained. It is also desirable to increase the dissolution rate of API-containing pharmaceutical compositions in water, increase the bioavailability of orally-administered compositions, and provide a more rapid onset to therapeutic effect. It is also desirable to have a form of the API which, when administered to a subject, reaches a peak plasma level faster, has a longer lasting therapeutic plasma concentration, and higher overall exposure when compared to equivalent amounts of the API in its presently-known form.

SUMMARY OF THE INVENTION

It has now been found that new co-crystalline forms of APIs can be obtained which improve the properties of APIs as compared to such APIs in a non-co-crystalline state (free acid, free base, zwitter ions, salts, etc.).

Accordingly, in a first aspect, the present invention provides a co-crystal pharmaceutical composition comprising an API compound and a co-crystal former, such that the API and co-crystal former are capable of co-crystallizing from a solid or solution phase under crystallization conditions.

Another aspect of the present invention provides a process for the production of a pharmaceutical composition, which process comprises:

(1) providing an API which has at least one functional group selected from ether, thioether, alcohol, thiol, aldehyde, ketone, thioketone, nitrate ester, phosphate ester, thiophosphate ester, ester, thioester, sulfate ester, carboxylic acid, phosphonic acid, phosphinic acid, sulfonic acid, amide, primary amine, secondary amine, ammonia, tertiary amine, sp2 amine, thiocyanate, cyanamide, oxime, nitrile, diazo, organohalide, nitro, s-heterocyclic ring, thiophene, n-heterocyclic ring, pyrrole, o-heterocyclic ring, furan, epoxide, peroxide, hydroxamic acid, imidazole, and pyridine;

(2) providing a co-crystal former which has at least one functional group selected from ether, thioether, alcohol, thiol, aldehyde, ketone, thioketone, nitrate ester, phosphate ester, thiophosphate ester, ester, thioester, sulfate ester, carboxylic acid, phosphonic acid, phosphinic acid, sulfonic acid, amide, primary amine, secondary amine, ammonia, tertiary amine, sp2 amine, thiocyanate, cyanamide, oxime, nitrile, diazo, organohalide, nitro, s-heterocyclic ring, thiophene, n-heterocyclic ring, pyrrole, o-heterocyclic ring, furan, epoxide, peroxide, hydroxamic acid, imidazole, and pyridine;

(3) grinding, heating or contacting in solution the API with the co-crystal former under crystallization conditions;

(4) isolating co-crystals formed thereby; and

(5) incorporating the co-crystals into a pharmaceutical composition.

A further aspect of the present invention provides a process for the production of a pharmaceutical composition, which comprises:

(1) grinding, heating or contacting in solution an API compound with a co-crystal former, under crystallization conditions, so as to form a solid phase;

(2) isolating co-crystals comprising the API and the co-crystal former; and

(3) incorporating the co-crystals into a pharmaceutical composition.

In a further aspect, the present invention provides a process for the production of a pharmaceutical composition, which comprises:

(1) providing (i) an API or a plurality of different APIs, and (ii) a co-crystal former or a plurality of different co-crystal formers, wherein at least one of the APIs and the co-crystal formers is provided as a plurality thereof;

(2) isolating co-crystals comprising the API and the co-crystal former; and

(3) incorporating the co-crystals into a pharmaceutical composition.

Solubility Modulation

In a further aspect, the present invention provides a process for modulating the solubility of an API, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Dissolution Modulation

In a further aspect, the present invention provides a process for modulating the dissolution of an API, whereby the aqueous dissolution rate or the dissolution rate in simulated gastric fluid or in simulated intestinal fluid, or in a solvent or plurality of solvents is increased or decreased, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

In one embodiment, the dissolution of the API is increased.

Bioavailability Modulation

In a further aspect, the present invention provides a process for modulating the bioavailability of an API, whereby the AUC is increased, the time to T_{max} is reduced, the length of time the concentration of the API is above ½ T_{max} is increased, or C_{max} is increased, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Dose Response Modulation

In a further aspect the present invention provides a process for improving the linearity of a dose response of an API, which process comprises:

(1) grinding, heating, or contacting in solution an API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Increased Stability

In a still further aspect the present invention provides a process for improving the stability of a pharmaceutical salt, which process comprises:

(1) grinding, heating or contacting in solution the pharmaceutical salt with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Difficult to Salt or Unsaltable Compounds

In a still further aspect the present invention provides a process for making co-crystals of difficult to salt or unsaltable APIs, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Decreasing Hygroscopicity

In a still further aspect the present invention provides a method for decreasing the hygroscopicity of an API, which method comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Crystallizing Amorphous Compounds

In a still further embodiment aspect the present invention provides a process for crystallizing an amorphous compound, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Decreasing Form Diversity

In a still further embodiment aspect the present invention provides a process for reducing the form diversity of an API, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Morphology Modulation

In a still further embodiment aspect the present invention provides a process for modifying the morphology of an API, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

In a further aspect, the present invention provides a co-crystal composition comprising a co-crystal, wherein said co-crystal comprises an API compound and a co-crystal former. In further embodiments the co-crystal has an improved property as compared to the free form (including a free acid, free base, zwitter ion, hydrate, solvate, etc.) or a salt (which includes salt hydrates and solvates). In further embodiments, the improved property is selected from the group consisting of: increased solubility, increased dissolution, increased bioavailability, increased dose response, decreased hygroscopicity, a crystalline form of a normally amorphous compound, a crystalline form of a difficult to salt or unsaltable compound, decreased form diversity, more desired morphology, or other property described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** PXRD pattern for a co-crystal of carbamazepine and saccharin (Form I).

FIG. **2** DSC thermogram for a co-crystal of carbamazepine and saccharin (Form I).

FIG. **3** PXRD pattern for a co-crystal of carbamazepine and nicotinamide (Form I).

FIG. **4** DSC thermogram for a co-crystal of carbamazepine and nicotinamide (Form I).

FIG. **5** PXRD pattern for a co-crystal of carbamazepine and trimesic acid (Form I).

FIG. **6** PXRD pattern for a co-crystal of topiramate and 18-crown-6.

FIG. **7** DSC thermogram for a co-crystal of topiramate and 18-crown-6.

FIG. **8** PXRD pattern for a co-crystal of olanzapine and nicotinamide (Form I).

FIG. **9** DSC thermogram for a co-crystal of olanzapine and nicotinamide (Form I).

FIG. **10** PXRD pattern for a co-crystal of celecoxib and 18-crown-6.

FIG. **11** DSC thermogram for a co-crystal of celecoxib and 18-crown-6.

FIG. **12** PXRD pattern for a co-crystal of itraconazole and succinic acid.

FIG. **13** DSC thermogram for a co-crystal of itraconazole and succinic acid.

FIG. **14** PXRD pattern for a co-crystal of itraconazole and fumaric acid.

FIG. **15** DSC thermogram for a co-crystal of itraconazole and fumaric acid.

FIG. **16** PXRD pattern for a co-crystal of itraconazole and tartaric acid

FIG. **17** DSC thermogram for a co-crystal of itraconazole and tartaric acid.

FIG. **18** PXRD pattern for a co-crystal of itraconazole and malic acid.

FIG. **19** DSC thermogram for a co-crystal of itraconazole and malic acid.

FIG. **20** PXRD pattern for a co-crystal of itraconazoleHCl and tartaric acid.

FIG. **21** DSC thermogram for a co-crystal of itraconazole-HCl and tartaric acid.

FIG. **22** PXRD pattern for a co-crystal of modafinil and malonic acid.

FIG. **23** PXRD pattern for a co-crystal of modafinil and benzamide.

FIG. **24** PXRD pattern for a co-crystal of modafinil and mandelic acid.

FIG. **25** PXRD pattern for a co-crystal of modafinil and glycolic acid.

FIG. **26** PXRD pattern for a co-crystal of modafinil and fumaric acid.

FIG. **27** Dissolution profile for a co-crystal of celecoxib: nicotinamide vs. celecoxib free acid.

FIG. **28** Dissolution profile for co-crystals of itraconazole: succinic acid, itraconazle:tartaric acid and itraconazole:malic acid vs. itraconazole free base.

FIG. **29** Hygroscopicity profile for a co-crystal of celecoxib:nicotinamide vs. celecoxib sodium.

FIG. **30** PXRD pattern for a co-crystal of olanzapine and nicotinamide (Form II).

FIG. **31** PXRD pattern for a co-crystal of olanzapine and nicotinamide (Form III).

FIG. **32**A-D Packing diagrams and crystal structure of olanzapine and nicotinamide (Form III). FIG. **32**A depicts the molecular structure of the olanzapine-nicotinamide-H_2O-IP-OAc crystal. In FIG. **32**C, the olanzapine molecules occupy the spaces shown and are hydrogen bonded to the water molecules. The arrangement of the olanzapine molecules is similar to that observed from the methanol solvate and the published structures for the hydrates; the water molecules bridge the olanzapine moieties resulting in hydrogen-bonded zigzag sheets (see FIG. **32**D).

FIG. **33** DSC thermogram for a co-crystal of 5-fluorouracil and urea.

FIG. **34** TGA thermogram for a co-crystal of 5-fluorouracil and urea.

FIG. **35** Raman spectrum for a co-crystal of 5-fluorouracil and urea.

FIG. **36** PXRD pattern for a co-crystal of 5-fluorouracil and urea.

FIG. **37** PXRD pattern for a co-crystal of hydrochlorothiazide and nicotinic acid.

FIG. **38** PXRD pattern for a co-crystal of hydrochlorothiazide and 18-crown-6.

FIG. **39** PXRD pattern for a co-crystal of hydrochlorothiazide and piperazine.

FIG. **40** DSC thermogram for a co-crystal of modafinil and malonic acid.

FIG. **41** TGA thermogram for a co-crystal of modafinil and malonic acid.

FIG. **42** Raman spectrum for a co-crystal of modafinil and malonic acid.

FIG. **43** PXRD pattern for a co-crystal of modafinil and maleic acid.

FIG. **44**A-B An acetaminophen 1-D polymeric chain and a co-crystal of acetaminophen and 4,4'-bipyridine, respectively.

FIG. **45**A-B Pure phenyloin and a co-crystal with phenyloin and pyridone, respectively.

FIG. **46**A-D Pure aspirin and the corresponding crystal structure are shown in FIGS. **46**A and **46**B, respectively. FIGS. **46**C and **46**D show the supramolecular entity containing the synthon and corresponding co-crystal of aspirin and 4,4'-bipyridine, respectively.

FIG. **47**A-D Pure ibuprofen and the corresponding crystal structure are shown in FIGS. **7**A and **7**B, respectively. FIGS. **7**C and **7**D show the supramolecular entity containing the synthon and corresponding co-crystal of ibuprofen and 4,4'-bipyridine, respectively.

FIG. **48**A-D Pure flurbiprofen and the corresponding crystal structure are shown in FIGS. **48**A and **48**B, respectively. FIGS. **5**C and **5**D show the supramolecular synthon and corresponding co-crystal of flurbiprofen and 4,4'-bipyridine, respectively.

FIG. **49**A-B The supramolecular entity containing the synthon and the corresponding co-crystal structure of flurbiprofen and trans-1,2-bis(4-pyridyl)ethylene, respectively.

FIG. **50**A-B The crystal structure of pure carbamazepine and the co-crystal structure of carbamazepine and p-phthaladehyde, respectively.

FIG. **51** The co-crystal structure of carbamazepine and nicotinamide (Form II).

FIG. **52** The co-crystal structure of carbamazepine and saccharin (Form II).

FIG. **53**A-C The chemical structures of ibuprofen, flurbiprofen, and aspirin, respectively.

FIG. **54**A-B The crystal structure of carbamazepine and the co-crystal structure of carbamazepine and 2,6-pyridinedicarboxylic acid, respectively.

FIG. **55**A-B The crystal structure of carbamazepine and the co-crystal structure of carbamazepine and 5-nitroisophthalic acid, respectively.

FIG. **56**A-B The crystal structure of carbamazepine and the co-crystal structure of carbamazepine and 1,3,5,7-adamantanetetracarboxylic acid, respectively.

FIG. **57**A-B The crystal structure of carbamazepine and the co-crystal structure of carbamazepine and benzoquinone, respectively.

FIG. **58**A-B The crystal structure of carbamazepine and the co-crystal structure of carbamazepine and trimesic acid (Form II), respectively.

FIG. **59** PXRD diffractogram for a co-crystal of celecoxib and nicotinamide.

FIG. **60** DSC thermogram for a co-crystal of celecoxib and nicotinamide.

FIG. **61** TGA thermogram for a co-crystal of celecoxib and nicotinamide.

FIG. **62** Raman spectrum for a co-crystal of celecoxib and nicotinamide.

FIG. **63** Hydrogen-bonding motifs observed in co-crystals.

DETAILED DESCRIPTION OF THE INVENTION

The term "co-crystal" as used herein means a crystalline material comprised of two or more unique solids at room temperature, each containing distinctive physical characteristics, such as structure, melting point and heats of fusion, with the exception that, if specifically stated, the API may be a liquid at room temperature. The co-crystals of the present invention comprise a co-crystal former H-bonded to an API. The co-crystal former may be H-bonded directly to the API or may be H-bonded to an additional molecule which is bound to the API. The additional molecule may be H-bonded to the API or bound ionically or covalently to the API. The additional molecule could also be a different API. Solvates of API compounds that do not further comprise a co-crystal former are not co-crystals according to the present invention. The co-crystals may however, include one or more solvate molecules in the crystalline lattice. That is, solvates of co-crystals, or a co-crystal further comprising a solvent or compound that is a liquid at room temperature, is included in the present invention, but crystalline material comprised of only one solid and one or more liquids (at room temperature) are not included in the present invention, with the previously noted exception of specifically stated liquid APIs. The co-crystals may also be a co-crystal between a co-crystal former and a salt of an API, but the API and the co-crystal former of the present invention are constructed or bonded together through hydrogen bonds. Other modes of molecular recognition may also be present including, pi-stacking, guest-host complexation and van der Waals interactions. Of the interactions listed above, hydrogen-bonding is the dominant interaction in the formation of the co-crystal, (and a required interaction according to the present invention) whereby a non-covalent bond is formed between a hydrogen bond donor of one of the moieties and a hydrogen bond acceptor of the other. Hydrogen bonding can result in several different intermolecular configurations. For example, hydrogen bonds can result in the formation of dimers, linear chains, or cyclic structures. These configurations can further include extended (two-dimensional) hydrogen bond networks and isolated triads (FIG. **63**). An alternative embodiment provides for a co-crystal wherein the co-crystal former is a second API. In another embodiment, the co-crystal former is not an API. In another embodiment the co-crystal comprises two co-crystal formers. For purposes of the present invention, the chemical and physical properties of an API in the form of a co-crystal may be compared to a reference compound that is the same API in a different form. The reference compound may be specified as a free form, or more specifically, a free acid, free base, or zwitter ion; a salt, or more specifically for example, an inorganic base addition salt such as sodium, potassium, lithium, calcium, magnesium, ammonium, aluminum salts or organic base addition salts, or an inorganic acid addition salts such as HBr, HCl, sulfuric, nitric, or phosphoric acid addition salts or an organic acid addition salt such as acetic, proprionic, pyruvic, malanic, succinic, malic, maleic, fumaric, tartaric, citric, benzoic, methanesulfonic, ethanesulforic, stearic or lactic acid addition salt; an anhydrate or hydrate of a free form or salt, or more specifically, for example, a hemihydrate, monohydrate, dihydrate, trihydrate, quadrahydrate, pentahydrate; or a solvate of a free form or salt. For example, the reference compound for an API in salt form co-crystallized with a co-crystal former can be the API salt form. Similarly, the reference compound for a free acid API co-crystallized with a co-crystal former can be the free acid API. The reference compound may also be specified as crystalline or amorphous.

According to the present invention, the co-crystals can include an acid addition salt or base addition salt of an API. Acid addition salts include, but are not limited to, inorganic acids such as hydrochloric acid, hydrobromic acid, sulfuric acid, nitric acid, and phosphoric acid, and organic acids such as acetic acid, propionic acid, hexanoic acid, heptanoic acid, cyclopentanepropionic acid, glycolic acid, pyruvic acid, lactic acid, malonic acid, succinic acid, malic acid, maleic acid, fumaric acid, tartatic acid, citric acid, benzoic acid, o-(4-hydroxybenzoyl)benzoic acid, cinnamic acid, madelic acid, methanesulfonic acid, ethanesulfonic acid, 1,2-ethanedisulfonic acid, 2-hydroxyethanesulfonic acid, benzenesulfonic acid, p-chlorobenzenesulfonic acid, 2-naphthalenesulfonic acid, p-toluenesulfonic acid, camphorsulfonic acid, 4-methylbicyclo[2.2.2]oct-2-ene-1-carboxylic acid, glucoheptonic acid, 4,4'-methylenebis(3-hydroxy-2-ene-1-carboxylic acid), 3-phenylpropionic acid, trimethylacetic acid, tertiary butylacetic acid, lauryl sulfuric acid, gluconic acid, glutaric acid, hydroxynaphthoic acid, salicylic acid, stearic acid, and muconic acid. Base addition salts include, but are not limited to, inorganic bases such as sodium, potassium, lithium, ammonium, calcium and magnesium salts, and organic bases such as primary, secondary and tertiary amines (e.g. isopropylamine, trimethyl amine, diethyl amine, tri(iso-propyl) amine, tri(n-propyl) amine, ethanolamine, 2-dimethylaminoethanol, tromethamine, lysine, arginine, histidine, caffeine, procaine, hydrabamine, choline, betaine, ethylenediamine, glucosamine, N-alkylglucamines, theobromine, purines, piperazine, piperidine, morpholine, and N-ethylpiperidine).

The ratio of API to co-crystal former may be stoichiometric or non-stoichiometric according to the present invention. For example, 1:1, 1:1.5 and 1:2 ratios of API:co-crystal former are acceptable.

It has surprisingly been found that when an API and a selected co-crystal former are allowed to form co-crystals, the resulting co-crystals give rise to improved properties of the API, as compared to the API in a free form (including free acids, free bases, and zwitter ions, hydrates, solvates, etc.), or an acid or base salt thereof particularly with respect to: solubility, dissolution, bioavailability, stability, Cmax, Tmax, processability, longer lasting therapeutic plasma concentration, hygroscopicity, crystallization of amorphous compounds, decrease in form diversity (including polymorphism and crystal habit), change in morphology or crystal habit, etc. For example, a co-crystal form of an API is particularly advantageous where the original API is insoluble or sparingly soluble in water. Additionally, the co-crystal properties conferred upon the API are also useful because the bioavailability of the API can be improved and the plasma concentration and/or serum concentration of the API can be improved. This is particularly advantageous for orally-administrable formulations. Moreover, the dose response of the API can be improved, for example by increasing the maximum attainable response and/or increasing the potency of the API by increasing the biological activity per dosing equivalent.

Accordingly, in a first aspect, the present invention provides a pharmaceutical composition comprising a co-crystal of an API and a co-crystal former, such that the API and co-crystal former are capable of co-crystallizing from a solution phase under crystallization conditions or from the solid-state, for example, through grinding or heating. In another aspect, the API has at least one functional group selected from ether, thioether, alcohol, thiol, aldehyde, ketone, thioketone, nitrate ester, phosphate ester, thiophosphate ester, ester,

thioester, sulfate ester, carboxylic acid, phosphonic acid, phosphinic acid, sulfonic acid, amide, primary amine, secondary amine, ammonia, tertiary amine, sp2 amine, thiocyanate, cyanamide, oxime, nitrile, diazo, organohalide, nitro, s-heterocyclic ring, thiophene, n-heterocyclic ring, pyrrole, o-heterocyclic ring, furan, epoxide, peroxide, hydroxamic acid, imidazole, and pyridine and a co-crystal former which has at least one functional group selected from ether, thioether, alcohol, thiol, aldehyde, ketone, thioketone, nitrate ester, phosphate ester, thiophosphate ester, ester, thioester, sulfate ester, carboxylic acid, phosphonic acid, phosphinic acid, sulfonic acid, amide, primary amine, secondary amine, ammonia, tertiary amine, sp2 amine, thiocyanate, cyanamide, oxime, nitrile, diazo, organohalide, nitro, s-heterocyclic ring, thiophene, n-heterocyclic ring, pyrrole, o-heterocyclic ring, furan, epoxide, peroxide, hydroxamic acid, imidazole, and pyridine, or a functional group in a Table herein, such that the API and co-crystal former are capable of co-crystallizing from a solution phase under crystallization conditions.

The co-crystals of the present invention are formed where the API and co-crystal former are bonded together through hydrogen bonds. Other non-covalent interactions, including pi-stacking and van der Waals interactions, may also be present.

In one embodiment, the co-crystal former is selected from the co-crystal formers of Table I and Table II. In other embodiments, the co-crystal former of Table I is specified as a Class 1, Class 2, or Class 3 co-crystal former (see column labeled "class" Table I). In another embodiment, the difference in pK_a value of the co-crystal former and the API is less than 2. In other embodiments, the difference in pK_a values of the co-crystal former and API is less than 3, less than 4, less than 5, between 2 and 3, between 3 and −4, or between 4 and 5. Table I lists multiple pK_a values for co-crystal formers having multiple functionalities. It is readily apparent to one skilled in the art the particular functional group corresponding to a particular pK_a value.

In another embodiment the particular functional group of a co-crystal former interacting with the API is specified (see for example Table I, columns labeled "Functionality" and "Molecular Structure" and the column of Table II labeled "Co-Crystal Former Functional Group"). In a further embodiment the functional group of the API interacting with the co-crystal former functional group is specified (see, for example, Tables II and III).

In another embodiment, the co-crystal comprises more than one co-crystal former. For example, two, three, four, five, or more co-crystal formers can be incorporated in a co-crystal with an API. Co-crystals which comprise two or more co-crystal formers and an API are bound together via hydrogen bonds. In one embodiment, incorporated co-crystal formers are hydrogen bonded to the API molecules. In another embodiment, co-crystal formers are hydrogen bonded to either the API molecules or the incorporated co-crystal formers.

In a further embodiment, several co-crystal formers can be contained in a single compartment, or kit, for ease in screening an API for potential co-crystal species. The co-crystal kit can comprise 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, or more of the co-crystal formers in Tables I and II. The co-crystal formers are in solid form and in an array of individual reaction vials such that individual co-crystal formers can be tested with one or more APIs by one or more crystallization methods or multiple co-crystal formers can be easily tested against one or more compounds by one or more crystallization methods. The crystallization methods include, but are not limited to, melt recrystallization, grinding, milling, standing, co-crystal formation from solution by evaporation, thermally driven crystallization from solution, co-crystal formation from solution by addition of anti-solvent, co-crystal formation from solution by vapor-diffusion, co-crystal formation from solution by drown-out, co-crystal formation from solution by any combination of the above mentioned techniques, co-crystal formation by co-sublimation, co-crystal formation by sublimation using a Knudsen cell apparatus, co-crystal formation by standing the desired components of the co-crystal in the presence of solvent vapor, co-crystal formation by slurry conversion of the desired components of the co-crystal in a solvent or mixtures of solvents, or co-crystal formation by any combination of the above techniques in the presence of additives, nucleates, crystallization enhancers, precipitants, chemical stabilizers, or anti-oxidants. The co-crystallization kits can be used alone or as part of larger crystallization experiments. For example, kits can be constructed as single co-crystal former single well kits, single co-crystal former multi-well kits, multi-co-crystal former single well kits, or multi-co-crystal former multi-well kits.

In a further embodiment, the API is selected from an API of Table IV or elsewhere herein. For pharmaceuticals listed in Table IV, co-crystals can comprise such APIs in free form (i.e. free acid, free base, zwitter ion), salts, solvates, hydrates, or the like. For APIs in Table IV listed as salts, solvates, hydrates, and the like, the API can either be of the form listed in Table IV or its corresponding free form, or of another form that is not listed. Table IV includes the CAS number, chemical name, or a PCT or patent reference (each incorporated herein in their entireties). In further embodiments, the functional group of the particular API interacting with the co-crystal former is specified. A specific functional group of a co-crystal former, a specific co-crystal former, or a specified functional group or a specific co-crystal former interacting with the particular API may also be specified. It is noted that for Table II, the co-crystal former, and optionally the specific functionality, and each of the listed corresponding interacting groups are included as individual species of the present invention. Thus, each specific combination of a co-crystal former and one of the interacting groups in the same row may be specified as a species of the present invention. The same is true for other combinations as discussed in the Tables and elsewhere herein.

In each process according to the invention, there is a need to contact the API with the co-crystal former. This may involve grinding the two solids together or melting one or both components and allowing them to recrystallize. This may also involve either solubilizing the API and adding the co-crystal former, or solubilizing the co-crystal former and adding the API. Crystallization conditions are applied to the API and co-crystal former. This may entail altering a property of the solution, such as pH or temperature and may require concentration of the solute, usually by removal of the solvent, typically by drying the solution. Solvent removal results in the concentration of both API and co-crystal former increasing over time so as to facilitate crystallization. Once the solid phase comprising any crystals is formed, this may be tested as described herein.

The co-crystals obtained as a result of such process steps may be readily incorporated into a pharmaceutical composition by conventional means. Pharmaceutical compositions in general are discussed in further detail below and may further comprise a pharmaceutically-acceptable diluent, excipient or carrier.

In a further aspect, the present invention provides a process for the production of a pharmaceutical composition, which process comprises:

(1) providing an API which has at least one functional group selected from ether, thioether, alcohol, thiol, aldehyde, ketone, thioketone, nitrate ester, phosphate ester, thiophosphate ester, ester, thioester, sulfate ester, carboxylic acid, phosphonic acid, phosphinic acid, sulfonic acid, amide, primary amine, secondary amine, ammonia, tertiary amine, sp2 amine, thiocyanate, cyanamide, oxime, nitrile diazo, organohalide, nitro, s-heterocyclic ring, thiophene, n-heterocyclic ring, pyrrole, o-heterocyclic ring, furan, epoxide, peroxide, hydroxamic acid, imidazole, and pyridine or of Table II or III;

(2) providing a co-crystal former which has at least one functional group selected from ether, thioether, alcohol, thiol, aldehyde, ketone, thioketone, nitrate ester, phosphate ester, thiophosphate ester, ester, thioester, sulfate ester, carboxylic acid, phosphonic acid, phosphinic acid, sulfonic acid, amide, primary amine, secondary amine, ammonia, tertiary amine, sp2 amine, thiocyanate, cyanamide, oxime, nitrile diazo, organohalide, nitro, s-heterocyclic ring, thiophene, n-heterocyclic ring, pyrrole, o-heterocyclic ring, furan, epoxide, peroxide, hydroxamic acid, imidazole, and pyridine or of Table I, II, or III;

(3) grinding, heating or contacting in solution the API with the co-crystal former under crystallization conditions;

(4) isolating co-crystals formed thereby; and

(5) incorporating the co-crystals into a pharmaceutical composition.

In a still further aspect the present invention provides a process for the production of a pharmaceutical composition, which comprises:

(1) grinding, heating or contacting in solution an API with a co-crystal former, under crystallization conditions, so as to form a solid phase;

(2) isolating co-crystals comprising the API and the co-crystal former; and

(3) incorporating the co-crystals into a pharmaceutical composition.

Assaying the solid phase for the presence of co-crystals of the API and the co-crystal former may be carried out by conventional methods known in the art. For example, it is convenient and routine to use powder X-ray diffraction techniques to assess the presence of co-crystals. This may be affected by comparing the spectra of the API, the crystal former and putative co-crystals in order to establish whether or not true co-crystals had been formed. Other techniques, used in an analogous fashion, include differential scanning calorimetry (DSC), thermogravimetric analysis (TGA) and Raman spectroscopy. Single crystal X-ray diffraction is especially useful in identifying co-crystal structures.

In a further aspect, the present invention therefore provides a process of screening for co-crystal compounds, which comprises:

(1) providing (i) an API compound, and (ii) a co-crystal former; and

(2) screening for co-crystals of APIs with co-crystal formers by subjecting each combination of API and co-crystal former to a step comprising:

(a) grinding, heating or contacting in solution the API with the co-crystal former under crystallization conditions so as to form a solid phase; and

(b) isolating co-crystals comprising the API and the co-crystal former.

An alternative embodiment is drawn to a process of screening for co-crystal compounds, which comprises:

(1) providing (i) an API or a plurality of different APIs, and (ii) a co-crystal former or a plurality of different co-crystal formers, wherein at least one of the API and the co-crystal former is provided as a plurality thereof; and

(2) screening for co-crystals of APIs with co-crystal formers by subjecting each combination of API and co-crystal former to a step comprising

(a) grinding, heating or contacting in solution the API with the co-crystal former under crystallization conditions so as to form a solid phase; and

(b) isolating co-crystals comprising the API and the co-crystal former.

Solubility Modulation

In a further aspect, the present invention provides a process for modulating the solubility of an API, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

In one embodiment, the solubility of the API is modulated such that the aqueous solubility is increased. Solubility of APIs may be measured by any conventional means such as chromatography (e.g., HPLC) or spectroscopic determination of the amount of API in a saturated solution of the API, such as UV-spectroscopy, IR-spectroscopy, Raman spectroscopy, quantitative mass spectroscopy, or gas chromatography.

In another aspect of the invention, the API may have low aqueous solubility. Typically, low aqueous solubility in the present application refers to a compound having a solubility in water which is less than or equal to 10 mg/mL, when measured at 37 degrees C., and preferably less than or equal to 5 mg/mL or 1 mg/mL. Low aqueous solubility can further be specifically defined as less than or equal to 900, 800, 700, 600, 500, 400, 300, 200 150 100, 90, 80, 70, 60, 50, 40, 30, 20 micrograms/mL, or further 10, 5 or 1 micrograms/mL, or further 900, 800, 700, 600, 500, 400, 300, 200 150, 100 90, 80, 70, 60, 50, 40, 30, 20, or 10 ng/mL, or less than 10 ng/mL when measured at 37 degrees C. Aqueous solubility can also be specified as less than 500, 400, 300, 200, 150, 100, 75, 50 or 25 mg/mL. As embodiments of the present invention, solubility can be increased 2, 3, 4, 5, 7, 10, 15, 20, 25, 50, 75, 100, 200, 300, 500, 750, 1000, 5000, or 10,000 times by making a co-crystal of the reference form (e.g., crystalline or amorphous free acid, free base or zwitter ion, hydrate or solvate), or a salt thereof. Further aqueous solubility can be measured in simulated gastric fluid (SGF) or simulated intestinal fluid (SIF) rather than water. SGF (non-diluted) of the present invention is made by combining 1 g/L Triton X-100 and 2 g/L NaCl in water and adjusting the pH with 20 mM HCl to obtain a solution with a final pH=1.7 (SIF is 0.68% monobasic potassium phosphate, 1% pancreatin, and sodium hydroxide where the pH of the final solution is 7.5). The pH of the solvent used may also be specified as 1, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 10.5, 11, 11.5, or 12, or any pH in between successive values.

Examples of embodiments includes: co-crystal compositions with an aqueous solubility, at 37 degrees C. and a pH of 7.0, that is increased at least 5 fold over the reference form, co-crystal compositions with a solubility in SGF that is increased at least 5 fold over the reference form, co-crystal compositions with a solubility in SIF that is increased at least 5 fold over the reference form.

Dissolution Modulation

In another aspect of the present invention, the dissolution profile of the API is modulated whereby the aqueous dissolution rate or the dissolution rate in simulated gastric fluid or in simulated intestinal fluid, or in a solvent or plurality of solvents is increased. Dissolution rate is the rate at which API

solids dissolve in a dissolution medium. For APIs whose absorption rates are faster than the dissolution rates (e.g., steroids), the rate-limiting step in the absorption process is often the dissolution rate. Because of a limited residence time at the absorption site, APIs that are not dissolved before they are removed from intestinal absorption site are considered useless. Therefore, the rate of dissolution has a major impact on the performance of APIs that are poorly soluble. Because of this factor, the dissolution rate of APIs in solid dosage forms is an important, routine, quality control parameter used in the API manufacturing process.

$$\text{Dissolution rate} = K\,S(C_s - C)$$

where K is dissolution rate constant, S is the surface area, C_s is the apparent solubility, and C is the concentration of API in the dissolution medium.

For rapid API absorption, C_s–C is approximately equal to C_s

The dissolution rate of APIs may be measured by conventional means known in the art.

The increase in the dissolution rate of a co-crystal, as compared to the reference form (e.g., free form or salt), may be specified, such as by 10, 20, 30, 40, 50, 60, 70, 80, 90, or 100%, or by 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 500, 1000, 10,000, or 100,000 fold greater than the reference form (e.g., free form or salt form) in the same solution. Conditions under which the dissolution rate is measured is the same as discussed above The increase in dissolution may be further specified by the time the composition remains supersaturated before reaching equilibrium solubility.

Examples of above embodiments include: co-crystal compositions with a dissolution rate in aqueous solution, at 37 degrees C. and a pH of 7.0, that is increased at least 5 fold over the reference form, co-crystal compositions with a dissolution rate in SGF that is increased at least 5 fold over the reference form, co-crystal compositions with a dissolution rate in SIF that is increased at least 5 fold over the reference form.

Bioavailability Modulation

The methods of the present invention are used to make a pharmaceutical API formulation with greater solubility, dissolution, and bioavailability. Bioavailability can be improved via an increase in AUC, reduced time to T_{max}, (the time to reach peak blood serum levels), or increased C_{max}. The present invention can result in higher plasma concentrations of API when compared to the neutral form or salt alone (reference form).

AUC is the area under the plot of plasma concentration of API (not logarithm of the concentration) against time after API administration. The area is conveniently determined by the "trapezoidal rule": The data points are connected by straight line segments, perpendiculars are erected from the abscissa to each data point, and the sum of the areas of the triangles and trapezoids so constructed is computed. When the last measured concentration (C_n, at time t_n) is not zero, the AUC from t_n to infinite time is estimated by C_n/k_{el}.

The AUC is of particular use in estimating bioavailability of APIs, and in estimating total clearance of APIs (Cl_T). Following single intravenous doses, $AUC=D/Cl_T$, for single compartment systems obeying first-order elimination kinetics, where D is the dose; alternatively, $AUC=C_0/k_{el}$, where k_{el} is the API elimination rate constant. With routes other than the intravenous, for such systems, $AUC=F\cdot D/Cl_T$, where F is the absolute bioavailability of the API.

Thus, in a further aspect, the present invention provides a process for modulating the bioavailability of an API when administered in its normal and effective dose range as a co-crystal, whereby the AUC is increased, the time to T_{max} is reduced, or C_{max} is increased, as compared to a reference form, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Examples of the above embodiments include: co-crystal compositions with a time to T_{max} that is reduced by at least 10% as compared to the reference form, co-crystal compositions with a time to T_{max} that is reduced by at least 20% over the reference form, co-crystal compositions with a time to T_{max} that is reduced by at least 40% over the reference form, co-crystal compositions with a time to T_{max} that is reduced by at least 50% over the reference form, co-crystal compositions with a T_{max} that is reduced by at least 60% over the reference form, co-crystal compositions with a T_{max} that is reduced by at least 70% over the reference form, co-crystal compositions with a T_{max} that is reduced by at least 80% over the reference form, co-crystal compositions with a T_{max} that is reduced by at least 90% over the reference form, co-crystal compositions with a C_{max} that is increased by at least 20% over the reference form, co-crystal compositions with a C_{max} that is increased by at least 30% over the reference form, co-crystal compositions with a C_{max} that is increased by at least 40% over the reference form, co-crystal compositions with a C_{max} that is increased by at least 50% over the reference form, co-crystal compositions with a C_{max} that is increased by at least 60% over the reference form, co-crystal compositions with a C_{max} that is increased by at least 70% over the reference form, co-crystal compositions with a C_{max} that is increased by at least 80% over the reference form, co-crystal compositions with a Cmax that is increased by at least 2 fold, 3 fold, 5 fold, 7.5 fold, 10 fold, 25 fold, 50 fold or 100 fold, co-crystal compositions with an AUC that is increased by at least 10% over the reference form, co-crystal compositions with an AUC that is increased by at least 20% over the reference form, co-crystal compositions with an AUC that is increased by at least 30% over the reference form, co-crystal compositions with an AUC that is increased by at least 40% over the reference form, co-crystal compositions with an AUC that is increased by at least 50% over the reference form, co-crystal compositions with an AUC that is increased by at least 60% over the reference form, co-crystal compositions with an AUC that is increased by at least 70% over the reference form, co-crystal compositions with an AUC that is increased by at least 80% over the reference form or co-crystal compositions with an AUC that is increased by at least 2 fold, 3 fold, 4 fold, 5 fold, 6 fold, 7 fold, 8 fold, 9 fold, or 10 fold. Other examples include wherein the reference form is crystalline, wherein the reference form is amorphous, wherein the reference form is an anhydrous crystalline sodium salt, or wherein the reference form is an anhydrous crystalline HCl salt.

Dose Response Modulation

In a further aspect the present invention provides a process for improving the dose response of an API, which process comprises:

(1) contacting in solution an API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Dose response is the quantitative relationship between the magnitude of response and the dose inducing the response and may be measured by conventional means known in the art. The curve relating effect (as the dependent variable) to

dose (as the independent variable) for an API-cell system is the "dose-response curve". Typically, the dose-response curve is the measured response to an API plotted against the dose of the API (mg/kg) given. The dose response curve can also be a curve of AUC against the dose of the API given.

In an embodiment of the present invention, a co-crystal of the present invention has an increased dose response curve or a more linear dose response curve than the corresponding reference compound.

Increased Stability

In a still further aspect the present invention provides a process for improving the stability of an API (as compared to a reference form such as its free form or a salt thereof), which process comprises:

(1) grinding, heating or contacting in solution the pharmaceutical salt with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

In a preferred embodiment, the compositions of the present invention, including the API or active pharmaceutical ingredient (API) and formulations comprising the API, are suitably stable for pharmaceutical use. Preferably, the API or formulations thereof of the present invention are stable such that when stored at 30 degrees C. for 2 years, less than 0.2% of any one degradant is formed. The term degradant refers herein to product(s) of a single type of chemical reaction. For example, if a hydrolysis event occurs that cleaves a molecule into two products, for the purpose of the present invention, it would be considered a single degradant. More preferably, when stored at 40 degrees C. for 2 years, less than 0.2% of any one degradant is formed. Alternatively, when stored at 30 degrees C. for 3 months, less than 0.2% or 0.15%, or 0.1% of any one degradant is formed, or when stored at 40 degrees C. for 3 months, less than 0.2% or 0.15%, or 0.1% of any one degradant is formed. Further alternatively, when stored at 60 degrees C. for 4 weeks, less than 0.2% or 0.15%, or 0.1% of any one degradant is formed. The relative humidity (RH) may be specified as ambient (RH), 75% (RH), or as any single integer between 1 to 99%.

Difficult to Salt or Unsaltable Compounds

In a still further aspect the present invention provides a process for making co-crystals of unsaltable or difficult to salt APIs which process comprises:

(1) grinding, heating or contacting in solution an API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

Difficult to salt compounds include bases with a pKa<3 or acids with a pKa>10. Zwitter ions are also difficult to salt or unsaltable compounds according to the present invention.

Decreasing Hygroscopicity

In a still further aspect, the present invention provides a method for decreasing the hygroscopicity of an API, which method comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

An aspect of the present invention provides a pharmaceutical composition comprising a co-crystal of an API that is less hygroscopic than amorphous or crystalline, free form or salt (including metal salts such as sodium, potassium, lithium, calcium, magnesium) or another reference compound. Hygroscopicity can be assessed by dynamic vapor sorption analysis, in which 5-50 mg of the compound is suspended from a Cahn microbalance. The compound being analyzed should be placed in a non-hygroscopic pan and its weight should be measured relative to an empty pan composed of identical material and having nearly identical size, shape, and weight. Ideally, platinum pans should be used. The pans should be suspended in a chamber through which a gas, such as air or nitrogen, having a controlled and known percent relative humidity (% RH) is flowed until equilibrium criteria are met. Typical equilibrium criteria include weight changes of less than 0.01% over 3 minutes at constant humidity and temperature. The relative humidity should be measured for samples dried under dry nitrogen to constant weight (<0.01% change in 3 minutes) at 40 degrees C. unless doing so would de-solvate or otherwise convert the material to an amorphous compound. In one aspect, the hygroscopicity of a dried compound can be assessed by increasing the RH from 5 to 95% in increments of 5% RH and then decreasing the RH from 95 to 5% in 5% increments to generate a moisture sorption isotherm. The sample weight should be allowed to equilibrate between each change in % RH. If the compound deliquesces or becomes amorphous above 75% RH, but below 95% RH, the experiment should be repeated with a fresh sample and the relative humidity range for the cycling should be narrowed to 5-75% RH or 10-75% RH, instead of 5-95% RH. If the sample cannot be dried prior to testing due to lack of form stability, than the sample should be studied using two complete humidity cycles of either 10-75% RH or 5-95% RH, and the results of the second cycle should be used if there is significant weight loss at the end of the first cycle.

Hygroscopicity can be defined using various parameters. For purposes of the present invention, a non-hygroscopic molecule should not gain or lose more than 1.0%, or more preferably, 0.5% weight at 25 degrees C. when cycled between 10 and 75% RH (relative humidity at 25 degrees C.). The non-hygroscopic molecule more preferably should not gain or lose more than 1.0%, or more preferably, 0.5% weight when cycled between 5 and 95% RH at 25 degrees C., or more than 0.25% of its weight between 10 and 75% RH. Most preferably, a non-hygroscopic molecule will not gain or lose more than 0.25% of its weight when cycled between 5 and 95% RH.

Alternatively, for purposes of the present invention, hygroscopicity can be defined using the parameters of Callaghan et al., "Equilibrium moisture content of pharmaceutical excipients", in Api Dev. Ind. Pharm., Vol. 8, pp. 335-369 (1982). Callaghan et al. classified the degree of hygroscopicity into four classes.

Class 1: Non-hygroscopic Essentially no moisture increases occur at relative humidities below 90%.

Class 2: Slightly hygroscopic Essentially no moisture increases occur at relative humidities below 80%.

Class 3: Moderately hygroscopic Moisture content does not increase more than 5% after storage for 1 week at relative humidities below 60%.

Class 4: Very hygroscopic Moisture content increase may occur at relative humidities as low as 40 to 50%.

Alternatively, for purposes of the present invention, hygroscopicity can be defined using the parameters of the European Pharmacopoeia Technical Guide (1999, p. 86) which has defined hygrospocity, based on the static method, after storage at 25 degrees C. for 24 hours at 80% RH:

Slightly hygroscopic: Increase in mass is less than 2 percent m/m and equal to or greater than 0.2 percent m/m.

Hygroscopic: Increase in mass is less than 15 percent m/m and equal to or greater than 0.2 percent m/m.

Very Hygroscopic: Increase in mass is equal to or greater than 15 percent m/m.

Deliquescent: Sufficient water is absorbed to form a liquid.

Co-crystals of the present invention can be set forth as being in Class 1, Class 2, or Class 3, or as being Slightly hygroscopic, Hygroscopic, or Very Hygroscopic. Co-crystals of the present invention can also be set forth based on their ability to reduce hygroscopicity. Thus, preferred co-crystals of the present invention are less hygroscopic than a reference compound. The reference compound can be specified as the API in free form (free acid, free base, hydrate, solvate, etc.) or salt (e.g., especially metal salts such as sodium, potassium, lithium, calcium, or magnesium). Further included in the present invention are co-crystals that do not gain or lose more than 1.0% weight at 25 degrees C. when cycled between 10 and 75% RH, wherein the reference compound gains or loses more than 1.0% weight under the same conditions. Further included in the present invention are co-crystals that do not gain or lose more than 0.5% weight at 25 degrees C. when cycled between 10 and 75% RH, wherein the reference compound gains or loses more than 0.5% or more than 1.0% weight under the same conditions. Further included in the present invention are co-crystals that do not gain or lose more than 1.0% weight at 25 degrees C. when cycled between 5 and 95% RH, wherein the reference compound gains or loses more than 1.0% weight under the same conditions. Further included in the present invention are co-crystals that do not gain or lose more than 0.5% weight at 25 degrees C. when cycled between 5 and 95% RH, wherein the reference compound gains or loses more than 0.5% or more than 1.0% weight under the same conditions. Further included in the present invention are co-crystals that do not gain or lose more than 0.25% weight at 25 degrees C. when cycled between 5 and 95% RH, wherein the reference compound gains or loses more than 0.5% or more than 1.0% weight under the same conditions.

Further included in the present invention are co-crystals that have a hygroscopicity (according to Callaghan et al.) that is at least one class lower than the reference compound or at least two classes lower than the reference compound. Included are a Class 1 co-crystal of a Class 2 reference compound, a Class 2 co-crystal of a Class 3 reference compound, a Class 3 co-crystal of a Class 4 reference compound, a Class 1 co-crystal of a Class 3 reference compound, a Class 1 co-crystal of a Class 4 reference compound, or a Class 2 co-crystal of a Class 4 reference compound.

Further included in the present invention are co-crystals that have a hygroscopicity (according to the European Pharmacopoeia Technical Guide) that is at least one class lower than the reference compound or at least two classes lower than the reference compound. Non-limiting examples include; a slightly hygroscopic co-crystal of a hygroscopic reference compound, a hygroscopic co-crystal of a very hygroscopic reference compound, a very hygroscopic co-crystal of a deliquescent reference compound, a slightly hygroscopic co-crystal of a very hygroscopic reference compound, a slightly hygroscopic co-crystal of a deliquescent reference compound, and a hygroscopic co-crystal of a deliquescent reference compound.

Crystallizing Amorphous Compounds

In a further aspect, the present invention provides a process for crystallizing an amorphous compound, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

An amorphous compound includes compounds that do not crystallize using routine methods in the art.

Decreasing Form Diversity

In a still further embodiment aspect the present invention provides a process for reducing the form diversity of an API, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

For purposes of the present invention, the number of forms of a co-crystal is compared to the number of forms of a reference compound (e.g. the free form or a salt of the API) that can be made using routine methods in the art.

Morphology Modulation

In a still further aspect the present invention provides a process for modifying the morphology of an API, which process comprises:

(1) grinding, heating or contacting in solution the API with a co-crystal former under crystallization conditions, so as to form a co-crystal of the API and the co-crystal former; and

(2) isolating co-crystals comprising the API and the co-crystal former.

In an embodiment the co-crystal comprises or consists of a co-crystal former and a pharmaceutical wherein the interaction between the two, e.g., H-bonding, occurs between a functional group of Table III of an API with a corresponding interacting group of Table III. In a further embodiment, the co-crystal comprises a co-crystal former of Table I or II and an API with a corresponding interacting group of Table III. In a further embodiment the co-crystal comprises an API from Table IV and a co-crystal former with a functional group of Table III. In a further embodiment, the co-crystal is from Table I or II. In an aspect of the invention, only co-crystals having an H-bond acceptor on the first molecule and an H-bond donor on the second molecule, where the first and second molecules are either co-crystal former and API respectively or API and co-crystal former respectively, are included in the present invention. Table IV includes the CAS number, chemical name or a PCT or patent reference (each incorporated herein in their entireties). Thus, whether a particular API contains an H-bond donor, acceptor or both is readily apparent.

In another embodiment, the co-crystal former and API each have only one H-bond donor/acceptor. In another aspect, the molecular weight of the API is less than 2000, 1500, 1000, 750, 500, 350, 200, or 150 Daltons. In another embodiment, the molecular weight of the API is between 100-200, 200-300, 300-400, 400-500, 500-600, 600-700, 700-800, 800-900, 900-1000, 1000-1200, 1200-1400, 1400-1600, 1600-1800, or 1800-2000. APIs with the above molecular weights may also be specifically excluded from the present invention.

In another embodiment, peptides, proteins, nucleic acids or other biological APIs are excluded from the present invention. In another embodiment, all non-pharmaceutically acceptable co-crystal formers are excluded from the present invention. In another embodiment, organometalic APIs are excluded from the present invention. In another embodiment, a co-crystal former comprising any one or more of the functional groups of Table III may be specifically excluded from the present invention. In another embodiment, any one or more of the co-crystal formers of Table I or II may be specifically excluded from the present invention. Any APIs currently known in the art may also be specifically excluded from the

present invention. For example, carbanazepine, itraconazole, nabumetone, fluoxetine, acetaminophen and theophylline can each be specifically excluded from the present invention. In another embodiment, the API is not a salt, is not a non-metal salt, or is not a metal salt, e.g., sodium, potassium, lithium, calcium or magnesium. In another embodiment, the API is a salt, is a non-metal salt, or is a metal salt, e.g., sodium, potassium, lithium, calcium, magnesium. In one embodiment, the API does not contain a halogen. In one embodiment, the API does contain a halogen.

In another embodiment, any one or more of the APIs of Table IV may be specifically excluded from the present invention. Any APIs currently known in the art may also be specifically excluded from the present invention. For example, nabumetone:2,3-naphthalenediol, fluoxetine HCl:benzoic acid, fluoxetine HCl:succinic acid, acetaminophen:piperazine, acetaminophen:theophylline, theophylline:salicylic acid, theophylline:p-hydroxybenzoic acid, theophylline:sorbic acid, theophylline:1-hydroxy-2-naphthoic acid, theophylline:glycolic acid, theophylline:2,5-dihydroxybenzoic acid, theophylline:chloroacetic acid, bis(diphenylhydantoin):9-ethyladenine acetylacetone solvate, bis(diphenylhydantoin):9-ethyladenine 2,4-pentanedione solvate, 5,5-diphenylbarbituric acid:9-ethyladenine, bis(diphenylhydantoin):9-ethyladenine, 4-aminobenzoic acid:4-aminobenzonitrile, sulfadimidine:salicylic acid, 8-hydroxyquinolinium 4-nitrobenzoate:4-nitrobenzoic acid, sulfaproxyline:caffeine, retro-inverso-isopropyl (2R,3S)-4-cyclohexyl-2-hydroxy-3-(N-((2R)-2-morpholinocarbonylmethyl-3-(1-naphthyl)propionyl)-L-histidylamino)butyrate: cinnamic acid monohydrate, benzoic acid:isonicotinamide, 3-(2-N',N'-(dimethylhydrazino)-4-thiazolylmethylthio)-N''-sulfamoylpropionamidine:maleic acid, diglycine hydrochloride ($C_2H_5NO_2$:$C_2H_6NO_2^+Cl^-$), octadecanoic acid:3-pyridinecarboxamide, cis-N-(3-methyl-1-(2-(1,2,3,4-tetrahydro) naphthyl)-piperidin-4-yl)-N-phenylpropanamide hydrochloride:oxalic acid, trans-N-(3-methyl-1-(2-(1,2,3,4-tetrahydro)naphthyl)-piperidin-4-ylium)-N-phenylpropanamide oxalate:oxalic acid dihydrate, bis(1-(3-((4-(2-isopropoxyphenyl)-1-piperazinyl)methyl)benzoyl)piperidine) succinate:succinic acid, bis(p-cyanophenyl)imidazolylmethane:succinic acid, cis-1-((4-(1-imidazolylmethyl)cyclohexyl)methyl)imidazole:succinic acid, (+)-2-(5,6-dimethoxy-1,2,3,4-tetrahydro-1-naphthyl)imidazoline:(+)-dibenzoyl-D-tartaric acid, raclopride:tartaric acid, 2,6-diamino-9-ethylpurine:5,5-diethylbarbituric acid, 5,5-diethylbarbituric acid:bis(2-aminopyridine), 5,5-diethylbarbituric acid:acetamide, 5,5-diethylbarbituric acid: KI_3, 5,5-diethylbarbituric acid:urea, bis(barbital): hexamethylphosphoramide, 5,5-diethylbarbituric acid: imidazole, barbital: 1-methylimidazole, 5,5-diethylbarbituric acid:N-methyl-2-pyridone, 2,4-diamino-5-(3,4,5-trimethoxybenzyl)-pyrimidine:5,5-diethylbarbituric acid, bis(barbital):caffeine, bis(barbital): 1-methylimidazole, bis(beta-cyclodextrin):bis(barbital) hydrate, tetrakis(beta-cyclodextrin):tetrakis(barbital), 9-ethyladenine:5,5-diethylbarbituric acid, barbital:N'-(p-cyanophenyl)-N-(p-iodophenyl)melamine, barbital:2-amino-4-(m-bromophenylamino)-6-chloro-1,3,5-triazine, 5,5-diethylbarbituric acid:N,N'-diphenylmelamine, 5,5-diethylbarbituric acid:N,N'-bis(p-chlorophenyl)melamine, N,N'-bis(p-bromophenyl) melamine:5,5-diethylbarbituric acid, 5,5-diethylbarbituric acid:N,N'-bis(p-iodophenyl)melamine, 5,5-diethylbarbituric acid:N,N'-bis(p-tolyl)melamine, 5,5-diethylbarbituric acid: N,N'-bis(m-tolyl)melamine, 5,5-diethylbarbituric acid:N,N'-bis(m-chlorophenyl)melamine, N,N'-Bis(m-methylphenyl) melamine:barbital, N,N'-bis(m-chlorophenyl)melamine: barbital tetrahydrofuran solvate, 5,5-diethylbarbituric acid: N,N'-bis(t-butyl)melamine, 5,5-diethylbarbituric acid:N,N'-di(t-butyl)melamine, 6,6'-diquinolyl ether:5,5-diethylbarbituric acid, 5-t-butyl-2,4,6-triaminopyrimidine: diethylbarbituric acid, N,N'-bis(4-carboxymethylphenyl) melamine:barbital ethanol solvate, N,N'-bis(4-t-butylphenyl) melamine:barbital, tris(5,17-N,N'-bis(4-amino-6-(butylamino)-1,3,5-triazin-2-yl)diamino-11,23-dinitro-25, 26,27,28-tetrapropoxycalix(4)arene):hexakis (diethylbarbituric acid) toluene solvate, N,N'-bis(m-fluorophenyl)melamine:barbital, N,N'-bis(m-bromophenyl) melamine:barbital acetone solvate, N,N'-bis(m-iodophenyl) melamine:barbital acetonitrile solvate, N,N'-bis(m-trifluoromethylphenyl)melamine:barbital acetonitrile solvate, aminopyrine:barbital, N,N'-bis(4-fluorophenyl) melamine:barbital, N,N'-bis(4-trifluoromethylphenyl) melamine:barbital, 2,4-diamino-5-(3,4,5-trimethoxybenzyl) pyrimidine:barbital, hydroxybutyrate:hydroxyvalerate, 2-aminopyrimidine:succinic acid, 1,3-bis(((6-methylpyrid-2-yl)amino)carbonyl)benzene:glutaric acid, 5-t-butyl-2,4,6-triaminopyrimidine:diethylbarbituric acid, bis(dithiobiuret-S,S')nickel(II):diuracil, platinum 3,3'-dihydroxymethyl-2,2'-bipyridine dichloride:$AgF_{3\ CSO3}$, 4,4'-bipyridyl:isophthalic acid, 4,4'-bipyridyl:1,4-naphthalenedicarboxylic acid, 4,4'-bipyridyl:1,3,5-cyclohexane-tricarboxylic acid, 4,4'-bipyridyl:tricaballylic acid, urotropin:azelaic acid, insulin:C8-HI (octanoyl-N^{ε}-LysB29-human insulin), isonicotinamide:cinnamic acid, isonicotinamide:3-hydroxybenzoic acid, isonicotinamide:3-N,N-dimethylaminobenzoic acid, isonicotinamide:3,5-bis(trifluoromethyl)-benzoic acid, isonicotinamide:d,1-mandelic acid, isonicotinamide:chloroacetic acid, isonicotinamide:fumaric acid monoethyl ester, isonicotinamide:12-bromododecanoic acid, isonicotinamide:fumaric acid, isonicotinamide:succinic acid, isonicotinamide:4-ketopimelic acid, isonicotinamide:thiodiglycolic acid, 1,3,5-cyclohexane-tricarboxylic acid:hexamethyltetramine, 1,3,5-cyclohexane-tricarboxylic acid:4,7-phenanthroline, 4,7-phenanthroline:oxalic acid, 4,7-phenanthroline: terephthalic acid, 4,7-phenanthroline: 1,3,5-cyclohexane-tricarboxylic acid, 4,7-phenanthroline: 1,4-naphthalenedicarboxylic acid, pyrazine:methanoic acid, pyrazine:ethanoic acid, pyrazine:propanoic acid, pyrazine:butanoic acid, pyrazine:pentanoic acid, pyrazine:hexanoic acid, pyrazine:heptanoic acid, pyrazine:octanoic acid, pyrazine:nonanoic acid, pyrazine:decanoic acid, diammine-(deoxy-quanyl-quanyl-N^7,N^7)-platinum:tris(glycine) hydrate, 2-aminopyrimidine:p-phenylenediacetic acid, bis(2-aminopyrimidin-1-ium)fumarate:fumaric acid, 2-aminopyrimidine:indole-3-acetic acid, 2-aminopyrimidine:N-methylpyrrole-2-carboxylic acid, 2-aminopyrimidine:thiophen-2-carboxylic acid, 2-aminopyrimidine:(+)-camphoric acid, 2,4,6-Trinitrobenzoic acid: 2-aminopyrimidine, 2-aminopyrimidine:4-aminobenzoic acid, 2-aminopyrimidine:bis(phenoxyacetic acid), 2-aminopyrimidine:(2,4-dichlorophenoxy)acetic acid, 2-aminopyrimidine:(3,4-dichlorophenoxy)acetic acid, 2-aminopyrimidine:indole-2-carboxylic acid, 2-aminopyrimidine:terephthalic acid, 2-aminopyrimidine:bis(2-nitrobenzoic acid), 2-aminopyrimidine:bis(2-aminobenzoic acid), 2-aminopyrimidine:3-aminobenzoic acid, 2-hexeneoic acid:isonicotinamide, 4-nitrobenzoic acid:isonicotinamide, 3,5-dinitrobenzoic acid: isonicotinamide:4-methylbenzoic acid, 2-amino-5-nitropyrimidine:2-amino-3-nitropyridine, 3,5-dinitrobenzoic acid:4-chlorobenzamide, 3-dimethylaminobenzoic acid:4-chlorobenzamide, fumaric acid:4-chlorobenzamide, oxine:4-nitrobenzoic acid, oxine:3,5-dinitrobenzoic acid, oxine:3,5-dinitrosalicylic acid, 3-[2-

(N',N'-dimethylhydrazino)-4-thiazolylmethylthio]-N^2-sulfamoylpropionamidine:maleic acid, 5-fluorouracil:9-ethylhypoxanthine, 5-fluorouracil:cytosine dihydrate, 5-fluorouracil:theophylline monohydrate, stearic acid:nicotinamide, cis-1-{[4-(1-imidazolylmethyl)cyclohexyl] methyl}imidazole:succinic acid, CGS18320B:succinic acid, sulfaproxyline:caffeine, 4-aminobenzoic acid:4-aminobenzonitrile, 3,5-dinitrobenzoic acid:isonicotinamide:3-methylbenzoic acid, 3,5-dinitrobenzoic acid:isonicotinamide:4-(dimethylamino)benzoic acid, 3,5-dinitrobenzoic acid: isonicotinamide:4-hydroxy-3-methoxycinnamic acid, isonicotinamide:oxalic acid, isonicotinamide:malonic acid, isonicotinamide:succinic acid, isonicotinamide:glutaric acid, isonicotinamide:adipic acid, benzoic acid:isonicotinamide, mazapertine:succinate, betaine:dichloronitrophenol, betainepyridine:dichloronitrophenol, betainepyridine:pentachlorophenol, 4-{2-[1-(2-hydroxyethyl)-4-pyridylidene]-ethylidene}-cyclo-hexa-2,5-dien-1-one:methyl 2,4-dihydroxybenzoate, 4-{2-[1-(2-hydroxyethyl)-4-pyridylidene]-ethylidene}-cyclo-hexa-2,5-dien-1-one:2,4-dihydroxypropiophenone, 4-{2-[1-(2-hydroxyethyl)-4-pyridylidene]-ethylidene}-cyclo-hexa-2,5-dien-1-one:2,4-dihydroxyacetophenone, squaric acid:4,4'-dipyridylacetylene, squaric acid: 1,2-bis(4-pyridyl)ethylene, chloranilic acid: 1,4-bis[(4-pyridyl)ethynyl]benzene, 4,4'-bipyridine:phthalic acid, 4,4'-dipyridylacetylene:phthalic acid, bis(pentamethylcyclopentadienyl)iron:bromanilic acid, bis (pentamethylcyclopentadienyl)iron:chloranilic acid, bis (pentamethylcyclopentadienyl)iron:cyananilic acid, pyrazinotetrathiafulvalene:chloranilic acid, phenol: pentafluorophenol, co-crystals of itraconazole, and co-crystals of topiramate are specifically excluded from the present invention.

Excipients employed in pharmaceutical compositions of the present invention can be solids, semi-solids, liquids or combinations thereof. Preferably, excipients are solids. Compositions of the invention containing excipients can be prepared by any known technique of pharmacy that comprises admixing an excipient with an API or therapeutic agent. A pharmaceutical composition of the invention contains a desired amount of API per dose unit and, if intended for oral administration, can be in the form, for example, of a tablet, a caplet, a pill, a hard or soft capsule, a lozenge, a cachet, a dispensable powder, granules, a suspension, an elixir, a dispersion, a liquid, or any other form reasonably adapted for such administration. If intended for parenteral administration, it can be in the form, for example, of a suspension or transdermal patch. If intended for rectal administration, it can be in the form, for example, of a suppository. Presently preferred are oral dosage forms that are discrete dose units each containing a predetermined amount of the API, such as tablets or capsules.

In another embodiment, APIs with an inappropriate pH for transdermal patches can be co-crystallized with an appropriate co-crystal former, thereby adjusting its pH to an appropriate level for use as a transdermal patch. In another embodiment, an APIs pH level can be optimized for use in a transdermal patch via co-crystallization with an appropriate co-crystal former.

Non-limiting examples follow of excipients that can be used to prepare pharmaceutical compositions of the invention.

Pharmaceutical compositions of the invention optionally comprise one or more pharmaceutically acceptable carriers or diluents as excipients. Suitable carriers or diluents illustratively include, but are not limited to, either individually or in combination, lactose, including anhydrous lactose and lactose monohydrate; starches, including directly compressible starch and hydrolyzed starches (e.g., Celutab™ and Emdex™); mannitol; sorbitol; xylitol; dextrose (e.g., Cerelose™ 2000) and dextrose monohydrate; dibasic calcium phosphate dihydrate; sucrose-based diluents; confectioner's sugar; monobasic calcium sulfate monohydrate; calcium sulfate dihydrate; granular calcium lactate trihydrate; dextrates; inositol; hydrolyzed cereal solids; amylose; celluloses including microcrystalline cellulose, food grade sources of alpha- and amorphous cellulose (e.g., RexcelJ), powdered cellulose, hydroxypropylcellulose (HPC) and hydroxypropylmethylcellulose (HPMC); calcium carbonate; glycine; bentonite; block co-polymers; polyvinylpyrrolidone; and the like. Such carriers or diluents, if present, constitute in total about 5% to about 99%, preferably about 10% to about 85%, and more preferably about 20% to about 80%, of the total weight of the composition. The carrier, carriers, diluent, or diluents selected preferably exhibit suitable flow properties and, where tablets are desired, compressibility.

Lactose, mannitol, dibasic sodium phosphate, and microcrystalline cellulose (particularly Avicel PH microcrystalline cellulose such as Avicel PH 101), either individually or in combination, are preferred diluents. These diluents are chemically compatible with many co-crystals described herein. The use of extragranular microcrystalline cellulose (that is, microcrystalline cellulose added to a granulated composition) can be used to improve hardness (for tablets) and/or disintegration time. Lactose, especially lactose monohydrate, is particularly preferred. Lactose typically provides compositions having suitable release rates of co-crystals, stability, pre-compression flowability, and/or drying properties at a relatively low diluent cost. It provides a high density substrate that aids densification during granulation (where wet granulation is employed) and therefore improves blend flow properties and tablet properties.

Pharmaceutical compositions of the invention optionally comprise one or more pharmaceutically acceptable disintegrants as excipients, particularly for tablet formulations. Suitable disintegrants include, but are not limited to, either individually or in combination, starches, including sodium starch glycolate (e.g., Explotab™ of PenWest) and pregelatinized corn starches (e.g., National™ 1551 of National Starch and Chemical Company, National™ 1550, and Colorcon™ 1500), clays (e.g., Veegum™ HV of R.T. Vanderbilt), celluloses such as purified cellulose, microcrystalline cellulose, methylcellulose, carboxymethylcellulose and sodium carboxymethylcellulose, croscarmellose sodium (e.g., Ac-Di-Sol™ of FMC), alginates, crospovidone, and gums such as agar, guar, locust bean, karaya, pectin and tragacanth gums.

Disintegrants may be added at any suitable step during the preparation of the composition, particularly prior to granulation or during a lubrication step prior to compression. Such disintegrants, if present, constitute in total about 0.2% to about 30%, preferably about 0.2% to about 10%, and more preferably about 0.2% to about 5%, of the total weight of the composition.

Croscarmellose sodium is a preferred disintegrant for tablet or capsule disintegration, and, if present, preferably constitutes about 0.2% to about 10%, more preferably about 0.2% to about 7%, and still more preferably about 0.2% to about 5%, of the total weight of the composition. Croscarmellose sodium confers superior intragranular disintegration capabilities to granulated pharmaceutical compositions of the present invention.

Pharmaceutical compositions of the invention optionally comprise one or more pharmaceutically acceptable binding agents or adhesives as excipients, particularly for tablet for-

mulations. Such binding agents and adhesives preferably impart sufficient cohesion to the powder being tableted to allow for normal processing operations such as sizing, lubrication, compression and packaging, but still allow the tablet to disintegrate and the composition to be absorbed upon ingestion. Such binding agents may also prevent or inhibit crystallization or recrystallization of a co-crsytal of the present invention once the salt has been dissolved in a solution. Suitable binding agents and adhesives include, but are not limited to, either individually or in combination, acacia; tragacanth; sucrose; gelatin; glucose; starches such as, but not limited to, pregelatinized starches (e.g., National™ 1511 and National™ 1500); celluloses such as, but not limited to, methylcellulose and carmellose sodium (e.g., Tylose™); alginic acid and salts of alginic acid; magnesium aluminum silicate; PEG; guar gum; polysaccharide acids; bentonites; povidone, for example povidone K-15, K-30 and K-29/32; polymethacrylates; HPMC; hydroxypropylcellulose (e.g., Klucel™ of Aqualon); and ethylcellulose (e.g., Ethocel™ of the Dow Chemical Company). Such binding agents and/or adhesives, if present, constitute in total about 0.5% to about 25%, preferably about 0.75% to about 15%, and more preferably about 1% to about 10%, of the total weight of the pharmaceutical composition.

Many of the binding agents are polymers comprising amide, ester, ether, alcohol or ketone groups and, as such, are preferably included in pharmaceutical compositions of the present invention. Polyvinylpyrrolidones such as povidone K-30 are especially preferred. Polymeric binding agents can have varying molecular weight, degrees of crosslinking, and grades of polymer. Polymeric binding agents can also be copolymers, such as block co-polymers that contain mixtures of ethylene oxide and propylene oxide units. Variation in these units' ratios in a given polymer affects properties and performance. Examples of block co-polymers with varying compositions of block units are Poloxamer 188 and Poloxamer 237 (BASF Corporation).

Pharmaceutical compositions of the invention optionally comprise one or more pharmaceutically acceptable wetting agents as excipients. Such wetting agents are preferably selected to maintain the co-crystal in close association with water, a condition that is believed to improve bioavailability of the composition. Such wetting agents can also be useful in solubilizing or increasing the solubility of co-crystals.

Non-limiting examples of surfactants that can be used as wetting agents in pharmaceutical compositions of the invention include quaternary ammonium compounds, for example benzalkonium chloride, benzethonium chloride and cetylpyridinium chloride, dioctyl sodium sulfosuccinate, polyoxyethylene alkylphenyl ethers, for example nonoxynol 9, nonoxynol 10, and degrees Ctoxynol 9, poloxamers (polyoxyethylene and polyoxypropylene block copolymers), polyoxyethylene fatty acid glycerides and oils, for example polyoxyethylene (8) caprylic/capric mono- and diglycerides (e.g., Labrasol™ of Gattefosse), polyoxyethylene (35) castor oil and polyoxyethylene (40) hydrogenated castor oil; polyoxyethylene alkyl ethers, for example polyoxyethylene (20) cetostearyl ether, polyoxyethylene fatty acid esters, for example polyoxyethylene (40) stearate, polyoxyethylene sorbitan esters, for example polysorbate 20 and polysorbate 80 (e.g., Tween™ 80 of ICI), propylene glycol fatty acid esters, for example propylene glycol laurate (e.g., Lauroglycol™ of Gattefosse), sodium lauryl sulfate, fatty acids and salts thereof, for example oleic acid, sodium oleate and triethanolamine oleate, glyceryl fatty acid esters, for example glyceryl monostearate, sorbitan esters, for example sorbitan monolaurate, sorbitan monooleate, sorbitan monopalmitate and sorbitan monostearate, tyloxapol, and mixtures thereof. Such wetting agents, if present, constitute in total about 0.25% to about 15%, preferably about 0.4% to about 10%, and more preferably about 0.5% to about 5%, of the total weight of the pharmaceutical composition.

Wetting agents that are anionic surfactants are preferred. Sodium lauryl sulfate is a particularly preferred wetting agent. Sodium lauryl sulfate, if present, constitutes about 0.25% to about 7%, more preferably about 0.4% to about 4%, and still more preferably about 0.5% to about 2%, of the total weight of the pharmaceutical composition.

Pharmaceutical compositions of the invention optionally comprise one or more pharmaceutically acceptable lubricants (including anti-adherents and/or glidants) as excipients. Suitable lubricants include, but are not limited to, either individually or in combination, glyceryl behapate (e.g., Compritol™ 888 of Gattefosse); stearic acid and salts thereof, including magnesium, calcium and sodium stearates; hydrogenated vegetable oils (e.g., Sterotex™ of Abitec); colloidal silica; talc; waxes; boric acid; sodium benzoate; sodium acetate; sodium fumarate; sodium chloride; DL-leucine; PEG (e.g., Carbowax™ 4000 and Carbowax™ 6000 of the Dow Chemical Company); sodium oleate; sodium lauryl sulfate; and magnesium lauryl sulfate. Such lubricants, if present, constitute in total about 0.1% to about 10%, preferably about 0.2% to about 8%, and more preferably about 0.25% to about 5%, of the total weight of the pharmaceutical composition.

Magnesium stearate is a preferred lubricant used, for example, to reduce friction between the equipment and granulated mixture during compression of tablet formulations.

Suitable anti-adherents include, but are not limited to, talc, cornstarch, DL-leucine, sodium lauryl sulfate and metallic stearates. Talc is a preferred anti-adherent or glidant used, for example, to reduce formulation sticking to equipment surfaces and also to reduce static in the blend. Talc, if present, constitutes about 0.1% to about 10%, more preferably about 0.25% to about 5%, and still more preferably about 0.5% to about 2%, of the total weight of the pharmaceutical composition.

Glidants can be used to promote powder flow of a solid formulation. Suitable glidants include, but are not limited to, colloidal silicon dioxide, starch, talc, tribasic calcium phosphate, powdered cellulose and magnesium trisilicate. Colloidal silicon dioxide is particularly preferred.

Other excipients such as colorants, flavors and sweeteners are known in the pharmaceutical art and can be used in pharmaceutical compositions of the present invention. Tablets can be coated, for example with an enteric coating, or uncoated. Compositions of the invention can further comprise, for example, buffering agents.

Optionally, one or more effervescent agents can be used as disintegrants and/or to enhance organoleptic properties of pharmaceutical compositions of the invention. When present in pharmaceutical compositions of the invention to promote dosage form disintegration, one or more effervescent agents are preferably present in a total amount of about 30% to about 75%, and preferably about 45% to about 70%, for example about 60%, by weight of the pharmaceutical composition.

According to a particularly preferred embodiment of the invention, an effervescent agent, present in a solid dosage form in an amount less than that effective to promote disintegration of the dosage form, provides improved dispersion of the API in an aqueous medium. Without being bound by theory, it is believed that the effervescent agent is effective to accelerate dispersion of the API from the dosage form in the gastrointestinal tract, thereby further enhancing absorption

and rapid onset of therapeutic effect. When present in a pharmaceutical composition of the invention to promote intragastrointestinal dispersion but not to enhance disintegration, an effervescent agent is preferably present in an amount of about 1% to about 20%, more preferably about 2.5% to about 15%, and still more preferably about 5% to about 10%, by weight of the pharmaceutical composition.

An "effervescent agent" herein is an agent comprising one or more compounds which, acting together or individually, evolve a gas on contact with water. The gas evolved is generally oxygen or, most commonly, carbon dioxide. Preferred effervescent agents comprise an acid and a base that react in the presence of water to generate carbon dioxide gas. Preferably, the base comprises an alkali metal or alkaline earth metal carbonate or bicarbonate and the acid comprises an aliphatic carboxylic acid.

Non-limiting examples of suitable bases as components of effervescent agents useful in the invention include carbonate salts (e.g., calcium carbonate), bicarbonate salts (e.g., sodium bicarbonate), sesquicarbonate salts, and mixtures thereof. Calcium carbonate is a preferred base.

Non-limiting examples of suitable acids as components of effervescent agents and/or solid organic acids useful in the invention include citric acid, tartaric acid (as D-, L-, or D/L-tartaric acid), malic acid (as D-, L-, or DL-malic acid), maleic acid, fumaric acid, adipic acid, succinic acid, acid anhydrides of such acids, acid salts of such acids, and mixtures thereof. Citric acid is a preferred acid.

In a preferred embodiment of the invention, where the effervescent agent comprises an acid and a base, the weight ratio of the acid to the base is about 1:100 to about 100:1, more preferably about 1:50 to about 50:1, and still more preferably about 1:10 to about 10:1. In a further preferred embodiment of the invention, where the effervescent agent comprises an acid and a base, the ratio of the acid to the base is approximately stoichiometric.

Excipients which solubilize APIs typically have both hydrophilic and hydrophobic regions, or are preferably amphiphilic or have amphiphilic regions. One type of amphiphilic or partially-amphiphilic excipient comprises an amphiphilic polymer or is an amphiphilic polymer. A specific amphiphilic polymer is a polyalkylene glycol, which is commonly comprised of ethylene glycol and/or propylene glycol subunits. Such polyalkylene glycols can be esterified at their termini by a carboxylic acid, ester, acid anhyride or other suitable moiety. Examples of such excipients include poloxamers (symmetric block copolymers of ethylene glycol and propylene glycol; e.g., poloxamer 237), polyalkyene glycolated esters of tocopherol (including esters formed from a di- or multi-functional carboxylic acid; e.g., d-alpha-tocopherol polyethylene glycol-1000 succinate), and macrogolglycerides (formed by alcoholysis of an oil and esterification of a polyalkylene glycol to produce a mixture of mono-, di- and tri-glycerides and mono- and di-esters; e.g., stearoyl macrogol-32 glycerides). Such pharmaceutical compositions are advantageously administered orally.

Pharmaceutical compositions of the present invention can comprise about 10% to about 50%, about 25% to about 50%, about 30% to about 45%, or about 30% to about 35% by weight of a co-crystal; about 10% to about 50%, about 25% to about 50%, about 30% to about 45%, or about 30% to about 35% by weight of an excipient which inhibits crystallization in aqueous solution, in simulated gastric fluid, or in simulated intestinal fluid; and about 5% to about 50%, about 10% to about 40%, about 15% to about 35%, or about 30% to about 35% by weight of a binding agent. In one example, the weight ratio of the co-crystal to the excipient which inhibits crystallization to binding agent is about 1 to 1 to 1.

Solid dosage forms of the invention can be prepared by any suitable process, not limited to processes described herein.

An illustrative process comprises (a) a step of blending an API of the invention with one or more excipients to form a blend, and (b) a step of tableting or encapsulating the blend to form tablets or capsules, respectively.

In a preferred process, solid dosage forms are prepared by a process comprising (a) a step of blending a co-crystal of the invention with one or more excipients to form a blend, (b) a step of granulating the blend to form a granulate, and (c) a step of tableting or encapsulating the blend to form tablets or capsules respectively. Step (b) can be accomplished by any dry or wet granulation technique known in the art, but is preferably a dry granulation step. A salt of the present invention is advantageously granulated to form particles of about 1 micrometer to about 100 micrometer, about 5 micrometer to about 50 micrometer, or about 10 micrometer to about 25 micrometer. One or more diluents, one or more disintegrants and one or more binding agents are preferably added, for example in the blending step, a wetting agent can optionally be added, for example in the granulating step, and one or more disintegrants are preferably added after granulating but before tableting or encapsulating. A lubricant is preferably added before tableting. Blending and granulating can be performed independently under low or high shear. A process is preferably selected that forms a granulate that is uniform in API content, that readily disintegrates, that flows with sufficient ease so that weight variation can be reliably controlled during capsule filling or tableting, and that is dense enough in bulk so that a batch can be processed in the selected equipment and individual doses fit into the specified capsules or tablet dies.

In an alternative embodiment, solid dosage forms are prepared by a process that includes a spray drying step, wherein an API is suspended with one or more excipients in one or more sprayable liquids, preferably a non-protic (e.g., non-aqueous or non-alcoholic) sprayable liquid, and then is rapidly spray dried over a current of warm air.

A granulate or spray dried powder resulting from any of the above illustrative processes can be compressed or molded to prepare tablets or encapsulated to prepare capsules. Conventional tableting and encapsulation techniques known in the art can be employed. Where coated tablets are desired, conventional coating techniques are suitable.

Excipients for tablet compositions of the invention are preferably selected to provide a disintegration time of less than about 30 minutes, preferably about 25 minutes or less, more preferably about 20 minutes or less, and still more preferably about 15 minutes or less, in a standard disintegration assay.

Pharmaceutically acceptable co-crystals can be administered by controlled- or delayed-release means. Controlled-release pharmaceutical products have a common goal of improving drug therapy over that achieved by their non-controlled release counterparts. Ideally, the use of an optimally designed controlled-release preparation in medical treatment is characterized by a minimum of drug substance being employed to cure or control the condition in a minimum amount of time. Advantages of controlled-release formulations include: 1) extended activity of the drug; 2) reduced dosage frequency; 3) increased patient compliance; 4) usage of less total drug; 5) reduction in local or systemic side effects; 6) minimization of drug accumulation; 7) reduction in blood level fluctuations; 8) improvement in efficacy of treatment; 9) reduction of potentiation or loss of drug activity;

and 10) improvement in speed of control of diseases or conditions. Kim, Cherng-ju, Controlled Release Dosage Form Design, 2 (Technomic Publishing, Lancaster, Pa.: 2000).

Conventional dosage forms generally provide rapid or immediate drug release from the formulation. Depending on the pharmacology and pharmacokinetics of the drug, use of conventional dosage forms can lead to wide fluctuations in the concentrations of the drug in a patient's blood and other tissues. These fluctuations can impact a number of parameters, such as dose frequency, onset of action, duration of efficacy, maintenance of therapeutic blood levels, toxicity, side effects, and the like. Advantageously, controlled-release formulations can be used to control a drug's onset of action, duration of action, plasma levels within the therapeutic window, and peak blood levels. In particular, controlled- or extended-release dosage forms or formulations can be used to ensure that the maximum effectiveness of a drug is achieved while minimizing potential adverse effects and safety concerns, which can occur both from under dosing a drug (i.e., going below the minimum therapeutic levels) as well as exceeding the toxicity level for the drug.

Most controlled-release formulations are designed to initially release an amount of drug (active ingredient) that promptly produces the desired therapeutic effect, and gradually and continually release other amounts of drug to maintain this level of therapeutic or prophylactic effect over an extended period of time. In order to maintain this constant level of drug in the body, the drug must be released from the dosage form at a rate that will replace the amount of drug being metabolized and excreted from the body. Controlled-release of an active ingredient can be stimulated by various conditions including, but not limited to, pH, ionic strength, osmotic pressure, temperature, enzymes, water, and other physiological conditions or compounds.

A variety of known controlled- or extended-release dosage forms, formulations, and devices can be adapted for use with the co-crystals and compositions of the invention. Examples include, but are not limited to, those described in U.S. Pat. Nos. 3,845,770; 3,916,899; 3,536,809; 3,598,123; 4,008,719; 5,674,533; 5,059,595; 5,591,767; 5,120,548; 5,073,543; 5,639,476; 5,354,556; 5,733,566; and 6,365,185 B1; each of which is incorporated herein by reference. These dosage forms can be used to provide slow or controlled-release of one or more active ingredients using, for example, hydroxypropylmethyl cellulose, other polymer matrices, gels, permeable membranes, osmotic systems (such as OROS®) (Alza Corporation, Mountain View, Calif. USA)), multilayer coatings, microparticles, liposomes, or microspheres or a combination thereof to provide the desired release profile in varying proportions. Additionally, ion exchange materials can be used to prepare immobilized, adsorbed co-crystals and thus effect controlled delivery of the drug. Examples of specific anion exchangers include, but are not limited to, Duolite® A568 and Duolite® AP143 (Rohm & Haas, Spring House, Pa. USA).

One embodiment of the invention encompasses a unit dosage form which comprises a pharmaceutically acceptable co-crystal, or a solvate, hydrate, dehydrate, anhydrous, or amorphous form thereof, and one or more pharmaceutically acceptable excipients or diluents, wherein the pharmaceutical composition or dosage form is formulated for controlled-release. Specific dosage forms utilize an osmotic drug delivery system.

A particular and well-known osmotic drug delivery system is referred to as OROS® (Alza Corporation, Mountain View, Calif. USA). This technology can readily be adapted for the delivery of compounds and compositions of the invention. Various aspects of the technology are disclosed in U.S. Pat. Nos. 6,375,978 B1; 6,368,626 B1; 6,342,249 B1; 6,333,050 B2; 6,287,295 B1; 6,283,953 B1; 6,270,787 B1; 6,245,357 B1; and 6,132,420; each of which is incorporated herein by reference. Specific adaptations of OROS® that can be used to administer compounds and compositions of the invention include, but are not limited to, the OROS® Push-Pull™, Delayed Push-Pull™, Multi-Layer Push-Pull™, and Push-Stick™ Systems, all of which are well known. See, e.g., http://www.alza.com. Additional OROS® systems that can be used for the controlled oral delivery of compounds and compositions of the invention include OROS®-CT and L-OROS®. Id.; see also, Delivery Times, vol. II, issue II (Alza Corporation).

Conventional OROS® oral dosage forms are made by compressing a drug powder (e.g. co-crystal) into a hard tablet, coating the tablet with cellulose derivatives to form a semipermeable membrane, and then drilling an orifice in the coating (e.g., with a laser). Kim, Chemg-ju, Controlled Release Dosage Form Design, 231-238 (Technomic Publishing, Lancaster, Pa.: 2000). The advantage of such dosage forms is that the delivery rate of the drug is not influenced by physiological or experimental conditions. Even a drug with a pH-dependent solubility can be delivered at a constant rate regardless of the pH of the delivery medium. But because these advantages are provided by a build-up of osmotic pressure within the dosage form after administration, conventional OROS® drug delivery systems cannot be used to effectively deliver drugs with low water solubility. Id. at 234. Because co-crystals of this invention can be far more soluble in water than the API itself, they are well suited for osmotic-based delivery to patients. This invention does, however, encompass the incorporation of conventional crystalline API (e.g. pure API without co-crystal former), and non-salt isomers and isomeric mixtures thereof, into OROS® dosage forms.

A specific dosage form of the invention comprises: a wall defining a cavity, the wall having an exit orifice formed or formable therein and at least a portion of the wall being semipermeable; an expandable layer located within the cavity remote from the exit orifice and in fluid communication with the semipermeable portion of the wall; a dry or substantially dry state drug layer located within the cavity adjacent to the exit orifice and in direct or indirect contacting relationship with the expandable layer; and a flow-promoting layer interposed between the inner surface of the wall and at least the external surface of the drug layer located within the cavity, wherein the drug layer comprises a co-crystal, or a solvate, hydrate, dehydrate, anhydrous, or amorphous form thereof. See U.S. Pat. No. 6,368,626, the entirety of which is incorporated herein by reference.

Another specific dosage form of the invention comprises: a wall defining a cavity, the wall having an exit orifice formed or formable therein and at least a portion of the wall being semipermeable; an expandable layer located within the cavity remote from the exit orifice and in fluid communication with the semipermeable portion of the wall; a drug layer located within the cavity adjacent the exit orifice and in direct or indirect contacting relationship with the expandable layer; the drug layer comprising a liquid, active agent formulation absorbed in porous particles, the porous particles being adapted to resist compaction forces sufficient to form a compacted drug layer without significant exudation of the liquid, active agent formulation, the dosage form optionally having a placebo layer between the exit orifice and the drug layer, wherein the active agent formulation comprises a co-crystal, or a solvate, hydrate, dehydrate, anhydrous, or amorphous

form thereof. See U.S. Pat. No. 6,342,249, the entirety of which is incorporated herein by reference.

The invention will now be described in further detail, by way of example, with reference to the accompanying drawings.

EXEMPLIFICATION

General Methods for the Preparation of Co-Crystals

a) High Throughput Crystallization Using the CrystalMax Platform

CrystalMax™ comprises a sequence of automated, integrated high throughput robotic stations capable of rapid generation, identification and characterization of polymorphs, salts, and co-crystals of APIs and API candidates. Worksheet generation and combinatorial mixture design is carried out using proprietary design software InForm™. Typically, an API or an API candidate is dispensed from an organic solvent into tubes and dried under a stream of nitrogen. Salts and/or co-crystal formers may also be dispensed and dried in the same fashion. Water and organic solvents may be combinatorially dispensed into the tubes using a multi-channel dispenser. Each tube in a 96-tube array is then sealed within 15 seconds of combinatorial dispensing to avoid solvent evaporation. The mixtures are then rendered supersaturated by heating to 70 degrees C. for 2 hours followed by a 1 degree C./minute cooling ramp to 5 degrees C. Optical checks are then conducted to detect crystals and/or solid material. Once a solid has been identified in a tube, it is isolated through aspiration and drying. Raman spectra are then obtained on the solids and cluster classification of the spectral patterns is performed using proprietary software (QForm™).

b) Crystallization from Solution

Co-crystals may be obtained by dissolving the separate components in a solvent and adding one to the other. The co-crystal may then precipitate or crystallize as the solvent mixture is evaporated slowly. The co-crystal may also be obtained by dissolving the two components in the same solvent or a mixture of solvents.

c) Crystallization from the Melt

A co-crystal may be obtained by melting the two components together and allowing recrystallization to occur. In some cases, an anti-solvent may be added to facilitate crystallization.

d) Thermal Microscopy

A co-crystal may be obtained by melting the higher melting component on a glass slide and allowing it to recrystallize. The second component is then melted and is also allowed to recrystallize. The co-crystal may form as a separated phase/band in between the eutectic bands of the two original components.

e) Mixing and/or Grinding

A co-crystal may be obtained by mixing or grinding two components together in the solid state.

Analytical Methods

Procedure for DSC Analysis

DSC analysis of the samples was performed using a Q1000 Differential Scanning Calorimeter (TA Instruments, New Castle, Del., U.S.A.), which uses Advantage for QW-Series, version 1.0.0.78, Thermal Advantage Release 2.0 (®2001 TA Instruments-Water LLC). In addition, the analysis software used was Universal Analysis 2000 for Windows 95/95/2000/NT, version 3.1 E;Build 3.1.0.40 (®2001 TA Instruments-Water LLC).

For the DSC analysis, the purge gas used was dry nitrogen, the reference material was an empty aluminum pan that was crimped, and the sample purge was 50 mL/minute.

DSC analysis of the sample was performed by placing ≦2 mg of sample in an aluminum pan with a crimped pan closure. The starting temperature was typically 20 degrees C. with a heating rate of 10 degrees C./minute, and the ending temperature was 300 degrees C. Unless otherwise indicated, all reported transitions are as stated +/−10 degrees C.

Procedure for TGA Analysis

TGA analysis of samples was performed using a Q500 Thermogravimetric Analyzer (TA Instruments, New Castle, Del., U.S.A.), which uses Advantage for QW-Series, version 1.0.0.78, Thermal Advantage Release 2.0 (82001 TA Instruments-Water LLC). In addition, the analysis software used was Universal Analysis 2000 for Windows 95/95/2000/NT, version 3.1E;Build 3.1.0.40 (®2001 TA Instruments-Water LLC).

For all of the TGA experiments, the purge gas used was dry nitrogen, the balance purge was 40 mL/minute N_2, and the sample purge was 60 mL/minute N_2.

TGA of the sample was performed by placing ≦2 mg of sample in a platinum pan. The starting temperature was typically 20 degrees C. with a heating rate of 10 degrees C./minute, and the ending temperature was 300 degrees C.

Procedure for PXRD Analysis

A powder X-ray diffraction pattern for the samples was obtained using a D/Max Rapid, Contact (Rigaku/MSC, The Woodlands, Tex., U.S.A.), which uses as its control software RINT Rapid Control software, Rigaku Rapid/XRD, version 1.0.0 (®1999 Rigaku Co.). In addition, the analysis software used were RINT Rapid display software, version 1.18 (Rigaku/MSC), and JADE XRD Pattern Processing, versions 5.0 and 6.0 ((®1995-2002, Materials Data, Inc.).

For the PXRD analysis, the acquisition parameters were as follows: source was Cu with a K line at 1.5406 Å; x-y stage was manual; collimator size was 0.3 or 0.8 mm; capillary tube (Charles Supper Company, Natick, Mass., U.S.A.) was 0.3 mm ID; reflection mode was used; the power to the X-ray tube was 46 kV; the current to the X-ray tube was 40 mA; the omega-axis was oscillating in a range of 0-5 degrees at a speed of 1 degree/minute; the phi-axis was spinning at an angle of 360 degrees at a speed of 2 degrees/second; 0.3 or 0.8 mm collimator; the collection time was 60 minutes; the temperature was room temperature; and the heater was not used. The sample was presented to the X-ray source in a boron rich glass capillary.

In addition, the analysis parameters were as follows: the integration 2-theta range was 2-40 or 60 degrees; the integration chi range was 0-360 degrees; the number of chi segments was 1; the step size used was 0.02; the integration utility was cylint; normalization was used; dark counts were 8; omega offset was 180; and chi and phi offsets were 0.

The relative intensity of peaks in a diffractogram is not necessarily a limitation of the PXRD pattern because peak intensity can vary from sample to sample, e.g., due to crystalline impurities. Further, the angles of each peak can vary by about +/−0.1 degrees, preferably +/−0.05. The entire pattern or most of the pattern peaks may also shift by about +/−0.1 degree due to differences in calibration, settings, and other variations from instrument to instrument and from operator to operator.

Procedure for Raman Acquisition Filtering and Binning Acquisition

The sample was either left in the glass vial in which it was processed or an aliquot of the sample was transferred to a glass slide. The glass vial or slide was positioned in the sample chamber. The measurement was made using an Almega™ Dispersive Raman (Almega™ Dispersive Raman, Thermo-Nicolet, 5225 Verona Road, Madison, Wis. 53711-

4495) system fitted with a 785 nm laser source. The sample was manually brought into focus using the microscope portion of the apparatus with a 10×power objective (unless otherwise noted), thus directing the laser onto the surface of the sample. The spectrum was acquired using the parameters outlined in Table A. (Exposure times and number of exposures may vary; changes to parameters will be indicated for each acquisition.)

Filtering and Binning

Each spectrum in a set was filtered using a matched filter of feature size 25 to remove background signals, including glass contributions and sample fluorescence. This is particularly important as large background signal or fluorescence limit the ability to accurately pick and assign peak positions in the subsequent steps of the binning process. Filtered spectra were binned using the peak pick and bin algorithm with the parameters given in Table B. The sorted cluster diagrams for each sample set and the corresponding cluster assignments for each spectral file were used to identify groups of samples with similar spectra, which was used to identify samples for secondary analyses.

TABLE A

Raman Spectral acquisition parameters

Parameter	Setting Used
Exposure time (s)	2.0
Number of exposures	10
Laser source wavelength (nm)	785
Laser power (%)	100
Aperture shape	pin hole
Aperture size (um)	100
Spectral range	104-3428
Grating position	Single
Temperature at acquisition (degrees C.)	24.0

TABLE B

Raman Filtering and Binning Parameters

Parameter	Setting Used
Filtering Parameters	
Filter type	Matched
Filter size	25
QC Parameters	
Peak Height Threshold	1000
Region for noise test (cm^{-1})	0-10000
RMS noise threshold	10000
Automatically eliminate failed spectra	Yes
Region of Interest	
Include (cm^{-1})	104-3428
Exclude region I (cm^{-1})	
Exclude region II (cm^{-1})	
Exclude region III (cm^{-1})	
Exclude region IV (cm^{-1})	
Peak Pick Parameters	
Peak Pick Sensitivity	Variable
Peak Pick Threshold	100
Peak Comparison Parameters	
Peak Window (cm^{-1})	2
Analysis Parameters	
Number of clusters	Variable

Procedure for Single Crystal X-Ray Diffraction

Single crystal x-ray data were collected on a Bruker SMART-APEX CCD diffractometer (M. J. Zawarotko, Department of Chemistry, University of South Florida). Lattice parameters were determined from least squares analysis. Reflection data was integrated using the program SAINT. The structure was solved by direct methods and refined by full matrix least squares using the program SHELXTL (Sheldrick, G. M. SHELXTL, Release 5.03; Siemans Analytical X-ray Instruments Inc.: Madison, Wis.).

The co-crystals of the present invention can be characterized, e.g., by the TGA or DSC data or by any one, any two, any three, any four, any five, any six, any seven, any eight, any nine, any ten, or any single integer number of PXRD 2-theta angle peaks or Raman shift peaks listed herein or disclosed in a figure, or by single crystal x-ray diffraction data.

Example 1

1:1 carbamazepine:saccharin co-crystals (Form I) were prepared. A 12-block experiment was designed with 12 solvents. 1152 crystallization experiments were carried out using the CMAX platform. The co-crystal was obtained from a mixture of isopropyl acetate and heptane. Detailed characterization of the co-crystal is listed in Table V. (See FIGS. **1** and **2**)

Example 2

1:1 carbamazepine:nicotinamide co-crystals (Form I) were prepared. A 12-block experiment was designed with 12 solvents. 1152 crystallization experiments were carried out using the CMAX platform. The co-crystal was obtained from samples containing toluene, acetone, or isopropyl acetate. Detailed characterization of the co-crystal is listed in Table V. (See FIGS. **3** and **4**)

Example 3

1:1 carbamazepine:trimesic acid co-crystals (Form I) were prepared. A 9-block experiment was designed with 10 solvents. 864 crystallization experiments with 8 co-crystal formers and 3 concentrations were carried out using the CMAX platform. The co-crystal was obtained from samples containing methanol. Detailed characterization of the co-crystal is listed in Table V. (See FIG. **5**)

Example 4

1:1 celecoxib:nicotinamide co-crystals were prepared. Celecoxib (100 mg, 0.26 mmol) and nicotinamide (32.0 mg, 0.26 mmol) were each dissolved in acetone (2 mL). The two solutions were mixed and the resulting mixture was allowed to evaporate slowly overnight. The precipitated solid was collected and characterized. Detailed characterization of the co-crystal is listed in Table V.

Example 5

Co-crystals of topiramate and 18-crown-6 were prepared. An equimolar amount of topiramate and 18-crown-6 were dissolved in ether separately. The solution containing topiramate was then added to the solution containing 18-crown-6. A white solid precipitated after minor agitation and was collected and dried. Detailed characterization of the co-crystal is listed in Table V. (See FIGS. **6** and **7**)

Example 6

Co-crystals of olanzapine and nicotinamide (Form I and II) were prepared. A 9-block experiment was designed with 12 solvents. 864 crystallization experiments with 10 co-crystal formers and 3 concentrations were carried out using the CMAX platform. The co-crystal was obtained from tubes containing isopropyl acetate. PXRD and DSC characterization of the co-crystal (Form I and II) is listed in Table V. (See FIGS. **8**, **9**, and **30**)

Example 7

Co-crystals of celecoxib and 18-crown-6 were prepared. A solution of celecoxib (157.8 mg, 0.4138 mmol) in Et_2O (10.0 mL) was added to 18-crown-6 (118.1 mg, 0.447 mmol). The opaque solid dissolves immediately and a white solid subsequently began to crystallize very rapidly. The solid was collected via filtration and was washed with additional Et_2O (5 mL). Detailed characterization of the co-crystal is listed in Table V. (See FIGS. **10** and **11**)

Example 8

Co-crystals of itraconazole and succinic acid were prepared. Approximately 51.1 mg of cis-itraconazole free base, 0.75 mL of THF, and a magnetic stir bar were charged into a screw cap vial, heated to reflux to dissolve, and then the vial was closed with the screw cap and placed on top of a hot plate maintained at a temperature between 60 and 75 degrees C. A solution of 77.7 mg of succinic acid in 1.58 mL of THF was prepared. 0.20 mL of the succinic acid solution was added to the cis-itraconazole solution and the solution remained clear. 0.75 mL of iso-propylacetate was added and the solution was seeded with <1 mg of the L-tartaric acid co-crystal salt from Example 10 below. The heat was turned off and the sample crystallized as it cooled to room temperature. The cooled sample was suction filtered. It was rinsed with 0.2-0.3 mL of THF. The filter cake was broken-up and allowed to air-dry for 1 hour prior to analysis. (See FIGS. **12** and **13**)

Example 9

Co-crystals of itraconazole and fumaric acid were prepared. Approximately 500 mg of cis-itraconazole free base was placed in a 50 mL screw top bottle along with 33.33 mL of tetrahydrofuran (THF). 3.0887 mL of fumaric acid stock solution (prepared in Example 1) was then added to the beaker (resulting in a 1.05:1 ratio of salt former to free base). The cap was screwed on to seal the bottle and the bottle was placed in a 70 degrees C. oven (Model # 1400E, VWR Scientific) and heated for approximately 1 hour. Thereafter, the bottle was removed from the oven, the cap from the bottle was removed, and the sample was allowed to evaporate under flowing air under ambient conditions. When all but about 5 mL of the solvent had evaporated, the remaining solvent was removed by decantation and the solid was isolated by filtering over a Whatman filter using suction. This solid was returned back into the 50 mL bottle with the remaining solid and the bottle was placed into the vacuum oven at approximately 25 mm Hg and the solid was allowed to dry for 4 days prior to analysis. (See FIGS. **14** and **15**)

Example 10

Co-crystals of itraconazole and tartaric acid were prepared. Approximately 100.4 mg of cis-itraconazole free base, 0.90 mL of THF, and a magnetic stir bar were charged into a screw cap vial, heated to reflux to dissolve, and then the vial was closed with the screw cap and placed in an oil bath maintained at 70 degrees C. A solution of 138.5 mg of L(+) tartaric acid in 1.15 mL of THF was prepared. 0.21 mL of the L(+)tartaric acid solution was added to the cis-itraconazole solution and the solution remained clear. 0.90 mL of iso-propylacetate was added and the solution was seeded with <1 mg of the salt from a preparation of DL-tartaric acid co-crystal. The sample was allowed to crystallize over about 5 minutes in the 70 degrees C. oil bath before it was removed and allowed to cool to room temperature. The cooled sample was suction filtered. It was rinsed with 0.2-0.3 mL of THF. The filter cake was broken-up and allowed to air-dry for 4 hours prior to analysis. (See FIGS. **16** and **17**)

Example 11

Co-crystals of itraconazole and malic acid were prepared. To prepare the L-malic acid co-crystal salt of cis-itraconazole, 100.4 mg of cis-itraconazole free base, 0.50 mL of THF, and a magnetic stir bar were charged into a screw cap vial. A solution of 191.3 mg of L(−)malic acid in 5.0 mL of THF was prepared. 0.50 mL of the L-malic acid solution was added to the vial containing cis-itraconazole and the solution was heated with a heat gun to dissolve. The solution was allowed to cool and was then seeded with <1 mg of the salt from cis-itraconazole-L-tartaric acid co-crystal. The cooled crystals were filtered in a centrifuge filter tube. The filter cake was broken-up and allowed to air-dry prior to analysis. (See FIGS. **18** and **19**)

Example 12

Co-crystals of itraconazole HCl and tartaric acid were prepared. Approximately 212.7 mg of L-tartaric acid and 118 microL of 37% HCl were dissolved in 25 mL of hot dioxane. This solution was added to 1.0 g of cis-itraconazole dissolved in 50 mL of hot dioxane with stirring. The mixture was heated until a clear solution formed and was then allowed to cool to room temperature. Upon cooling, 50 mL tert-butyl methyl ether was added and the crystals were harvested by vacuum filtration on a Buchner funnel with #4 Whatman filter paper. The crystals were washed 3 times with 5 mL aliquots of cold tert-butyl methyl ether and left to air dry. Approximately 573 mg of a crystalline form of cis-itraconazole HCl-tartaric acid (1:1:0.5) co-crystal were obtained. (See FIGS. **20** and **21**)

Example 13

Co-crystals of modafinil and malonic acid were prepared. Using a 250 mg/ml modafinil-acetic acid solution, malonic acid was dissolved on a hotplate (about 67 degrees C.) at a 1:2 modafinil to malonic acid ratio. The mixture was dried under flowing nitrogen overnight. A powdery white solid was produced. After further drying for 1 day, acetic acid is removed (as determined by TGA) and the crystal structure, as determined by PXRD, remains the same. (See FIG. **22**)

Example 14

Co-crystals of modafinil and benzamide were prepared. Modafinil (1 mg, 0.0037 mmol) and benzamide (0.45 mg, 0.0037 mmol) were dissolved in 1,2-dichloroethane (400 microL). The solution was allowed to evaporate to dryness

and the resulting solid was characterized using PXRD. PXRD data for the co-crystal is listed in Table V. (See FIG. **23**)

Example 15

Co-crystals of modafinil and mandelic acid were prepared. Modafinil (1 mg, 0.0037 mmol) and mandelic acid (0.55 mg, 0.0037 mmol) were dissolved in acetone (400 microL). The solution was allowed to evaporate to dryness and the resulting solid was characterized using PXRD. PXRD data for the co-crystal is listed in Table V. (See FIG. **24**)

Example 16

Co-crystals of modafinil and glycolic acid were prepared. Modafinil (1 mg, 0.0037 mmol) and glycolic acid (0.30 mg, 0.0037 mmol) were dissolved in acetone (400 microL). The solution was allowed to evaporate to dryness and the resulting solid was characterized using PXRD. PXRD data for the co-crystal is listed in Table V. (See FIG. **25**)

Example 17

Co-crystals of modafinil and fumaric acid were prepared. Modafinil (1 mg, 0.0037 mmol) and fumaric acid (0.42 mg, 0.0037 mmol) were dissolved in 1,2-dichloroethane (400 microL). The solution was allowed to evaporate to dryness and the resulting solid was characterized using PXRD. PXRD data for the co-crystal is listed in Table V. (See FIG. **26**)

Example 18

Co-crystals of modafinil and maleic acid were prepared. Using a 250 mg/ml modafinil-acetic acid solution, maleic acid was dissolved on a hotplate (about 67 degrees C.) at a 2:1 modafinil to maleic ratio. The mixture was dried under flowing nitrogen overnight. A clear amorphous material remained. Solids began to grow after 2 days stored in a sealed vial at room temperature. (See FIG. **43**)

Example 19

Co-crystals of olanzapine and nicotinamide (Form III) were prepared. Olanzapine (40 μL of 25 mg/mL stock solution in tetrahydrofuran) and nicotinamide (37.6 μL of 20 mg/mL stock solution in methanol) were added to a glass vial and dried under a flow of nitrogen. To the solid mixture was added isopropyl acetate (100 μL) and the vial was sealed with an aluminum cap. The suspension was then heated at 70 degrees C. for two hours in order to dissolve all of the solid material. The solution was then cooled to 5 degrees C. and maintained at that temperature for 24 hours. After 24 hours the vial was uncapped and the mixture was concentrated to 50 μL of total volume. The vial was then resealed with an aluminum cap and was maintained at 5 degrees C. for an additional 24 hours. Large, yellow plates were observed and were collected (Form III). The solid was characterized with single crystal x-ray diffraction and powder x-ray diffraction. PXRD characterization of the co-crystal is listed in Table V. (See FIGS. **31** and **32**A-D)

Single crystal x-ray analysis reveals that the olanzapine: nicotinamide (Form III) co-crystal is made up of a ternary system containing olanzapine, nicotinamide, water and isopropyl acetate in the unit cell. The co-crystal crystallizes in the monoclinic space group $P2_1/c$ and contains one olanzapine, one nicotinamide, 4 waters and one isopropyl acetate solvate in the asymmetric unit. The packing diagram is made up of a two-dimensional hydrogen-bonded network with the water molecules connecting the olanzapine and nicotinamide moieties. The packing diagram is also comprised of alternating olanzapine and nicotinamide layers connected through hydrogen bonding via the water and isopropyl acetate molecules, as shown in FIG. **32**B. The olanzapine layer propagates along the b axis at c/4 and 3c/4. The nicotinamide layer propagates along the b axis at c/2. The top of FIG. **32**C illustrates the nicotinamide superstructure. The nicotinamide molecules form dimers which hydrogen bond to chains of 4 water molecules. The water chains terminate with isopropyl acetate molecules on each side.

Crystal data: $C_{45}H_{64}N_{10}O_7S_2$, M=921.18, monoclinic P21/c; a=14.0961(12) Å, b=12.5984(10) Å, c=27.219(2) Å, α=90°, β=97.396(2)°, γ=90°, T=100(2) K, Z=4, D_c=1.276 Mg/m^3,U=4793.6(7) Å^3, λ=0.71073 Å; 24952 reflections measured, 8457 unique (R_{int}=0.0882). Final residuals were R_1=0.0676, wR_2=0.1461 for I>2σ(I), and R_1=0.1187, wR_2=0.1687 for all 8457 data.

Example 20

Co-crystals of 5-fluorouracil and urea were prepared. To 5-fluorouracil (1 g, 7.69 mmol) and urea (0.46 g, 7.69 mmol) was added methanol (100 mL). The solution was heated at 65 degrees C. and sonicated until all the material dissolved. The solution was then cooled to 5 degrees C. and maintained at that temperature overnight. After about 3 days a white precipitate was observed and collected. The solid was characterized by DSC, PXRD, Raman spectroscopy, and TGA. Characterization data are listed in Table V. (See FIGS. **33**-**36**)

Example 21

Co-crystals of hydrochlorothiazide and nicotinic acid were prepared. Hydrochlorothiazide (I2.2 mg, 0.041 mmol) and nicotinic acid (5 mg, 0.041 mmol) were dissolved in methanol (1 mL). The solution was then cooled to 5 degrees C. and maintained at that temperature for 12 hours. A white solid precipitated and was collected and characterized using PXRD. (See FIG. **37**)

Example 22

Co-crystals of hydrochlorothiazide and 18-crown-6 were prepared. Hydrochlorothiazide (100 mg, 0.33 mmol) was dissolved in diethyl ether (15 mL) and was added to a solution of 18-crown-6 (87.2 mg, 0.33 mmol) in diethyl ether (15 mL). A white precipitate immediately began to form and was collected and characterized as the hydrochlorothiazide: 18-crown-6 co-crystal using PXRD. (See FIG. **38**)

Example 23

Co-crystals of hydrochlorothiazide and piperazine were prepared. Hydrochlorothiazide (17.3 mg, 0.058 mmol) and piperazine (5 mg, 0.058 mmol) were dissolved in a 1:1 mixture of ethyl acetate and acetonitirle (1 mL). The solution was then cooled to 5 degrees C. and maintained at that temperature for 12 hours. A white solid precipitated and was collected and characterized using PXRD. (See FIG. **39**)

Example 24

Acetaminophen:4,4'-bipyridine:water (1:1:1 stoichiometry)

50 mg (0.3307 mmol) acetaminophen and 52 mg (0.3329 mmol) 4,4'-bipyridine were dissolved in hot water and

allowed to stand. Slow evaporation yielded colorless needles of a 1:1:1 acetaminophen/4,4'-bipyridine/water co-crystal, as shown in FIG. **44**A-B.

Crystal data: (Bruker SMART-APEX CCD Diffractometer). $C_{36}H_{44}N_2O_4$, M=339.84, triclinic, space group P$\bar{1}$, a=7.0534(8), b=9.5955(12), c=19.3649(2) Å, α=86.326(2), β80.291(2), γ=88.880(2)°, U=1308.1(3) Å^3, T=200(2) K, Z=2, μ(Mo—Kα)=0.090 mm^{-1}, D_c=1.294 Mg/m^3, λ=0.71073 Å, F(000)=537, $2\theta_{max}$=25.02°; 6289 reflections measured, 4481 unique (R_{int}=0.0261). Final residuals for 344 parameters were R_1=0.0751, wR_2=0.2082 for I>2σ(I), and R_1=0.1119, wR_2=0.2377 for all 4481data.

Crystal packing: The co-crystals contain bilayered sheets in which water molecules act as a hydrogen bonded bridge between the network bipyridine moieties and the acetaminophen. Bipyridine guests are sustained by π-υ stacking interactions between two network bipyridines. The layers stack via π-π interactions between the phenyl groups of the acetaminophen moieties.

Differential Scanning Calorimetry: (TA Instruments 2920 DSC), 57.77 degrees C. (endotherm); m.p.=58-60 degrees C. (MEL-TEMP); (acetaminophen m.p.=169 degrees C., 4,4'-bipyridine m.p.=111-114 degrees C.).

Example 25

Phenyloin:Pyridone (1:1 stoichiometry)

28 mg (0.1109 mmol) phenyloin and 11 mg (0.1156 mmol) 4-hydroxypyridone were dissolved in 2 mL acetone and 1 mL ethanol with heating and stirring. Slow evaporation yielded colorless needles of a 1:1 phenyloin/pyridone co-crystal, as shown in FIG. **45**A-B.

Crystal data: (Bruker SMART-APEX CCD Diffractometer), $C_{20}H_{17}N_3O_3$, M=347.37, monoclinic $P2_1/c$; a=16.6583 (19), b=8.8478(10), c=11.9546(14) Å, β=96.618(2)°, U=1750.2(3) Å^3, T=200(2) K, Z=4, μ(Mo—Kα)=0.091 mm^{-1}, D_c=1.318 Mg/m^3, λ=0.71073 Å, F(000)=728, $2\theta_{max}$=56.60°; 10605 reflections measured, 4154 unique (R_{int}=0.0313). Final residuals for 247 parameters were R_1=0.0560, wR_2=0.1356 for I>2σ(I), and R_1=0.0816, wR_2=0.1559 for all 4154 data.

Crystal packing: The co-crystal is sustained by hydrogen bonding of adjacent phentoin molecules between the carbonyl and the amine closest to the tetrahedral carbon, and by hydrogen bonding between pyridone carbonyl functionalities and the amine not involved in phenyloin-phenyloin interactions. The pyridone carbonyl also hydrogen bonds with adjacent pyridone molecules forming a one-dimensional network.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR), characteristic peaks for the co-crystal were identified as: 2° amine found at 3311 cm^{-1}, carbonyl (ketone) found at 1711 cm^{-1}, olephin peak found at 1390 cm^{-1}.

Differential Scanning Calorimetry: (TA Instruments 2920 DSC), 233.39 degrees C. (endotherm) and 271.33 degrees C. (endotherm); m.p.=231-233 degrees C. (MEL-TEMP); (phenyloin m.p.=295 degrees C., pyridone m.p.=148 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA), a 29.09% weight loss starting at 192.80 degrees C., 48.72% weight loss starting at 238.27 degrees C., and 18.38% loss starting at 260.17 degrees C. followed by complete decomposition.

Powder x-ray diffraction: (Rigaku Miniflex Diffractometer using Cu Kα (λ=1.540562), 30 kV, 15 mA). The powder data were collected over an angular range of 3° to 40°2θ in continuous scan mode using a step size of 0.02= 2θ and a scan speed of 2.0°/minute. PXRD: Showed analogous peaks to the simulated PXRD derived from the single crystal data. In all cases of recrystallization and solid state reaction, experimental (calculated): 5.2 (5.3); 11.1 (11.3); 15.1 (15.2); 16.2 (16.4); 16.7 (17.0); 17.8 (17.9); 19.4 (19.4); 19.8 (19.7); 20.3 (20.1); 21.2 (21.4); 23.3 (23.7); 26.1 (26.4); 26.4 (26.6); 27.3 (27.6); 29.5 (29.9).

Example 26

Aspirin (acetylsalicylic acid):4,4'-bipyridine (2:1 stoichiometry)

50 mg (0.2775 mmol) aspirin and 22 mg (0.1388 mmol) 4,4'-bipyridine were dissolved in 4 mL hexane. 8 mL ether was added to the solution and allowed to stand for one hour, yielding colorless needles of a 2:1 aspirin/4,4'-bipyridine co-crystal, as shown in FIG. **46**A-D. Alternatively, aspirin/4,4'-bipyridine (2:1 stoichiometry) can be made by grinding the solid ingredients in a pestle and mortar.

Crystal data: (Bruker SMART-APEX CCD Diffractometer), $C_{28}H_{24}N_2O_8$, M=516.49, orthorhombic Pbcn; a=28.831 (3), b=11.3861(12), c=8.4144(9) Å, U=2762.2(5) Å^3, T=173 (2) K, Z=4, μ(Mo—Kα)=0.092 mm^{-1}, D_c=1.242 Mg/m^3, λ=0.71073 Å, F(000)=1080, $2\theta_{max}$=25.02°; 12431 reflections measured, 2433 unique (R_{int}=0.0419). Final residuals for 202 parameters were R_1=0.0419, wR_2=0.1358 for I>2σ (I), and R_1=0.0541, wR_2=0.1482 for all 2433 data.

Crystal packing: The co-crystal contains the carboxylic acid-pyridine heterodimer that crystallizes in the Pbcn space group. The structure is an inclusion compound containing disordered solvent in the channels. In addition to the dominant hydrogen bonding interaction of the heterodimer, π-π stacking of the bipyridine and phenyl groups of the aspirin and hydrophobic interactions contribute to the overall packing interactions.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR), characteristic (—COOH) peak at 1679 cm^{-1} was shifted up and less intense at 1694 cm^{-1}, where as the lactone peak is shifted down slightly from 1750 cm^{-1} to 1744 cm^{-1}.

Differential Scanning Calorimetry: (TA Instruments 2920 DSC), 95.14 degrees C. (endotherm); m.p.=91-96 degrees C. (MEL-TEMP); (aspirin m.p.=1345 degrees C., 4,4'-bipyridine m.p.=111-114 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA), weight loss of 9% starting at 22.62 degrees C., 49.06% weight loss starting at 102.97 degrees C. followed by complete decomposition starting at 209.37 degrees C.

Example 27

Ibuprofen:4,4'-Bipyridine (2:1 stoichiometry)

50 mg (0.242 mmol) racemic ibuprofen and 18 mg (0.0960 mmol) 4,4'-bipyridine were dissolved in 5 mL acetone. Slow evaporation of the solvent yielded colorless needles of a 2:1 ibuprofen/4,4'-bipyridine co-crystal, as shown in FIG. **47**A-D.

Crystal data: (Bruker SMART-APEX CCD Diffractometer), $C_{36}H_{44}N_2O_4$, M=568.73, triclinic, space group P-1; a=5.759(3), b=11.683(6), c=24.705(11) Å, α=93.674(11), β=90.880(10), γ=104.045(7)°, U=1608.3(13) Å^3, λ=200(2) K, Z=2, μ(Mo—Kα)=0.076 mm^{-1}, D_c=1.174 Mg/m^3, λ=0.71073 Å, F(000)=612, $2\theta_{max}$=23.29°; 5208 reflections measured, 3362 unique (R_{int}=0.0826). Final residuals for 399 parameters were R_1=0.0964, wR_2=0.2510 for I>2σ(I), and R_1=0.1775, wR_2=0.2987 for all 3362 data.

Crystal packing: The co-crystal contains ibuprofen/bipyridine heterodimers, sustained by two hydrogen bonded carboxylic acidpyridine supramolecular synthons, arranged in a

herringbone motif that packs in the space group P-1. The heterodimer is an extended version of the homodimer and packs to form a two-dimensional network sustained by π-π stacking of the bipyridine and phenyl groups of the ibuprofen and hydrophobic interactions from the ibuprofen tails.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR). Analysis observed stretching of aromatic C—H at 2899 cm^{-1}; N—H bending and scissoring at 1886 cm_{-1}; C═O stretching at 1679 cm^{-1}; C—H out-of-plane bending for both 4,4'-bipyridine and ibuprofen at 808 cm^{-1} and 628 cm^{-1}.

Differential Scanning Calorimetry: (TA Instruments 2920 DSC), 64.85 degrees C. (endotherm) and 118.79 degrees C. (endotherm); m.p.=113-120 degrees C. (MEL-TEMP); (ibuprofen m.p.=75-77 degrees C., 4,4'-bipyridine m.p.=111-114 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA), 13.28% weight loss between room temperature and 100.02 degrees C. immediately followed by complete decomposition.

Powder x-ray diffraction: (Rigaku Miniflex Diffractometer using Cu Kα (λ=1.540562), 30 kV, 15 mA). The powder data were collected over an angular range of 3° to 40° 2θ in continuous scan mode using a step size of 0.02° 2θ and a scan speed of 2.0°/minute. PXRD derived from the single crystal data, experimental (calculated): 3.4 (3.6); 6.9 (7.2); 10.4 (10.8); 17.3 (17.5); 19.1 (19.7).

Example 28

Flurbiprofen:4,4'-bipyridine (2:1 stoichiometry)

50 mg (0.2046 mmol) flurbiprofen and 15 mg (0.0960 mmol) 4,4'-bipyridine were dissolved in 3 mL acetone. Slow evaporation of the solvent yielded colorless needles of a 2:1 flurbiprofen/4,4'-bipyridine co-crystal, as shown in FIG. **48**A-D.

Crystal data: (Bruker SMART-APEX CCD Diffractometer), $C_{40}H_{34}F_2N_2O_4$, M=644.69, monoclinic $P2_1/n$; a=5.860 (4), b=47.49(3), c=5.928(4) Å, β=107.382 (8)°, U=1574.3 (19) $Å^3$, T=200(2) K, Z=2, μ(Mo—Kα)=0.096 mm^{-1}, D_c=1.360 Mg/m^3, λ=0.71073 Å, F(000)=676, $2\theta_{max}$=21.69°; 4246 reflections measured, 1634 unique (R_{int}=0.0677). Final residuals for 226 parameters were R_1=0.0908, wR_2=0.2065 for I>2σ(I), and R_1=0.1084, wR_2=0.2209 for all 1634 data.

Crystal packing: The co-crystal contains flurbiprofen/bipyridine heterodimers, sustained by two hydrogen bonded carboxylic acidpyridine supramolecular synthon, arranged in a herringbone motif that packs in the space group $P2_1/n$. The heterodimer is an extended version of the homodimer and packs to form a two-dimensional network sustained by π-π stacking and hydrophobic interactions of the bipyridine and phenyl groups of the flurbiprofen.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR), aromatic C—H stretching at 3057 cm^{-1} and 2981 cm^{-}; N—H bending and scissoring at 1886 cm^{-1}; C═O stretching at 1690 cm^{-1}; C═C and C═N ring stretching at 1418 cm^{-1}.

Differential Scanning Calorimetry: (TA Instruments 2920 DSC), 162.47 degrees C. (endotherm); m.p.=155-160 degrees C. (MEL-TEMP); (flurbiprofen m.p.=110-111 degrees C., 4,4'-bipyridine m.p.=111-114 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA), 30.93% weight loss starting at 31.13 degrees C. and a 46.26% weight loss starting at 168.74 degrees C. followed by complete decomposition.

Powder x-ray diffraction: (Rigaku Miniflex Diffractometer using Cu Kα (λ=1.540562), 30 kV, 15 mA), the powder data were collected over an angular range of 3° to 40° 2θin continuous scan mode using a step size of 0.02° 2θ and a scan speed of 2.0°/minute. PXRD derived from the single crystal data: experimental (calculated): 16.8 (16.8); 17.1 (17.5); 18.1 (18.4); 19.0 (19.0); 20.0 (20.4); 21.3 (21.7); 22.7 (23.0); 25.0 (25.6); 26.0 (26.1); 26.0 (26.6); 26.1 (27.5); 28.2 (28.7); 29.1 (29.7).

Example 29

Flurbiprofen:trans-1,2-bis(4-pyridyl) ethylene (2:1 stoichiometry)

25 mg (0.1023 mmol) flurbiprofen and 10 mg (0.0548 mmol) trans-1,2-bis(4-pyridyl) ethylene were dissolved in 3 mL acetone. Slow evaporation of the solvent yielded colorless needles of a 2:1 flurbiprofen/1,2-bis(4-pyridyl) ethylene co-crystal, as shown in FIG. **49**A-B.

Crystal data: (Bruker SMART-APEX CCD Diffractometer), $C_{42}H_{36}F_2N_2O_4$, M=670.73, monoclinic $P2_1/n$; a=5.8697 (9), b=47.357(7), c=6.3587(10) Å, β=109.492(3)°, U=1666.2(4) $Å^3$, T=200(2) K, Z=2, μ(Mo—Kα)=0.093 mm^{-1}, D_c=1.337 Mg/m^3, λ=0.71073 Å, F(000)=704, $2\theta_{max}$=21.69°, 6977 reflections measured, 2383 unique (R_{int}=0.0383). Final residuals for 238 parameters were R_1=0.0686, wR_2=0.1395 for I>2θ(I), and R_1=0.1403, wR_2=0.1709 for all 2383 data.

Crystal packing: The co-crystal contains flurbiprofen/1,2-bis(4-pyridyl) ethylene heterodimers, sustained by two hydrogen bonded carboxylic acid-pyridine supramolecular synthons, arranged in a herringbone motif that packs in the space group $P2_1/n$. The heterodimer from 1,2-bis(4-pyridyl) ethylene further extends the homodimer relative to example 28 and packs to form a two-dimensional network sustained by π-π stacking and hydrophobic interactions of the bipyridine and phenyl groups of the flurbiprofen.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR), aromatic C—H stretching at 2927 cm^{-1} and 2850 cm^{-1}; N—H bending and scissoring at 1875 cm^{-1}; C═O stretching at 1707 cm^{-1}; C═C and C═N ring stretching at 1483 cm^{-1}.

Differential Scanning Calorimetry: (TA Instruments 2920 DSC), 100.01 degrees C., 125.59 degrees C. and 163.54 degrees C. (endotherms); m.p.=153-158 degrees C. (MEL-TEMP); (flurbiprofen m.p.=110-111 degrees C., trans-1,2-bis(4-pyridyl) ethylene m.p.=150-153 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA), 91.79% weight loss starting at 133.18 degrees C. followed by complete decomposition.

Powder x-ray diffraction: (Rigaku Miniflex Diffractometer using Cu Kα (λ=1.540562), 30 kV, 15 mA), the powder data were collected over an angular range of 3° to 40° 2θ in continuous scan mode using a step size of 0.02° 2θ and a scan speed of 2.0°/minute. PXRD derived from the single crystal data, experimental (calculated): 3.6 (3.7); 17.3 (17.7); 18.1 (18.6); 18.4 (18.6); 19.1 (19.3); 22.3 (22.5); 23.8 (23.9); 25.9 (26.4); 28.1 (28.5).

Example 30

Carbamazepine:p-Phthalaldehyde (1:1 stoichiometry)

25 mg (0.1058 mmol) carbamazepine and 7 mg (0.0521 mmol) p-phthalaldehyde were dissolved in approximately 3 mL methanol. Slow evaporation of the solvent yielded colorless needles of a 1:1 carbamazepine/p-phthalaldehyde co-crystal, as shown in FIG. **50**A-B.

Crystal data: (Bruker SMART-APEX CCD Diffractometer), $C_{38}H_{30}N_4O_4$, M=606.66, monoclinic C2/c; a=29.191 (16), b=4.962(3), c=20.316(11) Å, β=92.105(8)°, U=2941(3) $Å^3$, T=200(2) K, Z=4, μ(Mo—Kα)=0.090 mm^{-1}, D_c=1.370 Mg/m^3, λ=0.71073 Å, F(000)=1272, $2\theta_{max}$=43.66°, 3831

reflections measured, 1559 unique (R_{int}=0.0510). Final residuals for 268 parameters were R_1=0.0332, wR_2=0.0801 for I>2σ(I), and R_1=0.0403, wR_2=0.0831 for all 1559 data.

Crystal packing: The co-crystals contain hydrogen bonded carboxamide homodimers that crystallize in the space group C2/c. The 1° amines of the homodimer are bifurcated to the carbonyl of the p-phthalaldehyde forming a chain with an adjacent homodimer. The chains pack in a crinkled tape motif sustained by π-π interactions between phenyl rings of the CBZ.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR). The 1° amine unsymmetrical and symmetrical stretching was shifted down to 3418 cm^{-1}; aliphatic aldehyde and 1° amide C═O stretching was shifted up to 1690 cm^{-1}; N—H in-plane bending at 1669 cm^{-1}; C—H aldehyde stretching at 2861 cm^{-1} and H—C═O bending at 1391 cm^{-1}.

Differential Scanning Calorimetry: (TA Instruments 2920 DSC), 128.46 degrees C. (endotherm), m.p.=121-124 degrees C. (MEL-TEMP), (carbamazepine m.p.=190.2 degrees C., p-phthalaldehyde m.p.=116 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA), 17.66% weight loss starting at 30.33 degrees C. then a 17.57% weight loss starting at 100.14 degrees C. followed by complete decomposition.

Powder x-ray diffraction: (Rigaku Miniflex Diffractometer using Cu Kα (λ=1.540562), 30 kV, 15 mA). The powder data were collected over an angular range of 3° to 40° 2θ in continuous scan mode using a step size of 0.02° 2θ and a scan speed of 2.0°/minute. PXRD derived from the single crystal data, experimental (calculated): 8.5 (8.7); 10.6 (10.8); 11.9 (12.1); 14.4 (14.7) 15.1 (15.2); 18.0 (18.1); 18.5 (18.2); 19.8 (18.7); 23.7 (24.0); 24.2 (24.2); 26.4 (26.7); 27.6 (27.9); 27.8 (28.2); 28.7 (29.1); 29.3 (29.6); 29.4 (29.8).

Example 31

Carbamazepine:nicotinamide (Form II) (1:1 stoichiometry)

25 mg (0.1058 mmol) carbamazepine and 12 mg (0.0982 mmol) nicotinamide were dissolved in 4 mL of DMSO, methanol or ethanol. Slow evaporation of the solvent yielded colorless needles of a 1:1 carbamazepine/nicotinamide co-crystal, as shown in FIG. **51**.

Using a separate method, 25 mg (0.1058 mmol) carbamazepine and 12 mg (0.0982 mmol) nicotinamide were ground together with mortar and pestle. The solid was determined to be 1:1 carbamazepine/nicotinamide microcrystals (PXRD).

Crystal data: (Bruker SMART-APEX CCD Diffractometer), $C_{21}H_{18}N_4O_2$, M=358.39, monoclinic $P2_1/n$; a=5.0961 (8), b=17.595(3), c=19.647(3) Å, β=90.917(3)°, U=1761.5 (5) $Å^3$, T=200(2) K, Z=4, μ(Mo—Kα)=0.090 mm^{-1}, D_c=1.351 Mg/m^3, λ=0.71073 Å, F(000)=752, $2\theta_{max}$=56.600°, 10919 reflections measured, 4041 unique (R_{int}=0.0514). Final residuals for 248 parameters were R_1=0.0732, wR_2=0.1268 for I>2σ(I), and R_1=0.1161, wR_2=0.1430 for all 4041 data.

Crystal packing: The co-crystals contain hydrogen bonded carboxamide homodimers. The 1° amines are bifurcated to the carbonyl of the nicotinamide on each side of the dimer. The 1° amines of each nicotinamide are hydrogen bonded to the carbonyl of the adjoining dimer. The dimers form chains with π-π interactions from the phenyl groups of the CBZ.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR), unsymmetrical and symmetrical stretching shifts down to 3443 cm^{-1} and 3388 cm^{-1} accounting for 1° amines; 1° amide C═O stretching at 1690 cm^{-1}; N—H in-plane bending at 1614 cm^{-1}; C═C stretching shifted down to 1579 cm^{-1}; aromatic H's from 800 cm^{-1} to 500 cm^{-1} are present.

Differential Scanning Calorimetry: (TA Instruments 2920 DSC), 74.49 degrees C. (endotherm) and 159.05 degrees C. (endotherm), m.p.=153-158 degrees C. (MEL-TEMP), (carbamazepine m.p.=190.2 degrees C., nicotinamide m.p.=150-160 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA), 57.94% weight loss starting at 205.43 degrees C. followed by complete decomposition.

Powder x-ray diffraction: (Rigaku Miniflex Diffractometer using Cu Kα (λ=1.540562), 30 kV, 15 mA). The powder data were collected over an angular range of 3° to 40° 2θ in continuous scan mode using a step size of 0.02° 2θ and a scan speed of 2.0°/minute. PXRD: Showed analogous peaks to the simulated PXRD derived from the single crystal data. PXRD analysis experimental (calculated): 6.5 (6.7); 8.8 (9.0); 10.1 (10.3); 13.2 (13.5); 15.6 (15.8); 17.7 (17.9); 17.8 (18.1); 18.3 (18.6); 19.8 (20.1); 20.4 (20.7); 21.6 (22.); 22.6 (22.8); 22.9 (23.2); 26.4 (26.7); 26.7 (27.0); 28.0 (28.4).

Example 32

Carbamazepine:saccharin (Form II) (1:1 stoichiometry)

25 mg (0.1058 mmol) carbamazepine and 19 mg (0.1037 mmol) saccharin were dissolved in approximately 4 mL ethanol. Slow evaporation of the solvent yielded colorless needles of a 1:1 carbamazepine/saccharin cocrystal, as shown in FIG. **52**. Solubility measurements indicate that this multiple-component crystal of carbamazepine has improved solubility over previously known forms of carbamazepine (e.g., increased molar solubility and longer solubility in aqueous solutions).

Crystal data: (Bruker SMART-APEX CCD Diffractometer), $C_{22}H_{17}N_3O_4S_1$, M=419.45, triclinic P-1; a=7.5140(11), b=10.4538(15), c=12.6826(18) Å, α=83.642(2)°, β=85.697 (2)°, γ=75.411(2)°, U=957.0(2) $Å^3$, T=200(2) K, Z=2, μ(Mo—Kα)=0.206 mm^{-1}, D_c=1.456 Mg/m^3, λ=0.71073 Å, F(000)=436, $2\theta_{max}$=56.20°; 8426 reflections measured, 4372 unique (R_{int}=0.0305). Final residuals for 283 parameters were R_1=0.0458, wR_2=0.1142 for I>2σ(I), and R_1=0.0562, wR_2=0.1204 for all 4372 data.

Crystal packing: The co-crystals contain hydrogen bonded carboxamide homodimers. The 2° amines of the saccharin are hydrogen bonded to the carbonyl of the CBZ on each side forming a tetramer. The crystal has a space group of P-1 with π-π interactions between the phenyl groups of the CBZ and the saccharin phenyl groups.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR), unsymmetrical and symmetrical stretching shifts up to 3495 cm^{-1} accounting for 1° amines; C═O aliphatic stretching was shifted up to 1726 cm^{-1} N—H in-plane bending at 1649 cm^{-1}; C═C stretching shifted down to 1561 cm^{-1}; (O═S═O) sulfonyl peak at 1330 cm^{-1} C—N aliphatic stretching 1175 cm^{-1}.

Differential Scanning Calorimetry: (TA Instruments 2920 DSC), 75.31 degrees C. (endotherm) and 177.32 degrees C. (endotherm), m.p.=148-155 degrees C. (MEL-TEMP); (carbamazepine m.p.=190.2 degrees C., saccharin m.p.=228.8 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA), 3.342% weight loss starting at 67.03 degrees C. and a 55.09% weight loss starting at 118.71 degrees C. followed by complete decomposition.

Powder x-ray diffraction: (Rigaku Miniflex Diffractometer using Cu Kα (λ=1.540562), 30 kV, 15 mA). The powder data were collected over an angular range of 3° to 40° 2θ in continuous scan mode using a step size of 0.02° 2θ and a scan speed of 2.0°/minute. PXRD derived from the single crystal data, experimental (calculated): 6.9 (7.0); 12.2 (12.2); 13.6

(13.8); 14.0 (14.1); 14.1 (14.4); 15.3 (15.6); 15.9 (15.9); 18.1 (18.2); 18.7 (18.8); 20.2 (20.3); 21.3 (21.5); 23.7 (23.9); 26.3 (26.4); 28.3 (28.3).

Example 33

Carbamazepine:2,6-pyridinedicarboxylic acid (2:3 stoichiometry)

36 mg (0.1524 mmol) carbamazepine and 26 mg (0.1556 mmol) 2,6-pyridinedicarboxylic acid were dissolved in approximately 2 mL ethanol. Slow evaporation of the solvent yielded clear needles of a 1:1 carbamazepine/2,6-pyridinedicarboxylic acid co-crystal, as shown in FIG. **54**A-B.

Crystal data: (Bruker SMART-APEX CCD Diffractometer). $C_{22}H_{17}N_3O_5$, M=403.39, orthorhombic P2(1)2(1)2(1); a=7.2122, b=14.6491, c=17.5864 Å,α=90°, β=90°, γ=90°, V=1858.0(2) Å^3, T=100 K, Z=4, μ(MO-Kα)=0.104 mm^{-1}, D_c=1.442 Mg/m^3, λ=0.71073 Å, F(000)840, $2\theta_{max}$=28.3. 16641 reflections measured, 4466 unique (R_{int}=0.093). Final residuals for 271 parameters were R_1=0.0425 and wR_2=0.0944 for I>2σ(I).

Crystal packing: Each hydrogen on the CBZ 1° amine is hydrogen bonded to a carbonyl group of a different 2,6-pyridinedicarboxylic acid moiety. The carbonyl of the CBZ carboxamide is hydrogen bonded to two hydroxide groups of one 2,6-pyridinedicarboxylic acid moitey.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR). 3439 cm^{-1}, (N—H stretch, 1° amine, CBZ); 1734 cm^{-1}, (C═O); 1649 cm^{-1}, (C═C).

Melting Point: 214-216 degrees C. (MEL-TEMP). (carbamazepine m.p.=191-192 degrees C., 2,6-pyridinedicarboxylic acid m.p.=248-250 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA). 69% weight loss starting at 215 degrees C. and a 17% weight loss starting at 392 degrees C. followed by complete decomposition.

Example 34

Carbamazepine:5-nitroisophthalic acid (1:1 stoichiometry)

40 mg (0.1693 mmol) carbamazepine and 30 mg (0.1421 mmol) 5-nitroisophthalic acid were dissolved in approximately 3 mL methanol or ethanol. Slow evaporation of the solvent yielded yellow needles of a 1:1 carbamazepine/5-nitroisophthalic acid co-crystal, as shown in FIG. **55**A-B.

Crystal data: (Bruker SMART-APEX CCD Diffractometer). $C_{47}H_{40}N_6O_{16}$, M=944.85, monoclinic C2/c; a=34.355 (8), b=5.3795(13), c=23.654(6) Å,α=90°, β=93.952(6)°, γ=90°, V=4361.2(18)Å^3, T=200(2) K, Z=4, μ(MO-Kα)=0.110 mm^{-1}, D_c=1.439 Mg/m^3, λ=0.71073 Å, F(000)1968, $2\theta_{max}$=26.43°. 11581 reflections measured, 4459 unique (R_{int}=0.0611). Final residuals for 311 parameters were R_1=0.0725, wR_2=0.1801 for I>2σ(I), and R_1=0.1441, wR_2=0.1204 for all 4459 data.

Crystal packing: The co-crystals are sustained by hydrogen bonded carboxylic acid homodimers between the two 5-nitroisophthalic acid moieties and hydrogen bonded carboxyamide heterodimers between the carbamazepine and 5-nitroisophthalic acid moiety. There is solvent hydrogen bonded to an additional N—H donor from the carbamazepine moiety.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR). 3470 cm^{-1}, (N—H stretch, 1° amine, CBZ); 3178 cm^{-1}, (C—H stretch, alkene); 1688 cm^{-1}, (C═O); 1602 cm^{-1}, (C═C).

Differential Scanning Calorimetry: (TA Instruments 2920 DSC). 190.51 degrees C. (endotherm). m.p.=NA (decomposes at 197-200 degrees C.) (MEL-TEMP). (carbamazepine m.p.=191-192 degrees C., 5-nitroisophthalic acid m.p.=260-261 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA). 32.02% weight loss starting at 202 degrees C., a 12.12% weight loss starting at 224 degrees C. and a 17.94% weight loss starting at 285 degrees C. followed by complete decomposition.

Powder x-ray diffraction: (Rigaku Miniflex Diffractometer using CuKα (λ=1.540562), 30 kV, 15 mA). The powder data were collected over an angular range of 3 to 40 2 in continuous scan mode using a step size of 0.02 2 and a scan speed of 2.0/min. PXRD: Showed analogous peaks to the simulated PXRD derived from the single crystal data. PXRD analysis experimental (calculated): 10.138 (10.283), 15.291 (15.607), 17.438 (17.791), 21.166 (21.685), 31.407 (31.738), 32.650 (32.729).

Example 35

Carbamazepine: 1,3,5,7-adamantane tetracarboxylic acid (1:1 stoichiometry)

15 mg (0.1524 mmol) carbamazepine and 20 mg (0.1556 mmol) 1,3,5,7-adamantanetetracarboxylic acid were dissolved in approximately 1 mL methanol or 1 mL ethanol. Slow evaporation of the solvent yields clear plates of a 2:1 carbamazepine/1,3,5,7-adamantanetetracarboxylic acid co-crystal, as shown in FIG. **56**A-B.

Crystal data: (Bruker SMART-APEX CCD Diffractometer). $C_{44}H_{40}N_2O_{10}$, M=784.80, monoclinicC2/c; a=18.388 (4), b=12.682(3), c=16.429(3) Å, β=100.491(6)°, V=3767.1 (14) Å^3, T=100(2) K, Z=4, μ(MO-Kα)=0.099 mm^{-1}, D_c=1.384 Mg/m^3, λ=0.71073 Å, F(000)1648, $2\theta_{max}$=28.20°. 16499 reflections measured, 4481 unique (R_{int}=0.052). Final residuals for 263 parameters were R_1=0.0433 and wR_2=0.0913 for I>2σ(I).

Crystal packing: The co-crystals form a single 3D network of four tetrahedron, linked by square planes similar to the PtS topology. The crystals are sustained by hydrogen bonding.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR). 3431 cm^{-1}, (N—H stretch, 1° amine, CBZ); 3123 cm^{-1}, (C—H stretch, alkene); 1723 cm^{-1}, (C═O); 1649 cm^{-1}, (C═C).

Melting Point: (MEL-TEMP). 258-260 degrees C. (carbamazepine m.p.=191-192 degrees C., adamantanetetracarboxylic acid m.p.=>390 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA). 9% weight loss starting at 189 degrees C., a 52% weight loss starting at 251 degrees C. and a 31% weight loss starting at 374 degrees C. followed by complete decomposition.

Example 36

Carbamazepine:benzoquinone (1:1 stoichiometry)

25 mg (0.1058 mmol) carbamazepine and 11 mg (0.1018 mmol) benzoquinone was dissolved in 2 mL methanol or THF. Slow evaporation of the solvent produced an average yield of yellow crystals of a 1:1 carbamazepine/benzoquinone co-crystal, as shown in FIG. **57**A-B.

Crystal data: (Bruker SMART-APEX CCD Diffractometer). $C_{21}H_{16}N_2O_3$, M=344.36, monoclinic P2(1)/c; a=10.3335(18), b=27.611(5), c=4.9960(9) Å, β=102.275 (3)°, V=1392.9(4) Å^3, T=100(2) K, Z=3, D_c=1.232 Mg/m^3, μ(MO-Kα)=0.084 mm^{-1}, λ=0.71073 Å, F(000)540, $2\theta_{max}$=28.24°. 8392 reflections measured, 3223 unique (R_{int}=0.1136). Final residuals for 199 parameters were

R_1=0.0545 and wR_2=0.1358 for I>2σ(I), and R_1=0.0659 and wR_2=0.1427 for all 3223 data.

Crystal packing: The co-crystals contain hydrogen bonded carboxamide homodimers. Each 1° amine on the CBZ is bifurcated to a carbonyl group of a benzoquinone moiety. The dimers form infinite chains.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR). 3420 cm^{-1}, (N—H stretch, 1° amine, CBZ); 2750 cm^{-1}, (aldehyde stretch); 1672 cm^{-1}, (C═O); 1637 cm^{-1}, (C═C, CBZ).

Melting Point: 170 degrees C. (MEL-TEMP). (carbamazepine m.p.=191-192 degrees C., benzoquinone m.p.=115.7 degrees C.).

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA). 20.62% weight loss starting at 168 degrees C. and a 78% weight loss starting at 223 degrees C. followed by complete decomposition.

Example 37

Carbamazepine:trimesic Acid (Form II) (1:1 stoichiometry)

36 mg (0.1524 mmol) carbamazepine and 31 mg (0.1475 mmol) trimesic acid were dissolved in a solvent mixture of approximately 2 mL methanol and 2 mL dichloromethane. Slow evaporation of the solvent mixture yielded white star-bursts of a 1:1 carbamazepine/trimesic acid co-crystal, as shown in FIG. **58**A-B.

Crystal data: (Bruker SMART-APEX CCD Diffractometer). $C_{24}H_{18}N_2O_7$, M=446.26, monoclinic C2/c; a=32.5312(50), b=5.2697(8), c=24.1594(37) Å,α=90°, β=98.191(3)°, γ=90°, V=4099.39(37) $Å^3$, T=−173 K, Z=8, μ(MO-Kα)=0.110 mm^{-1}, D_c=1.439 Mg/m^3, λ=0.71073 Å, F(000)1968, $2\theta_{max}$=26.43°. 11581 reflections measured, 4459 unique (R_{int}=0.0611). Final residuals for 2777 parameters were R_1=0.1563, wR_2=0.1887 for I>2σ(I), and R_1=0.1441, wR_2=0.1204 for all 3601 data.

Crystal packing: The co-crystals are sustained by hydrogen bonded carboxylic acid homodimers between carbamazepine and trimesic acid moieties and hydrogen bonded carboxylic acid-amine heterodimers between two trimesic acid moieties arranged in a stacked ladder formation.

Infrared Spectroscopy: (Nicolet Avatar 320 FTIR). 3486 cm^{-1} (N—H stretch, 1° amine, CBZ); 1688 cm^{-1} (C═O, 1° amide stretch, CBZ); 1602 cm^{-1} (C═C, CBZ).

Differential Scanning Calorimetry: (TA Instruments 2920 DSC). 273 degrees C. (endotherm). m.p.=NA, decomposes at 278 degrees C. (MEL-TEMP). (carbamazepine m.p.=191-192 degrees C., trimesic acid m.p.=380 degrees C.)

Thermogravimetric Analysis: (TA Instruments 2950 Hi-Resolution TGA). 62.83% weight loss starting at 253 degrees C. and a 30.20% weight loss starting at 278 degrees C. followed by complete decomposition.

Powder x-ray diffraction: (Rigaku Miniflex Diffractometer using CuKα (λ=1.540562), 30 kV, 15 mA). The powder data were collected over an angular range of 3 to 40 2 in continuous scan mode using a step size of 0.02 2 and a scan speed of 2.0/min. PXRD analysis experimental: 10.736, 12.087, 16.857, 24.857, 27.857.

TABLE V

Detailed Characterization of Co-Crystals
All PXRD peaks are in units of degrees 2-theta All Raman shifts are in units of cm^{-1}
Carbamazepine: Saccharin PXRD (Form I): 7.01, 12.07, 14.09, 15.41, 18.47, 20.13, 22.01, 23.57, 24.41, 28.31 (FIG. 1) PXRD (Form II): 6.9, 12.2, 13.6, 14.0, 14.1, 15.3, 15.9, 18.1, 18.7, 20.2, 21.3, 23.7, 26.3, 28.3 DSC (Form I): Broad endotherm at 161.9 degrees C. (FIG. 2)
TGA (Form I): Decomposition above 200 degrees CDSC (Form II): Endothermic transitions at 75.31 and 177.32 degrees C. TGA (Form II): 3.342 percent weight loss starting at 67.03 degrees C., 55.09 percent weight loss starting at 118.71 degrees C., followed by decomposition Method: CMAX
Carbamazepine: Nicotinamide PXRD (Form I): 4.97, 6.67, 8.75, 10.25, 13.25, 17.91, 18.49, 19.95, 20.49, 22.73, 24.39, 26.49 (FIG. 3) PXRD (Form II): 6.5, 8.8, 10.1, 13.2, 15.6, 17.7, 17.8, 18.3, 19.8, 20.4, 21.6, 22.6, 22.9, 26.4, 26.7, 28.0 DSC (Form I): Sharp endotherm at 156.9 degrees C. (FIG. 4) TGA (Form I): Decomposition beginning at ~150 degrees CDSC (Form II): Endothermic transitions at 74.49 and 159.05 degrees C. TGA (Form II): 57.94 percent weight loss starting at 205.43 degrees C., followed by decomposition Method: CMAX
Carbamazepine: Trimesic acid PXRD (Form I): 10.89, 12.23, 14.83, 16.25, 17.05, 18.13, 18.47, 21.47, 21.95, 24.57, 25.11, 27.99 (FIG. 5) PXRD (Form II): 10.74, 12.09, 16.86, 24.86, 27.86 DSC (Form II): Endothermic transition at 273 degrees C. TGA (Form II): 62.83 percent weight loss starting at 253 degrees C., 30.20 percent weight loss starting at 278 degrees C., followed by decomposition Method: CMAX
Celecoxib: Nicotinamide PXRD: 3.77, 7.56, 9.63, 14.76, 15.21, 16.01, 17.78, 18.68, 19.31, 20.44, 21.19, 22.10 DSC: Two endothermic transitions at 117.2 and 118.8 degrees C. and a sharp endotherm at 129.7 degrees C. TGA: Decomposition beginning at ~150 degrees C. Raman: 1617.5, 1598.7, 1452.1, 1370.3, 1162.5, 1044.3, 972.9, 796.4, 631.8, 392.5, 205.9 Method: Slow evaporation of a 1:1 solution from acetone
Topiramate: 18-Crown-6 PXRD: 10.79, 11.07, 12.17, 13.83, 16.13, 18.03, 18.51, 18.79, 19.21, 21.43, 22.25, 24.11 (FIG. 6) DSC: Sharp endotherm at 134.7 degrees C., followed by an exotherm at 203 degrees C. (FIG. 7) TGA: Rapid decomposition beginning at ~135 degrees C. and leveling off slightly after 200 degrees C. Raman: 2994.5, 2942.7, 1471.6, 1427.4, 1261.7, 849.4, 804.5, 745.1, 629.2, 280.4, 225.9 Method: Addition of an ether solution containing 1 equivalent of topiramate to an ether solution containing 18-crown-6. Product precipitated following minor agitation of the combined mixture and was collected.
Olanzapine: Nicotinamide PXRD (Form I): 4.89, 8.65, 12.51, 14.19, 15.59, 17.15, 19.71, 21.05, 23.95, 24.59, 25.53, 26.71 (FIG. 8) PXRD (Form II): 6.41, 12.85, 18.67, 21.85, 24.37 (FIG. 30) PXRD (Form III): 6.41, 12.85, 14.91, 18.67, 21.85, 24.37 (FIG. 31) DSC (Form I): Slightly broad endotherm at 126.1 degrees C. (FIG. 9) Method: See above
Celecoxib: 18-Crown-6 PXRD: 8.73, 11.89, 12.57, 13.13, 15.01, 16.37, 17.03, 17.75, 18.45, 20.75, 22.37, 23.11, 24.33, 24.97, 26.61, 28.15 (FIG. 10) DSC: Sharp endotherm at 189.6 degrees C. (FIG. 11) TGA: Decomposition above 200 degrees C. with a 25% weight loss between ~190-210 degrees C. Method: A solution containing one equivalent of celecoxib in ether was added to a solution containing 18-crown-6. A white solid formed immediately and was collected.
Itraconazole: Succinic Acid PXRD: 3.0, 6.0, 8.1, 9.0, 17.1, 24.5 (FIG. 12) DSC: Single endothermic transition at 160.1 degrees C. ± 1.0 degrees C. (FIG. 13) TGA: Less than 0.1% volatile components by weight Method: See above

TABLE V-continued

Detailed Characterization of Co-Crystals
Itraconazole: Fumaric Acid PXRD: 4.6, 5.9, 9.2, 10.6, 19.1, 20.8 (FIG. 14) DSC: The material had a weak endothermic transition at 141.7 degrees C. and a strong endothermic transition at 179.58 degrees C. (FIG. 15) TGA: The sample loses 0.5% of its weight on the TGA between room temperature and 100 degrees C. Method:
Itraconazole: Tartaric Acid PXRD: 4.1, 6.2, 8.3, 20.7, 25.6, 26.3 (FIG. 16) DSC: An endothermic transition at 180.74 degrees C. (FIG. 17) TGA: Less than 0.1% volatile components by weight by TGA. Method: See above
Itraconazole: Malic acid PXRD: 4.4, 5.9, 8.8, 17.7, 20.0, 21.1, 22.6 (FIG. 18) DSC: The sample has a strong endothermic transition at 154.36 degrees C. (FIG.19) TGA: The sample contained less than 0.1% volatile components by weight Method: See above
ItraconazoleHCl: Tartaric acid PXRD: 3.7, 11.0, 13.8, 16.5, 17.8 (FIG. 20) DSC: The sample has a peak endothermic transition at 161degrees C. (FIG. 21) TGA: The sample contained less than 0.1% volatile components by weight Method: See above
Modafinil: Malonic acid PXRD: 5.00, 9.17, 16.81, 18.26, 19.43, 21.36, 21.94, 22.77, 24.49, 25.63, 28.45 (FIG. 22) DSC: Endothermic transition at 106.23 degrees C. (FIG. 40) Raman: 1601, 1183, 1032, 1004, 814, 633, 265, 222 (FIG. 42) Method: See above
Modafinil: Benzamide PXRD: 5.11, 9.35, 10.25, 10.79, 14.07, 16.87, 18.33, 19.53, 21.38, 22.05, 22.89, 23.57, 24.73, 25.19, 25.81, 26.51, 28.60 (FIG. 23) Method: Slow evaporation from a 1:1 solution in 1,2-dichoroethane
Modafinil: Mandelic acid PXRD: 6.11, 6.75, 9.53, 10.31, 14.77, 15.77, 16.99, 18.03, 20.01, 21.61, 22.47, 23.27, 25.27, 25.75, 27.23 (FIG. 24) Method: Slow evaporation from a 1:1 solution in acetone
Modafinil: Glycolic acid PXRD: 6.09, 9.51, 14.91, 15.97, 19.01, 20.03, 21.59, 22.43, 22.75, 23.75, 25.03, 25.71 (FIG. 25) Method: Slow evaporation from a 1:1 solution in acetone
Modafinil: Fumaric acid PXRD: 5.87, 7.19, 8.95, 12.49, 13.99, 16.13, 17.09, 18.19, 19.99, 21.57, 23.48, 25.01, 25.79, 28.17, 28.87, 29.69, 32.19 (FIG. 26) Method: Slow evaporation from a 1:1 solution in 1,2-dichoroethane
Modafinil: Maleic acid PXRD: 4.69, 6.15, 9.61, 10.23, 15.65, 16.53, 17.19, 18.01, 19.27, 19.53, 19.97, 21.83, 22.45, 25.65 (FIG. 43) Method: See above
5-fluorouracil: Urea PXRD: 11.23, 12.69, 13.27, 15.93, 16.93, 20.37, 23.65, 25.55, 26.87, 32.49 (FIG. 36) DSC: Sharp endotherm at 207.6 degrees C. (FIG. 33) TGA: 32 percent weight loss between 150 and 220 degrees C. (FIG. 34) Raman: 1347.1, 1024.4, 756.9, 643.7, 545.3 (FIG. 35) Method: See above
Hydroclorothiazide: Nicotinic acid PXRD: 8.57, 13.23, 14.31, 16.27, 17.89, 18.75, 21.13, 21.45, 24.41, 25.73, 26.57, 27.43 (FIG. 37) Method: See above
Hydrochlorothiazide: 18-crown-6 PXRD: 9.97, 10.43, 11.57, 11.81, 12.83, 14.53, 15.67, 16.61, 19.05, 20.31, 20.65, 21.09, 21.85, 22.45, 23.63, 24.21, 25.33, 26.73 (FIG. 38) Method: See above

TABLE V-continued

Detailed Characterization of Co-Crystals
Hydrochlorothiazide: piperazine PXRD: 6.85, 13.75, 15.93, 18.71, 20.67, 20.93, 23.27, 24.17, 28.33, 28.87, 30.89 (FIG. 39) Method: See above
Acetaminophen: 4,4'-bipyridine:water DSC: Endothermic transition at 57.77 degrees C. Method: See above
Phenytoin: Pyridone PXRD: 5.2, 11.1, 15.1, 16.2, 16.7, 17.8, 19.4, 19.8, 20.3, 21.2, 23.3, 26.1, 26.4, 27.3, 29.5 DSC: Endothermic transitions at 233.39 and 271.33 degrees C. TGA: 29.09 percent weight loss starting at 192.8 degrees C., 48.72 percent weight loss starting at 238.27 degrees C., 18.38 percent weight loss starting at 260.17 degrees C., followed by decomposition Method: See above
Aspirin: 4,4'-bipyridine DSC: Endothermic transition at 95.14 degrees C. TGA: 9 percent weight loss starting at 22.62 degrees C., 49.06 percent weight loss starting at 102.97 degrees C., decomposition starting at 209.37 degrees C. Method: See above
Ibuprofen: 4,4'-bipyridine PXRD: 3.4, 6.9, 10.4, 17.3, 19.1 DSC: Endothermic transitions at 64.85 and 118.79 degrees C. TGA: 13.28 percent weight loss between room temperature and 100.02 degrees C. followed by decomposition Method: See above
Flurbiprofen: 4,4'-bipyridine PXRD: 16.8, 17.1, 18.1, 19.0, 20.0, 21.3, 22.7, 25.0, 26.0, 26.0, 26.1, 28.2, 29.1 DSC: Endothermic transition at 162.47 degrees C. TGA: 30.93 percent weight loss starting at 31.13 degrees C., 46.26 percent weight loss starting at 168.74 degrees C., followed by decomposition Method: See above
Flurbiprofen: trans-1,2-bis (4-pyridyl) ethylene PXRD: 3.6, 17.3, 18.1, 18.4, 19.1, 22.3, 23.8, 25.9, 28.1 DSC: Endothermic transitions at 100.01, 125.59, and 163.54 degrees C. TGA: 91.79 percent weight loss starting at 133.18 degrees C. followed by decomposition Method: See above
Carbamazepine: p-phthalaldehyde PXRD: 8.5, 10.6, 11.9, 14.4, 15.1, 18.0, 18.5, 19.8, 23.7, 24.2, 26.4, 27.6, 27.8, 28.7, 29.3, 29.4 DSC: Endothermic transition at 128.46 degrees C. TGA: 17.66 percent weight loss starting at 30.33 degrees C., 17.57 percent weight loss starting at 100.14 degrees C., followed by decomposition Method: See above
Carbamazepine: 2,6-pyridinecarboxylic acid TGA: 69 percent weight loss starting at 215 degrees C., 17 percent weight loss starting at 392 degrees C., followed by decomposition Method: See above
Carbamazepine: 5-nitroisophthalic acid PXRD: 10.14, 15.29, 17.44, 21.17, 31.41, 32.65 TGA: 32.02 percent weight loss starting at 202 degrees C., 12.12 percent weight loss starting at 224 degrees C., 17.94 percent weight loss starting at 285 degrees C., followed by decomposition Method: See above
Carbamazepine: 1,3,5,7-adamantane tetracarboxylic acid TGA: 9 percent weight loss starting at 189 degrees C., 52 percent weight loss starting at 251 degrees C., 31 percent weight loss starting at 374 degrees C., followed by decomposition Method: See above
Carbamazepine: Benzoquinone TGA: 20.62 percent weight loss starting at 168 degrees C., 78 percent weight loss starting at 223 degrees C., followed by decomposition Method: See above

Example 38

A co-crystal with a modulated dissolution profile has been prepared. Celecoxib: nicotinamide co-crystals were prepared via methods shown in example 4. (See FIG. **27**)

Example 39

A co-crystal with a modulated dissolution profile has been prepared. Itraconazole: succinic acid, itraconazole:tartaric acid and itraconazole:malic acid co-crystals were prepared via methods shown in examples 8, 10 and 11. (See FIG. **28**)

Example 40

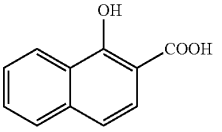
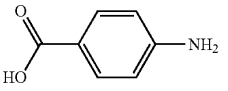
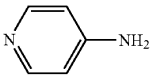
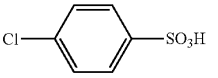
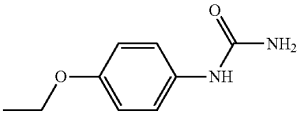
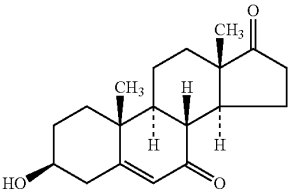
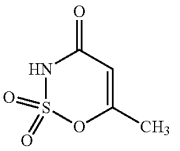
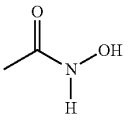
A co-crystal of an unsaltable or difficult to salt API has been prepared. Celecoxib: nicotinamide co-crystals were prepared via methods shown in example 4.

Example 41

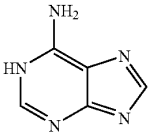
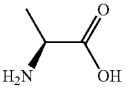
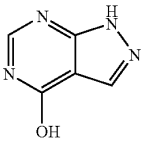
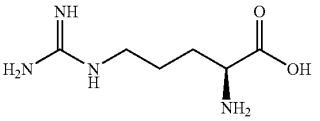
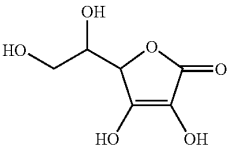
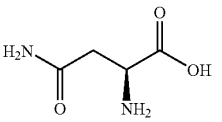
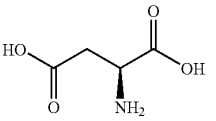
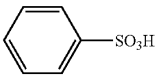
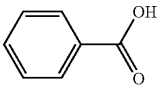
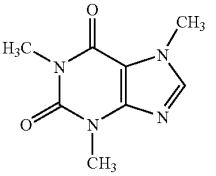
A co-crystal with an improved hygroscopicity profile has been prepared. Celecoxib: nicotinamide co-crystals were prepared via methods shown in example 4. (See FIG. **29**)

Example 42

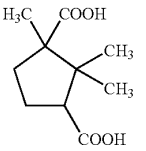
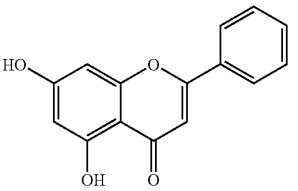
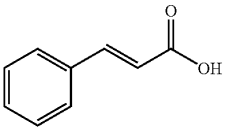
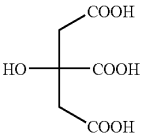
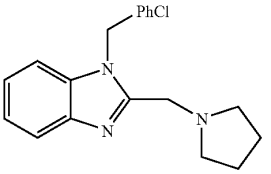
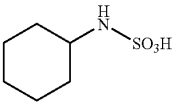
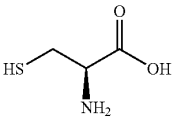
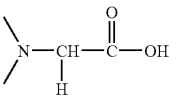
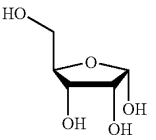
A co-crystal with reduced form diversity as compared to the API has been prepared. Co-crystals of carbamazepine and saccharin have been prepared via method shown in example 1.

Co-Crystal Former	MW (g/mol)	MP (° C.)	Class	Functionalilty	# acceptors	# donors	Molecular Structure	pKa Values
1-Hydroxy-2-naphthoic acid	188.18	191-192	2	Carboxylic acid, alcohol	1	2		2.7,13.5
4-aminobenzoic acid	137.14	187-188	2	Amine, carboxylic acid	1	3		4.7,4.8
4-aminopyridine	94.11	158-159	3	Amine, pyridine	1	2		10
4-Chlorobenzene-sulfonic acid	192.63	67	1	SO_3H	3	1		0-1
4-ethoxyphenyl urea	180.2	173-174	3	Amide, NH	2	3		~7-9
7-oxo-DHEA	303	190-192	1	Alcohol, Ketone	3	1		
Acesulfame	163.15	123-124	3	SO_2, Amide	4	1		~5-7
Acetohydroxamic acid	75.07	89-92	3	Amide, NH, OH	2	2		8.7

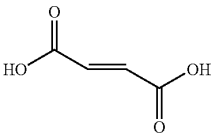
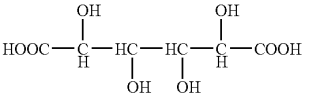
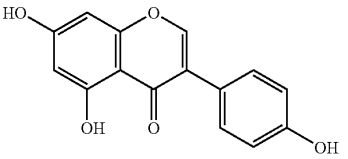
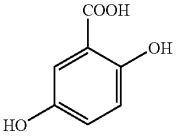
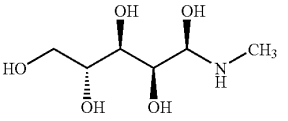
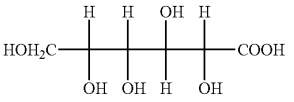
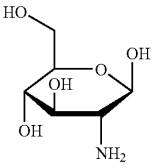
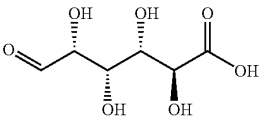
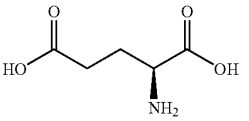
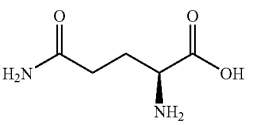
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Co-Crystal Former	MW (g/mol)	MP (° C.)	Class	Functionalilty	# acceptors	# donors	Molecular Structure	pKa Values
Adenine	135.13	200 (sub.)	1	Amide, NH	3	3		3.8
Adipic Acid	146.14	152	1	Carboxylic acid	2	2	$HOOC(CH_2)_4COOH$	4.44, 5.44
Alanine	89.09	289-291	1	Amine, carboxillic acid	1	3		2.35, 9.87
Allopurinaol	136.11	>350	3	OH, NH	4	2		10.2
Arginine	174.2	244 (dec.)	1	Amine, COOH	2	7		2.18, 9.09, 13.2
Ascorbic acid	176.12	190-192	1	C═O, OH	6	4		4.17, 11.57
Asparagine	132.12	234-235	1	Amine, amide, COOH	3	5		2.02, 8.5
Aspartic acid	133.1	270-271	1	Amine, COOH	2	4		1.88, 3.65, 9.60
Benzenesulfonic Acid	158.18	43-44	1	SO_3H	2	1		0.70, 1.58
Benzoic acid*	122.12	122-123	2	COOH	1	1		4.19
Caffeine	194.19	238	3	C═O	3	0		

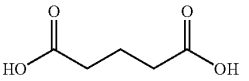
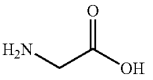
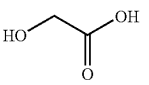
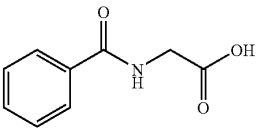
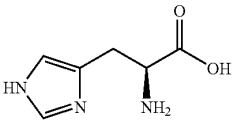
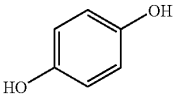
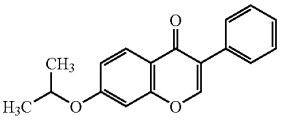
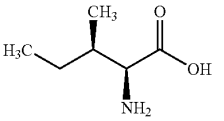
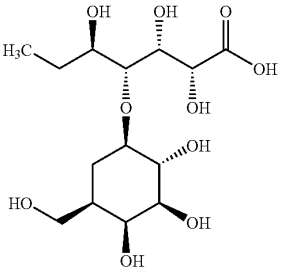
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Co-Crystal Former	MW (g/mol)	MP (° C.)	Class	Functionalilty	# acceptors	# donors	Molecular Structure	pKa Values
Camphoric acid	200.23	186-189	2	Carboxylic acid	2	2		4.72, 5.83
Capric acid	172.27	31.4	1	Carboxylic acid	1	1	$CH_3(CH_2)_8COOH$	4.9
Chrysin	254.24	285	1	Phenol, ether, ketone	2	2		
Cinnamic acid	144.2	133	3	Carboxylic acid	1	1		4.4
Citric Acid	192.12	153	1	OH, COOH	4	4		3.13, 4.76, 6.40
Clemizole	325.84	167	1	Pyrrolidine	3	0		
Cyclamic acid	179.24	169-170	3	NH, SO_3H	2	2		−2
Cysteine	121.15	—	1	Amine, COOH, SH	2	4		1.71, 8.33, 10.78
Dimethylglycine	103.1	178-192	1	Amine, Carboxylic acid	2	1		2.5
D-Ribose	150.13	87	1	Alcohol, ether	1	4		

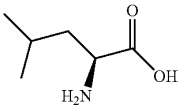
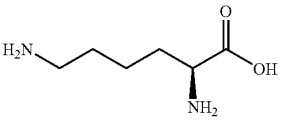
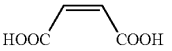
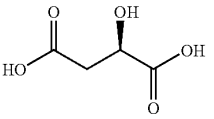
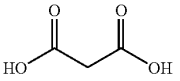
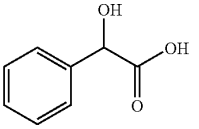
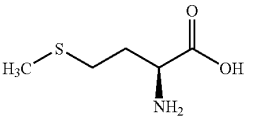
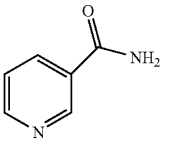
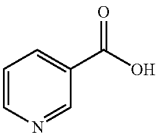
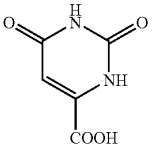
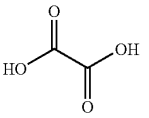
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Co-Crystal Former	MW (g/mol)	MP (° C.)	Class	Functionalilty	# acceptors	# donors	Molecular Structure	pKa Values
Fumaric acid	116.07	287	1	COOH	2	2		3.03, 4.38
Galactaric acid	210.14	255 (dec)	1	Carboxylic acid, alcohol	2	6		3.08, 3.63
Genistein	270.24	297-298	1	Alcohol, Phenol, ether, ketone	2	3		
Gentisic acid	154.12	199-200 form I, 205 form II	2	Carboxylic acid, alcohol, phenol	1	3		2.93
Glucamine, N-Methyl	195.22	128-129	1	Alcohol, Amine	5	6		8.03(B)
Gluconic acid	196.15	131	1	OH, COOH	6	6		3.76
Glucosamine	179.17	88	1	OH	5	6		6.91
Glucuronic acid	194.14	165	1	Carboxylic acid, alcohol, aldehyde	2	5		3.18
Glutamic acid	147.13	160	1	Amine, COOH	2	4		2.19, 4.25, 9.67
Glutamine	146.15	185-186	1	Amine, Amide, COOH	2	5		2.17, 9.13

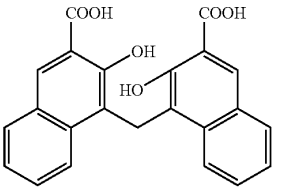
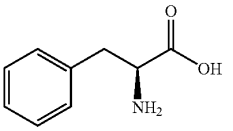
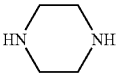
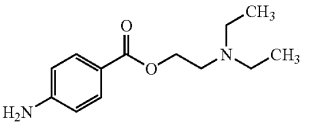
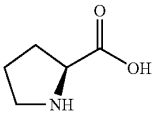
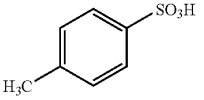
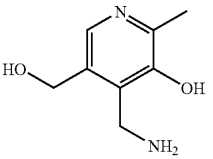
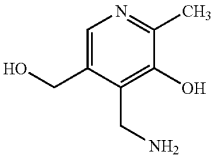
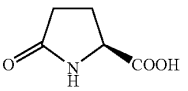
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Co-Crystal Former	MW (g/mol)	MP (° C.)	Class	Functionalilty	# acceptors	# donors	Molecular Structure	pKa Values
Glutaric acid	132.11	98-98	1	COOH	2	2		2.7,4.5
Glycine	75.07	182	1	Amine, COOH	2	3		2.34, 9.6
Glycolic acid	76.05	80	1	OH, COOH	2	2		3.82
Hippuric acid	179.17	187-188	1	Amide, NH, COOH	2	2		3.55
Histidine	155.16	287 (dec.)	1	Amine, COOH, Imidazole	2	4		1.78, 5.97, 8.97
Hydroquinone*	110.11	170-171	2	OH, Phenol	2	2		~10
Imidazole	68.08	90-91	1	NH	1	1		6.92
Ipriflavone	280.32	115-117	1	Ketone, ether	3	0		
Isoleucine	131.17	168-170 (sub.)	1	Amine, COOH	1	3		2.32, 9.76
Lactobionic acid	358.3	128-130	2	Alcohol, carboxylic acid, ether	1	9		3.2
Lauric acid	200.32	44-48	1	Carboxylic acid	1	1	$CH_3(CH_2)_{10}COOH$	~4.5

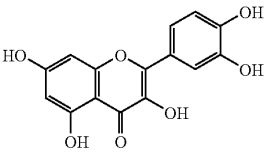
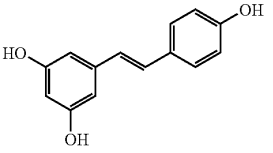
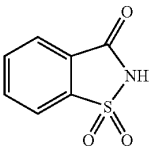
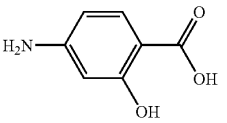
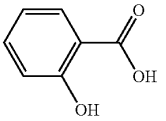
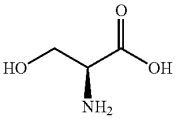
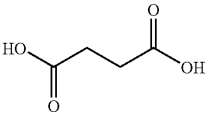
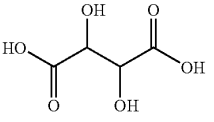
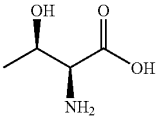
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Co-Crystal Former	MW (g/mol)	MP (° C.)	Class	Functionalilty	# acceptors	# donors	Molecular Structure	pKa Values
Leucine	131.17	145-148 (sub.)	1	Carboxylic acid, amine	1	3		2.36, 9.6
Lysine	146.19	225 (dec.)	1	Amine, COOH	1	5		2.2,8.9, 10.28
Maleic	116.07	138-139	1	COOH	2	2		1.92, 6.23
Malic acid	134.09	131-132	1	OH, COOH	3	3		3.46, 5.1
Malonic	104.06	135	1	COOH	2	2		2.83, 5.70
Mandelic acid	152.15	119	1	OH, COOH	2	2		3.37
Methionine	149.21	280-282 (dec.)	1	Amine, COOH, S-Me	2	3		2-3, 9
Nicotinamide	122.12	128-131	1	Pyridine, amide	2	2		3.3
Nicotinic acid	123.11	236-237	2	Carboxylic acid, pyridine	2	1		2.07(B), 4.85
Orotic acid	156.1	345-346	2	Carboxilic acid, lactam	3	3		5.85, 8.95
Oxalic acid	90.04	189 (dec)	2	Carboxilic acid	2	2		1.27, 4.27

-continued

Co-Crystal Former	MW (g/mol)	MP (° C.)	Class	Functionalilty	# acceptors	# donors	Molecular Structure	pKa Values
Palmitic acid	256.43	63-64	1	Carboxylic acid	1	1	$CH_3(CH_2)_{14}COOH$	4.9
Pamoic	388.38	280 (dec)	2	Carboxylic acid, phenol	2	4		2.51, 3.1
Phenylalanine	165.19	283 (dec.)	1	Amine, COOH	1	3		~2, ~9
Piperazine	86.14	106	1	NH	0	2		9.82(B)
Procaine	236.31	61	1	Amine, C═O	2	2		8.9(B)
Proline	115.13	220-222 (dec.)	1	COOH, NH	1	2		1.99, 10.6
p-Toluenesulfonic acid	172.2	106-107	2	Sulfonic acid	2	1		−1.34
Pyridoxamine	168	193-194	2	OH, Amine, Pyridine	3	4		~9
Pyridoxine	170	160	2	Alcohol, Pyridine	3	3		~9
Pyroglutamic acid	129.12	162	2	Carboxylic acid, Lactam	2	2		3.32

-continued

Co-Crystal Former	MW (g/mol)	MP (° C.)	Class	Functionalilty	# acceptors	# donors	Molecular Structure	pKa Values
Quercetin	302.24	314 dec.	1	Phenol, ether, ketone	2	5		
Resveratrol	228.24	253-255	1	Phenol	0	3		
Saccharin	183.19	228-230	1	Amide, C═O, S═O, N—H	3	1		2
Salicylic acid, 4-amino	153.14	150-151	3	COOH, OH, Analine	1	4		3.25,10, 3.5(B)
Salicylic acid	138.12	159	3	COOH, OH	2	2		2.98, 13.82
Sebacic acid	202.25	134.5	1	Carboxylic acid	2	2	$HOOC(CH_2)_8COOH$	4.59, 5.59
Serine	105.09	228 (dec.)	1	Carboxylic acid, amine, OH	2	3		2.21, 9.15
Stearic acid	284.47	70-71	1	Carboxylic acid	1	1	$CH_3(CH_2)_{16}COOH$	4.9
Succinic acid	118.09	185-187	1	Carboxylic acid	2	2		4.21, 5.64
Tartaric acid	150.09	205-206	1	Carboxylic acid	4	4		3.02, 4.36
Threonine	119.12	255-257 (dec.)	1	Amine, COOH, OH	2	4		2.15, 9.12

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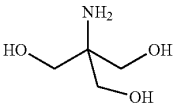
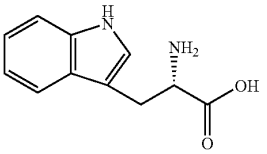
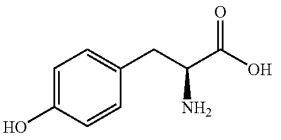
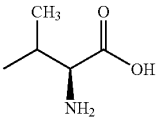
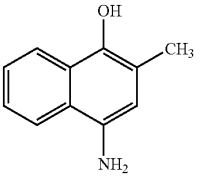
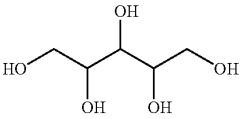
Co-Crystal Former	MW (g/mol)	MP (° C.)	Class	Functionalilty	# acceptors	# donors	Molecular Structure	pKa Values
TRIS	121.13	171-172	2	Amine, OH	3	5		5.91, 8.3
Tryptophan	204.23	289 (dec.)	1	Amine, COOH, Indole	1	4		2.38, 9.39
Tyrosine	181.19	342-344	1	Amine, COOH, OH	2	3		2.2,9.11, 10.07
Urea	60.06	Dec.	1	C═O, NH2	1	4		~8
Valine	117.15	315	1	Amine, COOH	1	3		~4.5, ~9
Vitamin K5	209.68	280-282 (dec.)	3	Amine, OH	1	3		~9
Xylitol	152.15	93-95 (1)	2	OH	5	5		~9

TABLE II

Co-crystal Former	Co-crystal Former Functional Group	Interacting Group						
1,5-Napthalene-disulfonic Acid	Sulfonic Acid	pyridine	ketone	aldehyde	ether	ester	amide	Carboxylic Acid
1-Hydroxy-2-naphthoic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
1-Hydroxy-2-naphthoic acid	alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
4-Aminobenzoic Acid	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
4-Aminobenzoic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
4-aminopyridine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
4-aminopyridine	Pyridine	*alcohol	pyridinium	*	*amide	nitro	*amine	*Carboxylic Acid
4-Chlorobenzene-Sulfonic Acid	Sulfonic Acid	pyridine	ketone	aldehyde	ether	ester	amide	Carboxylic Acid
4-ethoxyphenyl Urea	Amide	alcohol	ketone	thiol	amide	amine	analine	phenol
4-ethoxyphenyl Urea	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
7-oxo-DHEA	alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
7-oxo-DHEA	Ketone	alcohol		thiol	amide	amine	analine	phenol
Acesulfame	Sulfone	pyridine	ketone	aldehyde	ether	ester	amide	carboxilic acid
Acesulfame	Amide	alcohol	ketone	thiol	amide	amine	analine	phenol
Acetohydroxamic Acid	Amide	alcohol	ketone	thiol	amide	amine	analine	phenol
Acetohydroxamic Acid	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Acetohydroxamic Acid	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Adenine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Adenine	N	*alcohol	pyridinium	*	*amide	nitro	*amine	*carboxilic acid
Adipic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Alanine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Alanine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Allopurinaol	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Allopurinaol	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Arginine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Arginine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Ascorbic Acid	Ketone	alcohol		thiol	amide	amine	analine	phenol
Ascorbic Acid	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Ascorbic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Asparagine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Asparagine	Amide	alcohol	ketone	thiol	amide	amine	analine	phenol
Asparagine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Aspartic Acid	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Aspartic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Benzenesulfonic Acid	Sulfonic Acid	pyridine	ketone	aldehyde	ether	ester	amide	Carboxylic Acid
Benzoic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Caffeine	Ketone	alcohol		thiol	amide	amine	analine	phenol
Camphoric acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Capric acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Genistein	Ketone	alcohol		thiol	amide	amine	analine	phenol
Genistein	Phenol	amine	amide	sulfoxide	n	pyridine	cyano	aldehyde
Genistein	Ether	aromatic-N	amide	amine	aromatic_s	Sp2 amine	sulfoxide	chlorate
Cinnamic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Citric Acid	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Citric Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Clemizole	Pyrrolidine	*alcohol	pyridinium	*	*amide	nitro	*amine	*carboxilic acid
Cyclamic Acid	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol

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TABLE II-continued

Cyclamic Acid	Sulfonic Acid	pyridine	ketone	aldehyde	ether	ester	amide	Carboxylic Acid	
Cysteine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
Cysteine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Cysteine	Thiol	carboxylic acid	sodium	aldehyde	ketone	-N	cadmium		
Dimethylglycine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Dimethylglycine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
D-ribose	Ether	aromatic-N	amide	amine	aromatic_s	Sp2 amine	sulfoxide	chlorate	
D-ribose	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol	
Fumaric Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Galactaric acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Galactaric acid	alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol	
Chrysin	Ketone	alcohol		thiol	amide	amine	analine	phenol	
Chrysin	Phenol	amine	amide	sulfoxide	n	pyridine	cyano	aldehyde	
Chrysin	Ether	aromatic-N	amide	amine	aromatic_s	Sp2 amine	sulfoxide	chlorate	
Gentisic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Gentisic acid	Phenol	amine	amide	sulfoxide	n	pyridine	cyano	aldehyde	
Glucamine, N-methyl	alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glucamine, N-methyl	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
Gluconic Acid	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol	
Gluconic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glucosamine	alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glucuronic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glucuronic acid	alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glucuronic acid	Aldehyde	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glutamic Acid	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glutamic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glutamine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glutamine	Amide	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glutamine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glutaric Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glycine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glycine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glycolic Acid	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol	
Glycolic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Hippuric Acid	Amide	alcohol	ketone	thiol	amide	amine	analine	phenol	
Hippuric Acid	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
Hippuric Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Histidine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
Histidine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Histidine	Imidazole	imidazole	chlorine	acetamide	carboxylate		thione	nitro	
Hydroquinone	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol	
Hydroquinone	Phenol	amine	amide	sulfoxide	n	pyridine	cyano	aldehyde	
Imidazole	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
Ipriflavone	Ether	aromatic-N	amide	amine	aromatic_s	Sp2 amine	sulfoxide	chlorate	
Ipriflavone	Ketone	alcohol		thiol	amide	amine	analine	phenol	
Isoleucine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	
Isoleucine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
lactobionic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Lactobionic acid	alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol	
Lactobionic acid	Ether	aromatic-N	amide	amine	aromatic_s	Sp2 amine	sulfoxide	chlorate	
Lauric acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Leucine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol	
Leucine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol	

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TABLE II-continued

Lysine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Lysine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Maleic	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Malic Acid	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Malic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Malonic	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Mandelic Acid	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Mandelic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Methionine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Methionine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Methionine	Thioether	-N	amide	amine	_s	Sp2 amine	sulfoxide	chlorate
Nicotinamide	Pyridine	*alcohol		*	*amide	nitro	*amine	*Carboxylic Acid
Nicotinamide	Amide	alcohol	ketone	thiol	amide	amine	analine	phenol
Nicotinic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Nicotinic Acid	Pyridine	*alcohol		*	*amide	nitro	*amine	*Carboxylic Acid
Orotic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Orotic acid	Lactam	alcohol	ketone	thiol	amide	amine	analine	phenol
Oxalic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Palmitic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Pamoic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Pamoic acid	alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Pamoic acid	Phenol	amine	amide	sulfoxide	n	pyridine	cyano	aldehyde
Phenylalanine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Phenylalanine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Piperazine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Procaine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Procaine	Ketone	alcohol		thiol	amide	amine	analine	phenol
Proline	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Proline	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
p-Toluenesulfonic acid	Sulfonic Acid	pyridine	ketone	aldehyde	ether	ester	amide	Carboxylic Acid
Pyridoxamine	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Pyridoxamine	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Pyridoxamine	Pyridine	*alcohol		*	*amide	nitro	*amine	*Carboxylic Acid
Pyridoxine (4-Pyridoxic Acid)	Pyridine	*alcohol	pyridinium	*	*amide	nitro	*amine	*Carboxylic Acid
Pyridoxine (4-Pyridoxic Acid)	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Pyroglutamic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Pyroglutamic acid	Lactam	alcohol	ketone	thiol	amide	amine	analine	phenol
Quercetin	Ketone	alcohol		thiol	amide	amine	analine	phenol
Quercetin	Phenol	amine	amide	sulfoxide	n	pyridine	cyano	aldehyde
Quercetin	Ether	aromatic-N	amide	amine	aromatic_s	Sp2 amine	sulfoxide	chlorate
Resveratrol	Ketone	alcohol		thiol	amide	amine	analine	phenol
Resveratrol	Phenol	amine	amide	sulfoxide	n	pyridine	cyano	aldehyde
Saccharin	Amide	alcohol	ketone	thiol	amide	amine	analine	phenol
Saccharin	Ketone	alcohol		thiol	amide	amine	analine	phenol
Saccharin	Sulfoxide	pyridine	ketone	aldehyde	ether	ester	amide	Carboxylic Acid
Saccharin	Amine	alcohol	ketone	thiol	amide		analine	phenol
Salicylic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Salicylic Acid	Alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Salicylic Acid, 4-amino	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Salicylic Acid, 4-amino	alcohol	alcohol	ketone	thiol	amide	amine	analine	phenol
Salicylic Acid, 4-amino	Amine	alcohol	ketone	thiol	amide	amine	analine	phenol
Sebacic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol
Serine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine	phenol

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Serine	Amine	alcohol	ketone	thiol	amide	amine	analine		phenol
Serine	Alcohol	alcohol	ketone	thiol	amide	amine	analine		phenol
Stearic acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine		phenol
Succinic Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine		phenol
Tartaric Acid	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine		phenol
Threonine	Amine	alcohol	ketone	thiol	amide	amine	analine		phenol
Threonine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine		phenol
Threonine	alcohol	alcohol	ketone	thiol	amide	amine	analine		phenol
Tris	Amine	alcohol	ketone	thiol	amide	amine	analine		phenol
Tris	Alcohol	alcohol	ketone	thiol	amide	amine	analine		phenol
Tryptophan	Amine	alcohol	ketone	thiol	amide	amine	analine		phenol
Tryptophan	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine		phenol
Tryptophan	Indole	*alcohol	pyridinium	*	*amide	nitro	*amine		*carboxilic acid
Tyrosine	Amine	alcohol	ketone	thiol	amide	amine	analine		phenol
Tyrosine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine		phenol
Tyrosine	Alcohol	alcohol	ketone	thiol	amide	amine	analine		phenol
Urea	Ketone	alcohol		thiol	amide	amine	analine		phenol
Urea	Amine	alcohol	ketone	thiol	amide	amine	analine		phenol
Urea	Amide	alcohol	ketone	thiol	amide	amine	analine		phenol
Valine	Amine	alcohol	ketone	thiol	amide	amine	analine		phenol
Valine	Carboxylic Acid	alcohol	ketone	thiol	amide	amine	analine		phenol
Vitamin K5	Amine	alcohol	ketone	thiol	amide	amine	analine		phenol
Vitamin K5	Alcohol	alcohol	ketone	thiol	amide	amine	analine		phenol
Xylitol	Alcohol	alcohol	ketone	thiol	amide	amine	analine		phenol
Co-crystal Former						Interacting Group			
1,5-Napthalene-disulfonic Acid	amine	metals	thioether		sulfate	alcohol			
1-Hydroxy-2-naphthoic acid	phosphate	sulfate	sulfone	nitrate	pyridine	carboxilic acid	metals		aldehyde
1-Hydroxy-2-naphthoic acid	phosphate	sulfate	sulfone	nitrate	pyridine	carboxilic acid	metals		aldehyde
4-Aminobenzoic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals
4-Aminobenzoic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid		metals
4-aminopyridine	phosphate	sulfate	sulfone	nitrate	pyridine	ammonium	oxime		*chlorine
4-Chlorobenzene-Sulfonic Acid	amine	metals	thioether	triazole	sulfate	alcohol			
4-ethoxyphenyl Urea	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid		metals
4-ethoxyphenyl Urea	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals
7-oxo-DHEA	phosphate	sulfate	sulfone	nitrate	pyridine	carboxilic acid	metals		aldehyde
7-oxo-DHEA	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid		metals
Acesulfame	amine	metals	thioether		sulfate	alcohol			
Acesulfame	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid		metals
Acetohydroxamic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals
Acetohydroxamic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals
Acetohydroxamic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid		metals
Adenine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals
Adenine	*sulfonamide	*ketone	ether	triazole		ammonium	oxime		*chlorine
Adipic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals
Alanine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals
Alanine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals
Allopurinaol	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid		metals
Allopurinaol	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals
Arginine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		metals

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Arginine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Ascorbic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Ascorbic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Ascorbic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Asparagine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Asparagine	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Asparagine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Aspartic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Aspartic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Benzenesulfonic Acid	amine	metals	thioether		sulfate	alcohol			fluorine
Benzoic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Caffeine	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Camphoric acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Capric acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Genistein	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Genistein		alchohol		ester	ether	n-oxide		chlorine	fluorine
Genistein	chlorine		cyano	ester	amine	nitro		nitrate	bromine
Cinnamic acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Citric Acid	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Citric Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Clemizole	*sulfonamide	sulfate	*ketone	ether	triazole		ammonium	oxime	*chlorine
Cyclamic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Cyclamic Acid	amine	metals	thioether		sulfate	alcohol			
Cysteine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Cysteine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Cysteine	arsenic	chlorine	alcohol	potassium	Ru			Rb	Sb
Dimethylglycine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Dimethylglycine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
D-ribose	chlorine		cyano	ester	amine	nitro		nitrate	bromine
D-ribose	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Fumaric Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Galactaric acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Galactaric acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	aldehyde
Chrysin	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Chrysin		alchohol		ester	ether	n-oxide		chlorine	fluorine
Chrysin	chlorine		cyano	ester	amine	nitro		nitrate	bromine
Gentisic acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Gentisic acid		alchohol		ester	ether	n-oxide		chlorine	fluorine
Glucamine, N-methyl	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	aldehyde
Glucamine, N-methyl	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Gluconic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Gluconic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Glucosamine	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Glucuronic acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Glucuronic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	aldehyde
Glucuronic acid	phosphate	sulfate	sulfone	nitrate	pyridine		aromatic	carboxilic acid	metals
Glutamic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Glutamic Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Glutamine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Glutamine	phosphate	sulfate	sulfone	nitrate	pyridine			Carboxylic Acid	metals
Glutamine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Glutaric Acid	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals
Glycine	phosphate	sulfate	sulfone	nitrate	pyridine			carboxilic acid	metals

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Glycine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Glycolic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Glycolic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Hippuric Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Hippuric Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Hippuric Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Histidine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Histidine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Histidine	cyanamide	ketone	cyano	Carboxylic Acid	alcohol		thiol	amine	
Hydroquinone	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Hydroquinone		alchohol		ester	ether	n-oxide	chlorine	fluorine	
Imidazole	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Ipriflavone	chlorine		cyano	ester	amine	nitro	nitrate	bromine	
Ipriflavone	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Isoleucine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Isoleucine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
lactobionic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Lactobionic acid	phosphate	sulfate	sulfone	nitrate	pyridine	carboxilic acid	metals	aldehyde	
Lactobionic acid	chlorine		cyano	ester	amine	nitro	nitrate	bromine	
Lauric acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		
Leucine	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Leucine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Lysine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Lysine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Maleic	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Malic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Malic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Malonic	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Mandelic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Mandelic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Methionine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Methionine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Methionine	chlorine		cyano	ester	amine	nitro	nitrate	bromine	
Nicotinamide	*sulfonamide	*ketone	ether	triazole		ammonium	oxime	*chlorine	
Nicotinamide	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Nicotinic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Nicotinic Acid	*sulfonamide	*ketone	ether	triazole		ammonium	oxime	*chlorine	
Orotic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		
Orotic acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Oxalic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		
Palmitic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		
Panoic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid		
Panoic acid	phosphate	sulfate	sulfone	nitrate	pyridine	carboxilic acid	metals	aldehyde	
Panoic acid		alchohol		ester	ether	n-oxide	chlorine	fluorine	
Phenylalanine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Phenylalanine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Piperazine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Procaine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Procaine	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Proline	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Proline	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
p-Toluenesulfonic acid	amine	metals	thioether		sulfate	alcohol			

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Co-crystal Former	Interacting Group								
Pyridoxamine	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Pyridoxamine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Pyridoxamine	*sulfonamide	*ketone	ether	triazole		ammonium	oxime	*chlorine	
Pyridoxine (4-Pyridoxic Acid)	*sulfonamide	*ketone	ether	triazole		ammonium	oxime	*chlorine	
Pyridoxine (4-Pyridoxic Acid)	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Pyroglutamic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Pyroglutamic acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Quercetin	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Quercetin		alchohol		ester	ether	n-oxide	chlorine	fluorine	
Quercetin	chlorine		cyano	ester	amine	nitro	nitrate	bromine	
Resveratrol	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Resveratrol		alchohol		ester	ether	n-oxide	chlorine	fluorine	
Saccharin	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Saccharin	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Saccharin	amine	metals	thioether		sulfate	alcohol			
Saccharin	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Salicylic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Salicylic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Salicylic Acid, 4-amino	phosphate	sulfate	sulfone	nitrate	pyridine	carboxilic acid	metals	aldehyde	
Salicylic Acid, 4-amino	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Sebacic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Serine	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Serine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Serine	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Stearic acid	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Succinic Acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Tartaric Acid	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Threonine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Threonine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Threonine	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Tris	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Tris	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Tryptophan	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Tryptophan	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Tryptophan	*sulfonamide	*ketone	ether	triazole		ammonium	oxime	*chlorine	
Tyrosine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Tyrosine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Tyrosine	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Urea	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Urea	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Urea	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Valine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Valine	phosphate	sulfate	sulfone	nitrate	pyridine		carboxilic acid	metals	
Vitamin K5	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	
Xylitol	phosphate	sulfate	sulfone	nitrate	pyridine		Carboxylic Acid	metals	

1,5-Napthalene-disulfonic Acid

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1-Hydroxy-2-naphthoic acid	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic	
1-Hydroxy-2-naphthoic acid	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic	
4-Aminobenzoic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
4-Aminobenzoic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
4-aminopyridine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
4-aminopyridine		thiol	n-heterocyclic ring	thionedisulfide	pyrrolidindione	iodine	hydrazone	thiocyanate	
4-Chlorobenzene-Sulfonic Acid									
4-ethoxyphenyl Urea	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
4-ethoxyphenyl Urea	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
7-oxo-DHEA	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic	
7-oxo-DHEA	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Acesulfame									
Acesulfame	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Acetohydroxamic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Acetohydroxamic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Acetohydroxamic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Adenine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Adenine		thiol	n-heterocyclic ring	thionedisulfide	pyrrolidindione	iodine	hydrazone	thiocyanate	
Adipic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Alanine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Alanine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Allopurinaol	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Allopurinaol	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Arginine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Arginine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Ascorbic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Ascorbic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Ascorbic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Asparagine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Asparagine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Asparagine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Aspartic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Aspartic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Benzenesulfonic Acid									
Benzoic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Caffeine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Camphoric acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Capric acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Genistein	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Genistein	bromine	iodine	ketone	sulfonic acid	sulfate	phosphate	phosphonic acid	carboxylic acid	
Genistein	aldehyde	ketone	peroxide	epoxide			heterocyclic-S	iodine	
Cinnamic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Citric Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Citric Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Clemizole		thiol	n-heterocyclic ring	thionedisulfide	pyrrolidindione	iodine	hydrazone	thiocyanate	
Cyclamic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Cyclamic Acid									
Cysteine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Cysteine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Cysteine									
Dimethylglycine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Dimethylglycine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	

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D-ribose	aldehyde	ketone	peroxide	epoxide			heterocyclic-S	iodine	
D-ribose	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Fumaric Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Galactaric acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Galactaric acid	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic	
Chrysin	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Chrysin	bromine	iodine	ketone	sulfonic acid	sulfate	phosphate	phosphonic acid	carboxylic acid	
Chrysin	aldehyde	ketone	peroxide	epoxide			heterocyclic-S	iodine	
Gentisic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Gentisic acid	bromine	iodine	ketone	sulfonic acid	sulfate	phosphate	phosphonic acid	carboxylic acid	
Glucamine, N-methyl	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic	
Glucamine, N-methyl	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Gluconic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Gluconic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glucosamine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glucuronic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glucuronic acid	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic	
Glucuronic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glutamic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glutamic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glutamine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glutamine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glutamine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glutaric Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glycine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glycine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glycolic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Glycolic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Hippuric Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Hippuric Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Hippuric Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Histidine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Histidine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Histidine	phosphinic acid hemihydrate	chlorine	sulfonyl	sulfoxide	amide	fluorine	sulfonate ester		
Hydroquinone	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Hydroquinone	bromine	iodine	ketone	sulfonic acid	sulfate	phosphate	phosphonic acid	carboxylic acid	
Imidazole	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Ipriflavone	aldehyde	ketone	peroxide	epoxide			heterocyclic-S	iodine	
Ipriflavone	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Isoleucine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Isoleucine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
lactobionic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Lactobionic acid	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic	
Lactobionic acid	aldehyde	ketone	peroxide	epoxide			heterocyclic-S	iodine	
Lauric acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Leucine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Leucine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Lysine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Lysine	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Maleic	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Malic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Malic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	
Malonic	aldehyde	ester	ether	cyano		furan	bromine	chlorine	

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Mandelic Acid	aldehyde	ester	ether	cyano		furan	bromine	bromine	chlorine	
Mandelic Acid	aldehyde	ester	ether	cyano		furan	bromine	bromine	chlorine	
Methionine	aldehyde	ester	ether	cyano		furan	bromine	bromine	chlorine	
Methionine	aldehyde	ester	ether	cyano		furan	bromine	heterocyclic-S	chlorine	
Methionine	aldehyde	ketone	peroxide	epoxide	Ag	Se	heterocyclic-S	iodine		
Nicotinamide		thiol	n-heterocyclic ring	thionedisulfide	pyrrolidindione	iodine	hydrazone	thiocyanate		
Nicotinamide	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Nicotinic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Nicotinic Acid		thiol	n-heterocyclic ring	thionedisulfide	pyrrolidindione	iodine	hydrazone	thiocyanate		
Orotic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Orotic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Oxalic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Palmitic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Panoic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Panoic acid	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic		
Panoic acid	bromine	iodine	ketone	sulfonic acid	sulfate	phosphate	phosphonic acid	carboxylic acid		
Phenylalanine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Phenylalanine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Piperazine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Procaine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Procaine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Proline	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Proline	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
p-Toluenesulfonic acid										
Pyridoxamine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Pyridoxamine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Pyridoxamine		thiol	n-heterocyclic ring	thionedisulfide		iodine	hydrazone	thiocyanate		
Pyridoxine (4-Pyridoxic Acid)		thiol	n-heterocyclic ring	thionedisulfide	pyrrolidindione	iodine	hydrazone	thiocyanate		
Pyridoxine (4-Pyridoxic Acid)	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Pyroglutamic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Pyroglutamic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Quercetin	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Quercetin	bromine	iodine	ketone	sulfonic acid	sulfate	phosphate	phosphonic acid	carboxylic acid		
Quercetin	aldehyde	ketone	peroxide	epoxide			heterocyclic-S	iodine		
Resveratrol	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Resveratrol	bromine	iodine	ketone	sulfonic acid	sulfate	phosphate	phosphonic acid	carboxylic acid		
Saccharin	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Saccharin	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Saccharin										
Saccharin	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Salicylic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Salicylic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Salicylic Acid, 4-amino	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Salicylic Acid, 4-amino	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic		
Salicylic Acid, 4-amino	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Sebacic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Serine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Serine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Serine	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Stearic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		
Succinic Acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine		

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Tartaric Acid	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Threonine	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Threonine	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Threonine	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Tris	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Tris	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Tryptophan	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Tryptophan	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Tryptophan		thiol	n-heterocyclic ring	thionedisulfide	pyrrolidindione	iodine	hydrazone			thiocyanate
Tyrosine	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Tyrosine	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Tyrosine	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Urea	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Urea	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Urea	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Valine	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Valine	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Vitamin K5	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Vitamin K5	aldehyde	ester	ether	cyano		furan	bromine			chlorine
Xylitol	aldehyde	ester	ether	cyano		furan	bromine			chlorine

Co-crystal Former	Interacting Group								
1,5-Napthalene-disulfonic Acid									
1-Hydroxy-2-naphthoic acid	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	
1-Hydroxy-2-naphthoic acid	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	
4-Aminobenzoic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	
4-Aminobenzoic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	
4-aminopyridine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	
4-aminopyridine	*bromine		hydroxamic acid	cyano	carboxamide	*sulfonic acid	*phosphoric acid	N-oxide	
4-Chlorobenzene-Sulfonic Acid									
4-ethoxyphenyl Urea	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	
4-ethoxyphenyl Urea	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	
7-oxo-DHEA	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	
7-oxo-DHEA	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	
Acesulfame									
Acesulfame	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Acetohydroxamic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Acetohydroxamic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Acetohydroxamic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Adenine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Adenine	*bromine		hydroxamic acid	cyano	carboxamide	*sulfonic acid	*phosphoric acid	N-oxide	
Adipic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Alanine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Alanine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Allopurinaol	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Allopurinaol	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Arginine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Arginine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Ascorbic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Ascorbic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Ascorbic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine

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Asparagine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Asparagine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Asparagine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Aspartic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Aspartic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Benzenesulfonic Acid								
Benzoic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Caffeine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Camphoric acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Capric acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Genistein	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Genistein	nitro	sulfone	aniline				alcohol	
Genistein	ester	ether	carboxylic acid	sulfate	sulfone			
Cinnamic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Citric Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Citric Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Clemizole	*bromine		hydroxamic acid	cyano	carboxamide	*sulfonic acid	*phosphoric acid	N-oxide
Cyclamic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Cyclamic Acid								
Cysteine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Cysteine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Cysteine								
Dimethylglycine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Dimethylglycine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
D-ribose	ester	ether	carboxylic acid	sulfate	sulfone		alcohol	
D-ribose	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Fumaric Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Galactaric acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Galactaric acid		pyridine	cyano	n-heterocyclic	ketone	phosphate ester	fluorine	carbamate
Chrysin	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Chrysin	nitro	sulfone	aniline				alcohol	
Chrysin	ester	ether	carboxylic acid	sulfate	sulfone			
Gentisic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Gentisic acid	nitro	sulfone	aniline					
Glucamine, N-methyl		pyridine	cyano	n-heterocyclic	ketone	phosphate ester	fluorine	carbamate
Glucamine, N-methyl	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Gluconic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Gluconic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glucosamine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glucuronic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glucuronic acid	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate
Glucuronic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glutamic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glutamic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glutamine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glutamine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glutamine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glutaric Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glycine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glycine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glycolic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Glycolic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Hippuric Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine

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Hippuric Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Hippuric Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Histidine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Histidine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Histidine									
Hydroquinone	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Hydroquinone	nitro	sulfone	aniline						
Imidazole	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
ester	ester	ether	carboxylic acid	sulfate	sulfone		alcohol		
Ipriflavone	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Isoleucine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Isoleucine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
lactobionic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Lactobionic acid	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine		carbamate
Lactobionic acid	ester	ether	carboxylic acid	sulfate	sulfone		alcohol		
Lauric acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Leucine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Leucine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Lysine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Lysine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Maleic	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Malic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Malic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Malonic	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Mandelic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Mandelic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Methionine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Methionine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Methionine	ester	ether	carboxylic acid	sulfate	sulfone		alcohol		
Nicotinamide	*bromine		hydroxamic acid	cyano	carboxamide	*sulfonic acid	*phosphoric acid		N-oxide
Nicotinamide	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Nicotinic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Nicotinic Acid	*bromine		hydroxamic acid	cyano	carboxamide	*sulfonic acid	*phosphoric acid		N-oxide
Orotic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Orotic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Oxalic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Palmitic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Panoic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Panoic acid	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine		carbamate
Panoic acid	nitro	sulfone	aniline						
Phenylalanine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Phenylalanine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Piperazine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Procaine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Procaine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Proline	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Proline	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
p-Toluenesulfonic acid									
Pyridoxamine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Pyridoxamine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester			fluorine
Pyridoxamine	*bromine		hydroxamic acid	cyano	carboxamide	*sulfonic acid	*phosphoric acid		N-oxide
Pyridoxine (4-Pyridoxic Acid)	*bromine		hydroxamic acid	cyano	carboxamide	*sulfonic acid	*phosphoric acid		N-oxide

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Pyridoxine (4-Pyridoxic Acid)	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Pyroglutamic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Pyroglutamic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Quercetin	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Quercetin	nitro	sulfone	analine					
Quercetin	ester	ether	carboxylic acid	sulfate	sulfone		alcohol	
Resveratrol	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Resveratrol	nitro	sulfone	analine					
Saccharin	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Saccharin	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Saccharin								
Saccharin	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Salicylic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Salicylic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Salicylic Acid, 4-amino	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Salicylic Acid, 4-amino	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate
Salicylic Acid, 4-amino	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Sebacic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Serine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Serine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Serine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Stearic acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Succinic Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Tartaric Acid	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Threonine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Threonine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Threonine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Tris	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Tris	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Tryptophan	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Tryptophan	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Tryptophan	*bromine		hydroxamic acid	cyano	carboxamide	*sulfonic acid	*phosphoric acid	N-oxide
Tyrosine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Tyrosine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Tyrosine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Urea	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Urea	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Urea	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Valine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Valine	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Vitamin K5	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Vitamin K5	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine
Xylitol	s-heterocyclic	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine

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TABLE II-continued

Co-crystal Former	Interacting Group											
1,5-Napthalene-disulfonic Acid												
1-Hydroxy-2-naphthoic acid	imidazole	BF4										
1-Hydroxy-2-naphthoic acid	imidazole	BF4										
4-Aminobenzoic Acid	carbamate	imidazole	BF4		N-SO2		thiourea		iodine			
4-Aminobenzoic Acid	carbamate	imidazole	BF4		N-SO2		thiourea		iodine			
4-aminopyridine	carbamate	imidazole	BF4		N-SO2		thiourea		iodine			
4-aminopyridine	ester	ether	fluorine	acetate	thione	dithiadiazocyclopentadienyl						
4-Chlorobenzene-Sulfonic Acid												
4-ethoxyphenyl Urea	carbamate	imidazole	BF4			N-SO2		thiourea		iodine	epoxide	peroxide
4-ethoxyphenyl Urea	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
7-oxo-DHEA		BF4										
7-oxo-DHEA	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Acesulfame												
Acesulfame	carbamate	imidazole	BF4			N-SO2		thiourea		iodine	epoxide	peroxide
Acetohydroxamic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine	epoxide	peroxide
Acetohydroxamic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Acetohydroxamic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine	epoxide	
Adenine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Adenine	ester	ether	fluorine	acetate	thione	dithiadiazocyclopentadienyl						
Adipic acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Alanine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Alanine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Allopurinaol	carbamate	imidazole	BF4			N-SO2		thiourea		iodine	epoxide	
Allopurinaol	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Arginine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Arginine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Ascorbic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Ascorbic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine	epoxide	
Ascorbic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Asparagine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Asparagine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine	epoxide	peroxide
Asparagine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Aspartic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Aspartic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Benzenesulfonic Acid												
Benzoic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Caffeine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Camphoric acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Capric acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Genistein	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Genistein												
Genistein	phospphate	cyaanamide										
Cinnamic acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Citric Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine	epoxide	
Citric Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Clemizole	ester	ether	fluorine	acetate	thione	dithiadiazocyclopentadienyl						
Cyclamic Acid	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Cyclamic Acid												
Cysteine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		
Cysteine	carbamate	imidazole	BF4			N-SO2		thiourea		iodine		

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TABLE II-continued

Cysteine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Dimethylglycine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Dimethylglycine	phospphate	cyanamide								
D-ribose	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide		
D-ribose	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Fumaric Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Galactaric acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Galactaric acid	imidazole	BF4								
Chrysin	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Chrysin	phospphate	cyanamide								
Chrysin	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Gentisic acid	imidazole	BF4								
Glucamine, N-methyl	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Glucamine, N-methyl	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide		
Gluconic Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Gluconic Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide		
Glucosamine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Glucuronic acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	peroxide	
Glucuronic acid	imidazole	BF4								
Glucuronic acid	carbamate	imidazole	BF4	alkane	N-SO2	thiourea	iodine	epoxide		
Glutamic Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Glutamic Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Glutamine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	peroxide	
Glutamine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Glutaric Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Glycine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Glycolic Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide		
Glycolic Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Hippuric Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	peroxide	
Hippuric Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Hippuric Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Histidine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Histidine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Histidine										
Hydroquinone	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide		
Hydroquinone										
Imidazole	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Ipriflavone	phospphate	cyanamide								
Ipriflavone	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Isoleucine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Isoleucine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
lactobionic acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Lactobionic acid	imidazole	BF4								
Lactobionic acid	phospphate	cyanamide								
Lauric acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Leucine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Leucine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			
Lysine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine			

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TABLE II-continued

Lysine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Maleic	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Malic Acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine	epoxide	
Malic Acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Malonic	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Mandelic Acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine	epoxide	
Mandelic Acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Methionine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Methionine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Methionine	phospphate									
Nicotinamide	ester	ether	fluorine	acetate	thione	dithiadiazocyclopentadienyl				
Nicotinamide	carbamate	imidazole	BF4			N-SO2	thiourea	iodine	epoxide	peroxide
Nicotinic Acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Nicotinic Acid	ester	ether	fluorine	acetate	thione	dithiadiazocyclopentadienyl				
Orotic acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Orotic acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine	epoxide	peroxide
Oxalic acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Palmitic acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Pamoic acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Pamoic acid	imidazole	BF4								
Pamoic acid										
Phenylalanine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Phenylalanine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Piperazine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Procaine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Procaine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Proline	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Proline	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
p-Toluenesulfonic acid										
Pyridoxamine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine	epoxide	
Pyridoxamine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Pyridoxamine	ester	ether	fluorine	acetate	thione	dithiadiazocyclopentadienyl				
Pyridoxine	ester	ether	fluorine	acetate	thione	dithiadiazocyclopentadienyl				
(4-Pyridoxic Acid)										
Pyridoxine	carbamate	imidazole	BF4			N-SO2	thiourea	iodine	epoxide	
(4-Pyridoxic Acid)										
Pyroglutamic acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Pyroglutamic acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine	epoxide	peroxide
Quercetin	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Quercetin	phospphate	cyanamide								
Resveratrol	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Resveratrol										
Saccharin	carbamate	imidazole	BF4			N-SO2	thiourea	iodine	epoxide	peroxide
Saccharin	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Saccharin										
Saccharin	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Salicylic Acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Salicylic Acid	carbamate	imidazole	BF4			N-SO2	thiourea	iodine	epoxide	
Salicylic Acid, 4-amino	carbamate	imidazole	BF4			N-SO2	thiourea	iodine		
Salicylic Acid, 4-amino	imidazole	BF4								

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Salicylic Acid, 4-amino	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Sebacic acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Serine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Serine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	
Serine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	
Stearic acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Succinic Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Tartaric Acid	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Threonine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Threonine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	
Threonine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Tris	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	
Tris	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Tryptophan	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Tryptophan	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Tryptophan	ester	ether	fluorine	acetate	thione	dithiadiazocyclopentadienyl			
Tyrosine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Tyrosine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Tyrosine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	
Urea	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Urea	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Urea	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	peroxide
Valine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Valine	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Vitamin K5	carbamate	imidazole	BF4		N-SO2	thiourea	iodine		
Vitamin K5	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	
Xylitol	carbamate	imidazole	BF4		N-SO2	thiourea	iodine	epoxide	

TABLE III

Functional Group	Functional Group Structure	Interacting Group										
pyridine		*alcohol	pyridinium	*amide	nitro	*amine	*carboxilic acid					
imidazol		imidazole	chlorine	acetamide	carboxylate	thione	nitro					
Hydroxamic acid		hydroxamic acid	alcohol	phosphinic ester	alkane	pyridine	amide					
peroxide	R—O—OH	ester	peroxide	amide	ether	alkane	N-heterocycle					
epoxide		alkane	bromine	alcohol	ester	epoxide	amide					
thioester		aromatic	thioester	alkane	sulfamide	hydroxy	bromine					
thioketone		alkane	thioketone	ketone	SULFAMIDE	AMINE	thiol					

Functional Group												
pyridine	*sulfonamide	*ketone	ether	triazole	alkane	ammonium	oxime	*chlorine	alkyne			
imidazole	cyanamide	ketone	cyano	carboxilic acid	alcohol	alkane	thiol	amine	phosphinic acid hemihydrate			
Hydroxamic acid	sulfonamide	carboxylate	phosphine	amine	aromatic							
peroxide	aromatic	alcohol	pyrimidinedione	analine	thiazole	peroxy acid	ketone	carboxilic acid	azide			
epoxide	alkene	hydrazone	aromatic	thioether	ketone	aldehyde	chlorine	carboxilic acid	alkyne			
thioester	iodine	amine	cyano	thioketone	amide		chlorine	nitro				
thioketone	sulfoxide	oxo	chlorine	bromine	AROMATIC	alkene	sulfone	iodine	AZOXY			
pyridin	thiol	n-heterocyclic ring	thionedisulfide	pyrrolidindione	iodine	hydrazone	thiocyanate	*bromine	aromatic			
imidazole	chlorine	sulfonyl	sulfoxide	amide	fluorine	sulfonate ester						
Hydroxamic acid												
peroxide	phosphine oxide	sulfonamide	analine									

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TABLE III-continued

epoxide		ammonium	fluorine	nitro	amine	cyano						
thio ster												
thioketone	potassium	epoxide	n-oxide	cyano	iron	cobalt	amine	sulfate				
pyridine	hydroxamic acid	cyano	carboxamide	*sulfonic acid	*phosphoric acid	N-oxide	ester	ether	fluorine	acetate	thione	
imidazole												
Hydroxamic acid												
peroxide												
epoxide												
thioester												
thioketone												
pyridine	dithiadiazocyclop entadienyl											
imidazole												
Hydroxamic acid												
peroxide												
epoxide												
thioester												
thioketone												

Functional Group	Functional Group Structure	Interacting Group								
nitrate ester		aromatic	amide	alkane	chlorine	nitrate ester	bromine			
Thiophosphate ester-O		amine	imidazole	cyclic amide						
Phosphate ester		aromatic	alcohol	phosphate ester	aromatic N-ring	pyridine	analine			
Ketone		alcohol	ketone	thiol	amide	amine	analine			
Aldehyde		alcohol	ketone	thiol	amide	amine	analine			
Thiol	R—SH	carboxylic acid	sodium	aldehyde	ketone	aromatic-N	cadmium			
Alcohol	R—OH	alcohol	ketone	thiol	amide	amine	analine			

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TABLE III-continued

Functional Group											
nitrate est r	alcohol	ether	acetate								
Thiophosphate ester-O											
Phosphate ester	amine		sodium	potassium	lithium	carboxylic acid	amide	alkane			
Ketone	phenol	phosphate	sulfate	sulfone	nitrate	pyridine	aromatic	carboxilic acid	metals		
Aldehyde	phenol	phosphate	sulfate	sulfone	nitrate	pyridine	aromatic	carboxilic acid	metals		
Thiol	alkane	arsenic	chlorine	alcohol	potassium	Ru	aromatic	Rb	Sb		
Alcohol	phenol	phosphate	sulfate	sulfone	nitrate	pyridine	aromatic	carboxilic acid	metals		
nitrate ester											
Thiophosphate ester-O											
Phosphate ester											
Ketone	aldehyde	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic		
Aldehyde	aldehyde	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic		
Thiol											
Alcohol	aldehyde	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic		
nitrate ester											
Thiophosphate ester-O											
Phosphate ester											
Ketone	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	imidazole	BF4	alkane
Aldehyde	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	imidazole	BF4	alkane
Thiol											
Alcohol	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	imidazole	BF4	alkane
nitrat ester											
Thiophosphate st r-O											
Phosphate ester											
Ketone	aromatic	N-SO2	thiourea	iodine		amine	aromatic_s	Sp2 amine	sulfoxide		
Aldehyde	aromatic	N-SO2	thiourea	iodine	epoxide						
Thiol											
Alcohol	aromatic	N-SO2	thiourea	iodine	epoxide		aromatic_s	Sp2 amine	sulfoxide		

Functional Group	Functional Group Structure	Interacting Group								
Thioether		aromatic-N	amide	amine	aromatic_s	Sp2 amine	sulfoxide			
Ether		aromatic-N	amide	amine	aromatic_s	Sp2 amine	sulfoxide			
Cyanamide		cyano	amine	potassium	aromatic-N	bromine	sodium			
Thiocyanate		aromatic-S	ester	ether						

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TABLE III-continued

sP2 amine		thioether	ether	metals	MoOCl4	BF4	bromine
Amine primary	R—NH$_2$	alcohol	ketone	thiol	amide	amine	analine
Amine secondary	R$_2$—NH	alcohol	ketone	thiol	amide	amine	analine
Functional Group							
Thioether	chlorate	chlorine	alkyne	cyano	ester	amine	nitro	nitrate	bromine		
Ether	chlorate	chlorine	alkyne	cyano	ester	amine	nitro	nitrate	bromine		
Cyanamide	imidazole	ether	n-heterocyclic	alcohol	cesium	Ag					
Thiocyanate											
sP2 amine	chlorine		Sp2 amine	sulfate	Osmium						
Amin primary	phenol	phosphate	sulfate	sulfone	nitrate	pyridine	aromatic	carboxilic acid	metals		
Amine secondary	phenol	phosphate	sulfate	sulfone	nitrate	pyridine	aromatic	carboxilic acid	metals		
Thioether	aldehyde	ketone	peroxide	epoxide	Ag	Se	hetero-cyclic-S	iodine	ester		
Ether	aldehyde	ketone	peroxide	epoxide	Ag	Se	hetero-cyclic-S	iodine	ester		
Cyanamide											
Thiocyanate											
sP2 amine											
Amine primary	aldehyde	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic		
Amine secondary	aldehyde	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic		
Thioether	ether	carboxylic acid	sulfate	sulfone	alkane	alcohol		phospphate			
Ether	ether	carboxylic acid	sulfate	sulfone	alkane	alcohol		phospphate	cyanamide		
Cyanamide											
Thiocyanate											
sP2 amine											
Amine primary	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	imidazole	BF4	alkane
Amine secondary	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	imidazole	BF4	alkane
Thioether											
Ether											
Cyanamide											
Thiocyanate											
sP2 amine											
Amine primary	aromatic	N-SO2	thiourea	iodine							
Amine secondary	aromatic	N-SO2	thiourea	iodine							

Functional Group	Functional Group Structure	Interacting Group						
Amin t rtiary	R$_3$—N	alcohol	ketone	thiol	amide	amine	analine
Amide		alcohol	ketone	thiol	amide	amine	analine

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TABLE III-continued

Sulfonic acid		pyridine	ketone	aldehyde		ether		ester		amide		
Phosphinic acid		alkane	potassium	lithium		n-heterocyclic		oxime		amide		
Phosphonic acid		alkane	potassium	lithium		n-heterocyclic		oxime		amide		
Carboxylic acid		alcohol	ketone	thiol		amide		amine		analine		
Functional Group												
Amine tertiary	phenol	phosphate	sulfate	sulfone	nitrate	pyridine	aromatic	carboxilic acid	metals			
Amide	phenol	phosphate	sulfate	sulfone	nitrate	pyridine	aromatic	carboxilic acid	metals			
Sulfonic acid	carboxilic acid	amine	metals	thioether		sulfate	alcohol					
Phosphinic acid	phenol	aromatic	amine	alcohol		metals		Sp2 amine	analine			
Phosphonic acid	phenol	aromatic	amine	alcohol		metals	carboxylic acid					
Carboxylic acid	phenol	phosphate	sulfate	sulfone	nitrate	pyridine	aromatic	carboxilic acid	metals			
Amine tertiary	aldehyde	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic			
Amide	aldehyde	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic			
Sulfonic acid												
Phosphinic acid												
Phosphonic acid	ether	phosphonic acid	aromatic-N	ketone	aldehyde	imidazole						
Carboxylic acid	aldehyde	ester	ether	cyano		furan	bromine	chlorine	s-heterocyclic			
Amine tertiary	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	imidazole	BF4	alkane	
Amide	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	imidazole	BF4	alkane	
Sulfonic acid												
Phosphinic acid												
Phosphonic acid												
Carboxylic acid	pyridine	cyano	n-heterocyclic	ketone	phosphate ester		fluorine	carbamate	imidazole	BF4	alkane	
Amine tertiary	aromatic	N-SO2	thiourea	iodine								

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TABLE III-continued

Amide	aromatic	N-SO2	thiourea	iodine	epoxide	peroxide				
Sulfonic acid										
Phosphinic acid										
Phosphonic acid										
Carboxylic acid	aromatic	N-SO2	thiourea	iodine						

Functional Group	Functional Group Structure	Interacting Group								
Sulfate ester		pyridine	ketone	aldehyde	ether	ester		amide		
Oxime	$C{\equiv}N{-}OH$	alcohol	alkane	amine	amide	ether		ester		
Nitrile	$-C{\equiv}N$	metal	ketone	phenol	alcohol			cyano		
Diazo	$RH_2C{-}N{\equiv}N{-}CH_2R$	Oxime								
Nitro	NO_2	pyridine	ketone	aldehyde	ether	ester		amide		
S-heterocyclic ring		alcohol	thioketone	thioether	s-heterocyclic	ketone		aromatic		
Thiophene		chlorine	fluorine	amide	ketone	NO		SO		

Functional Group										
Sulfate ester	carboxilic acid	amine	metals	thioether	sulfate	alcohol				
Oxime	pyridine	n-aromatic	chlorate	chlorine	Sp2-N	diazo	thioketone	cyano	n-oxide	
Nitrile	amine	analine	bromine	amide	alkane	carboxylic acid	chlorine	n-heterocyclic	aromatic	
Diazo										
Nitro	carboxilic acid	amine	metals	thioether	sulfate	alcohol				
S-heterocyclic ring	alkene	amine	chlorine	BF4	sulfate	ester	NO	ether	amide	
Thiophene	CO									
Sulfate ester										
Oxime	ketone	aldehyde	carboxylic acid	bromine	aromatic	pyridine	BF4			
Nitrile	potassium	aldehyde	thioether	pyridine	n-aromatic	bromine	ether	s-aromatic	thiophene	
Diazo										
Nitro										

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TABLE III-continued

S-heterocyclic ring	iodine	carboxylic acid	sodium	cyano	chloride	furan						
Thiophene												
Sulfate ester												
Oxime												
Nitrile												
Diazo												
Nitro												
S-heterocyclic ring												
Thiophene												
Sulfate ester												
Oxime												
Nitrile												
Diazo												
Nitro												
S-heterocyclic ring												
Thiophene												

Functional Group	Functional Group Structure	Interacting Group									
N-heterocyclic ring		alcohol	thioketone	thioether	s-heterocyclic	ketone	aromatic				
O-heterocyclic ring		alcohol	thioketone	thioether	s-heterocyclic	ketone	aromatic				
Pyrrole		chlorine	fluorine	amide	ketone	NO	SO				
Furan		s-heterocyclic									

Functional Group									
N-heterocyclic ring	alkene	amine	chlorine	BF4	sulfate	ester	NO	ether	amide
O-heterocyclic ring	alkene	amine	chlorine	BF4	sulfate	ester	NO	ether	amide

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TABLE III-continued

Pyrrole	CO	imidazole	pyridine	n-aromatic	aldehyde	carboxylic acid	sulfate	chlorine	bromine
Furan									
N-heterocyclic ring	iodine	carboxylic acid	sodium	cyano	chloride	aldehyde			
O-heterocyclic ring	iodine	carboxylic acid	sodium	cyano	chloride	aldehyde			
Pyrrole	oxime	alcohol	phenol	ester	ether				
Furan									
N-heterocyclic ring									
O-heterocyclic ring									
Pyrrole									
Furan									
N-heterocyclic ring									
O-heterocyclic ring									
Pyrrol									
Furan									

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TABLE IV

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
(−)-amlodipine	3,5-Pyridinedicarboxylic acid, 2-((2-aminoethoxy)methyl)-4-(2-chlorophenyl)-1,4-dihydro-6-methyl-, 3-ethyl-5-methyl ester, (S)-[CAS]	103129-82-4	WO 9310779	Antihypertensive, other	Hypertension, general
(−)-halofenate	(−)-Benzeneacetic acid, 4-chloro-Alpha-[3-(trifluoromethyl)-phenoxy]-, 2-(acetylamino)ethyl ester		U.S. 6,262,118	Antidiabetic	Diabetes, Type II
(R)-salbutamol	1,3-Benzenedimethanol, Alpha1-(((1,1-dimethylethyl)amino)methyl)-4-hydroxy-[CAS]			Formulation, modified-release, <=24 hr	Asthma
(R)-salbutamol	1,3-Benzenedimethanol, Alpha1-(((1,1-dimethylethyl)amino)methyl)-4-hydroxy-[CAS]	34391-04-3	U.S. 5,547,994	Antiasthma	Asthma
(R,R)-formoterol	Formamide, N-(2-hydroxy-5-(1-hydroxy-2-((2-(4-methoxyphenyl)-1-methylethyl)amino)ethyl)phenyl)-(R*,R*)-[CAS]	67346-49-0	U.S. 5,795,564	Antiasthma	Asthma
(S)-doxazosin	(S)-1-(4-amino-6,7-dimethoxy-2-quinazolinyl)-4-(1,4-benzodioxan-2-yl carbonyl)piperazine	70918-18-2	WO 9409785	Prostate disorders	Benign prostatic hyperplasia
(S)-fluoxetine	Benzenepropanamide, N-methyl-Gamma-(4-(trifluoromethyl)phenoxy)-(S)			Antimigraine	Migraine
(S)-oxybutynin	Benzeneacetic acid, Alpha-cyclohexyl-Alpha-hydroxy-, 4-(diethylamino)-2-butynyl ester, (S)-[CAS]	119618-22-3		Urological	Incontinence
1,2-Naphthoquinone		524-42-5			
17α-Hydroxyprogesterone		68-96-2			
17-Methyltestosterone		58-18-4			
195mPt-cisplatin	Platinum-195m, diammminedichloro, (SP-4-2)-		U.S. 6,074,626	Anticancer, alkylating	Cancer, liver
1α-Hydroxycholecalciferol		41294-56-8			
1-Naphthyl Salicylate		550-97-0			
1-Naphthylamine-4-sulfonic Acid		84-86-6			
1-Theobromineacetic Acid		5614-56-2			
2,4,6-Tribromo-m-cresol		4619-74-3			
2,6-Diamino-2'-butyloxy-3,5'-azopyridine		617-19-6			
21-Acetoxypregnenolone		566-78-9			
2-Amino-4-picoline		695-34-1			
2-Aminothiazole		96-50-4			
2-ethoxybenzoic acid	2-Ethoxybenzoic acid		DE 5134001	Analgesic, NSAID	Pain, general
2-Naphthol		135-19-3			
2-Naphthyl Benzoate		93-44-7			
2-Naphthyl Lactate		93-43-6			
2-Naphthyl Salicylate		613-78-5			

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
2-p-Sulfanilylanilinoethanol		80-02-4			
2-Thiouracil		141-90-2			
3',3",5',5"-Tetrabromophenolphthalein		76-62-0			
3-Amino-4-hydroxybutyric Acid		589-44-6			
3-Bromo-d-camphor		76-29-9			
3-Hydroxycamphor		10373-81-6			
3-O-Lauroylpyridoxol Diacetate		1562-13-6			
3-Pentadecylcatechol		492-89-7			
3-Quinuclidinol		1619-34-7			
4,4'-Oxydi-2-butanol		821-33-0			
4,4'-Sulfinyldianiline		119-59-5			
4-Amino-3-hydroxybutyric Acid		352-21-6			
4-Amino-3-phenylbutyric Acid		1078-21-3			
4-aminosalicylic acid	Benzoic acid, 4-amino-2-hydroxy-[CAS]	65-49-6		GI inflammatory/ bowel disorders	Inflammatory bowel disease
4-Chloro-m-cresol		59-50-7			
4-Hexylresorcinol		136-77-6			
4-Salicyloylmorpholine		3202-84-4			
5'-Nitro-2'-propoxyacetanilide		553-20-8			
5-aminolevulinic acid,	Pentanoic acid, 5-amino-4-oxo- [CAS]	106-60-5		Dermatological	Keratosis
5-azactidine	1,3,5-Triaxin-2(1H)-one, 4-amino-1-β-D-ribofuransyl- [CAS]	320-67-2		Anticancer, antimetabolite	Myelodysplastic syndrome
5-Bromosalicyl-hydroxamic Acid		5798-94-7			
5F-DF-203	2-(4-Amino-3-methylphenyl)-6-hydroxybenzothiazole			Anticancer, other	Cancer, breast
5-FU	2,4(1H,3H)-Pyrimidinedione, 5-fluoro [CAS]	51-21-8		Formulation, parenteral, targeted	Cancer, general
5-HT3 antagonists			U.S. 6,037,360	Male sexual dysfunction	Premature ejaculation
6-Azauridine		54-25-1			
6-Mercaptopurine		50-44-2			
8-Hydroxyquinoline		148-24-3			
9-Aminocamptothecin		91421-43-1			
A-151892	N[2-(2,2,2-Trifluoro-1-hydroxy-1-trifluoromethyl-ethyl)-naphthalen-1-yl] amide			Urological	Overactive bladder

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
α_1-Antitrypsin		9041-92-3			
A-5021	6H-Purin-6-one, 2-amino-9-(((1S,2R)-1,2-bis(hydroxymethyl)cyclopropyl)methyl)1,9-dihydro-[CAS]	145512-85-2		Antiviral, other	Infection, varicella zoster virus
abacavir	2-Cyclopentene-1-methanol, 4-(2-amino-6-(cyclopropylamino)-9H-purin-9-yl)-, (1S-cis)-[CAS]	136470-78-5 188062-50-2	EP 434450	Antiviral, anti-HIV	Infection, HIV/AIDS
abaperidone	7-[3-[4-(6-Fluoro-1,2-benzisoxazol-3-yl)piperidin-1-yl]propoxy]-3-(hydroxymethyl)chromen-4-one	183849-43-6	WO 9632389	Neuroleptic	Schizophrenia
abarelix	D-Alaninamide, N-acetyl-3-(2-naphthalenyl)-D-alanyl-4-chloro-D-phenylalanyl-3-(3-pyridinyl)-D-alanyl-L-seryl-N-methyl-L-tyrosyl-D-asparaginyl-L-leucyl-N6-(1-methylethyl)-L-lysyl-L-prolyl-[CAS]	183552-38-7	U.S. 5,843,902	Anticancer, hormonal	Cancer, prostate
Abciximab		143653-53-6			
Abecarnil		111841-85-1			
abetimus		169147-32-4	U.S. 5,552,391	Immunosuppressant	*Lupus erythematosus*, systemic
abiraterone	Androsta-5,16-dien-3-ol, 17-(3-pyridinyl)-, acetate (ester), (3β)-[CAS]	154229-18-2	GB 2265624	Anticancer, hormonal	Cancer, prostate
α-Bisabolol		515-69-5			
ABLC	Amphotericin B [CAS]	1397-89-3 30652-87-0		Formulation, conjugate, carbohydrate	Infection, Candida, general
ABT-751	Benzenesulfonamide, N-[2-[(4-hydroxyphenyl)amino]-3-pyridinyl]-4-methoxy-[CAS]	141430-65-1	EP 472053	Anticancer, other	Cancer, general
AC-5216	N-benzyl-N-ethyl-2-(7,8-dihydro-7-methyl-8-oxo-2-phenyl-9H-purin-9-yl)acetamide			Anxiolytic	Anxiety, general
Acadesine		2627-69-2			
acamprosate	1-Propanesulfonic acid, 3-(acetylamino)-[CAS]	77337-76-9	GB 2051789	Dependence treatment	Addiction, alcohol
Acamprosate		77337-73-6			
Acarbose		56180-94-0			
acebrophylline	7H-Purine-7-acetic acid, 1,2,3,6-tetrahydro-1,3-dimethyl-2,6-dioxo-,compd. with trans-4-[[(2-amino-3,5-dibromophenyl)methyl]amino]cyclohexanol (1:1)[CAS]	96989-76-3	DE 3425007	Antiasthma	Asthma
acebutolol	Butanamide, N-[3-acetyl-4-[2-hydroxy-3-[(1-methylethyl)amino]propoxy]phenyl]-, (+/−)-[CAS]	34381-68-5 37517-30-9	U.S. 3,726,919	Antihypertensive, adrenegic	
Acecainide		32795-44-1			
Acecarbromal		77-66-7			

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
aceclofenac	Benzeneacetic acid, 2-[(2,6-dichlorophenyl)amino]-, carboxymethyl ester[CAS]	89796-99-6	EP 119932	Anti-inflammatory	Pain, musculoskeletal
Acedapsone		77-46-3			
Acediasulfone		80-03-5			
Acefylline		652-37-9			
Aceglutamide		2490-97-3			
aceglutamide	Aluminum, pentakis(N2-acetyl-L-glutaminoato)tetrahydroxytri-[CAS]	12607-92-0	DE 2127176	Antiulcer	Ulcer, GI, general
acemetacin	1H-Indole-3-acetic acid, 1-(4-chlorobenzoyl)-5-methoxy-2-methyl-, carboxymethyl ester [CAS]	53164-05-9	U.S. 3,910,952	Anti-inflammatory	
Acenocoumarol		152-72-7			
Acetal		105-57-7			
Acetamidoeugenol		305-13-5			
Acetaminophen		103-90-2			
Acetaminosalol		118-57-0			
Acetanilide		103-84-4			
Acetarsone		97-44-9			
Acetazolamide		59-66-5			
Acetiamine		299-89-8			
Acetohexamide		968-81-0			
Acetohydroxamic Acid		546-88-3			
Acetophenazine		2751-68-0			
Acetophenone		98-86-2			
Acetosulfone		128-12-1			
acetoxolone	Olean-12-en-30-oic acid, 3β-hydroxy-11-oxo-acetate, aluminium salt [CAS]	29728-34-5	U.S. 3,764,618	Antiulcer	
Acetrizoat		6277-14-1			
Acetyl Sulfamethoxypyrazine		129-63-5			
Acetylcarnitine		3590-05-4			
Acetylcholine		14992-62-2			
Acetylcholine		66-23-9			
Acetylcysteine		60-31-1			
Acetylleucine		616-91-1			
Monoethanolamine		149-90-6			
Acetylphenetunide		13402-08-9			
acetylsalicylic acid	Benzoic acid, 2-(acetyloxy)-[CAS]	50-78-2		Formulation, optimized, microencapsulate	Pain, general
		53075-6			
α-Chloralose		15879-93-3			
aciclovir	6H-Purin-6-one, 2-amino-1,9-dihydro-9-[(2-hydroxyethoxy)methyl]-[CAS]	59277-89-3		Formulation, dermal,topical	Infection, herpes simplex virus
Acifran		72420-38-3			
acipimox	Pyrazinecarboxylic acid, 5-methyl-, 4-oxide [CAS]	51037-30-0	GB 1361967	Hypolipaemic/ Antiatherosclerosis	Hyper-lipidaemia, general
acitazanolast	Acetic acid, oxo[[3-(1H-tetrazol-5-yl)phenyl]amino]-[CAS]	114607-46-4	EP 256507	Ophthalmological	Conjunctivitis

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.		Patent Reference	Example of Therapeutic Use	Example of Indication
acitretin	2,4,6,8-Nonatetraenoic acid, 9-(4-methoxy-2,3,6-trimethylphenyl)-3,7-dimethyl-, (all-E) [CAS]	55079-83-9	SB	1468401	Antipsoriasis	Psoriasis
aclarubicin		57576-44-0	U.S.	3,988,315	Anticancer, antibiotic	
		75443-99-1				
Aclatonium Napadisilate		55077-30-0				
Aconitine		302-27-2				
Acranil ®		1684-42-0				
Acriflavine		8048-52-0				
Acrisorcin		7527-91-5				
acrivastine	2-Propenoic acid, 3-[6-[1-(4-methylphenyl)-3-(1-pyrrolidinyl)-1-propenyl]-2-pyridinyl]-, (E,E)-[CAS]	87848-99-5	EP	85959	Antipruritic/ inflamm, allergic	Rhinitis, allergic, general
acrivastine + pseudoephedrine	Benzenemethanol, Alpha-[1-(methylamino)ethyl]-, hydrochloride, [S-(R*,R*)]-, mixtwith 2-Propenoic acid, 3-[6-[1-(4-methylphenyl)-3-(1-pyrrolidinyl)-1-propenyl]-2-pyridinyl]-, (E,E)-				Antiallergic, non-asthma	Rhinitis, allergic, seasonal
actagardine derivative	3,3-dimethyl-1-propylamide HCl monocarboxamide actagardine				Peptide antibiotic	Infection, general
Actarit		18699-02-0				
ACTH		900-60-2				
Acyclovir		59277-89-3				
adapalene	2-Naphthalenecarboxylic acid, 6-(4-methoxy-3-tricyclo[3.3.1.13,7]dec-1-ylphenyl)-[CAS]	106685-40-9	EP	199636	Antiacne	Acne
ADCON-L	GL 402 [CAS]	137802-74-5			Formulation, other	Fibrosis, epidural
Adefovir		106941-25-7				
adefovir dipivoxil	Propanoic acid, 2,2-dimethyl-, (((2-(6-amino-9H-purin-9-yl)ethoxy)methyl)phosphinylidene)bis(oxymethylene)ester-[CAS]	142340-99-6	EP	205826	Antiviral, other	Infection, hepatitis-B virus
Adenoscan	6-Amino-9-β-D-ribofuranosyl-9H-purine [CAS]	58-61-7			Imaging agent	Diagnosis, coronary
Adenosine Triphosphate		56-65-5				
ADEPT		156079-88-8			Immunoconjugate, other	Cancer, colorectal
Adinazolam		37115-32-5				
Adiphenine		64-95-9				
ADL-10-0101			WO	9732857	Analgesic, other	Pain, general
Adrafinil		63547-13-7				
Adrenalone		99-45-6				
Adrenochrome		54-06-8				
adrogolide	Benzo(f)thieno(2,3-c)quinoline-9,10-diol, 4,5,5a,6,7,11b-hexahydro-2-propyl-, diacetate (ester), hydrochloride (5aR-trans)-[CAS]	166591-11-3 171752-56-0	U.S.	5,597,832	Dependence treatment	Addiction, cocaine
AEOL-10150			U.S.	6,103,714	Neuroprotective	Unspecified

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.		Patent Reference	Example of Therapeutic Use	Example of Indication
AET		56-10-0				
α-Ethylbenzyl Alcohol		93-54-9				
AF-2259	Benzeneacetic acid, Alpha-methyl-4-(2-methylpropyl)-, 2-methoxyphenyl ester [CAS]	66332-77-2	DE	2726435	Anti-inflammatory	Inflammation, general
Afloqualone		56287-74-2				
AG-041R	1H-Indole-3-acetamide, 1-(2,2-diethoxyethyl)-2,3-dihydro-N-(4-methylphenyl)-3-((((4-methylphenyl)amino)carbonyl)amino-2-oxo-, (3R)-[CAS]	199800-49-2	WO	9419322	Alimentary/ Metaboloc, other	Unspecified
AG-2037	N-(5-[2-(2-amino-4(3H)-oxo-5,6,7,8-tetrahydropyrido[2,3-d]pyrimidin-6-yl)ethyl]-4-methylthieno-2-yl)glutamic acid				Anticancer, antimetabolite	Cancer, general
α-Glucose-1-phosphate		59-56-3				
AGN-194310	Benzoic acid, 4-((4-(4-ethylphenyl)-2,2-dimethyl-2H-1-benzothiopyran-6-yl)ethynyl)-[CAS]	229961-45-9	WO	9709297	Dermatological	Psoriasis
agomelatine	Acetamide, N-(2-(7-methoxy-1-naphthalenyl)ethyl)-[CAS]	138112-76-2	EP	447285	Antidepressant	Sleep disorder, general
Ahistan		518-61-6				
AHL-157			U.S.	5,411,972	Hypolipaemic/ Antiatherosclerosis	Atherosclerosis
AIT-034	9H-Purine-9-propanamide, 1,6-dihydro-6-oxo-N-(3-(2-oxo-1-pyrrolidinyl)propyl)-[CAS]	138117-48-3	U.S.	5,447,939	Cognition enhancer	Dementia, senile, general
AIT-202	N-[2-(5-Hydroxy-1H-indol-3-yl)ethyl]-3-(6-oxo-6,9-dihydro-1H-purin-9-yl)propionamide		WO	9957120	Antidepressant	Unspecified
AJ-9677	Acetic acid, ((3-((2R)-2-(((2R)-2-(3-chlorophenyl)-2-hydroxyethyl)amino)propyl)-1H-indol-7-yl)oxy)-[CAS]	244081-42-3			Antidiabetic	Diabetes, Type II
AJG-049			WO	9733885	Gastroprokinetic	Motility dysfunction, GI, general
Ajmaline		12/07/4360				
Alacepril		74258-86-9				
albaconazole	4(3H)-Quinazolinone, 7-chloro-3-[(1R,2R)-2-(2,4-difluorophenyl)-2-hydroxy-1-methyl-3-(1H01,2,4-triazol-1-yl)propyl]-[CAS]	187949-02-6	WO	9705131	Antifungal	Infection, Candida, general
albendazole	Carbamic acid, [5-(propylthio)-1H-benzimidazol-2-yl]-, methyl ester [CAS]	54029-12-8 54965-21-8	GB	1454326	Anthelmintic	Infection, helminth, general
Albuterol		18559-94-9				
Albutoin		830-89-7				
alclofenac	Benzeneacetic acid, 3-chloro-4-(2-propenyloxy)-[CAS]	22131-79-9	GB	1174535	Anti-inflammatory	

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
alclometasone	Pregna-1,4-diene-3,20-dione, 7-chloro-11-hydroxy-16-methyl-17,21-bis(1-oxopropoxy)-, (7Alpha, 11ß, 16Alpha)-[CAS]	66734-13-2 67452-97-5	U.S. 4,124,707	Antipruritic/ inflamm, allergic	Inflammation, dermal
Alcuronium		23214-96-2			
Aldioxa		5579-81-7			
Aldol		107-89-1			
Aldosterone		52-39-1			
alendronate	Phosphonic acid, (4-amino-1-hydroxybutylidene)bis-[CAS]	121268-17-5 129318-43-0	GB 2118042	Osteoporosis treatment	Osteoporosis
Alendronic Acid		66376-36-1			
Alexidine		22573-93-9			
alfacalcidol	9,10-Secocholesta-5,7,10(19)-triene-1,3-diol, (1Alpha.,3ß,5Z,7E)-[CAS]	41294-56-8		Osteoporosis treatment	Osteodystrophy
Alfadolone		23930-37-2			
Alfaxalone		23930-19-0			
Alfentanil		71195-58-9			
alfimeprase		259074-76-5		Fibrinolytic	Peripheral vascular disease
alfuzosin	2-Furancarboxamide, N-[3-[(4-amino-6,7-dimethoxy-2-quinazolinyl)methylamino]-tetrahydro-[CAS]	81403-68-1 81403-80-7	GB 2013679	Prostate disorders	Benign prostatic hyperplasia
alfuzosin	2-Furancarboxamide, N-[3-[(4-amino-6,7-dimethoxy-2-quinazolinyl)methylamino]-propyl]tetrahydro-[CAS]	81403-68-1 81403-80-7		Formulation, modified-release, other	Benign prostatic hyperplasia
Algestone		595-77-7			
Algestone Acetophenide		24356-94-3			
Algin		9005-38-3			
Alglucerase		143003-46-7			
Alibendol		26750-81-2			
aliskiren	(2S,4S,5S,7S)-5-Amino-N-(2-carbamoyl-2-methylpropyl)-4-hydroxy-2-isopropyl-7-[4-methoxy-3-(3-methoxypropoxy)benzyl]-8-methylnonanamide	173334-57-1		Antihypertensive, renin system	Hypertension, general
alitretinoin	9-cis retinoic acid	03/08/5300		Antipruritic/ inflamm, allergic	Eczema, general
alizapride	1H-Benzotriazole-5-carboxamide, 6-methoxy-N-[[1-(2-propenyl)-2-pyrrolidinyl]methyl]-[CAS]	59338-93-1	GB 1475234	Antiemetic	Nausea and vomiting, general
Alkannin		517-88-4			
Alkofanone		7527-94-8			
Allantoin		97-59-6			
Allobarbital		52-43-7			
Allopurinol		315-30-0			
Allyl Isothiocyanate		57-06-7			
Allylestrenol		432-60-0			

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almagate	Magnesium, [carbonato(2-)]heptahydroxy-(aluminum)tri-, dihydrate [CAS]	66827-12-1 72526-11-5	U.S.	4,447,417	Antacid/ Antiflatulent	
alminoprofen	Benzeneacetic acid, Alpha-methyl-4[(2-methyl-2-propenyl)amino]-[CAS]	39718-89-3	U.S.	3,957,850	Analgesic, NSAID	
almitrine	1,3,5-Triazine-2,4-diamine, 6-[4-[bis(4-fluorophenyl)methyl]-1-piperazinyl]-N,N'-di-2-propenyl-, dimethanesulfonate [CAS]	27469-53-0 29608-49-9	GB	1256513	Respiratory	Bronchitis, chronic
almotriptan	Pyrrolidine, 1-(((3-(2-(dimethylamino)ethyl)-1H-indol-5-yl)methyl)sulfonyl)-[CAS]	154323-57-6	WO	9402460	Antimigraine	Migraine
Aloe-Emodin		481-72-1				
Aloin		5133-19-7				
alosetron	2,3,4,5-Tetrahydro-5-methyl-2-[(5-methyl-1H-imidazol-4-yl)methyl]-1H-pyrido[4,3-b]indol-1-one [CAS]	122852-42-0 122852-69-1 132414-02-9	EP	306323	GI inflammatory/ bowel disorders	Irritable bowel syndrome
alovudine	Thymidine, 3'-deoxy-3'-fluoro-[CAS]	25526-93-6	EP	470355	Antiviral, anti-HIV	Infection, HIV/AIDS
Aloxiprin		9014-67-9				
Alpha-1 protease inhibitor			U.S.	5,780,014	Formulation, inhalable, topical	Emphysema, alpha-1 antitrypsin deficiency
Alpha-dihydroergocryptine	Ergocryptine, 9,10-dihydro-methanesulfonate (salt)-[CAS]	29261-93-6			Formulation, other	Parkinson's disease
Alphaprodine		77-20-3				
Alpidem		82626-01-5				
Alpiropride		81982-32-3				
alprazolam	4H-[1,2,4]Triazolo[4,3-a][1,4]-benzodiazepine, 8-chloro-1-methyl-6-phenyl-[CAS]	28981-97-7	U.S.	3,987,052	Anxiolytic	Anxiety, general
Alprenolol		13655-52-2				
alsactide	Alpha-1-17-Corticotropin, 1-β-alanine-17-[N-(4-aminobutyl)-L-lysinamide]-[CAS]	34765-96-3	U.S.	3,749,704	ACTH	Arthritis, rheumatoid
ALT-711	Thiazolium, 4,5-dimethyl-3-(2-oxo-2-phenylethyl)-, bromide [CAS]	181069-80-7	WO	9622095	Symptomatic antidiabetic	Hypertension, general
Althiazid		5588-16-9				
altinicline	Pyridine, 3-ethynyl-5-((2S)-1-methyl-2-pyrrolidinyl)-[CAS]	179120-92-4	U.S.	5,594,011	Antiparkinsonian	Parkinson's disease
altretamine	1,3,5-Triazine-2,4,6-triamine, N,N,N',N',N'',N''-hexamethyl-[CAS]	645-05-6	U.S.	3,424,752	Anticancer, alkylating	Cancer, ovarian
aluminium chloride hexahydrate	Aluminium chloride, hexahydrate	7446-70-0			Dermatological	Hyperhidrosis
Aluminon		7784-13-6				
Aluminum Acetate Solution		569-58-4 8006-13-1				
Aluminum Chlorate		15477-33-5				
Aluminum Hydroxychloride		1327-41-9				
Aluminum Potassium Sulfate		10043-67-1				

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Aluminum Sodium Sulfate		10102-71-3				
alusulf	Aluminum hydroxide sulfate (Al7(OH)17(SO4)2), dodecahydrate [CAS]	611115-28-4	DE	2510663	Urological	Hypernhos-phataemia
Alverine		150-59-4				
alvimopan	Glycine, N-[(2S)-2-[[(3R,4R)-4-(3-hydroxyphenyl)-3,4-dimethyl-1-piperidinyl]methyl]-1-oxo-3-phenylpropyl]-[CAS]	156053-89-3	EP	657428	GI inflammatory/ bowel disorders	Ileus
alvocidib	4H-1-Benzopyran-4-one, 2-(2-chlorophenyl)-5,7-dihydroxy-8-(3-hydroxy-1-methyl-4-piperidinyl)-, cis-(-)-[CAS]	1317740-09-5 146426-40-6	WO	9506638	Antimigraine GI inflammatory/ bowel disorders	Migraine Crohn's disease
ALX-0646					Neuroprotective	Unspecified
AM-24	2,4,6-Triiodophenol	609-23-4			Antiasthma	Asthma
AM-36	1-Piperazineethanol, 4-[[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]-Alpha-(4-chlorophenyl)-[CAS]	199467-52-2				
AM-477	2-Methoxyoestradiol	768-94-5				
Amantadine		539-21-9			Antifungal	Infection, general
amantanium	1-Decanaminium, N,N-dimethyl-N-[2-[(tricyclo[3.3.1.13,7]dec-1-ylcarbonyl)oxy]ethyl]-, bromide [CAS]	58158-77-3	U.S.	4,288,609		
Ambazon		115-79-7			Vasodilator, peripheral	Heart failure
Ambenonium		177036-94-1				
ambrisentan	(+)-(2S)-2-[(4,6-dimethylpyrimidin-2-yl)-oxy]-3-methoxy-3,3-diphenylpropanoic acid	18683-91-5 23828-92-4	GB	1178034	COPD treatment	Bronchitis, chronic
ambroxol	Cyclohexanol, 4-[[(2-amino-3,5-dibromophenyl)methyl]amino]-, trans-[CAS]	119-29-9 5634-34-4 3754-19-6 115-51-5				
Ambucaine		51022-69-6	DE	2437847	Antipsoriasis	
Ambuphylline						
Ambusid						
Ambutonium Bromide						
amcinonide	Pregna-1,4-diene-3,20-dione, 21-(acetyloxy)-16,17-[cyclopentylidenebis(oxy)]-9-fluoro-11-hydroxy-, (11β, 16Alpha)-[CAS]					
AMD-3100	1,4,8,11-Tetraazacyclotetradecane, 1,11-(1,4-phenylenebis(methylene))bis-, octahydrochloride [CAS]	155148-31-5	U.S.	5,612,478	Haematological	Chemotherapy-induced injury, bone marrow, leucopenia
Amdinocillin		32887-01-7				
Amdinocillin Pivoxil		32886-97-8				
amdoxovir	1,3-Dioxolane-2-methanol, 4-(2,6-diamino-9H-purin-9-yl)-(2R-cis)-[CAS]	145514-04-1	EP	656778	Antiviral, anti-HIV	Infection, HIV/AIDS
amelubant	Carbamic acid, ((4-((3-((4-(1-(4-hydroxyphenyl)-1-methylethyl)phenoxy)methyl)phenyl)-methoxy)phenyl)iminomethyl)-ethyl ester [CAS]	346735-24-8	DE	10000907	COPD treatment	Chronic obstructive pulmonary disease

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Americaine	Benzenemethanaminium, N,N-dimethyl-N-[2-[2-[4-(1,1,3,3-tetramethylbutyl)phenoxy]ethoxy]ethyl]-, chloride, mixt. with ethyl 4-aminobenzoate [CAS]	129128-13-8		Formulation, inhalable, other	Pain, general
Amezinium		30578-37-1			
Amfenac		51579-82-9			
Amidephrine		3354-67-4			
Amidinomycin		3572-60-9			
amifostine	Ethanethiol, 2-[(3-aminopropyl)amino], dihydrogen phosphate (ester)-[CAS]	20537-88-6 63717-27-1	EP 131500	Radio/ chemoprotective	Chemotherapy-induced injury, renal
amiglumide	Pentanoic acid, 5-(dipentylamino)-4-((2-naphthalenylcarbonyl)amino)-5-oxo-(R)-[CAS]	119363-62-1	WO 8805774	GI inflammatory/ bowel disorders	Pancreatitis
amikacin		37517-28-5 39831-55-5		Formulation, optimized, microencapsulate	Infection, general
Amiloride		2609-46-3			
Aminacrine		90-45-9			
amineptine	Heptanoic acid, 7-[(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)amino]-[CAS]	30272-08-3 57574-09-1	U.S. 3,758,528	Antidepressant	
Aminitrozole		140-40-9			
Amino Acid Preparations					
Aminocaproic Acid					
aminoglutethimide	2,6-Piperidinedione, 3-(4-aminophenyl)-3-ethyl-[CAS]	125-84-8	U.S. 3,944,671	Anticancer, hormonal	Cancer, breast
Aminoguanidine		79-17-4			
Aminohippurate					
Aminometradine		642-44-4			
Aminopentamide		60-46-8			
aminophylline	1H-Purine-2,6-dione, 3,7-dihydro-1,3-dimethyl-, compd. with 1,2-ethanediamine (2:1) [CAS]	317-34-0		Formulation, modified-release, other	Asthma
Aminopromazine		58-37-7			
Aminopyrine		58-15-1			
Aminoquinuride		3811-56-1			
Aminorex		2207-50-3			
amiodarone	Methanone, (2-butyl-3-benzofuranyl)[4-[2-(diethylamino)ethoxy]-3,5-diiodophenyl]-[CAS]	1951-25-3 19774-82-4	U.S. 3,248,401	Antiarrhythmic	Arrhythmia, general
Aminophenazole		490-55-1			
Aminprilose		56824-20-5			
amisulpride	Benzamide, 4-amino-N-[(1-ethyl-2-pyrrolidinyl)methyl]-5-(ethylsulfonyl)-2-methoxy-[CAS]	71675-85-9	U.S. 4,401,822	Neuroleptic	Schizophrenia
Amitriptyline		50-48-6			
amitriptyline +	1-Propanamine,3-(10,11-dihydro-5H-			Formulation,	Pain,

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ketamine	dibenzo[a,d]cyclohepten-5-ylidene)-N,N-dimethyl + cyclohexanone,2-(2-chlorophenyl)-2-(methylamino)			fixed-dose combinations	neuropathic
Amitriptylinoxide		4317-14-0			
amlexanox	5H-[1]Benzopyrano[2,3-b]pyridine-3-carboxylic acid, 2-amino-7-(1-methylethyl)-5-oxo-[CAS]	68302-57-8	U.S. 4,299,963	Antiasthma	Asthma
amiodipine	3,5-Pyridinedicarboxylic acid, 2-[(2-aminoethoxy)methyl]-4-(2-chlorophenyl)-1,4-dihydro-6-methyl-, 3-ethyl 5-methyl ester [CAS]	111470-99-6 88150-42-9 88150-47-4	EP 89167	Antianginal	Hypertension, general
Ammoniacum		03/07/9000			
Ammonium Benzoate		1863-63-4			
Ammonium Mandelate		530-31-4			
Ammonium Salicylate		528-94-9			
Ammonium Valerate		42739-38-8			
Amobarbital		57-43-2			
Amocarzine		36590-19-9			
Amodiaquin		86-42-0			
amorolfine	Morpholine, 4-[3-[4-(1,1-dimethylpropyl)phenyl]-2-methylpropyl]-2,6-dimethyl-, cis-[CAS]	78613-35-1 78613-38-4	EP 24334	Antifungal	Infection, fungal, general
Amoscanat		26328-53-0			
amosulalol	Benzenesulfonamide, 5-[1-hydroxy-2-[[2-(2-methoxyphenoxy)ethyl]amino]ethyl]-2-methyl-, (+/−)-[CAS]	70958-86-0 85320-68-9	EP 136103	Antihypertensive, adrenergic	Hypertension, general
Amotriphene		5585-64-8			
amoxapine	Dibenz[b,f][1,4]oxazepine, 2-chloro-11-(1-piperazinyl)-[CAS]	14028-44-5	GB 1192812	Antidepressant	Depression, general
amoxicillin	4-Thia-1-azobicyclo[3.2.0]heptane-2-carboxylic acid, 6-[[amino(4-hydroxyphenyl)acetyl]amino]-3,3-dimethyl-7-oxo-,[2S-[2Alpha,5Alpha,6β(S*)]][CAS]	26787-78-0 61336-70-7		Formulation, modified-release, other	Infection, general
amoxicillin + potassium clavulan		74469-00-4	GB 1508977	Formulation, fixed-dose combinations	Infection, respiratory tract, general
AMPAlex	Piperidine, 1-(6-quinoxalinylcarbonyl)-[CAS]	154235-83-3	U.S. 5,650,409	Psychostimulant	Attention deficit disorder
Amphetamine		300-62-9			
Amphetaminil		17590-01-1			
amphotericin B	Amphotericin B compd. with (3β)-cholest-5-en-3-yl hydrogen sulfate (1:1) [CAS]	120895-52-5 1397-89-3	U.S. 4,822,777	Formulation, optimized, liposomes	Infection, general
ampicillin	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 6-[(aminophenylacetyl)amino]-3,3-dimethyl-7-oxo-, [2S-[2Alpha,5Alpha,6β(S*)]]	69-53-4 7177-48-2		Formulation, fixed-dose combinations	Infection, general
Ampiroxicam		99464-64-9			
Ampligen		38640-92-5			

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amprenavir	Carbamic acid, (3-(((4-aminophenyl)sulfonyl)(2-methylpropyl)amino)-2-hydroxy-1-(phenylmethyl)propyl)-, tetrahydro-3-furanyl ester, (3S-(3R*(1R*,2S*)))-[CAS]	161814-49-9	U.S.	5,783,701	Antiviral, anti-HIV	Infection, HIV/AIDS
amrinose	[3,4'-Bipyridin]-6(1H)-one, 5-amino-[CAS]	60719-84-8 75898-90-7	U.S.	4,004,012	Cardiostimulant	
amrubicin	5,12-Naphthacenedione, 9-acetyl-9-amino-7-[(2-deoxy-β-D-erythro-pentopyranosyl)oxy]-7,8,9,10-tetrahydro-6,11-dihydro-, hydrochloride, (7S,cis)-[CAS]	92395-36-3	EP	107486	Anticancer, antibiotic	Cancer, lung, non-small cell
amsacrine	Methanesulfonamide, N-[4-(9-acridinylamino)-3-methoxyphenyl]-[CAS]	51264-14-3			Anticancer, other	Cancer, leukaemia, acute lymphocytic
amtolmetin guacil	Glycine, N-[[1-methyl-5-(4-methylbenzoyl)-1H-pyrrol-2-yl]acetyl]-, 2-methoxyphenyl ester [CAS]	87344-06-7	GB	2115417	Analgesic, NSAID	Arthritis, rheumatiod
Amylocaine		532-59-2				
AN-152			WO	9719954	Anticancer, antibiotic	Cancer, prostate
anabolic steroids			WO	9848812	Cardiovascular	Heart failure
Anagestone		2740-52-5				
anagrelide	Imidazo[2,1-b]quinazolin-2(3H)-one, 6,7-dichloro-1,5-dihydro-, monohydrochloride [CAS]	58579-51-4 68475-42-3	GB	1418822	Haematological	Thrombocytosis
anastrozole	1,3-benzenediacetonitrile, Alpha,Alpha,Alpha',Alpha'-tetramethyl-5-(1H-1,2,4-triazol-1-ylmethyl)-[CAS]	120511-73-1	EP	296749	Anticancer, hormonal	Cancer, breast
Anazolene		3861-73-2				
Ancitabine		31698-14-3				
Ancrod		9046-56-4				
andolast	N-4'-[5-1Tetrazolyl]-phenyl-4-(5-tetrazolyl)-benzamide	132640-22-3	EP	460083	Antiasthma	Asthma
Androisoxazole		360-66-7				
Androstenediol		521-17-5				
aneocortave	21-(Acetyloxy)-17-hydroxypregna-4,9(11)-diene-3,20-dione	7753-60-8			Ophthalmological	Macular degeneration
Anethole		4180-23-8; 104-46-1 (unspecified)				
Anethole Trithione		532-11-6				
Angiogenix			U.S.	6,417,205	Cardiovascular	Cardio-myopathy, ischaemic
Angiotensin		1407-47-2				
anhydrovinblastine	Vincaleukoblastine, 3',4'-didehydro-4'-deoxy-[CAS]	38390-45-3	U.S.	6,011,041	Anticancer, other	Cancer, general

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anidulafungin	Echinocandin B, 1-((4R,,5R)-4,5-dihydroxy-N2-((4"-(pentyloxy)(1,1':4',1"-terphenyl)-4-yl)carbonyl)-L-ornithine)-[CAS]	166663-25-8	U.S. 6,384,013	Antifungal	Infection, Candida, general
Anilerdine		144-14-9			
Aniracetam		72432-10-1			
Anisindione		117-37-3			
Anisomycin		22862-76-6			
Anisotropine Methylbromide		80-50-2			
anistreplase	Anistreplase [CAS]	81669-57-0	EP 28489	Fibrinolytic	Infarction, myocardial
Antazoline		91-75-8			
Anthiolimine		305-97-5			
Anthralin		1143-38-0			
Anthramycin		4803-27-4			
Anthrarobin		577-33-3			
Anthrax inhibitor			U.S. 6,436,933	Anti-infective, other	Infection, anthrax
antiangiogenic dendrimers			U.S. 6,426,067	Anticancer, other	Cancer, general
Anticort	L-Ascorbic acid, mixt with 2-(diethylamino)ethyl 4-aminobenzoate monohydrochloride, disodium hydrogen phosphate, potassium benzoate and zinc sulfate (1:1) [CAS]	186646-39-9	WO 9640038	Anabolic	Cachexia
antidepressants			U.S. 5,898,036	Antidepressant	Depression, general
anti-invasins			U.S. 6,303,302	Antifungal	Infection, fungal, general
Antimony Potassium Tartrate		28300-74-5			
Antimony Sodium Thioglycollate		539-54-8			
Antimony Thioglycollamide		6533-78-4			
Antiprogestin	19-Norpregna-4,9-dien-3-one,(acetylphenyl)-20,20,21,21,21-pentafluoro-17-hydroxy-(11β, 17Alpha) [CAS]	211254-73-8	DE 19703061	Anticancer, hormonal	Cancer, breast
Antipyrine		60-80-0			
Antipyrine Salicylate		520-07-0			
antithrombin III	Antithrombin, III [CAS]	9000-94-6		Blood fraction	Antithrombin III deficiency
		90170-80-2			Unspecified
AR-116081 AR-A2	(R)-N-[5-methyl-8-(4-methylpiperazin-1-yl)-1,2,3,4-tetrahydro-2-naphthyl]-4-morpholinobenzamide		U.S. 6,107,324	Neuroleptic Anxiolytic	Anxiety, general
Arachidonic Acid		506-32-1			

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aranidipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(2-nitrophenyl)-, methyl 2-oxopropyl ester-[CAS]	86780-90-7	GB 2111978	Antihypertensive, other	Hypertension, general
arbekacin	D-Streptamine, O-3-amino-3-deoxy-Alpha-D-glucopyranosyl-(1-6)-O-[2,6-diamino-2,3,4,6-tetradeoxy-Alpha-D-erythro-hexopyranosyl-(1-4)]-N1-(4-amino-2-hydroxy-1-oxobutyl)-2-deoxy-, (S)-[CAS]	51025-85-5 75282-65-4	U.S. 4,001,208	Aminoglycoside antibiotic	Infection, general
Arbidol	1H-indole-3-carboxylic acid, 6-bromo-4-((dimethylamino)methyl)-5-hydroxy-1-methyl-2-((phenylthio)methyl)-, ethylester, monohydrochloride [CAS]	131707-23-8	WO 9008135	Immunostimulant, other	Infection, influenza virus
arbutamine	1,2-Benzenediol, 4-[1-hydroxy-2-[[4-(4-hydroxyphenyl)butyl]amino]ethyl]-, (R)-[CAS]	128470-16-6	WO 9220324	Diagnostic	Diagnosis, coronary
Arcitumomab		154361-48-5			
ardeparin	Heparin [CAS]	9005-49-6		Anticoagulant	Thrombosis, venous
arecoline	1,2,5,6-Tetrahydro-1-methyl-3-pyridine carboxylic acid methyl ester			Formulation, transdermal, patch	Alzheimer's disease
argatroban	2-Piperidinecarboxylic acid, 1-[5-[(aminoiminomethyl)amino]-1-oxo-2-[[(1,2,3,4-tetrahydro-3-methyl-8-quinolinyl)sulfonyl]amino]pentyl]-4-methyl-[CAS]	74863-84-6	EP 8746	Anticoagulant	Thrombosis, arterial
Arginine		74-79-3			
Arifio ®		153259-65-5			
aripiprazole	2(1H)-Quinolinone, 7-[4-[4-(2,3-dichlorophenyl)-1-piperazinyl]butoxy]-3,4-dihydro-[CAS]	129722-12-9	EP 367141	Neuroleptic	Schizophrenia
anxiolytics			U.S. 5,756,538	Anxiolytic	Anxiety, general
AP-521	N-Piperonyl-2-amino-1,2,3,4-tetrahydrobenzo(b)thieno(2,3-c)pyridine-3-carbamide	151227-08-6	WO 9321189	Anxiolytic	Anxiety, general
AP-5280			U.S. 5,965,118	Anticancer, alkylating	Cancer, general
Apalcillin		63469-19-2			
apaziquone	1H-indole-4,7-dione, 5-(1-aziridinyl)-3-(hydroxymethyl)-2-(3-hydroxy-1-propenyl)-1-methyl-, (E)-[CAS]	114560-48-4	WO 8706227	Anticancer, alkylating	Cancer, breast
Apazone		13539-59-8			
α-Phenylbutyramide		90-26-6			
Apocodeine		641-36-1			
apomine	Phosphonic acid, (2-(3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl)ethylidene)bis-tetrakis(1-methylethyl) ester [CAS]	126411-13-0		Anticancer, other	Cancer, prostate

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
apomorphine	4H-Dibenzo[de,g]quinoline-10,11-diol, 5,6,6a,7-tetrahydro-6-methyl-, hydrochloride	314-19-2 58-00-4		Formulation, transmucosal, nasal	Impotence
apraclonidine	1,4-Benzenediamine, 2,6-dichloro-N1-(4,5-dihydro-1H-imidazol-2-yl)-[CAS]	66711-21-5 73218-79-8	U.S. 4,517,199	Antiglaucoma	Glaucoma
aprepitant	3H-1,2,4-Triazol-3-one, 5-[(2R,3S)-2-[(1R)-1-[3,5-bis(trifluoromethyl)phenyl]ethoxy]-3-(4-fluorophenyl)-4-morpholinyl]methyl]-1,2-dihydro-[CAS]	170729-80-3	U.S. 5,719,147	Antiemetic	Chemotherapy-induced nausea and vomiting
aprindine	1,3-Propanediamine, N-(2,3-dihydro-1H-inden-2-yl)-N',N'-diethyl-N-phenyl-[CAS]	33237-74-0 37640-71-4 77-02-1 528-92-7 9087-70-1 137159-92-3	GB 1321424	Antiarrhythmic	
Aprobarbital					
Apronalide					
Aprotinin					
Aptiganel					
AQ4N	9,10-Anthracenedione, 1,4-bis[(2-(dimethyloxidoamino)ethyl)amino)-5,8-dihydroxy-[CAS]	136470-65-0	U.S. 5,132,327	Anticancer, other	Cancer, general
Aquavan			U.S. 6,204,257	Anaesthetic, injectable	Anaesthesia
arofylline	1H-Purine-2,6-dione, 3-(4-chlorophenyl)-3,7-dihydro-1-propyl-[CAS]	136145-07-8	EP 435811	COPD treatment	Chronic obstructive pulmonary disease
arotinolol	2-Thiophenecarboxamide, 5-[2-[[3-[(1,1-dimethylethyl)amino]-2-hydroxypropyl]thio]-4-thiazolyl]-, (±)-[CAS]	104766-23-6 68377-92-4	U.S. 3,932,400	Antihypertensive, adrenergic	Hypertension, general
Arsacetin		618-22-4			
arsenic trioxide	Arsenic oxide (As2O3) [CAS]	1327-53-3		Anticancer, other	Cancer, leukemia, acute myelogenous
Arsphenamine		139-93-5			
Aesthinol		119-96-0			
Arteether		75887-54-6			
Artefene		123407-36-3 (Z-form)			
Artemether		71963-77-4			
Artemisinin		63968-64-9			
artenimol	3,12-Epoxy-12H-pyrano[4,3-j]-1,2-benzodioxepin, 10-ethoxydecahydro-3,6,9-trimethyl-, [3R-(3Alpha,5aβ,6β,8aβ,9aAlpha,10Alpha,12β,12aR*)]-[CAS]	75887-54-6		Antimalarial	Infection, malaria
artesunate	Butanedioic acid mono-[(3R,5aS,6R,8aS,9R,10R,12R,12aR)-decahydro-3,6,9-trimethyl-3,12-epoxy-12H-pyrano[4,3-j]-1,2-benzodioxepin-10-yl]ester	88495-63-0		Formulation, transmucosal, systemic	Infection, malaria
arzoxifene	Benzo(b)thiophene-6-ol, 2-(4-methoxyphenyl)-3-(4-(2-(1-piperidinyl)ethoxy)phenoxy)-[CAS]	182133-27-3	WO 9609041	Anticancer, hormonal	Cancer, breast

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
AS-3201	Spiro(pyrrolidine-3,4'(1'H)-pyrrolo(1,2-a)pyrazine)-1',2,3',5(2'H)-tetrone, 2'-((4-bromo-2-fluorophenyl)methyl)-, (3'R)-[CAS]	147254-64-6	EP 520320	Symptomatic antidiabetic	Diabetic complication, general
ASA	Benzoic acid, 2-(acetyloxy)-[CAS]	50-78-2 56449-07-1		Formulation, modified-release, other	Pain, general
α-Santonin Ascaridole Ascorbic Acid		481-06-1 512-85-6 50-81-7			
asenapine	1H-Dibenz[2,3:6,7]oxepino[4,5-c]pyrrole, 5-chloro-2,3,3a,12b-tetrahydro-2-methyl-, trans-, (Z)-2-butenedioate (1:1) [CAS]	85650-56-2	WO 9523600	Neuroleptic	Psychosis, general
asimadoline	Benzeneacetamide, N-[2-(3-hydroxy-1-pyrrolidinyl)-1-phenylethyl]-N-methyl-Alpha-phenyl-, [S-(R*,R*)]- [CAS]	153205-46-0	DE 4215213	GI inflammatory/ bowel disorders	Irritable bowel syndrome
asoprisnil	11β-[4-(Hydroxyiminomethyl)phenyl]-17β-methoxy-17Alpha-(methoxymethyl)estra-4,9-dien-3-one	199396-76-1	EP 0648778	Menstruation disorders	Endometriosis
Asoxime Aspartic Acid Aspidin Aspidinol Aspirin Aspirin, Dipyridamole		34433-31-3 56-84-8 584-28-1 519-40-4 50-78-2			
aspoxicillin	Glycinamide, N-methyl-D-asparaginyl-N-(2-carboxy-3,3-dimethyl-7-oxo-4-thia-1-azabicyclo[3.2.0]hept-6-yl)-D-2-(4-hydroxyphenyl)-, [2S-(2Alpha,5Alpha,6β)]-[CAS]	63358-49-6	GB 1533413	Penicillin, injectable	Infection, respiratory tract, general
AST-120 Astemizole	AST 120 [CAS]	90597-58-3 68844-77-9		Urological	Renal failure
asulacrine	4-Acridinecarboxamide, 9-[[2-methoxy-4-[(methylsulfonyl)amino]phenyl]amino]-N,5-dimethyl-[CAS]	80841-47-0 80841-48-1	EP 39224	Anticancer, other	Cancer, general
AT-1015	(N-[2-[4-(5H-Dibenzo[a,d]cyclohepten-5-ylidene)-piperdino]ethyl]-1-formyl-4-piperidinecarboxamide monohydrochloride monohydrate			Antithrombotic	Thrombosis, general
atamestane	Androsta-1,4-diene-3,17-dione, 1-methyl-[CAS]	96301-34-7	DE 3338212	Anticancer, hormonal	Cancer, breast
atazanavir	2,5,6,10,13-Pentaazatetradecanedioic acid, 3,12-bis(1,1-dimethylethyl)-8-hydroxy-4,11-dioxo-9-(phenylmethyl)-6-((4-(2-pyridinyl)phenyl)methyl)-dimethyl ester, (3S,8S,9S,12S)-, sulfate (1:1) (salt) [CAS]	229975-97-7		Antiviral, anti-HIV	Infection, HIV/AIDS
atenolol	Benzeneacetamide, 4-[2-hydroxy-3-[(1-methylethyl)amino]propoxy]-[CAS]	29122-68-7 73677-19-7	GB 1285038	Antihypertensive, adrenergic	Hypertension, general
atenolol +	Benzeneacetamide, 4-[2-hydroxy-3-[(1-	73677-19-7	U.S. 3,836,671	Formulation,	Hypertension,

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TABLE IV-continued

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chlorthalidone	methyl(ethyl)amino]propoxy]-, mixt. with 2-chloro-5-(2,3-dihydro-1-hydroxy-3-oxo-1H-isoindol-1-yl)benzenesulfonamide [CAS]			fixed-dose combinations	general
atenolol + nifedipine	Benzeneacetamide, 4-[2-hydroxy-3-[(1-methylethyl)amino]propoxy]-, + 4-(2'-nitrophenyl)-2,6-dimethyl-3,5-dicarbomethoxy-1,4-dihydropyridine			Formulation, fixed-dose combinations	Hypertension, general
α-Terpineol		98-55-5			
Atevirdine		136816-75-6			
atipamezole	1H-Imidazole, 4-(2-ethyl-2,3-dihydro-1H-inden-2-yl)-[CAS]	104054-27-5	EP 183492	Reproductive/ gonadal, general	Sexual dysfunction, female
atiprimod dimaleate	2-Azaspiro[4.5]decane-2-propanamine, N,N-diethyl-8,8-dipropyl-, dimaleate	130065-61-1	U.S. 5,744,495	Antiarthritic, immunological	Arthritis, rheumatoid
ATL-146e			U.S. 6,232,297	Imaging agent	Unspecified
α-Tocopherol		59-02-9			
atomoxetine	Benzenepropanamine, N-methyl-Gamma-(2-methylphenoxy)-, (R)-[CAS]	82248-59-7 83015-36-3	EP 52492	Neurological	Attention deficit disorder
atorvastatin	1H-Pyrrole-1-heptanoic acid, 2-(4-fluorophenyl)-β,delta-dihydroxy-5-(1-methylethyl)-3-phenyl-4-[(phenylamino)carbonyl]-[CAS]	134523-03-8 134523-00-5	EP 409281	Hypolipaemic/ Antiatherosclerosis	Hyper-cholesterolaemia
atosiban	Oxytocin, 1-(3-mercaptopropanoin acid)-2-(O-ethyl-D-tyrosine)-4-L-threonine-8-L-ornithine-[CAS]	90779-69-4	EP 112809	Labour inhibitor	Labour, preterm
atovaquone	1,4-Naphthalenedione, 2-[4-(4-chlorophenyl)cyclohexyl]-3-hydroxy-, trans-[CAS]	95233-18-4	EP 123238	Antifungal	Infection, *Pneumocystis jiroveci*
atovaquone + proguanil	1,4-Naphthalenedione, 2-[4-(4-chlorophenyl)cyclohexyl]-3-hydroxy-, trans + N-(4-chloro-phenyl)-N'-(1-methylethyl)imidiodicarbonimidic diamide			Antimalarial	Infection, malaria
atracurium	Isoquinolinium, 2,2'-[1,5-pentanediylbis[oxy(3-oxo-3,1-propanediyl)]]bis[1-[(3,4-dimethoxyphenyl)methyl]-1,2,3,4-tetrahydro-6,7-dimethoxy-2-methyl-[CAS]]	64228-81-5	U.S. 4,179,557	Muscle relaxant	Surgery adjunct
atrasentan	3-Pyrrolidenecarboxylic acid, 4-(1,3-benzodioxol-5-yl)-1-[2-(dibutylamino)-2-oxoethyl]-2-(4-methoxyphenyl)-, (2R,3R,4S)-[CAS]	173937-91-2	WO 9730045	Anticancer, other	Cancer, prostate
Atrial Natriuretic Peptide		85637-73-6			
Atrolactamide		2019-68-3			
Atropine		51-55-8			
Augmentin		74469-00-4		Formulation, modified-release, other	Infection, respiratory tract, general
auranofin	Gold, (1-thio-β-D-glucopyranose 2,3,4,6-tetraacetato-S)(triethylphosphine)-[CAS]	34031-32-8	U.S. 3,708,579	Antiarthritic, other	Arthritis, rheumatoid

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Aurothioglucose		12192-57-3			
avasimibe	Sulfamic acid, [[2,4,6-tris(1-methylethyl)phenyl]acetyl]-, 2,6-bis(1-methylethyl)phenyl ester [CAS]	166518-60-1	U.S. 5,491,172	Hypolipaemic/ Antiatherosclerosis	Atherosclerosis
Avobenzone		70356-09-1			
AWD-12-281	AWD 12-281 [CAS]	257892-33-4		Antiallergic, non-asthma	Rhinitis, allergic, general
Azacitidine		320-67-2			
Azacyclonol		115-46-8			
azanidazole	2-Pyrimidinamine, 4-[2-(1-methyl-5-nitro-1H-imidazol-2-yl)ethenyl]-,(E)-[CAS]	62973-76-6	U.S. 3,882,105	Antibacterial, other	Infection, trichomoniasis
azapropazone	1H-Pyrazolo[1,2-a][1,2,4]benzotriazine-1,3(2H)-dione, 5-(dimethylamine)-9-methyl-2-propyl-[CAS]	13539-59-8	FR 1440629	Anti-inflammatory	
Azaserine		115-02-6			
azasetron	2H-1,4-Benzoxazine-8-carboxamide, N-1-azabicyclo[2.2.2]oct-3-yl-6-chloro-3,4-dihydro-4-methyl-3-oxo-, monohydrochloride-[CAS]	123040-16-4 123040-94-8 123040-96-0 123040-69-7	EP 313393	Antiemetic	Nausea and vomiting, general
Azatadine		3964-81-6			
azathioprine	6-[(1-Methyl-4-nitro-1H-imidazol-5-yl)thio]-1H-purine	446-86-6		Formulation, oral, other	Transplant rejection, bone marrow
AZD-4282	glycine			Analgesic, other	Pain, neuropathic
AZD-6140	3,4-Difluorophenylcyclopropylamine			Antithrombotic	Thrombosis, arterial
azelaic acid	Nonanedioic acid [CAS]	123-99-9		Antiacne	Acne
azelastine	1(2H)-Phthalazinone, 4-[(4-chlorophenyl)methyl]-2-(hexahydro-1-methyl-1H-azepin-4-yl)-, monohydrochloride [CAS]	58581-89-8 79307-93-0	GB 1377231	Antiasthma	Asthma
azelnidipine	3,5-Pyridinedicarboxylic acid, 2-amino-1,4-dihydro-6-methyl-4-(3-nitrophenyl)-, 3-[1-(diphenylmethyl)-3-azetidinyl] 5-(1-methylethyl)ester, (+/−)-[CAS]	123524-52-7	EP 266922	Antihypertensive, other	Hypertension, general
Azidamfenicol		13838-08-9			
Azidocillin		17243-38-8			
Azimilide		149908-53-2			
Azintamide		1830-32-6			
azithromycin	9-deoxo-9a-aza-9a-methyl-9a-homoerythromycin-A	76801-85-9 83905-01-5 92395-24-9	U.S. 4,328,334	Macrolide antibiotic	Infection, respiratory tract, lower
azlocillin	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 3,3-dimethyl-7-oxo-6-[[[[(2-oxo-1-imidazolidinyl)carbonyl]amino]-phenylacetyl]amino]-, [2S-[2 alpha.,5Alpha, 6β(S*)]]-[CAS]	37091-65-9 37091-66-0	GB 1392849	Penicillin, injectable	Infection, general

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Azosemide		27589-33-9			
aztreonam	Propanoic acid, 2-[[[1-(2-amino-4-thiazolyl)-2-[(2-methyl-4-oxo-1-sulfo-3-azetidinyl)amino]-2-oxoethylidene]amino]oxy]-2-methyl-, [2S-[2Alpha,3β(Z)]]- [CAS]	104184-69-2 78110-38-0	GB 2071650	Beta-lactam antibiotic	Infection, general
azulene	Sodium 5-isopropyl-3,8-dimethyl-1-azulene sulfonate	6223-35-4	EP 88958	Formulation, modified-release, other	Inflammation, general
bacampicillin	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 6-[(aminophenylacetyl)amino]-3,3-dimethyl-7-oxo-, 1-[(ethoxycarbonyl)oxy]ethyl ester, [2S-[2Alpha,5Alpha,6β(S*)]]- [CAS]	37661-08-8 50972-17-3	GB 1363506	Penicillin, oral	Infection, general
Bacitracin		1405-87-4			
baclofen	β-(Aminomethyl)-4-chlorobenzenepropanoic acid [CAS]	1134-47-0		Formulation, implant	Spastic paralysis
Baicalein		491-67-8			
balofloxacin	3-Quinolinecarboxylic acid, 1-cyclopropyl-6-fluoro-1,4-dihydro-8-methoxy-7-[3-(methylamino)-1-piperidinyl]-4-oxo- [CAS]	127294-70-6	EP 342675	Quinolone antibacterial	Infection, urinary tract
balsalazide	Benzoic acid, 5-[[4-[[(2-carboxyethyl)amino]carbonyl]phenyl]azo]-2-hydroxy-, (E)- [CAS]	80573-04-2	U.S. 4,412,992	GI inflammatory/ bowel disorders	Colitis, ulcerative
bambuterol	Carbamic acid, dimethyl-, 5-[2-[(1,1-dimethylethyl)amino]-1-hydroxyethyl]-1,3-phenylene ester, monohydrochloride [CAS]	81732-46-9 81732-65-5	EP 43807	Antiasthma	Asthma
Bamethan		3703-79-5			
Bamifylline		2016-63-9			
Bamipine		4945-47-5			
Barbital		57-44-3			
barnidipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, methyl-1-(phenylmethyl)-3-pyrrolidinyl ester, [S-(R*,R*)]-	104713-75-9 104757-53-1 71863-56-4	U.S. 4,220,649	Antihypertensive, other	Hypertension, general
BAS-118	N-Methyl-3-[2-(2-napthyl)acetylamino]benzamide			Antibacterial, other	Infection, *Helicobacter pylori*
Basic Aluminum Carbonate Gel		1339-92-0			
Baslilximab		179045-86-4			
Batimastat		130370-60-4			
Batroxobin		9039-61-6			
Bay-41-2272	5-cyclopropyl-2-[1(2-fluoro-benzyl)-1H-pyrazolo[3,4-b]pyridine-3-yl]pyrimidin-4ylamine			Male sexual dysfunction	Sexual dysfunction, male, general
Bay-41-8543	2-[1-(2-Fluorobenzyl)-1H-pyrazolo[3,4-b]pyridin-3-yl]-5-(4-morpholinyl)pyrimidine-4,6-diamine			Cardiovascular	Unspecified

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BAY-43-9006	N-(4-chloro-3-(trifluoromethyl)phenyl)-N'-(4-(2-(N-methylcarbamoyl)-4-pyridyloxy)phenyl)urea			Anticancer, other	Cancer, liver
BAY-57-1293	N-[5(aminosulfonyl)-4-methyl-1,3-thiazol-2-yl]-N-methyl-2-[4-(2-pyridinyl)phenyl]acetamide			Antiviral, other	Infection, herpes simplex virus
bazedoxifen	TSE 424 [CAS]	198481-33-3	EP 802183	Osteoporosis treatment	Osteoporosis
β-Benzalbutyramide		7236-47-7			
BBR-3464	Platinum(4+), hexaaminedichlorobis(μ-(1,6-hexanediamine-N:N'))tri-stereoisomer, tetranitrate [CAS]	172903-00-3	U.S. 5,744,497	Anticancer, alkylating	Cancer, lung, non-small cell
BBR-3576			U.S. 5,519,029	Anticancer, antibiotic	Cancer, prostate
BBR-3610			U.S. 6,060,616	Anticancer, alkylating	Cancer, general
β-Carotene		7235-40-7			
BCH-1868	(−)-2-R-dihydroxyphosphinyol-5-(S)-(guanin-9'-yl-methyl)tetrahydrofuran			Anticancer, antimetabolite	Cancer, general
Bebeerine		477-60-1			
Beclamide		501-68-8			
beclometasone	Pregna-1,4-diene-3,20-dione, 9-chloro-11β,17,21-trihydroxy-16β-methyl, [CAS]	5534-09-8 4419-39-0	WO 0006132	Formulation, inhalable, solution	Asthma
Befloxatone		134564-82-2			
befunolol	Ethanone, 1-[7-[2-hydroxy-3-[(1-methylethyl)amino]propoxy]-2-benzofuranyl]-[CAS]	39543-79-8 39552-01-7		Antiglaucoma	
Benegride		64-65-3			
Benactyzine		302-40-9			
benazepril	1H-1-Benzazepine-1-acetic acid, 3-[[1-(ethoxycarbonyl)-3-phenylpropyl]amino]-2,3,4,5-tetrahydro-2-oxo-, [S-(R*,R*)]-[CAS]	86541-74-4 86541-75-5 86541-78-8	EP 72352	Antihypertensive, renin system	Hypertension, general
bencyclane	1-Propanamine, N,N-dimethyl-3-[[1-(phenylmethyl)cycloheptyl]oxy]-, (E)-2-butenedioate (1:1) [CAS]	14286-84-1 2179-37-5	WO 9829409	Vasodilator, peripheral	
bendazac	L-Lysine, mono[[[1-(phenylmethyl)1H-indazol-3-yl]oxy]acetate][CAS]	81919-14-4 20187-55-7	GB 2081708	Ophthalmological	
Bendroflumethiazide		73-48-3			
Benexate		78718-25-9			
benfluorex	Ethanol, 2-[[1-methyl-2-[3-(trifluoromethyl)phenyl]ethyl]amino]-, benzoate (ester) [CAS]	23602-78-0 23642-66-2	GB 1175516	Hypolipaemic/ Antiatherosclerosis	
Benfotiamine		22457-89-2			
Benfurodil		3447-95-8			
benidipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, methyl 1-(phenylmethyl)-3-piperidinyl ester, monohydrochloride (R*,R*)-(+/−)-[CAS]	105979-17-7 91599-74-5	EP 63365	Antihypertensive, other	Hypertension, general
Benorylate		5003-48-5			
Benoxaprofen		67434-14-4			
Benoxinate		99-43-4			

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Benperidol		2062-84-2			
Benproperine		2156-27-6			
Benserazide		322-35-0			
bentazepam	2H-[1]Benzothieno[2,3-e]-1,4-diazepin-2-one, 1,3,6,7,8,9-hexahydro-5-phenyl-[CAS]	29462-18-8	DE 2005276	Anxiolytic	
Bentiromide		37106-97-1			
Bentoquatam		1340-69-8			
Benzalkonium		8001-54-5			
Benzarone		1477-19-6			
benzbromarone	Methanone, (3,5-dibromo-4-hydroxyphenyl)(2-ethyl-3-benzofuranyl)-[CAS]	3562-84-3	U.S. 3,012,042	Antigout	
Benzethonium		121-54-0			
Benzetimide		14051-33-3			
Benzilonium		1050-48-2			
Benziodarone		68-90-6			
benznidazole	N-benzyl-2-nitroimidazole-1-acetamide	22994-85-0	GB 1138529	Protozoacide	
benzocaine	Benzoic acid, 4-amino-, ethyl ester	94-09-7		Formulation, fixed-dose combinations	Pain, musculoskeletal
Benzoctamine		17243-39-9			
Benzonatate		104-31-4			
Benzoxonium Chloride		19379-90-9			
benzoyl peroxide	Peroxide, dibenzoyl [CAS]	94-36-0		Formulation, other	Acne
Benzoylpas		13898-58-3			
Benzphetamine		156-08-1			
Benzpiperylon		53-89-4			
Benzquinamide		63-12-7			
Benzthiazide		91-33-8			
Benztropine		132-17-2			
benzydamine	1-Propanamine, N,N-dimethyl-3-[[1-(phenylmethyl)-1H-indazol-3-yl]oxy]-[CAS]	132-69-4 642-72-8		Stomatological, reproductive/gonadal, anti-inflammatory	
Benzyl Benzoate		120-51-4			
Benzylhydrochlorothiazide		1824-50-6			
Benzylmorphline		14297-87-1			
Bepheuium		3818-50-6			
Hydroxynaphthoate					
bepotastine	1-Piperidinebutanoic acid, 4-((4-chlorophenyl)-2-pyridinylmethoxy)-, (S)-, monobenzenesulfonate [CAS]	190786-44-8 190786-43-7	WO 9829409	Antiallergic, non-asthma	Allergy, general
bepridil	1-Pyrrolidineethanamine, β-[(2-methylpropoxy)methyl]-N-phenyl-N-(phenylmethyl)-[CAS]	64706-54-3 74764-40-2 74764-75-3	EP 146155	Antianginal	Angina, general
beraprost	1H-Cyclopenta[b]benzofuran-5-butanoic acid, 2,3,3a,8b-tetrahydro-2-hydroxy-1-(3-hydroxy-4-methyl-1-octen-6-ynyl)-[CAS]	88475-69-8 88430-50-6	U.S. 4,474,802	Prostaglandin	Peripheral vascular disease
Berberine		2086-83-1			
Bergapten		484-20-8			

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Bermoprofen		78499-27-1			
Besipirdine		119257-34-0			
betahistine	2-Pyridineethanamine, N-methyl-, dihydrochloride	5579-84-0 5638-76-6		Formulation, modified-release, <=24 hr	Meniere's disease
betaine	Betaine-[CAS]	107-43-7		Metabolic and enzyme disorders	Homocystinuria
betamethasone	Pregna-1,4-diene-3,20-dione, 9-fluoro-11,17,21-trihydroxy-16-methyl-, (11β,16β)-[CAS]	378-44-9		Formulation, dermal, topical	Psoriasis
Betamipron		3440-28-6			
Betasine		3734-24-5			
betaxolol	2-Propanol, 1-[4-[2-(cyclopropylmethoxy)ethyl]phenoxy]-3-[(1-methylethyl)amino]-[CAS]	63659-18-7 63659-19-8	U.S. 4,252,984	Antihypertensive, adrenergic	Hypertension, general, glaucoma
Betazole		105-20-4			
Bethanechol		590-63-6			
Bethanidine		55-73-2			
Betoxycaine		3818-62-0			
β-Eucaine		500-34-5			
bevantolol	2-Propanol, 1-[[2-(3,4-dimethoxyphenyl)ethyl]amino]-3-(3-methylphenoxy)-[CAS]	42864-78-8 59170-23-9	U.S. 3,857,891	Antihypertensive, adrenergic	Hypertension, general
Bevonium		5205-82-3			
bexarotene	Benzoic acid 4-(1-(5,6,7,8-tetrahydro-3,5,5,8,8-pentamethyl-2-napthalenyl)-[CAS]	153559-49-0	WO 9321146	Anticancer, other	Cancer, lymphoma, T-cell
benzafibrate	Propanoic acid, 2-[4-[2-[(4-chlorobenzoyl)amino]ethyl]phenoxy]-2-methyl-[CAS]	41859-67-0	GB 1359264	Hypolipaemic/ Antifherosclerosis	
Beziramide		15301-48-1			
BG-9928		166374-48-7		Cardiostimulant	Heart failure
BIA-2-024	10,11-dihydro-10-hydroxyimino-5H-dibenz/b,f/azepine-5-carboxamide	199997-15-4	WO 9745416	Antiepileptic	Epilepsy, general
BIA-2-093	(S)-(−)-10-acetoxy-10,11-dihydro-5H-dibenzo/b,f/azepine-5-carboxamide-[CAS]	236395-14-5		Antiepileptic	Epilepsy, general
BIA-3-202	1-(3,4-dihydroxy-5-nitrophenyl)-2-phenyl-ethanone	274925-86-9	EP 1010688	Antiparkinsonian	Parkinson's disease
Bialamicol		493-75-4			
biapenem	5H-Pyrazolo[1,2-a][1,2,4]triazol-4-ium, 6-[[2-carboxy-6-(1-hydroxyethyl)-4-methyl-7-oxo-1-azabicyclo[3.2.0]hept-2-en-3-yl]thio]-6,7-dihydro-, hydroxide, inner salt, [4R-[4Alpha.,5β,6β(R*)]]-[CAS]	120410-24-4	EP 289801	Beta-lactam antibiotic	Infection, beta-lactamase resistant
Bibenzonium		15585-70-3			
Bibrocathol		6915-57-7			
bicalutamide	Propanamide, N-[4-cyano-3-(trifluoromethyl)phenyl]-3-[(4-fluorophenyl)sulfonyl]-2-hydroxy-2-methyl-, (+/−)-[CAS]	90357-06-5	EP 100172	Anticancer, hormonal	Cancer, prostate

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bicifadine	3-Azabicyclo[3.1.0]hexane, 1-(4-methylphenyl)-, (+/−)-[CAS]	66504-75-4	DE	2740562	Analgesic, other	Pain, general
		71195-57-8	U.S.	6,294,585	Dermatological	Unspecified
bicyclic monoterpene diols		116078-65-0				
Bidisomide		479-81-2				
Bietamiverine		6888-11-5				
Bietanautine		53-18-9				
Bietaserpine		62232-46-6	GB	1512880	Cognition enhancer	Attention deficit disorder
bifemelane	1-Butanamine, N-methyl-4-[2-(phenylmethyl)phenoxy]-, hydrochloride [CAS]	90293-01-9				
Bifluranol		34633-34-6				
bifonazole	1H-Imidazole, 1-((1,1'-biphenyl]-4-ylphenylmethyl)-[CAS]	60628-96-8	U.S.	4,118,487	Antifungal	Infection, fungal, general
		60629-08-5				
		60629-09-6				
bimatoprost	5-Heptenamide, 7-(3,5-dihydroxy-2-(3-hydroxy-5-phenyl-1-pentenyl)cyclopentyl)-N-ethyl-(1R-(1A)alpha(Z)2[R(1E,3S,3Alpha,5Alpha))[CAS]	155206-00-1	U.S.	5,688,819	Prostaglandin	Glaucoma
bimoclomol	N-[2-hydroxy-3-(1-piperidinyl)propoxy]-3-pyridinecarboximidoyl chloride, (Z)-2-butanedioate (1:1)	130493-04-8	U.S.	5,147,874	Symptomatic antidiabetic	Neuropathy, diabetic
binosiamose	(1,1'-Biphenyl)-3-acetic acid, 3',3'"-(1,6-hexanediyl)bis(6'-Alpha-D-mannopyranosyloxy)-, [CAS]	187269-40-5	U.S.	5,444,050	Antiasthma	Asthma
Binifibrate		69047-39-8				
binodenoson	Adenosine, 2-((cyclohexylmethylene)hydrazino)-[CAS]	144348-08-3	U.S.	6,423,744	Vasodilator, coronary Anticancer, other	Diagnosis, coronary Cancer, renal
Biomed-101		58-85-5				
Biotin		514-65-8				
Biperiden		174254-13-8			Radio/ chemosensitizer	Cancer, breast
biricodar	2-Piperidinecarboxylic acid, 1-(oxo(3,4,5-trimethoxyphenyl)acetyl)-,4-(3-pyridinyl)-1-(3-(3-pyridinyl)propyl)butyl ester, (S)-, 2-hydroxy-1,2,3-propanetricarboxylate (1:2) [CAS]	159997-94-1				
bitiperone	1-Butanone, 1-(4-fluorophenyl)-4-(3,4,6,7,12,12a-hexahydropyrazino[1',2':1,6]pyrido[3,4-b]indol-2(1H)-yl)-[CAS]	42021-34-1	DE	2333922	Neuroleptic	
Bisacodyl		603-50-9				
Bisantrene		78186-34-2				
Bisbentiamine		2667-89-2				
Bisdequalinium		52951-36-7				
Bismuth Aluminate		12284-76-3				
Bismuth		53897-25-9				
Butylthiolaurate						
Bismuth Ethyl Camphorate		52951-37-8				

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Bismuth Iodosubgallate		138-58-9			
Bismuth Sodium Iodide		53778-50-0			
Bismuth Sodium Triglycollamate		5798-43-6			
Bismuth Subcarbonate		5892-10-4			
Bismuth Subgallate		22650-86-8			
Bismuth Subnitrate		1304-85-4			
Bismuth Subsalicylate		14882-18-9			
Bismuth Tribromophenate		5175-83-7			
bisoprolol	2-Propanol, 1-[4-[[2-(1-methylethoxy)ethoxy]methyl]phenoxy]-3-[(1-methylethyl)amino]-[CAS]	104344-23-2 66722-44-9	GB 1532380	Antihypertensive, adrenergic	Heart failure
bisoprolol + HCTZ	2-Propanol, 1-[4-[[2-(1-methylethoxy)ethoxy]methyl]phenoxy]-3-[(1-methylethyl)amino] mixt. with 6-chloro-3,4-dihydro-2H-1,2,4-benzothiadiazine-7-sulfonamide 1,1-dioxide			Formulation, fixed-dose combinations	Hypertension, general
bisoprolol + trichloromethiazide	2-Propanol, 1-[4-[[2-(1-methylethoxy)ethoxy]methyl]phenoxy]-3-[(1-methylethyl)amino] mixt. with 6-chloro-3-(dichloromethyl)-3,4-dihydro-2H-1,2,4-benzothiadiazine-7-sulfonamide 1,1-dioxide			Formulation, fixed-dose combinations	Hypertension, general
Bisoxatin		14008-48-1			
Bithionol		97-18-7			
Bitolterol		30392-40-6			
Bitoscanat		4044-65-9			
BL-3875			WO 0218378	Anti-inflammatory	Unspecified
bleomycin	Bleomycin [CAS]	11056-06-7 9041-93-4		Formulation, transdermal, enhanced	Cancer, head and neck
blonanserin	Cycloocta[b]pyridine, 2-(4-ethyl-1-piperazinyl)-4-(4-fluorophenyl)-5,6,7,8,9,10-hexahydro-[CAS]	132810-10-7	EP 385237	Neuroleptic	Schizophrenia
BMS-184476			EP 639577	Anticancer, other	Cancer, breast
BMS-387032	cis-(+/−)-2-(Ethylthio)-5,7-dihydroxy-8-(3-hydroxy-1-methyl-4-piperidinyl)-4H-1-benzopyran-4-one		WO 9742949	Anticancer, other	Cancer, general
BN-82451	4-[2-(aminomethyl)-1,3-thiazol-4-yl]-2,6-di-tert-butylphenol, dihydrochloride			Neuroprotective	Unspecified
BNP-7787	Ethanesulfonic acid, 2,2'-dithiobis-, disodium salt [CAS]	16208-51-8		Radio/chemoprotective	Chemotherapy-induced nausea and vomiting
BO-653	5-Benzofuranol, 4,6-bis(1,1-dimethylethyl)-2,3-dihydro-2,2-dipentyl-[CAS]	157360-23-1	WO 9408930	Hypolipaemic/Antiatherosclerosis	Atherosclerosis
Bolandiol		19793-20-5			

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Bolasterone		1605-89-6			
Boldenone		846-48-0			
bopindolol	2-Propanol, 1-[(1,1-dimethylethyl)amino]-3-[(2-methyl-1H-indol-4-yl)oxy]-, benzoate (ester), (+/−)-[CAS]	62658-63-3 82857-38-3	U.S. 4,340,541	Antihypertensive, adrenergic	Hypertension, general
Bornyl Chloride		464-41-5			
Bornyl Salicylate		560-88-3			
bortezomib	Boronic acid, [(1R)-3-methyl-1-[[(2S)-1-oxo 3-phenyl-2-[(pyrazinylcarbonyl)amino]propyl]amino]-butyl]-[CAS]	179324-69-7	U.S. 6,271,199	Anticancer, other	Cancer, myeloma
Bromocriptine		25614-03-3			
Bromo-diphenhydramine		118-23-0			
Bromoform		75-25-2			
Bromopride		4093-35-0			
Bromo-salicychloranilide		3679-64-9			
bromperidol	1-Butanone, 4-[4-(4-bromophenyl)-4-hydroxy-1-piperidinyl]-1-(4-fluorophenyl)-[CAS]	10457-90-6	U.S. 3,438,991	Neuroleptic	Psychosis, general
Brompheniramine		86-22-6			
Broparoestrol		479-68-5			
Bropirimine		56741-95-8			
brostallicin	4-(2-Bromoacrylamido)-N'''-(2-guanidinoethyl)-1-1',1'',1'''-tetramethyl-N,4':N',4'':N'',4'''-quarter-[pyrrole-2-carboxamide][CAS]			Anticancer, other	Cancer, general
brotizolam	6H-Thieno[3,2-f][1,2,4]triazolo[4,3-a][1,4]diazepine, 2-bromo-4-(2-chlorophenyl)-9-methyl-[CAS]	57801-81-7	U.S. 4,094,984	Hypnotic/Sedative	
Brovincamine		57475-17-9			
Brozuridine		59-14-3			
Broxyquinoline		521-74-4			
Brucine		357-57-3			
β-Sitosterol		83-46-5			
Bucetin		1083-57-4			
Bucillamine		65002-17-7			
Bucindolol		71119-11-4			
buciladesine	Adenosine, N-(1-oxobutyl)-, cyclic 3',5'-(hydrogen phosphate) 2'-butanoate [CAS]	362-74-3	JP 51113896	Cardiostimulant	Wound healing
Buclizine		82-95-1			
Buclosamide		575-74-6			
Bucolome		841-73-6			
bucricaine	9-Acridinamine, N-butyl-1,2,3,4-tetrahydro-, monohydrochloride [CAS]	82636-28-0		Anaesthetic, local	
bosentan	Benzenesulfonamide, 4-(1,1-dimethylethyl)-N-[6-(2-hydroxyethoxy)-5-(2-methoxyphenoxy)[2,2'-bipyrimidin]-4-yl]-[CAS]	147536-97-8	EP 633259	Vasodilator, peripheral	Hypertension, pulmonary

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BP2,94	Phenol, 2-[[[(1R)-2-(1H-imidazol-4-yl)-1-methylethyl][imino]phenylmethyl]-[CAS]	139191-80-3	WO	9117146	Respiratory	Rhinitis, general
BP4,897	N-[4-[4-(2-methoxyphenyl)-1-piperazinyl]butyl]naphthalene-2-carboxamide		EP	779284	Dependence treatment	Addiction, cocaine
β-Propiolactone		57-57-8				
Bradycor		140661-97-8				
Brain Natriuretic Peptide		114471-18-0				
Brallobarbital		561-86-4				
brasofensine	8-Azabicyclo(3.2.1)octane-2-carboxaldehyde, 3-(3,4-dichlorophenyl)-8-methyl-, O-methyloxime, (1R-(1Alpha,2β(E),3Alpha,5Alpha))-[CAS]	171655-91-7	WO	9528401	Antiparkinsonian	Parkinson's disease
Brequinar		96187-53-0				
Bretylium		61-75-6				
Brilliant Green		633-03-4				
brimonidine	6-Quinoxalinamine, 5-bromo-N-(4,5-dihydro-1H-imidazol-2-yl)-[CAS]	59803-98-4	DE	2538620	Antiglaucoma	Glaucoma
brinzolamide	2H-Thieno(3,2-e)-1,2-thiazine-6-sulfonamide, 4-(ethylamino)-3,4-dihydro-2-(3-methoxypropyl)-, 1,1-dioxide, (R)-[CAS]	138890-62-7	U.S.	5,378,703	Antiglaucoma	Glaucoma
brivudin	Uridine, 5-(2-bromoethenyl)-2'-deoxy, (E)-[CAS]	69304-47-8			Antiviral, other	Infection, varicella zoster virus
Brodimoprim		56518-41-3				
Bromazepam		1812-30-2				
bromfenac	Benzeneacetic acid, 2-amino-3-(4-bromobenzoyl)-[CAS]	91714-93-1			Formulation, mucosal, topical	Inflammation, ocular
		91714-94-2				
		3572-43-8				
Bromhexine		1146-98-1				
Bromindione		496-67-3				
Bromisovalum		58409-59-9				
Bucumolol						
budesonide	Pregna-1,4-diene-3,20-dione, 16,17-[butylidenebis(oxy)]-11,21-dihydroxy-, (11β,16Alpha)-[CAS]	51333-22-3	GB	1429922	Antiasthma	Asthma
budesonide + formoterol	Pregna-1,4-diene-3,20-dione, 16,17-[butylidenebis(oxy)]-11,21-dihydroxy-, (11β,1bAlpha) + formamide, N-[2-hydroxy-5-[1-hydroxy-2-[[2-(4-methoxyphenol)-1-methylethyl]amino]ethyl]phenyl]-(R*,R*)-(±)				Formulation, fixed-dose combinations	Asthma
budipine	Piperidine, 1-(1,1-dimethylethyl)-4,4-diphenyl-[CAS]	57982-78-2	DE	2825322	Antiparkinsonian	Parkinson's disease
		63661-61-0				
Budralazine		36798-79-5				
Bufeniode		22103-14-6				
Bufetolol		53684-49-4				

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bufexamac	p-butoxyacetohydroxamic acid	2438-72-4	U.S.	3,479,396	Anti-inflammatory	
bufuralol	1-Butanone, 4-(1-pyrrolidinyl)-1-(2,4,6-trimethoxyphenyl)-[CAS]	35543-24-9 55837-25-7 692-13-7 54340-62-4	GB	1325192	Vasodilator, peripheral	
Bufotenin						
Bufuralol						
Bumadizon		3583-64-0				
bumetanide	Benzoic acid, 3-(aminosulfonyl)-5-(butylamino)-4-phenoxy-[CAS]	28395-03-1	U.S.	3,806,534	Antihypertensive, diuretic	Hypertension, general
bunaftine	1-Naphthalenecarboxamide, N-butyl-N-[2-(diethylamino)ethyl]-[CAS]	32421-46-8	DE	2009894	Antiarrhythmic	
Bunamiodyl Sodium		1923-76-8				
bunazosin	1H-1,4-Diazepine, 1-(4-amino-6,7-dimethoxy-2-quinazolinyl)hexahydro-4-(1-oxobutyl)-[CAS]	52712-76-2 80755-51-7	GB	1398455	Antihypertensive, adrenergic	Hypertension, general
bunitrolol	Benzonitrile, 2-[3-[(1,1-dimethylethyl)amino]-2-hydroxypropoxy]-[CAS]	34915-68-9	U.S.	3,940,489	Antihypertensive, adrenergic	
bupivacaine	2-Piperidinecarboxamide, 1-butyl-N-(2,6-dimethylphenyl)-[CAS]	38396-39-3 2180-92-9			Formulation, modified-release, >24 hr	Anaesthesia
Bupranolol		14556-46-8				
buprenorphine	6,14-Ethenomorphinan-7-methanol, 17-(cyclopropylmethyl)-Alpha-(1,1-dimethylethyl)-4,5-epoxy-18,19-dihydro-3-hydroxy-6-methoxy-Alpha-methyl-, [5Alpha,7Alpha(S)]-[CAS]	52485-79-7 53152-21-9	U.S.	3,433,791	Analgesic, other	
bupropion	1-Propanone, 1-(3-chlorophenyl)-2-[(1,1-dimethylethyl)amino]-, (+/−)-[CAS]	31677-93-7 34911-55-2 4663-83-6	U.S.	4,425,363	Antidepressant	Depression, general
Buramate						
buserelin	Luteinizing hormone-releasing factor (pig), 6-[O-(1,1-dimethylethyl)-D-serine]-9-(N-ethyl-L-prolinamide)-10-deglycinamide-[CAS]	57982-77-1 68630-75-1	GB	1523623	Releasing hormones	Cancer, prostate
buspirone	8-Azaspiro[4.5]decane-7,9-dione, 8-[4-[4-(2-pyrimidinyl)-1-piperazinyl]butyl]-[CAS]	36505-84-7	EP	276536	Anxiolytic	Anxiety, general
busulfan	1,4-Butanediol, dimethanesulfonate [CAS]	55-98-1			Formulation, optimized, microparticles	Cancer, general
busulfan	1,4-Butanediol, dimethanesulfonate [CAS]	55-98-1			Formulation, parenteral, other	Cancer, leukaemia, acute myeolgenous
Butabarbital		143-81-7				
Butacaine		149-16-6				
Butacetin		2109-73-1				
Butalamine		22131-35-7				
Butalbital		77-26-9				
Butallylonal		1142-70-7				

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butamben	4-Aminobenzoic acid butyl ester [CAS]	94-25-7		Formulation, modified-release, other	Pain, cancer
butamirate	Benzeneacetic acid, Alpha-ethyl-, 2[2-(diethylamino)ethoxy]ethylester, 2-hydroxy-1,2,3-propanetricarboxylate (1:1) [CAS]	18109-80-3 18109-81-4		Antitussive	Cough
Butanilicaine		3785-21-5			
Butaperazine		653-03-2			
Butaverine		55837-14-4			
Butazolamide		16790-49-1			
Butedronic Acid		51395-42-7			
butenafine	1-Naphthalenemethanamine, N-((4-(1,1-dimethylethyl)phenyl)methyl)-N-methyl-[CAS]	101827-46-7 101828-21-1	EP 164697	Antifungal	Infection, dermatological
Butethal		77-28-1			
Butethamate		14007-64-8			
Butethamine		2090-89-3			
Buthalital		510-90-7			
Buthiazide		2043-38-1			
Butibufen		55837-18-8			
Butidrine		1506-12-3			
butobendine	benzoic acid, 3,4,5-trimethoxy-, 1,2-ethanediylbis[(methylimino)(2-ethyl-2,1-ethanediyl)]ester, [S-(R*,R*)]-[CAS]	55769-64-7 55769-65-8	U.S. 4,012,473	Antiarrhythmic	Arrhythmia, general
butoconazole	1H-Imidazole, 1-[4-(4-chlorophenyl)-2-[(2,6-dichlorophenyl)thio]butyl]-, (+/−)-[CAS]	64872-76-0 64872-77-1	GB 1567431	Antifungal	Infection, Candida, general
Butoctamide		32838-26-9			
Butofilolol		64552-17-6			
butorphanol	Morphinan-3,14-diol, 17-(cyclobutylmethyl)-, [S-(R*,R*)]-2,3-dihydroxybutanedioate (1:1) (salt) [CAS]	42408-82-2 58786-99-5	GB 1412129	Analgesic, other	
Butoxycaine		3772-43-8			
Butriptyline		35941-65-2			
Butropium		29025-14-7			
Buzepide		3691-21-2			
BVT-5182			WO 0208178	Anorectic/ Antiobesity	Obesity
BXT-51072	2H-1,2-Benzoselenazine, 3,4-dihydro-4,4-dimethyl-[CAS]	173026-17-0		GI inflammatory/ bowel disorders	Colitis, ulcerative
C-1311	6H-Imidazo[4,5,1-de]acridin-6-one, 5-[[2-(diethylamino)ethyl]amino]-8-hydroxy-, 2HCl, 2H2O			Anticancer, other	Cancer, general
cabergoline	Ergoline-8-carboxamide, N-[3-(dimethylamino)propyl]-N-[(ethylamino)carbonyl]-6-(2-propenyl)-, (8β)-[CAS]	81409-90-7 83329-89-1	GB 2103603	Antiprolactin	Galactorrhoea
Cabergoline		81409-90-7			
Cacodylic Acid		75-60-5			
Cactinomycin		8052-16-2			

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cadexomer iodine	Cadexomer iodine [CAS]	94820-09-4		Anti-infective, other	Ulcer, venostasis
Cadmium Salicylate		19010-79-8			
Cadralazine		64241-34-5			
Cafaminol		30924-31-3			
caffeine	1,2,3,-Propanetricarboxylic acid, 2-hydroxy mixt. with 3,7-dihydro-1,4,7-trimethyl-1H-purine-2,6-dione [CAS]	69-22-7 58-08-2		Respiratory	Apnoea
Calcifediol		19356-17-3			
Calcipotriene		112965-21-6			
calcipotriol	9,10-Secochola-5,7,10(19),22-tetraene-1,3,24-triol, 24-cyclopropyl-, (1Alpha,3β,5Z,7E,22E)-[CAS]	112965-21-6	WO 8700834	Antipsoriasis	Psoriasis
calcipotriol + betamethasone	9,10-Secochola-5,7,10(19),22-tetraene-1,3,24-triol, 24-cyclopropyl-, (1Alpha,3β,5Z,7E,22E) + Pregna-1,4-diene-3,20-dione, 9-chloro-11β,17,21-trihydroxy-16β-methyl, 17,21-dipropionate			Formulation, fixed-dose combinations	Psoriasis
calcitriol	9,10-Secocholesta-5,7,10(19)-triene-1,3,25-triol, (1Alpha,3β,5Z,7E)-[CAS]	32222-06-3		Antipsoriasis	Psoriasis
Calcium 3-Aurothio-2-propanol-1-sulfonate		5743-29-3			
Calcium Acetylsalicylate		69-46-5			
Calcium Bromolactobionate		33659-28-8			
Calcium Carbonate		471-34-1			
Calcium Gluconate		299-28-5			
Calcium Glycerophosphate		27214-00-2			
calcium hopantothenate	Calcium D-(+)-4-(2,4-dihydroxy-3,3-dimethylbutyramido)butyrate (hemihydrate) [CAS]	17097-76-6	EP 117260	Neurological	Attention deficit disorder
Calcium Iodobehenate		1319-91-1			
Calcium Iodostearate		1301-16-2			
Calcium Lactate		814-80-2			
Calcium Levulinate		591-64-0			
Calcium Mesoxalate		21085-60-9			
Calcium N-Carbamoylaspartate		16649-79-9			
calcium polycarbophil	Polycarbophil, calcium salt-[CAS]	126040-58-2 9003-97-9		GI inflammatory/ bowel disorders	Irritable bowel syndrome
Calcium Propionate		4075-81-4			
Calcium Succinate		140-99-8			
caldaret	5-methyl-2-(1-piperazinyl)-benzenesulfonic acid monohydrate	133804-44-1		Cardiostimulant	Heart failure
Caliusterone		17021-26-0			
Camazepam		36104-80-0			

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
camostat	Benzeneacetic acid, 4-[[4-[(aminoiminomethyl)amino]benzoyl]oxy]-, 2-(dimethylamino)-2-oxoethyl ester, monomethanesulfonate [CAS]	59721-28-7 59721-29-8 71079-09-9	U.S. 4,021,472	GI inflammatory/ bowel disorders	Pancreatitis
Camphor		76-22-2			
Camphotamide		4876-45-3			
camptothecin	4-Ethyl-4-hydroxy-1H-pyrano-[3'4':6,7]indolizino[1,2-b;]quinoline-3,14(4H,12H)-dione			Formulation, optimized, microemulsion	Cancer, general
Candesartan		139481-59-7			
candesartan cilexetil	1H-Benzimidazole-7-carboxylic acid, 2-ethoxy-1-[[2'-(1H-tetrazol-5-yl)[1,1'-biphenyl]-4-yl]methyl]-, 1-[[(cyclohexyloxy)carbonyl]oxy]ethyl ester, (+/−)-[CAS]	145040-37-5	EP 520423	Antihypertensive, renin system	Hypertension, general
Candoxatril		123122-55-4			
canertinib	N-[4-(3-Chloro-4-fluoro-phenylamino)-7-(3-morpholin-4-yl-propoxy)-quinazolin-6-yl]-acrylamide	289499-45-2		Anticancer, other	Cancer, lung, non-small cell
Canrenone		976-71-6			
Cantharidin		56-25-7			
cantuzumab mertansine	Maytansine, N2-deacetyl-N2-(3-mercapto-1-oxopropyl)-, conjugated humanized C242 monoclonal antibody	139504-50-0		Immunotoxin	Cancer, colorectal
capecitabine	Cytidine, 5-deoxy-5-fluoro-N-[(pentyloxy)carbonyl]-[CAS]	154361-50-9	EP 602454	Anticancer, antimetabolite	Cancer, breast
Capobenic Acid		21434-91-3			
capravirine	1H-imidazole-2-methanol, 5-(3,5-dichlorophenyl)thio-4-(1-methylethyl)-1-(4-pyridinyl)methyl carbamate (ester) [CAS]	178979-85-6		Antiviral, anti-HIV	Infection, HIV/AIDS
Capromab		151763-64-3			
capsaicin cream	N-[(4-hydroxy-3-methoxyphenyl)methyl]-8-methyl-, (E)-[CAS]	404-86-4		Formulation, dermal, topical	Pain, post-herpetic
Captodiamine		486-17-9			
captopril	L-Proline, 1-(3-mercapto-2-methyl-1-oxopropyl)-, (S)-[CAS]	62571-86-2	U.S. 4,105,776	Antihypertensive, renin system	Hypertension, general
captopril + HCTZ	L-Proline, 1-(3-mercapto-2-methyl-1-oxopropyl)-, (S)-, mixt. with 6-chloro-3,4-dihydro-2H-1,2,4-benzothiadiazine-7-sulfonamide 1,1-dioxide [CAS]	110075-07-5	U.S. 4,217,347	Antihypertensive, renin system	
Capuride		5579-13-5			
carabersat	Benzamide, N-(6-acetyl-3,4-dihydro-3-hydroxy-2,2-dimethyl-2H-1-benzopyran-4-yl)-4-fluoro, (3R-trans)-[CAS]	184653-84-7	WO 9811890	Antiepileptic	Epilepsy, general
Caraniphen		77-22-5			
carazolol	2-Propanol, 1-(9H-carbazol-4-yloxy)-3-[(1-methylethyl)amino]-[CAS]	57775-29-8	DE 2240599	Antihypertensive, adrenergic	
Carbachol		51-83-2			

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
carbamazepine	5H-Dibenz[b,f]azepine-5-carboxamide [CAS]	298-46-4		Formulation, modified-release, other	Epilepsy, general
Carbamide Peroxide		124-43-6			
Carbarsone		121-59-5			
Carbaryl		63-25-2			
Carbazochrome		13051-01-9			
		51460-26-5			
carbendazim	Methyl-2-benzimidazolecarbamate			Anticancer, other	Cancer, general
Carbenicillin		4697-36-3			
Carbenoxolone		5697-56-3			
Carbetapentane		77-23-6			
Carbicarb	Carbonic acid disodium salt, mixt. with monosodium salt-[CAS]	72227-05-5		Alimentary/ Metabolic, other	Acidosis
Carbidopa		28860-95-9			
carbidopa + levodopa-1	S-Alpha Hydrazino-3,4-dihydroxy-Alpha methyl benzene propanoic acid monohydrate + 3-hydroxy-L-tyrosine			Formulation, fixed-dose combinations	Parkinson's disease
Carbimazole		22232-54-8			
Carbinoxamine		486-16-8			
Carbocloral		541-79-7			
carbocysteine		151756-26-2	EP 546272	Cystic fibrosis treatment	Cystic fibrosis
		638-23-3			
Carbon Tetrachloride		56-23-5			
carboplatin	Platinum, diammine[1,1-cyclobutanedicarboxylate(2-)]-, (SP-4-2)-[CAS]	41575-94-4		Anticancer, alkylating	Cancer, ovarian
Carboprost		35700-23-3			
carboprost trometamol	Prosta-5,13-dien-1-oic acid, 9,11,15-trihydroxy-15-methyl-, (5Z,9,alpha.,11Alpha,13E,15S)-, compd. with 2-amino-2-(hydroxymethyl)-1,3-propanediol(1:1) [CAS]	58551-69-2	U.S. 3,728,382	Prostaglandin	Abortion
		74849-93-7			
Carboquone	2,5-Cyclohexadiene-1,4-dione, 2-[2-[(aminocarbonyl)oxy]-1-methoxyethyl]-3,6-bis(1-aziridinyl)-5-methyl-[CAS]	24279-91-2	DE 1905224	Anticancer, antibiotic	
Carbromal		77-65-6			
Carbubarb		960-05-4			
Carbutamide		339-43-5			
Carbuterol		34866-47-2			
Carfimate		3567-38-2			
carglumic acid	N-Carbamoyl-L-glutamic acid	1188-38-1		Metabolic and enzyme disorders	Hyper-ammonaemia
Cargutocin		33605-67-3			
Carindacillin		35531-88-5			
cariporide	Benzamide, N-(aminoiminomethyl)-4-(1-methylethyl)-3-(methylsulfonyl)-[CAS]	159138-80-4	EP 589336	Antianginal	Angina, general
		159138-81-5			
Cariporide Carisoprodol		159138-80-4			
		78-44-4			

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carmofur	1(2H)-Pyrimidinecarboxamide, 5-fluoro-N-hexyl-3,4-dihydro-2,4-dioxo-[CAS]	61422-45-5	U.S.	4,071,519	Anticancer, antimetabolite	
Carnoxirole		98323-83-2				
carmustine	Urea, N,N'-bis(2-chloroethyl)-N-nitroso-[CAS]	154-93-8			Formulation, implant	Cancer, brain
Carnitine		461-06-3				
Caroverine		23465-76-1				
Caroxazone		18464-39-6				
Carphenazine		2622-30-2				
Carpipramine		5942-95-0				
carprofen	9H-Carbazole-2-acetic acid, 6-chloro-Alpha-methyl-, (+/-)-[CAS]	53716-49-7	U.S.	3,896,145	Anti-inflammatory	
Carsalam		2037-95-8				
carteolol	2(1H)-Quinolinone, 5-[3-[(1,1-dimethylethyl)amino]-2-hydroxypropoxy]-3,4-dihydro-, monohydrochloride [CAS]	51781-06-7 51781-21-6	U.S.	3,910,924	Antihypertensive, adrenergic	Glaucoma
Carticaine		23964-58-1				
Carubicin		50935-04-1				
Carumonam		87638-04-8				
Carvacrol		499-75-2				
carvedilol	2-Propanol, 1-(9H-carbazol-4-yloxy)-3-[[2-(2-methoxyphenoxy)ethyl]amino]-[CAS]	72956-09-3	EP	4920	Antihypertensive, adrenergic	Hypertension, general
Carvone		99-49-0				
Cascarillin		10118-56-6				
caspofungin	Pneumocandin B0, 1-((4R,5S)-5-((2-aminoethyl)amino)-N2-(10,12-dimethyl-1-oxotetradecyl)-4-hydroxy-L-ornithine)-5-(threo-3-hydroxy-L-ornithine)-, diacetate (salt) [CAS]	162808-62-0 179463-17-3	WO	9421677	Antifungal	Infection, Aspergillus
Catechin		154-23-4				
cathepsin K inhibitors	N-(1-benzothien-2-ylcarbonyl)-N-[2-(2-fluorophenyl)-4-oxo-1,2,3,4-tetrahydropyrimidin-5-yl]-L-leucinamide		WO	9613523	Osteoporosis treatment	Osteoporosis
cathepsin S inhibitors	N-(1-benzothien-2-ylcarbonyl)-N-[2-(2-fluorophenyl)-4-oxo-1,2,3,4-tetrahydropyrimidin-5-yl]-L-leucinamide				Antiasthma	Asthma
CC-401			U.S.	6,342,595	Immunosuppressant	Arthritis, rheumatoid
CCI-779	Rapamycin 42-(3-hydroxy-2-(hydroxymethyl)-2-methylpropanoate) [CAS]	162635-04-3			Anticancer, antibiotic	Cancer, renal
CCR5 antagonists			WO	9732019	Antiviral, anti-HIV	Infection, HIV/AIDS
CDC-394			U.S.	634061	Anticancer, other	Cancer, myeloma
CDC-801			U.S.	5,605,914	GI inflammatory/ bowel disorders	Crohn's disease
CEE-03-310	1H-3-Benzazepin-7-ol, 5-(2,3-dihydro-7-benzofuranyl)-2,3,4,5,-tetrahydro-3-methyl-8-nitro, (5S)-[CAS]	128022-68-4	EP	347672	Dependence treatment	Addiction, alcohol

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API Generic Name	API Chemical Name	CAS No.		Patent Reference	Example of Therapeutic Use	Example of Indication
cefactor	5-Thia-1-azabicycol[4.2.0]oct-2-ene-2-carboxylic acid, 7-[(aminophenylacetyl)amino]-3-chloro-8-oxo-, [6R-[6Alpha,7β(R*)]]-[CAS]	53994-73-3 70356-03-5	GB	1461323	Cephalosporin, oral	Infection, *Haemophilus influenzae prophylaxis*
cefadroxil	5-Thia-1-azabicycol[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[amino(4-hydroxyphenyl)acetyl]amino]-3-methyl-8-oxo-, [6R-[6Alpha,7β(R*)]]-[CAS]	50370-12-2 66592-87-8	GB	1240687	Cephalosporin, oral	Infection, general
cefalexin	5-Thia-1-azabicycol[4.2.0]oct-2-ene-2-[(aminophenylacetyl)amino]-3-methyl-8-oxo-, (2,2-dimethyl-1-oxopropoxy)methyl ester, monohydrochloride, [6R-[6Alpha,7β(R*)]]-[CAS]	105879-42-3 15686-71-2	U.S.	4,775,751	Cephalosporin, oral	Infection, respiratory tract, upper
cefalexin pivoxil	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[(aminophenylacetyl)amino]-3-methyl-8-oxo-, [6R-[6Alpha,7β(R*)]]-[CAS]	27726-31-4			Cephalosporin, oral	Infection, general
cefamandole	7-D-mandelamido-3[[(1-methyl-1H-tetrazol-5-yl)thio]methyl]-3-cephem-4-carboxylic acid	34444-01-4	U.S.	3,641,021	Cephalosporin, injectable	Infection, general
cefatrizine	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[amino(4-hydroxyphenyl)acetyl]amino]-8-oxo-3-[(1H-1,2,3-triazol-4-ylthio)methyl]-, [6R-[6Alpha,7β(R*)]]-[CAS]	51627-14-6	GB	1460914	Cephalosporin, oral	Infection, general
Cefazedone		56187-47-4				
Cefazolin		25953-19-9				
Cefbuperazone		76610-84-9				
cefcapene pivoxil	7β-[(Z)-2-(2-amino-4-thiazolyl)-2-pentenoylamino]-3-carbamoyloxymethyl-3-cephem-4-carboxylic acid, pivaloyloxymethyl ester HCl-[CAS]	105889-43-0 105889-46-1	GB	2173194	Cephalosporin, oral	Infection, respiratory tract, general
Cefclidin		105239-91-6				
cefdinir	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazolyl)(hydroxyimino)acetyl]amino]-3-ethenyl-8-oxo-, [6R-[6Alpha,7β(Z)]]-[CAS]	91832-40-5	EP	105459	Cephalosporin, oral	Infection, dermatological
cefditoren pivoxil	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazolyl)(methoxyimino)acetyl]amino]-3-[2-(4-methyl-5-thiazolyl)ethenyl]-8-oxo-, (2,2-dimethyl-1-oxopropoxy)methyl ester, [6R-[3(Z),6Alpha,7β(Z)]]-[CAS]	104145-95-1 104146-53-4 117467-28-4	JP	61178991	Cephalosporin, oral	Infection, general
cefepime	Pyrrolidinium, 1-[[7-[[(2-amino-4-thiazolyl)(methoxyimino)acetyl]amino]-2-carboxy-8-oxo-5-thia-1-azabicyclo[4.2.0]oct-2-en-3-yl]methyl]-1-methyl-, hydroxide, inner salt, [6R-[6Alpha,7β(Z)]]-[CAS]	107648-80-6 123171-59-5 88040-23-7	EP	531981	Cephalosporin, injectable	Infection, respiratory tract, lower

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Cefetamet		65052-63-3				
cefetamet pivoxil	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazolyl)(methoxyimino)acetyl]amino]-3-methyl-8-oxo-, (2,2-dimethyl-1-oxopropoxy)methyl ester, monohydrochloride, [6R-[6Alpha,7β(Z)]]-[CAS]	111696-23-2	GB	1581854	Cephalosporin, oral	Infection, general
cefixime	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazolyl)[(carboxymethoxy)imino]acetyl]-amino]-3-ethenyl-8-oxo-, [6R-[6Alpha,7β(Z)]]-[CAS]	79350-37-1	EP	30630	Cephalosporin, oral	Infection, general
cefmenoxime	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazolyl)(methoxyimino)acetyl]amino]-3-[[(1-methyl-1H-tetrazol-5-yl)thio]methyl]-8-oxo-, [6R-[6Alpha,7β(Z)]]-[CAS]	65085-01-0 75738-58-8	GB	1536281	Cephalosporin, injectable	Infection, ocular
cefmetazole	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[[(cyanomethyl)thio]acetyl]amino]-7-methoxy-3-[[(1-methyl-1H-tetrazol-5-yl)thio]methyl]-8-oxo-, (6R-cis)-[CAS]	56796-20-4 56796-39-5	GB	1449420	Cephalosporin, infectable	Infection, general
cefminox	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[[(2-amino-2-carboxyethyl)thio]acetyl]amino]-7-methoxy-3-[[(1-methyl-1H-tetrazol-5-yl)thio]methyl]-8-oxo-, [6R-[6Alpha,7Alpha,7(S*)]]-[CAS]	84305-41-9	EP	24879	Cephalosporin, injectable	Infection, urinary tract
cefodizime	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazoryl)(methoxyimino)acetyl]amino]-3-[[[5-(carboxymethyl)-4-methyl-2-thiazolyl]thio]methyl]-8-oxo-, [6R-[6Alpha,7β(Z)]]-[CAS]	69739-16-8 86329-79-5	U.S.	4,590,267	Cephalosporin, injectable	Infection, respiratory tract, lower
cefonicid	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[(hydroxyphenylacetyl)-amino]-8-oxo-3-[[[1-(sulfomethyl)-1H-tetrazol-5-yl]thio]methyl]-, disodium salt, [6R-[6Alpha,7β(R*)]]-[CAS]	61270-78-8 61270-58-4	GB	1547473	Cephalosporin, injectable	Infection, general
cefoperazone	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[[[(4-ethyl-2,3-dioxo-1-piperazinyl)carbonyl]amino](4-hydroxyphenyl)acetyl]amino]-3-[[(1-methyl-1H-tetrazol-5-yl)thio]methyl]-8-oxo-, [6R-[6Alpha,7β(R*)]]-[CAS]	62893-19-0	GB	1508071	Cephalosporin, injectable	Infection, general
cefoperazone + sulbactam		92739-15-6	U.S.	4,234,579	Antibiotic, other	Infection, general
Ceforanide		60925-61-3				

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cefoselis	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazolyl)(methoxyimino)acetyl]amino]-3-[[2,3-dihydro-2-(2-hydroxyethyl)-3-amino-1H-pyrazol-1-yl]methyl]-8-oxo-, [6R-[6Alpha,7[Z]]]	122841-12-7 122841-10-5	EP	307804	Cephalosporin, injectable	Infection, general
cefotaxime	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazolyl)(methoxyimino)acetyl]amino]-3-(acetyloxy)methyl]-8-oxo-, (6R,7R)-	64485-93-4 63527-52-6	GB	1580621	Cephalosporin, injectable	Infection, general
Cefotetan		69712-56-7				
cefotiam	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazolyl)acetyl]amino]-3-[[[1-[2-(dimethylamino)ethyl]-1H-tetrazol-5-yl]thio]methyl]-8-oxo-, (6R-trans)-[CAS]	61622-34-2 66309-69-1	U.S.	4,080,498	Cephalosporin, injectable	Infection, general
cefotiam hexetil	1-(cyclohexloxycarbonyloxy)ethyl 7β-[2-(2-aminothiazol-4-yl)acetamido]-3-[[[1-(2-dimethylaminoethyl)-1H-tetrazol-5-yl]thio]methyl]ceph-3-em-4-carboxylate 2HCl [CAS]	95789-30-3	EP	128029	Cephalosporin, oral	Infection, respiratory tract, lower
cefoxitin	5-Thia-1-azabicyclo(4.2.0)oct-2-ene-2-carboxylic acid, 3-(((aminocarbonyl)oxy)methyl)-7-methoxy-8-oxo-7-((2-thienylacetyl)amino)-, monosodium salt, (6R-cis)-[CAS]	33564-30-5 35607-66-0	GB	1348984	Cephalosporin, oral	Infection, general
cefozopran	Imidazo[1,2-b]pyridazinium, 1-[[7-[[(5-amino-1,2,4-thiadiazol-3-yl)(methoxyimino)acetyl]amino]-2-carboxy-8-oxo-5-thia-1-azabicyclo[4.2.0]oct-2-en-3-yl]methyl]-, hydroxide, inner salt, [6R-[6Alpha,7[Z]]]-[CAS]	113359-04-9	EP	203271	Cephalosporin, injectable	Infection, general
cefpimizole	Pyridinium, 1-[[2-carboxy-7-[[[[(5-carboxy-1H-imidazol-4-yl)carbonyl]amino]-phenylacetyl]amino]-8-oxo-5-thia-1-azabicyclo[4.2.0]oct-2-en-3-yl]methyl]-4-(2-sulfoethyl)-, hydroxide, inner salt, [6R-[6Alpha,7β(R*)]]-[CAS]	84880-03-5 85287-61-2	EP	60028	Cephalosporin, injectable	Infection, respiratory tract, general
cefpiramide	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[[[(4-hydroxy-6-methyl-3-pyridinyl)carbonyl]amino](4-hydroxyphenyl)acetyl]amino]-3-[[(1-methyl-1H-tetrazol-5-yl)thio]methyl]-8-oxo-, [6R-[6Alpha,7β(R*)]]-[CAS]	70797-11-4	U.S.	4,156,724	Cephalosporin, injectable	Infection, general
cefpirome	5H-1-Pyrindinium, 1-[[7-[[(2-amino-4-thiazolyl)(methoxyimino)acetyl]amino]-2-carboxy-8-oxo-5-thia-1-azabicyclo[4.2.0]oct-2-en-3-yl]methyl]-6,7-dihydro-,hydroxide, inner salt, [6R-[6Alpha,7β(Z)]]-[CAS]	84957-29-9 98753-19-6	EP	64740	Cephalosporin, injectable	Infection, respiratory tract, lower

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Cefpodoxime Proxetil		87239-81-4				
cefprozil	5-Thio-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[amino(4-hydroxyphenyl)acetyl]amino]-8-oxo-3-(1-propenyl)-, [6R-[6Alpha,7β(R*)]]-[CAS]	92665-29-7	GB	2173798	Cephalosporin, oral	Infection, dermatological
cefroxadine	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[(amino-1,4-cyclohexadien-1-yl)acetyl)amino]-3-methoxy-8-oxo-, [6R-[6Alpha,7β(R*)]]-[CAS]	51762-05-1	GB	1435111	Cephalosporin, oral	Infection, general
cefsulodin	Pyridinium, 4-(aminocarbonyl)-1-[[2-carboxy-8-oxo-7-[(phenylsulfoacetyl)amino]-5-thia-1-azabicyclo[4.2.0]oct-2-en-3-yl]methyl]-, hydroxide, inner salt, [6R-[6Alpha,7β(R*)]]-[CAS]	52152-93-9 62587-73-9	GB		Cephalosporin, injectable	Infection, pseudomonal
ceftazidime	Pyridinium, 1-[[7-[[(2-amino-4-thiazolyl)[(1-carboxy-1-methylethoxy)imino]acetyl]amino]-2-carboxy-8-oxo-5-thia-1-azabicyclo[4.2.0]oct-2-en-3-yl]methyl]-, hydroxide, inner salt, [6R-[6Alpha,7β(Z)]]-[CAS]	72558-82-8	GB	2025398	Cephalosporin, injectable	Infection, respiratory tract, upper
Cefteram		82547-58-8				
Ceftezole		26973-24-0				
ceftibuten	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[2-(2-amino-4-thiazolyl)-4-carboxy-1-oxo-2-butenyl]amino]-8-oxo-, [6R-[6Alpha,7β(Z)]]-[CAS]	97519-39-6	EP		Cephalosporin, oral	Infection, respiratory tract, lower
ceftizoxime	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[2-(2-amino-4-thiazolyl)-(methoxyimino)acetyl]amino]-8-oxo-, [6R-[6Alpha,7β(Z)]]-[CAS]	68401-81-0 68401-82-1	GB	1600735	Cephalosporin, injectable	Infection, general
ceftizoxime alapivoxil	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[[[2-[(2-amino-1-oxopropyl)amino]-4-thiazolyl](methoxyimino)acetyl]amino]-8-oxo-, (2,2-dimethyl-1-oxopropoxy)methyl ester, monohydrochloride, [6R-[6Alpha,7β(Z(S*))]]-[CAS]	113812-94-5 135767-36-1	JP	62209112	Cephalosporin, oral	Infection, general
ceftriaxone	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2-amino-4-thiazolyl)(methoxyimino)acetyl]amino]-8-oxo-3-[[(1,2,5,6-tetrahydro-2-methyl-5,6-dioxo-1,2,4-triazin-3-yl)thio]methyl]-, [6R-[6Alpha,7β(Z)]]-[CAS]	73384-59-5 74578-69-1	GB	2022090	Cephalosporin, injectable	Infection, respiratory tract, lower

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cefuroxime axetil	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 3-[[(aminocarbonyl)oxy]methyl]-7-[[2-furanyl(methoxyimino)acetyl]amino]-8-oxo-, 1-(acetyloxy)ethyl ester, [6R-[6Alpha,7β(Z)]]- [CAS]	15686-71-2 64544-07-6	GB	1571683	Cephalosporin, oral	Infection, respiratory tract, upper
cefuroxime	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 3-[[(aminocarbonyl)oxy]methyl]-7-[[2-furanyl(methoxyimino)acetyl]amino]-8-oxo-, 1-(acetyloxy)ethyl ester, [6R-[6Alpha,7β(Z)]]- [CAS]	55268-75-2 56238-63-2	GB	1453049	Cephalosporin, injectable	Infection, general
Cefuzonam		82219-78-1	U.S.	5,760,068	Antiarthritic, other	Arthritis, rheumatoid
celecoxib	Benzenesulfonamide, 4-(5-(4-methylphenyl)-3-(trifluoromethyl)-1H-pyrazol-1-yl)- [CAS]	169590-42-5				
celgosivir	Butanoic acid, octahydro-1,7,8-trihydroxy-6-indolizinyl ester, [1S-(1Alpha,6β,7Alpha,8β,8aβ)]- [CAS]	121104-96-9	U.S.	5,017,563	Antiviral, other	Infection, hepatitis virus, general
celiprolol	Urea, N'-[3-acetyl-4-[3-[(1,1-dimethylethyl)amino]-2-hydroxypropoxy]phenyl]-N,N-diethyl- [CAS]	56980-93-9 57470-78-7	GB	1441359	Antihypertensive, adrenergic	Angina, unstable
Cellulose Ethyl Hydroxyethyl Ether						
CEP-1347	9,12-Epoxy-1H-diindolo[1,2,3-fg:3',2',1'-kl]pyrrolo[3,4-i][1,6]benzodiazocine-10-carboxylic acid, 5,16-bis((ethylthio)methyl)-2,3,9,10,11,12-hexahydro-10-hydroxy-9-methyl-1-oxo-, methyl ester, (9S,10R,12R)- [CAS]	156177-65-0	WO	9731002	Antiparkinsonian	Parkinson's disease
CEP-701	9,12-Epoxy-1H-diindolo[1,2,3-fg:3',2',1'-kl]pyrrolo[3,4-i][1,6]benzodiazocin-1-one-, 2,3,9,10,11,12-hexahydro-10-hydroxy-10-(hydroxymethyl)-9-methyl-, (9S,10S,12R)- [CAS]	111358-88-4			Anticancer, antimetabolite	Cancer, prostate
Cephacetrile		23239-41-0				
Cephaeline		493-17-0				
Cephalexin		15686-71-2				
Cephaloglycin		3577-1-3				
Cephaloridine		50-59-9				
Cephalosporin C		61-24-5				
Cephalothin		153-61-7				
Cephapirin		24356-60-3				
Cephradine		38821-53-3				
Cerivastatin		145599-86-6				
Ceronapril		111223-26-8				
certoparin	Heparin [CAS]	9005-49-6			Anticoagulant	Thrombosis, venous
Ceruletide		17650-98-5				

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Cerviprost	Prosta-5,13-dien-1-oic acid, 11,15-dihydroxy-9-oxo-, (5Z,11Alpha,13E,-15S)-[CAS]	363-24-6		Formulation, dermal, topical	
Cetalkonium		122-18-9			
Cetamolol		34919-98-7			
Cethexonium		1794-74-7			
cethromycin	2H-Oxacyclotetradecino[4,3-d]oxazole-2,6,8,14(1H,7H,9H)-tetrone 4-ethyloctahydro-3a,7,9,11,13,15-hexamethyl-11-((3-(3-quinolinyl)-2-propenyl)oxy)-10-((3,4,6-trideoxy-3-(dimethylamino)-β-D-xylo-hexapyranosyl)oxy)-,(3aS,4R,7R,9R,10R,11R,13R,15R,15aR)-[CAS]	205110-48-1	EP 929563	Macrolide antibiotic	Infection, respiratory tract, general
Cetiedil		14176-10-4			
Cetirizine		83881-51-0			
cetirizine	Acetic acid, [2-[4-[(4-chlorophenyl)phenylmethyl]-1-piperazinyl]-, [CAS]	83881-51-0	EP 58146	Antiallergic, non-asthma	Allergy, general
		83881-52-1			
cetirizine + pseudoephedrine	Acetic acid, [2-[4-[(4-chlorophenyl)phenylmethyl]-1-piperazinyl]ethoxy]-, dihyrochloride, Benzenemethanol, Alpha-[1-(methylamino)ethyl]-, hydrochloride, [S-(R*,R*)]-	83881-52-1		Formulation, optimized, microencapsulate	Allergy, general
		90-82-4			
Cetotiamine		137-76-8			
Cetoxime		25394-78-9			
cetraxate	Benzenepropanoic acid, 4-[[[4-(aminomethyl)cyclohexyl]carbonyl]oxy]-, trans-[CAS]	27724-96-5	JP 48075547	Antiulcer	
		34675-84-8			
Cetrimonium		57-09-0			
Cetrorelix		120287-85-6			
Cetyldimethylethyl-ammonium		124-03-8			
Cetylpyridinium		123-03-5			
cevimeline	Spiro[1-azabicyclo[2.2.2]octane-3,5'-[1,3]oxathiolane], 2'-methyl-, cis-[CAS]	107220-27-9	EP 205247	Stomatological	Sjogran's syndrome
		107233-08-9			
CG-1521	7-phenyl-2,4,6-heptatrienoylhydroxamic acid			Anticancer, other	Cancer, general
Chaulmoogric Acid		29106-32-9			
Chenodiol		474-25-9			
CHF-3381			EP 951465	Analgesic, other	Pain, neuropathic
Chlophedianol		791-35-5			
Chloracizine		800-22-6			
chloral	1,1-Ethanediol, 2,2,2-trichloro-[CAS]	302-17-0		Formulation, transmucosal, systemic	Insomnia
		2218-68-0			
		515-82-2			
Chlorambucil		305-03-3			
Chloramine-B		127-52-6			

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Chloramine-T		127-65-1			
Chloramino-phenamide		121-30-2			
Chloramphenicol		56-75-7			
Chlorazanil		500-42-5			
Chlorbenzoxamine		522-18-9			
Chlorbetamide		97-27-8			
Chlorcyclizine		82-93-9			
Chlordantoin		5588-20-5			
Chloriazepoxide		58-25-3			
Chlorguanide		500-92-5			
Chlorhexadol		3563-58-4			
chlorhexidine	2,4,11,13-Tetraazatetradecanediimidamide, N,N'''-bis(4-chlorophenyl)-3,12-diimino-[CAS]	55-56-1		Formulation, other	Xerostomia, Periodontitis
Chlorisondamine		69-27-2			
Chlormadinone		302-22-7			
Chlornerodrin		62-37-3			
Chlornezanone		80-77-3			
Chlornidazole		3689-76-7			
Chlornaphazine		494-03-1			
Chloroazodin		502-98-7			
Chlorophyll		1406-65-1			
Chloroprednisone		52080-57-6			
Chloroprocaine		3858-89-7			
Chloropyramine		59-32-5			
Chloroquine		54-05-7			
Chlorothen		148-65-2			
Chlorothiazide		58-94-6			
Chlorotrianisene		569-57-3			
Chloroxine		773-76-2			
Chloroxylenol		88-04-0			
Chlorozotocin		54749-90-5			
chlorpheniramine	2-Pyridinepropanamine, Gamma-(4-chlorophenyl)-N,N-dimethyl-[CAS]	132-22-9		Formulation, modified-release, other	Allergy, general
Chlorphenesin		104-29-0			
Chlorpheniramine		886-74-8			
Chlorphenoxamide		132-22-9			
Chlorphenoxamine		3576-64-5			
Chlorphentermine		77-38-3			
Chlorproethazine		461-78-9			
Chlorproguanil		84-01-5			
chlorproguanil + dapsone	4,4'-Sulfonyldianiline + 1-(3,4-Dichlorophenyl)5-isopropylbiguanide	537-21-3		Antimalarial	Infection, malaria
Chlorpromazine		80-08-0			
Chlorpropamide		50-53-3			
Chlorprothixene		94-20-2			
Chlorquinaldol		113-59-7			
		72-80-0			

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Chlortetracycline		57-62-5			
Chlorthalidone		77-36-1			
Chlorthenoxazine(e)		132-89-8			
Chlorzoxazone		95-25-0			
Cholic Acid		81-25-4			
Choline		67-48-1			
		2016-36-6			
		28319-77-9			
choline theophyllinate	Ethanaminium, 2-hydroxy-N,N,N-trimethyl-, salt with 3,7-dihydro-1,3-dimethyl-1H-purine-2,6-dione (1:1) [CAS]	4499-40-5		Formulation, modified-release, other	
choline-L-alfoscerate	Ethanaminium, 2-[[2,3-dihydroxypropoxy)hydroxyphosphinyl]oxy]-N,N,N-trimethyl-, hydroxide, inner salt, (R)-[CAS]	28319-77-9	JP 55028955	Cognition enhancer	Amnesia
		4940-39-0			
Chromocarb		804-10-4			
Chromonar		532-82-1			
Chrysoidine					
CHS-828	Guanidine, N-[6-(4-chlorophenoxy)hexyl]-N'-cyano-N"-4-pyridinyl-[CAS]	200484-11-3	U.S. 5,696,140	Anticancer, other	Cancer, general
CI-1031	Glycine, N-[2-[5-(aminoiminomethyl)-2-hydroxyphenoxy]-6-[3-(4,5-dihydro-1-methyl-1H-imidazol-2-yl)phenoxy]-3,5-difluoro-4-pyridinyl]-N-methyl-[CAS]	183305-24-0	WO 9638421	Antianginal	Angina, unstable
CI-1040	Benzamide, 2-[(2-chloro-4-iodophenyl)amino]-N-(cyclopropylmethoxy)-3,4-difluoro-[CAS]	212631-79-3	WO 9837881	Anticancer, other	Cancer, general
cibenzoline	1H-Imidazole, 2-(2,2-diphenylcyclopropyl)-4,5-dihydro-[CAS]	53267-01-9	GB 1417174	Antiarrhythmic	Arrhythmia, general
ciclesonide	Pregna-1,4-diene-3,20-dione 16,17-((cyclohexylmethylene)bis(oxy))-11-hydroxy-21-(2-methyl-1-oxopropoxy)-(11β,16Alpha) [CAS]	126544-47-6	DE 4129535	Antiasthma	Asthma
cicletanine	Furo[3,4-c]pyridin-7-ol, 3-(4-chlorophenyl)-1,3-dihydro-6-methyl-, (+/−)-[CAS]	82747-56-6	U.S. 4,383,998	Antihypertensive, other	
		89943-82-8			
ciclonicate	3-Pyridinecarboxylic acid, 3,3,5-trimethylcyclohexyl ester, trans-[CAS]	53449-58-4	DE 1910481	Vasodilator, peripheral	Cancer, lung, small cell
ciclopirox	2(1H)-Pyridinone, 6-cyclohexyl-1-hydroxy-4-methyl-, [CAS]	41621-49-2	U.S. 3,883,545	Antifungal	Infection, fungal, general
		29342-05-0			
Ciclosidomine		66564-16-7			
ciclosporin A	Cyclosporin A-[CAS]	59865-13-3		Formulation, optimized, microemulsion	Transplant rejection, general
cidofovir	Phosphonic acid, [[2-(4-amino-2-oxo-1(2H)-pyrimidinyl)-1-(hydroxymethyl)ethoxy]methyl]-, (S)-[CAS]	113852-37-2	EP 253412	Antiviral, other	Infection, cytomegalo-virus
Cifenline		53267-01-9			
cilansetron	4H-Pyrido[3,2,1-jk]carbazol-11(8H)-one, 5,6,9,10-tetrahydro-10-[(2-methyl-1H-imidazol-1-yl)methyl]-, (R)-[CAS]	120635-74-7	EP 297651	GI inflammatory/ bowel disorders	Irritable bowel syndrome

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Cilastatin		82009-34-5			
cilazapril	6H-Pyridazino[1,2-a][1,2]diazepine-1-carboxylic acid, 9-[[1-(ethoxycarbonyl)-3-phenylpropyl]amino]octahydro-10-oxo-, [1S-[1Alpha,9Alpha(R*)]]-[CAS]	88768-40-5 90139-06-3	GB 2128984	Antihypertensive, renin system	Hypertension, general
cilengitide	Cyclo(L-arginylglycyl-L-Alpha-aspartyl-D-phenylalanyl-N-methyl-L-valyl) [CAS]	188968-51-6	EP 770622	Anticancer, other	Cancer, lung, non-small cell
cilnidipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, 2-methoxyethyl 3-phenyl-2-propenyl ester-[CAS]	102106-21-8 132203-70-4	EP 161877	Antihypertensive, other	Hypertension, general
cilomilast	Cis-4-cyano-4-[3-(cyclopentyloxy)-4-methoxyphenyl]cyclohexane-1-carboxylic acid	153259-65-5	U.S. 5,602,157	COPD treatment	Chronic obstructive pulmonary disease
cilostazol	2(1H)-Quinolinone, 6-[4-(1-cyclohexyl-1H-tetrazol-5-yl)butoxy]-3,4-dihydro-[CAS]	73963-72-1	GB 2033893	Antithrombotic	Peripheral vascular disease
Cimetidine		51481-61-9			
cimetropium	3-Oxa-9-azoniatricyclo[3.3.1.02,4]nonane, 9-(cyclopropylmethyl)-7-(3-hydroxy-1-oxo-2-phenylpropoxy)-9-methyl-, [7(S)-(1Alpha,2β,4β,5Alpha,7β)]-[CAS]	51598-60-8	U.S. 3,853,886	Antispasmodic	Muscle spasm, general
cinacalcet	1-naphthalenemethanamine,Alpha-methyl-N-[3-[3-(trifluoromethyl)phenyl]propyl]-, (AlphaR)-,	364782-34-3		Hormone	Hyperparathyroidsm
Cinchonidine		485-71-2			
Cinchonine		118-10-5			
Cinchophen		132-60-5			
Cinepazet		23887-41-4			
Cinepazide		23887-46-9			
cinepazide	Piperazine, 1-[2-oxo-2-(1-pyrrolidinyl)ethyl]-4-[1-oxo-3-(3,4,5-trimethoxyphenyl)-2-propenyl]-, (Z)-2-butenedioate (1:1) [CAS]	26328-04-1	GB 1218591	Vasodilator, peripheral	Peripheral vascular disease
Cinitapride		66564-14-5			
Cinnmetacin		20168-99-4			
Cinnamedrine		90-86-8			
Cinnarizine		298-57-7			
cinolazepam	1H-1,4-Benzodiazepine-1-propanenitrile, 7-chloro-5-[2-fluorophenyl)-2,3-dihydro-3-hydroxy-2-oxo-[CAS]	75696-02-5	DE 2950235	Hypnotic/Sedative	Insomnia
cinoxacin	[1,3]Dioxolo[4,5-g]cinnoline-3-carboxylic acid, 1-ethyl-1,4-dihydro-4-oxo-[CAS]	28657-80-9	GB 1296753	Quinolone antibacterial	Infection, urinary tract
Cinoxate		104-28-9			
Cinromide		58473-74-8			
Cioteronel		89672-11-7			
cipamfylline	1H-Purine-2,6-dione, 8-amino-1,3-bis(cyclopropylmethyl)-3,7-dihydro-[CAS]	132210-43-6	EP 389282	Antipruritic/inflamm, allergic	Eczema, atopic

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cipralisant	1H-Imidazole, 4-[(1R,2R)-2-(5,5-dimethyl-1-hexynyl)cyclopropyl]-[CAS]	213027-19-1	U.S. 6,008,240	Psychostimulant	Attention deficit disorder
ciprofibrate	Propanoic acid, 2-[4-(2,2-dichlorocyclopropyl)phenoxy]-2-methyl-[CAS]	52214-84-3	GB 1385828	Hypolipaemic/ Antiatherosclerosis	Hyper-lipidaemia, general
ciprofloxacin	3-Quinolinecarboxylic acid, 1-cyclopropyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-[CAS]	85721-33-1	U.S. 4,670,444	Quinolone antibacterial	Infection, general
ciprofloxacin + fluocinolone, SAL	3-Quinolinecarboxylic acid, 1-Cyclopropyl-6 fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)- + (6Alpha, 11β, 16Alpha)-6,9-Difluoro-11,21-dihydroxy-16,17-[(1-methylethylidene)bis-(oxy)]-pregna-1,4-diene-3,20-dione			Formulation, fixed-dose combinations	Otitis
Ciramadol		63269-31-8			
cisapride	Benzamide, 4-amino-5-chloro-N-[1-[3-(4-fluorophenoxy)propyl]-3-methoxy-4-piperidinyl]-2-methoxy-, cis-[CAS]	81098-60-4	EP 76530	Gastroprokinetic	
cisatracurium	Isoquinolinium, 2,2'-[1,5-pentanediylbis[oxy(3-oxo-3,1-propanediyl)]]bis[1-[(3,4-dimethoxyphenyl)methyl]]-1,2,3,4-tetrahydro-6,7-dimethoxy-2-methyl-, [1R-[1Alpha,2Alpha(1R*,2R*)]]-, [CAS]	96946-42-8	U.S. 5,453,510	Muscle relaxant	Surgery adjunct
cisplatin	Platinum, diamminedichloro-, (SP-4-2)-[CAS]	15663-27-1	U.S. 4,177,263	Anticancer, alkylating	
citalopram	5-Isobenzofurancarbonitrile, 1-[3-(dimethylamino)propyl]-1-(4-fluorophenyl)-1,3-dihydro-[CAS]	59729-32-7 59729-33-8	GB 1526331	Antidepressant	Depression, general
citicoline	Cytidine 5'-(trihydrogen diphosphate), P'-[2(trimethylammonio)ethyl]ester, hydroxide, inner salt [CAS]	987-78-0	JP 39006541	Cognition enhancer	Infarction, cerebral
Citiolone		1195-16-0			
Citric Acid		77-92-9			
Citrulline		372-75-8			
cizolirtine	Ethanamine, N,N-dimethyl-2-[(1-methyl-1H pyrazol-5-yl)phenylmethoxy]-, 2-hydroxy-1,2,3-propanetricarboxylate [CAS]	142155-44-0		Urological	Incontinence
CJ-13610	4-(3-[4-(2-Methyl-imidazol-1-yi)-phenylsulfanyl]-phenyl)-tetrahydro-pyran-4-carboxylic acid amide			COPD treatment	Chronic obstructive pulmonary disease
CKD-602	1H-Pyrano[3',4':6,7]indolizino[1,2-b]quinoline-3,15(4H,12H)-dione, 4-ethyl-4-hydroxy-11-[2-[(1-methylethyl)amino]ethyl]-, monohydrochloride, (4S)- [CAS]]	213819-48-8	WO 9902530	Anticancer, other	Cancer, ovarian
cladribine	Adenosine, 2-chloro-2'-deoxy-[CAS]	4291-63-8	EP 173059	Anticancer, antimetabolite	Cancer, leukaemia, hairy cell

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Clanobutin		30544-61-7			
clarithromycin	Erythromycin, 6-O-methyl-[CAS]	81103-11-9	EP 41355	Macrolide antibiotic	Infection, respiratory tract, lower
Clavulanate, Disodium					
Clavulanic Acid		58001-44-8			
Clebopride		55905-53-8			
Clemastine		15686-51-8			
Clemizol		442-52-4			
Clenbuterol		37148-27-9			
Clentiazem		96125-53-0			
clevidipine	3,5-Pyridinedicarboxylic acid, 4-(2,3-dichlorophenyl)-1,4-dihydro-2,6-dimethyl-, methyl (1-oxobutoxy)methyl ester (±) [CAS]	167221-71-8	WO 9512578	Antihypertensive, other	Hypertension, general
clevudine	2,4(1H,3H)-Pyrimidinedione, 1-(2-deoxy-2-fluoro-β-L-arabinofuranosyl)-5-methyl- [CAS]	163252-36-6		Antiviral, other	Infection, hepatitis-B virus
Clidanac		28968-07-2			
Clidinium		3485-62-9			
Clinafloxacin		105956-97-6			
Clindamycin		18323-44-9			
clindamycin + tretinoin	L-threo-Alpha-D-galacto-Octopyranoside, methyl 7-chloro-6,7,8-trideoxy-6-[[(1-methyl-4-propyl-2-pyrrolidinyl)carbonyl]amino]-1-thio, (2S-trans)- + retinoic acid			Formulation, fixed-dose combinations	Acne
clindamycin	L-Threo-Alpha-D-galacto-octopyranoside, methyl 7-chloro-6,7,8-trideoxy-6-[[(1-methyl-4-propyl-2-pyrrolidinyl)carbonyl]amino]-1-thio-, 2-(dihydrogen phosphate), (2S-trans)-	18323-44-9		Formulation, parenteral, other	Infection, gynaecological
		24729-96-2			
Clinofibrate		30299-08-2			
Clinprost		88931-51-5			
clobazam	1H-1,5-Benzodiazepine-2,4(3H,5H)-dione, 7-chloro-1-methyl-5-phenyl-[CAS]	22316-47-8	GB 1214662	Anxiolytic	
Clobenfurol		3611-72-1			
Clobenoside		29899-95-4			
Clobenzepam		1159-93-9			
Clobenzorex		13364-32-4			
Clobenztropine		5627-46-3			
clobetasol	Pregna-1,4-diene-3,20-dione, 21-chloro-9-fluoro-11,17-dihydroxy-16-methyl-, (11β,16β)-[CAS]	25122-41-2		Formulation, dermal, topical	Psoriasis
clobetasone	Pregna-1,4-diene-3,11,20-trione, 21-chloro-9-fluoro-16-methyl-17-(1-oxobutoxy)-, (16β)-[CAS]	25122-57-0	GB 1253831	Antipruritic/ inflamm. allergic	
		54063-32-0			
Clobutinol		14860-49-2			
Clocapramine		47739-98-0			

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Clocinizine		298-55-5			
Cloconazole		77175-51-0			
Clocortolone		4828-27-7			
clodronate	Phosphonic acid, (dichloromethylene)bis- [CAS]	22560-50-5		Osteoporosis treatment, Anticancer, hormonal	Pain, cancer, Hyper-calcaemia of malignancy
Clodronic Acid		10596-23-3			
clofarabine	2-chloro-9-(2-deoxy-2-fluoro-β-D-arabinofurasonyl)adenine			Anticancer, antimetabolite	Cancer, leukaemia, chronic lymphocytic
clofazimine	3-(p-chloroanilo)-10-(p-chlorophenyl)-2,10-dihydro-2-(isopropylimino)-phenazine	2030-63-9		Formulation, optimized, microencapsulate	Infection, tuberculosis
Clofenamide		671-95-4			
Clofibrat		637-07-0			
Clofibric Acid		882-09-7			
Cloflucarban		369-77-7			
Clofoctol		37693-01-9			
Cloforex		14261-75-7			
Clomacran		5310-55-4			
Clomestrone		4091-75-2			
Clometacin		25803-14-9			
Clomethiazole		533-45-9			
Clometocillin		1926-49-4			
Clomiphene		911-45-5			
Clomipramine		303-49-1			
Clomocycline		1181-54-0			
clonazepam	2H-1,4-Benzodiazepin-2-one, 5-(2-chlorophenyl)-1,3-dihydro-7-nitro-[CAS]	1622-61-3	U.S. 4,316,897	Antiepileptic	Epilepsy, general
clonidine	1H-Imidazol-2-amine, N-(2,6-dichlorophenyl)-4,5-dihydro-[CAS]	4205-90-7	U.S. 4,060,084	Formulation, transdermal, patch	Hypertension, general
Clonitazene		3861-76-5			
Clonitrate		2612-33-1			
Clonixin		17737-65-4			
Clopamid		636-54-4			
Clopenthixol		982-24-1			
Cloperastine		3703-76-2			
clopidogrel	Thieno[3,2-c]pyridine-5(4H)-acetic acid, Alpha-(2-chlorophenyl)-6,7-dihydro-, methyl ester, (S)-[CAS]	120202-48-4	EP 99802	Antithrombotic	Infarction, myocardial
		90055-48-4			
		113665-84-2			
		42779-82-8			
Clopirac		5251-34-3			
Cloprednol		39563-28-5	U.S. 4,310,549	Antihypertensive, adrenergic	
cloranolol	2-Propanol, 1-(2,5-dichlorophenoxy)-3-[(1,1-dimethylethyl)amino]-[CAS]	54247-25-5			
Clorazepic Acid		23887-31-2			
Clorexolone		2127-1-7			

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TABLE IV-continued

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cloricromene	Acetic acid, [[8-chloro-3-[2-(diethylamino)ethyl]-4-methyl-2-oxo-2H-1-benzopyran-7-yl]oxy]-, ethyl ester [CAS]	68206-94-0	U.S. 4,349,566	Vasodilator, coronary	Peripheral vascular disease
Clorindione		1146-99-2			
Clorprenaline		3811-25-4			
Clortermine		10389-73-8			
Clospirazine		24527-27-3			
Clostebol		1093-58-9			
Clothiapine		2058-52-8			
clotiazepam	2H-Thieno[2,3-e]-1,4-diazepin-2-one, 5(2-chlorophenyl)-7-ethyl-1,3-dihydro-1-methyl- [CAS]	33671-46-4	U.S. 3,849,405	Anxiolytic	Anxiety, general
clotrimazole	1-[(2-chlorophenyl)diphenylmethyl]-1H-imidazole	23593-75-1	U.S. 3,705,172	Antifungal	
clotrimazole + betamethasone	Pregna-1,4-diene-3,20-dione, 9-fluoro-11-hydroxy-16-methyl-17,21-bis(1-oxopropoxy)-, (11β,16β)-, mixt. with 1-[(2-chlorophenyl)diphenylmethyl]-1H-imidazole [CAS]	92522-91-3		Formulation, fixed-dose combinations	Infection, fungal, general
Cloxacillin		61-72-3			
cloxazolam	Oxazolo[3,2-d][1,4]benzodiazepin-6(5H)-one, 10-chloro-11b-(2-chlorophenyl)-2,3,7,11b-tetrahydro-[CAS]	24166-13-0	U.S. 3,442,371	Anxiolytic	
Cloxotestosterone		53608-96-1			
Cloxyquin		130-16-5			
clozapine	5H-Dibenzo[b,e][1,4]diazepine, 8-chloro-11-(4-methyl-1-piperazinyl)-[CAS]	5786-21-0	U.S. 3,539,573	Neuroleptic	Schizophrenia
CMI-392	Trans-2-[3-methoxy-4-(2-p-chlorophenylthio)ethoxy-5-(N'-methyl-N'-hydroxyureidyl)methylphenyl]-5-(3,4,5-trimethoxyphenyl)tetrahydrofuran	193739-23-0	U.S. 5,648,486	Antipsoriasis	Psoriasis
CMT-3	2-Naphthacenecarboxamide, 1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-, (4aS,5aR,12aS)-[CAS]	15866-90-7	U.S. 5,837,696	Anticancer, other	Cancer, sarcoma, Kaposi's
CNI-1493	Decanediamide, N,N'-bis[3,5-bis[1-[(aminoiminomethyl)hydrazono]ethyl]-phenyl]-, tetrahydrochloride [CAS]	164301-51-3	U.S. 5,750,573	Anti-inflammatory	Psoriasis
CNS-5161	N'-[2-chloro-5-(methylthio)phenyl]-N-methyl-N-[3-(methylthio)phenyl]guanide [CAS]	160754-76-7	WO 9427591	Analgesic, other	Pain, neuropathic
Cobamamide		13870-90-1			
Cocaethylene		529-38-4			
Cocaine		50-36-2			
Codeine		76-57-3			
		52-28-8			
CoFactor	5,10 methylene-tetrahydrofolate			Anticancer, antimetavolite	Cancer, colorectal
Colchicine		64-86-8			

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colesevelam	1-Hexanaminium, N,N,N-trimethyl-6-(2-propenylamino)-, polymer with (chloromethyl)oxirane, 2-propen-1-amine and N-2-propenyl-1-decanamine, hydrochloride [CAS]	182815-44-7	U.S. 5,607,669	Hypolipaemic/ Antiherosclerosis	Hyper-lipidaemia, general
colestilan	1H-Imidazole, 2-methyl-, polymer with (chloromethyl)oxirane [CAS]	95522-45-5	JP 59155421	Hypolipaemic/ Antiherosclerosis	Hyper-cholesterol-aemia
Colestipol		26658-42-4			
colforsin daropate	6-(3-dimethylaminopropionyl)forkolin-[CAS]	138605-00-2	EP 222413	Cardiostimulant	Heart failure
colfosceril	3,5,9-Trioxa-4-phosphapentacosan-1-aminium, 4-hydroxy-N,N,N-trimethyl-10-oxo-7-[(1-oxohexadecyl)oxy]-, hydroxide, inner salt, 4-oxide, (R)-[CAS]	63-89-8 99732-49-7	U.S. 4,826,821	Lung Surfactant	Respiratory distress syndrome, infant
Collagraft		138331-02-9		Formulation, implant	Regeneration, bone
Colocynthin		1398-78-3			
Colpormon		1247-71-8			
coluracetam	1-Pyrrolidineacetamide, 2-oxo-N-(5,6,7,8-tetrahydro-2,3-dimethyl[furo[2,3-b]quinolin-4-yl)-[CAS]	135463-81-9	EP 427636	Cognition enhancer	Alzheimer's disease
combretastatin A-4 prodrug	disodium combretastatin-A-4-3-O-phosphate			Anticancer, other	Cancer, thyroid
compound B, Pharmacor			U.S. 6,362,165	Antiviral, anti-HIV	Infection, HIV/AIDS
conivaptin	[1,1'-Biphenyl]-2-carboxamide, N-[4-[(4,5-dihydro-2-methylimidazo[4,5-d][1-benzazepin-6(1H)-yl)carbonyl]phenyl]-, [CAS]	168626-94-6	WO 9503305	GI inflammatory/ bowel disorders	Hyponatraemia
Connetrivina	Hyaluronic acid [CAS]	9004-61-9		Vulnerary	
Convallatoxin		508-75-8			
Coparaffinate		8001-60-3			
Corticorelin Ovine Triflutate					
Corticosterone		50-22-6			
Cortisone		53-06-5			
Cortivazol		1110-40-3			
Cosyntropin		16960-16-0			
Cotarnine		82-54-2			
Cotinine		486-56-6			
co-trimazine	Benzenesulfonamide, 4-amino-N-2-pyrimidinyl-, mixt. with 5-[(3,4,5-trimethoxyphenyl)methyl]-2,4-pyrimidinediamine [CAS]	39474-58-3		Trimethoprim and analogues	Infection, urinary tract
Coumetarol		4366-18-1			
CP-248	1H-Indene-3-acetamide, 5-fluoro-2-methyl-N-(phenylmethyl)-1-[(3,4,5-trimethoxyphenyl)methylene]-, (1Z)-[CAS]	200803-37-8	WO 9747303	Anticancer, other	Barrett's oesophagus

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CP-461			U.S. 5,948,779	Anticancer, other	Cancer, prostate
CPC-211	Acetic acid, dichloro-, sodium salt [CAS]	2156-56-1		Neuroprotective	Acidosis, lactic
CPI-1189	CPI 1189 [CAS]	210475-67-5	WO 9631462	Congnition enhancer	Dementia, AIDS-related
CRA-0450			WO 0202549	Anxiolytic	Unspecified
creatinol-O-phosphate	Guanidine, N-methyl-N-[2-(phosphonooxy)ethyl]-[CAS]	6903-79-3		Antianginal	
CRL-5861	Oxirane, methyl-, polymer with oxirane, block [CAS]	106392-12-5	U.S. 4,837,014	Antisickling	Anaemia, sickle cell
crobenetine	(2R,6S)-3-[2(S)-Benzyloxypropyl]-6,11,11-trimethyl-1,2,3,4,5,6,-hexahydro-2,6-methano-3-benzazocin-10-ol		WO 9914199	Neuroprotective	Ischaemia, cerebral
croconazole	1H-Imidazole, 1-[1-[2-[(3-chlorophenyl)methoxy]phenyl]ethenyl]-[CAS]	77175-51-0	DE 3021467	Antifungal	Infection, fungal, general
cromoglicic acid	4H-1-Benzopyran-2-carboxylic acid, 5,5'-[(2-hydroxy-1,3-propanediyl)bis(oxy)]bis4-oxo-[CAS]	53736-52-0		Formulation, mucosal, topical	Conjunctiv-itis
cromolyn	4H-1-Benzopyran-2-carboxylic acid, 5,5'-[(2-hydroxy-1,3-propanediyl)bis(oxy)]bis4-oxo-[CAS]	15826-37-6 16110-51-3		Formulation, inhalable, solution	Asthma
Cropropamide		633-47-6			
Crotamiton		483-63-6			
Crotethamide		6168-76-9			
Crystacide	□		U.S. 4,557,935	Formulation, dermal, topical	Infection, dermatological
CS-502			EP 799823	Analgesic, other	Pain, general
CS-758	4-[(1E,3E)-4-[trans-5-[(1R,2R)-2-(2,4-difluorophenyl)-2-hydroxy-1-methyl-3-(1H-1,2,4-triazol-1-yl)propyl]thio]-1,3-dioxan-2-yl]-1,3-butadienyl]-3-fluorobenzonitrile			Antifungal	Infection, fungal, general
CS-834	1-Azabicyclo[3.2.0]hept-2-ene-2-carboxylic acid, 6-[(1R)-1-hydroxyethyl]-4-methyl-7-oxo-3-[[(3R)-5-oxo-3-pyrrolidinyl]thio]-, (2,2-dimethyl-1-oxopropoxy)methyl ester, (4R,5S,6S)-[CAS]	157542-49-9	EP 599512	Beta-lactam antibiotic	Infection, general
CT-052923	[(2H-benzo[d]1,3-dioxalan-5-methyl)amino][4-(6,7-dimethoxyquinazolin-4-yl)piperazinyl]methane-1-thione			Cardiovascular	Restenosis
CT-32228	N-(4-bromophenyl)-6-(5-chloro-2-methylphenyl)-[1,3,5]triazine-2,4-diamine			Anticancer, other	Cancer, general
Cupric Citrate		866-82-0			
Cuproxoline		13007-93-7			
CVT-2584	Ethanol, 2,2'-[[6-[[(4-methoxyphenyl)methyl]amino]-9-(1-methylethyl)-9H-purin-2-yl]imino]bis-[CAS]	199986-75-9	WO 9805335	Cardiovascular	Restenosis

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
CX-659S	((S)-6-amino-5-(6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxamido)-3-methyl-1-phenyl-2,4-(1H,3H)-pyrimidinedione			Dermatological	Eczema, general
Cyacetacide		140-87-4			
Cyamenazine		3546-03-0			
Cyanidin		528-58-5			
CYC400			WO 00172745	Anticancer, other	Cancer, general
Cyclacillin		3485-14-1			
Cyclandelate		456-59-7			
Cyclazocine		3572-80-3			
Cyclexanone		15301-52-7			
Cyclexedrine		532-52-5			
cyclidrol	3-Cyclohexene-1-methanol, 5-hydroxy-Alpha,Alpha,4-trimethyl-[CAS]	498-71-5		COPD treatment, Respiratory	Bronchitis, chronic
cyclin D1 inhibitors			U.S. 6,033,843	Anticancer, hormonal	Cancer, breast
Cyclizine		82-92-8			
Cyclobarbital		52-31-3			
Cyclobendazole		31431-43-3			
cyclobenzaprine	1-Propanamine, 3-(5H-dibenzo[a,d]cyclohepten-5-ylidene)-N,N-dimethyl-[CAS]	303-53-7		Formulation, modified-release, other	Muscle spasm, general
Cyclobutyrol		512-16-3			
Cyclocumarol		518-20-7			
Cyclodrine		52109-93-0			
Cyclofenil		2624-43-3			
Cycloguanil		516-21-2			
Cyclomethycaine		139-62-8			
Cycloniumelodide		6577-41-9			
Cyclopentamine		102-45-4			
Cyclopenthiazide		742-20-1			
Cyclopentobarbital		76-68-6			
Cyclopentolate		512-15-2			
cyclophosphamide	N,N-Bis(2-chloroethyl)tetrahydro-2H-1,3,2-oxazaphosphorin-2-amine-2-oxide monohydrate	50-18-0 6055-19-2		Formulation, parenteral, targeted	Cancer, general
cyclopiroxalamine	2(1H)-Pyridinone, 6-cyclohexyl-1-hydroxy-4-methyl-, cmpd with 2-aminoethanol(1:1) [CAS]	41621-49-2		Formulation, transdermal, other	Vaginitis
Cycloserine		68-41-7			
Cyclothiazide		2259-96-3			
Cyclovalone		579-23-7			
Cymarin		508-77-0			
cymserine	Carbamic acid, [4-(1-methylethyl)phenyl]-, (3aS,8aR)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl ester [CAS]	145209-39-8	WO 9902154	Cognition enhancer	Alzheimer's disease
Cynarin(e)		30964-13-7			

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CYP26 inhibitors			U.S. 6,063,606	Dermatological	Unspecified
Cyproheptadine		129-03-3			
cyproterone	(1β,2β)-6-Chloro-1,2-dihydro-17-hydroxy-3'H-cyclopropa[1,2]pregna-1,4,6-triene-3,20-dione [CAS]	2098-66-0		Radio/ chemoprotective	Chemotherapy-induced injury, general
Cysteamine		60-23-1			
cystic fibrosis ther	[[4-[[3-[[4-[1-(4-hydroxyphenyl)-1-methyl-ethyl]phenoxy]methyl]phenyl]methoxy]-phenyl]iminomethyl]-, ethyl ester			Cystic fibrosis treatment	Cystic fibrosis
cytarabine	2(1H)-Pyrimidinone, 4-amino-1-[5-O-[hydroxy(octadecyloxy)phosphinyl]-β-D-arabinofuranosyl]-, [CAS]	65093-40-5 147-94-4	EP 239015	Anticancer, antimetabolite	Myelodysplastic syndrome
D-24851	N-(Pyridin-4-yl)-(1-(4-chlorobenzyl)-indol-3-yl)-glyoxyl-amide)			Anticancer, other	Cancer, general
D-4418	8-Methoxyquinoline-5-[N-(2,5-dichloropyridin-3-yl)]carboxamide			Antiasthma	Asthma
DA-5018	Benzeneacetamide, 4-(2-aminoethoxy)-N-(3-(3,4-dimethylphenyl)propyl)-3-methoxy-, monohydrochloride [CAS]	174661-97-3	U.S. 5,242,944	Analgesic, other	Pain, musculoskeletal
DA-6034			U.S. 6,025,387	GI inflammatory/ bowel disorders	Crohn's disease
DA-7867			KR 9957803	Antibacterial, other	Infection, general
DA-7911			KR 56034	Antiarthritic, other	Arthritis, rheumatiod
DA-8159	3-(1-Methyl-7-oxo-3-propyl-6,7-dihydro-1H-pyrazolo-[4,3-d]pyrimidin-5-yl)-N-[2-(1-methylpyrrolidin-2-yl)ethyl]-4-propoxybenzenesulfonamide		KR 353014	Male sexual dysfunction	Sexual dysfunction, male, general
Dacarbazine		4342-3-4			
Daclizumab		152923-56-3			
Dactinomycin		50-76-0			
dalbavancin	5,31-Dichloro-38-de(methoxycarbonyl)-7-demethyl-19-deoxy-56-O-[2-deoxy-2-(10-methylundecanamido)-β-D-glucopyranurosyl]-38-[N-[3-(dimethylamino)propyl]carbamoyl]-42-O-Alpha-D-mannopyranosyl-N15-methylristomycin A aglycone	171500-79-1		Peptide antibiotic	Infection, dermatological
Dalfopristin		112362-50-2			
dalfopristin + quinupristin	Virginiamycin M1, 26-((2-(diethylamino)ethyl)sulfonyl)-26,27-dihydro-, (26R,27S)-, mixt with 4-(4-(dimethylamino)-N-methyl-L-phenylalanine)-5-(5-((1-azabicyclo(2.2.2)oct-3-ylthio)methyl)-4-oxo-L-2-piperidinecarboxylic acid) virginiamycin S1 -[CAS]	126602-89-9	EP 248703	Antibiotic, other	Infection, respiratry tract, general
dalteparin	Heparin-, [CAS]	9041-08-1	U.S. 4,303,651	Anticoagulant	Thrombo-prophylaxis

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Daltroban		79094-20-5			
δ-Aminolevulinic Acid		106-60-5			
danaparoid			EP 66908	Anticoagulant	Thrombosis, venous
danazol	Pregna-2,4-dien-20-yno[2,3-d]isoxazol-17-ol, (17Alpha)-[CAS]	17230-88-5	GB 905844	Menstruation disorders	
Danthron		117-10-2			
Dantrolene		7261-97-4			
dapiprazole	1,2,4-Triazolo[4,3-a]pyridine, 5,6,7,8-tetrahydro-3-[2-[4-(2-methylphenyl)-1-piperazinyl]ethyl]-[CAS]	72822-12-9 72822-13-0	U.S. 4,252,721	Ophthalmological	Glaucoma
dapivirine	4-[[4-(2,4,6-trimethylphenyl)amino]pyrimidin-2-yl]amino]benzonitrile	244767-67-7		Antiviral, anti-HIV	Infection, HIV/AIDS
dapoxetine	(+)-(S)-N,N-dimethyl-Alpha-[2-(1-naphthyl-oxy)ethyl]benzylamine HCl	119356-77-3	EP 288188	Male sexual dysfunction	Premature ejaculation
dapsone	4,4'-Sulfonyldianiline	80-08-0		Formulation, dermal, topical	Acne
daptomycin	Daptomycin [CAS]	103060-53-3	EP 178152	Peptide antibiotic	Infection, dermatological
Darbepoetin Alfa					
darifenacin	3-Pyrrolidineacetamide, 1-[2-(2,3-dihydro-5-benzofuranyl)ethyl]-Alpha,Alpha-diphenyl-, (S)-[CAS]	133099-04-4	EP 388054	Urological	Overactive bladder
daunorubicin	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy-Alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-[CAS]	20830-81-3	U.S. 5,441,745	Formulation, optimized, liposomes	Cancer, sarcoma, Kaposi's
DAX< SciClone	3-diallyl-8-cyclohexylxanthine			Cystic fibrosis treatment	Cystic fibrosis
DB-67	7-tert-Butyldimethylsilyl-10-hydroxycamptothecin			Anticancer, other	Cancer, general
d-Camphocarboxylic		18530-30-8			
DCF-987	Dextran		U.S. 5,514,665	Formulation, other	Cystic fibrosis
DDT		50-29-3			
Deaminooxytocin		113-78-0			
Deanol		108-01-0			
Debrisoquin		1131-64-2			
Decamethonium		541-22-0			
Decimemide		14817-09-5			
decitabine	1,3,5-Triazin-2(1H)-one, 4-amino-1-(2-deoxy-β-D-erythro-pentofuranosyl)-[CAS]	23339-46-0 2353-33-5		Anticancer, antimetabolite	Myelo-dysplastic syndrome
decloprazide	Benzamide, 4-amino-3-chloro-N-(2-(diethylamino)ethyl)-[CAS]	891-60-1	WO 9732582	Anticancer, other	Cancer, colorectal
Deferiprone		30652-11-0			
Deferoxamine		70-51-9			

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deflazacort	5'H-Pregna-1,4-dieno[17,16]oxazole-3,20-dione, 21-(acetyloxy)-11-hydroxy-2'-methyl-, (11β,16β)-[CAS]	14484-47-0 74712-90-6	GB	1077393	Hormone	Asthma
Defosfamide		3733-81-1				
degarelix	N-acetyl-3-(naphtalen-2-yl)-D-alanyl-4-chloro-D-phenylalanyl-3-(pyridin-3-yl)-D-alanyl-L-seryl-4-[[[(4S)-2,6-dioxohexahydropyrimidin-4-yl]carbonyl]amino]-L-phenylalanyl-4-(carbamoylamino)-D-phenylalanyl-L-leucyl-N6-(1-methylethyl)-L-lysyl-L-prolyl-D-alaninamide	214766-78-6			Anticancer, hormonal	Cancer, prostate
dehydroascorbic acid	L-threo-2,3-Hexodiulosonic acid gamma-lactone	490-83-5			Cognition enhancer	Alzheimer's disease
Dehydrocholic Acid		81-23-2				
Dehydroemetine		4914-30-1				
delapril	Glycine, N-(2,3-dihydro-1H-inden-2-yl)-N-[N-[1-(ethoxycarbonyl)-3-phenylpropyl]-L-alanyl]-, (S)-[CAS]	83435-66-9 83435-67-0	EP	51391	Antihypertensive, renin system	Hypertension, general
delapri + manidipine	Glycine, N-(2,3-dihydro-1H-inden-2-yl)-N-[N-[1-(ethoxycarbonyl)-3-phenylpropyl]-L-alanyl]-, (S)-3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, 2-[4-(diphenylmethyl)-1-piperazinyl]ethyl methyl ester [CAS]		FR	2733911	Formulation, fixed-dose combinations	Hypertension, general
delavirdine	Piperazine, 1-[3-[(1-methylethyl)amino]-2-pyridinyl]-4-[[5-(methylsulfonyl)amino]-1H-indol-2-yl]carbonyl]-[CAS]	136817-59-9	WO	9109849	Antiviral, anti-HIV	Infection, HIV/AIDS
Delmadinone		13698-49-2				
Delmopinol		79874-76-3				
delorazepam	2H-1,4-Benzodiazepin-2-one, 7-chloro-5-(2-chlorophenyl)-1,3-dihydro-[CAS]	2894-67-9	CH	408029	Anxiolytic	
delucemine	3,3-Bis-(m-fluorophenyl)-N-methylpropylamine [CAS]	186495-99-8			Neuroprotective	Ischaemia, cerebral
Demanyl		6909-62-2				
Demecarium		56-94-0				
demeclocycline	2-Naphthacenecarboxamide, 7-chloro-4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,6,10,12,12a-pentahydroxy-1,11-dioxo-, [4S-(4Alpha,4aAlpha,5aAlpha,6β,12Alpha)]-[CAS]	127-33-3			Formulation, modified-release, <=24 hr	Infection, general
Demecolcine		477-30-5				
Demegestone		10116-22-0				
Demexiptilline		24701-51-7				
denaverine	Benzeneacetic acid, Alpha-(2-ethylbutoxy)-Alpha-phenyl-, 2-(dimethylamino)ethyl ester, [CAS]	3321-06-0	DE	4133785	Analgesic, NSAID	Pain, musculo-skeletal
Denileukin Diftitox		173146-27-5				
Denopamine		71771-90-9				

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Denopterin		22006-84-4			
Deoxycholic Acid		83-44-3			
Deoxycorticosterone		64-85-7			
Deoxydihydro-streptomycin		26086-49-7			
Deoxyepinephrine		501-15-5			
Depreotide		161982-62-3			
depsipeptide	L-Valine, N-[(3S,4E)-3-hydroxy-7-mercapto-1-oxo-4-heptenyl]-D-valyl-D-cysteinyl-(2Z)-2-amino-2-butenoyl-, (4-1)-lactone, cyclic (1-2)-disulfide [CAS]	128517-07-7	EP 352646	Anticancer, antibiotic	Cancer, general
Deptropine		604-51-3			
Dequalinium		522-51-0			
dersalazine	Benzoic acid, 2-hydroxy-5-[[4-[3-[4-(2-methyl-1H-imidazol[4,5-c]pyridin-1-yl]methyl]-1-piperidinyl]-3-oxo-1-phenyl-1-propenyl]phenyl]azo] (Z) [CAS]	188913-57-7 188913-58-8	U.S. 5,747,477	Anti-inflammatory	Colitis, ulcerative
Deserpidine		131-01-1			
desferrioxamine	Butanediamide, N'-[5-[[4-[[5-(acetylhydroxyamino)pentyl]amino]-1,4-dioxobutyl]hydroxyamino]pentyl]-N-(5-aminopentyl)-N-hydroxy-[CAS]	70-51-9		Antidote	Poisoning, metal
Desflurane		57041-67-5			
Desipramine		50-47-5			
Deslanoside		17598-65-1			
desloratadine	5H-Benzo(5,6)cyclohepta(1,2-b)pyridine, 8-chloro-6,11-dihydro-11-(4-piperidinylidene)-[CAS]	100643-71-8	U.S. 5,595,997	Antiallergic, non-asthma	Rhinitis, allergic, perennial
deslorelin	Luteinizing hormone-releasing factor (pig), 6-D-tryptophan-9-(N-ethyl-L-prolinamide)-10-deglycinamide-[CAS]	57773-65-6	U.S. 4,034,082	Releasing hormones	Cancer, prostate
desmopressin	Vasopressin, 1-(3-mercaptopropanoic acid)-8-D-arginine-[CAS]	16679-58-6	DE 2948345	Hormone	Enuresis
Desogestrel		54024-22-5			
desogestrel + estradiol	Estra-1,3,5(10)-triene-3,17-diol (17β)-, mixt. with (17Alpha)-13-ethyl-11-methylene-18,19-dinorpregn-4-en-20-yn-17-ol [CAS]	122364-17-4		Menopausal disorders	Hormone replacement therapy
desogestrel, Akzo Nobel	18,19-Dinorpregn-4-en-20-yn-17-ol, 13-ethyl-11-methylene-, (17Alpha)-[CAS]	54024-55-5		Formulation, oral, other	Contraceptive, female
desogestrel + ethinylestrad (1)	18,19-Dinorpregn-4-en-20-yn-17-ol, 13-ethyl-11-methylene-, (17Alpha)-[CAS]	54024-22-5 71138-35-7	U.S. 3,927,046	Formulation, oral, other	Contraceptive, female
Desomorphine		427-00-9			
Desonide		638-94-8			
Desoximetasone		382-67-2			
Detaxtran		9015-73-0			
Devacade			WO 9308176	Analgesic, other	Pain, general
dexamethasone	Pregna-1,4-diene-3,20-dione, 9-fluoro-11,17,21-trihydroxy-16-methyl-, (11β,16Alpha)-[CAS]	50-02-2 2392-39-4 312-93-6		Formulation, other	Inflammation, ocular

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dexanabinol	6H-Dibenzo[b,d]pyran-9-methanol, 3-(1,1-dimethylheptyl)-6a,7,10,10a-tetrahydro-1-hydroxy-6,6-dimethyl-, (6aS-trans)-[CAS]	112924-45-5	EP 427518	Neuroprotective	Head trauma
dexecadotril	Glycine, N-[2-[(acetylthio)methyl]-1-oxo-3-phenylpropyl]-, phenylmethyl ester, (R)-[CAS]	112573-72-5	EP 318377	Alimentary/ Metabolic, other	Unspecified
dexefaroxan	1H-Imidazole, 2-(2-ethyl-2,3-dihydro-2-benzofuranyl)-4,5-dihydro-[CAS]	89197-00-2 89197-32-0	EP 71368	Cognition enhancer	Alzheimer's disease
Dexetimide		21888-98-2			
dexibuprofen	Benzeneacetic acid, Alpha-methyl-4-(2-methylpropyl)-, (AlphaS)-[CAS]	51146-56-6		Analgesic, NSAID	Pain, general
dexketoprofen	Benzeneacetic acid, 3-benzoyl-Alpha-methyl-, (S)-[CAS]	22161-81-5		Anti-inflammatory	Inflammation, general
dexloxiglumide	Pentanoic acid, 4-[(3,4-dichlorobenzoyl)amino]-5-[(3-methoxypropyl)pentylamino]-5-oxo-, (R)-[CAS]	119817-90-2	EP 0344184	GI inflammatory/ bowel disorders	Irritable bowel syndrome
dexmedetomidine	1H-Imidazole, 4-[1-(2,3-dimethylphenyl)ethyl]-, (R)-[CAS]	113775-47-6 86347-15-1	EP 187471	Hypnotic/Sedative	Anaesthesia
dexmethylphenidate	2-Piperidineacetic acid, Alpha-phenyl-, methyl ester, (AlphaR,2R)-	19262-68-1		Psychostimulant	Attention deficit disorder
Dexpanthenol		81-13-0			
dexrazoxane	2,6-Piperazinedione, 4,4'-(1-methyl-1,2-ethanediyl)bis-, (S)-[CAS]	24584-09-6	DE 1910283	Radio/ chemoprotective	Chemotherapy-induced injury, general
Dextran-1	Dextran [CAS]	9004-54-0 56087-11-7		Plasma substitute	
Dextranomer		51-64-9			
Dextroamphetamine					
dextromethorphan	Morphinan, 3-methoxy-17-methyl-, (9Alpha, 13Alpha, 14Alpha)-,	6700-34-1 125-71-3	U.S. 4,221,788	Formulation, oral, other	Cough, Emotional lability
Dextromoramide		357-56-2			
dextropropoxyphene	Benzeneethanol, Alpha-[2-(dimethylamino)1-methylethyl]-Alpha-phenyl-, propanoate (ester), [S-(R*,S*)]-[CAS]	469-62-5		Formulation, modified-release, other	Pain, general
Dezocine		53648-55-8			
DF-1012	N-Tropyl 7-azaindol-3-ylcarboxamide	163220-65-3	WO 9504742	Respiratory	Respiratory disease, general
DFA-IV	di-D-fructofuranose 2,6':6,2' dianhydride		U.S. 5,700,832	Antianaemic	Anaemia, aplastic
d-Fenchone		4695-62-9			
D-Glucuronolactone		32449-92-6			
Diab II	Diab II	309956-85-2	U.S. 6,153,632	Antidiabetic	Diabetes, Type II
diacerein	2-Anthracenecarboxylic acid, 4,5-bis(acetyloxy)-9,10-dihydro-9,10-dioxo-[CAS]	13739-02-1	U.S. 4,244,968	Antiarthritic, other	Arthritis, rheumatoid
Diampromide		552-25-0			
Diamthazole		136-96-9			

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Diathymosulfone		5964-62-5			
Diatrizoate		737-31-5			
diazepam	2H-1,4-Benzodiazepin-2-one, 7-chloro-1,3-dihydro-1-methyl-5-phenyl-[CAS]	439-14-5		Formulation, transmucosal, systemic	Anxiety, epilepsy, general
Diaziquone		57998-68-2			
Diazoxide		364-98-7			
dibekacin	D-Streptamine, O-3-amino-3-deoxy-Alpha-D-glucopyranosyl-(1-6)-O-[2,6-diamino-2,3,4,6-tetradeoxy-Alpha-D-erythro-hexopyranosyl-(1-4)]-2-deoxy-, sulfate (salt)[CAS]	34493-98-6 58580-55-5	GB 1349302	Aminoglycoside antibiotic	Infection, general
Dibenzepin		4498-32-2			
Dibromopropamidine		496-00-4			
Dibucaine		61-12-1			
Dichloralphenazone		480-30-8			
Dichloramine T		473-34-7			
Dichlorisone		7008-26-6			
Dichlorobenzyl Alcohol		1777-82-8			
Dichlorophen		97-23-4			
Dichlorophenarsine		536-29-8			
Dichlorphenamide		120-97-8			
diclofenac + HA	Hyaluronic acid + benzeneacetic acid, 2-[(2,6-dichlorophenyl)amino]-[CAS]			Formulation, transdermal, systemic	Keratosis
diclofenac	Benzeneacetic acid, 2-[(2,6-dichlorophenyl)amino]-, [CAS]	15307-79-6 15307-86-5 15307-81-0		Formulation, modified-release, <=24 hr	Pain, general
Dicloxacillin		3116-76-5			
Dicumarol		66-76-2			
Dicyclomine		77-19-0			
didanosine	Inosine, 2',3'-dideoxy-[CAS]	69655-05-6	U.S. 4,861,759	Antiviral, anti-HIV	Infection, HIV/AIDS
Dideoxyadenosine		4097-22-7			
didox	Benzamide, N,3,4-trihydroxy-[CAS]	69839-83-4	U.S. 4,263,322	Anticancer, antimetabolite	Cancer, general
Dienestrol		84-17-3			
dienogest	19-Norpregna-4,9-diene-21-nitrile, 17-hydroxy-3-oxo-, (17Alpha)-[CAS]	65928-58-7	GB 1524917	Menstruation disorders	Endometriosis
dienogest + estradiol	19-Norpregna-4,9-diene-21-nitrile, 17-hydroxy-3-oxo-, (17Alpha) + Estra-1,3,5(10)-triene-3,17-diol(17β)			Formulation, fixed-dose combinations	Contraceptive, female
Diethadione		702-54-5			
Diethazine		60-91-3			
Diethylbromo-acetamide		511-70-6			
Diethylcarbamazine		90-89-1			
diethylpropion	1-Propanone, 2-(diethylamino)-1-phenyl-[CAS]	90-84-6		Formulation, modified-release, <=24 hr	Obesity
Diethylstilbestrol		56-53-1			
Difemerine		80387-96-8			

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Difenamizole		20170-20-1			
Difenoxin		28782-42-5			
Difenpiramide		51481-40-3			
difiomotecan	(5R)-5-Ethyl-9,10-difluoro-1,4,5,13-tetrahydro-5-hydroxy-3H,15H-oxepino[3',4':6,indolizino[1,2-b]quinoline-3,15-dione	220997-97-7		Anticancer, other	Cancer, general
diflorasone	Pregna-1,4-diene-3,20-dione, 17,21-bis(acetyloxy)-6,9-difluoro-11-hydroxy-16-methyl-, (6Alpha,11β,16β)-[CAS]	33564-31-7	U.S. 3,980,778	Antipsoriasis	
Difloxacin		2557-49-5			
Diflucortolone		98106-17-3			
diflunisal	2',4'-difluoro-4-hydroxy[1,1'-biphenyl]-3-carboxylic acid	2607-6-9			
		23674-86-4	GB 1175212	Analgesic, NSAID	Pain, post-operative
Difluprednate		22494-42-4			
Digitalin		23674-86-4			
Digitoxin		752-61-4			
digoxin	Card-20(22)-enolide, 3-[(O-2,6-dideoxy-β-D-ribo-hexopyranosyl-(1-4)-O-2,6-dideoxy-β-D-ribo-hexopyranosyl-(1-4)-2,6-dideoxy-β-D-ribo-hexopyranosyl)oxy]-12,14-dihydroxy-, (3β,5β,12β)-[CAS]	71-63-6			
		20830-75-5	U.S. 4,088,750	Formulation, oral, enteric-coated	Heart failure
Dihexyverine		561-77-3			
Dihydralazine		484-23-1			
Dihydrocodeine		125-28-0			
Dihydrocodeinone Enol		466-90-0			
dihydroergocryptine	Ergocryptine, dihydro-[CAS]	25447-66-9		Formulation, other	Depression, general
dihydroergotamine	Ergotaman-3',6',18-trione, 9,10-dihydro-12'-hydroxy-2'-methyl-5'-(phenylmethyl)-, (5'Alpha,10Alpha)-[CAS]	511-12-6	6495535	Formulation, modified-release, other	Migraine
Dihydromorphine		509-60-4			
Dihydrostreptomycin		128-46-1			
Dihydrotachysterol		67-96-9			
Dihydroxyaluminium		13682-92-3			
		539-68-4			
Diisopromine		5966-41-6			
Diisopropyl Paraoxon		3254-66-8			
Diisopropylamine		660-27-5			
dilazep	Benzoic acid, 3,4,5-trimethoxy-, (tetrahydro-1H-1,4-diazepine-1,4(5H)-diyl)di-3,1-propanediyl ester [CAS]	35898-87-4	JP 51095086	Vasodilator, coronary	
Dilevalol		75659-07-3			
diloxanide	2-Furancarboxylic acid, 4-[(dichloroacetyl)methylamino]phenyl ester [CAS]	3736-81-0		Amoebicide	
		579-38-4			

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diltiazem	1,5-Benzothiazepin-4(5H)-one, 3-(acetyloxy)-5-[2-(dimethylamino)ethyl]-2,3-dihydro-2-(4-methoxyphenyl)-, (2S-cis)-[CAS]	33286-22-5 42399-41-7	U.S. 4,721,619 U.S. 5,529,791 EP 322277	Antianginal	Angina, hypertension, general
Dimecrotic Acid		7706-67-4			
Dimefline		1165-48-6			
Dimemorfan		36309-01-0			
Dimenhydrinate		523-87-5			
Dimenoxadol		509-78-4			
Dimepheptanol		545-90-4			
Dimercaprol		59-52-9			
Dimetacrine		4757-55-5			
Dimethadione		695-53-4			
Dimethazan		519-30-2			
Dimethindene		5636-83-9			
Dimethisoquin		86-80-6			
Dimethisterone		79-64-1			
Dimethocaine		94-15-5			
Dimethoxanate		477-93-0			
Dimethyl Sulfoxide		67-68-5			
Dimethylthiambutene		524-84-5			
Dimetofrine		22950-29-4			
Dimorpholamine		119-48-2			
dinoprostone	Prosta-5,13-dien-1-oic acid, 11,15-dihydroxy-9-oxo-, (5Z,11Alpha,13E,15S)-[CAS]	363-24-6		Formulation, modified-release, <=24 hr	Labour, induction
diosmectite	Smecta-[CAS]	110070-78-5	FR 2770778	Antidiarrhoeal	Diarrhoea, general
diosmin	4H-1-Benzopyran-4-one, 7-[[6-O-(6-deoxy-Alpha-L-mannopyranosyl)-beta,-D-glucopyranosyl]oxy]-5-hydroxy-2-(3-hydroxy-4-methoxyphenyl)-[CAS]	520-27-4	DE 2602314	Vasoprotective, systemic	
Dioxadrol		6495-46-1			
Dioxaphetyl		467-86-7			
Dioxethedrine		497-75-6			
Dioxybenzone		131-53-3			
Diphemanil		62-97-5			
Diphenadione		82-66-6			
Diphencyprone		886-38-4			
Diphenhydramine		58-73-1			
Diphenidol		972-02-1			
Diphenoxylate		915-30-0			
Diphenylpyraline		147-20-6			
Diphetarsone		515-76-4			
Diphtheria & Tetanus Toxoids And Acellular Pertussis Vaccine Adsorbed					

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Dipipanone		467-83-4			
dipivefrin	Propanoic acid, 2,2-dimethyl-, 4-[1-hydroxy-2-(methylamino)ethyl]-1,2-phenylene ester, (+/−)-[CAS]	52365-63-6	U.S. 3,809,714	Antiglaucoma	Glaucoma
Dipyridamole		58-32-2			
Dipyrocetyl		486-79-3			
Dipyrone		5907-38-0			
diquafosol	Uridine 5'-(pentahydrogen tetraphosphate)-5'-ester with uridine, [CAS]	211427-08-6		Ophthalmological	Dry eye syndrome
dirithromycin	Erythromycin, 9-deoxo-11-deoxy-9,11-[imino[2-(2-methoxyethoxy)ethylidene]oxy]-, [9S(R)]-[CAS]	62013-04-1	DE 2515075	Macrolide antibiotic	Tonsilitis
disodium pamidronate	Phosphonic acid, (3-amino-1-hydroxypropylidene)bis-, disodium salt [CAS]	57248-88-1	EP 177443	Osteoporosis treatment	Hypercalcaemia of malignancy
Disofenin		65717-97-7			
disopyramide	2-Pyridineacetamide, Alpha-[2-[bis(1-methylethyl)amino]ethyl]-Alpha-phenyl-[CAS]	3737-09-5		Formulation, modified-release, <=24 hr	Arrhythmia, general
Distigmine		15879-67-2			
Disulfamide		671-88-5			
Disulfiram		97-77-8			
Ditazol		18471-20-0			
Dithiazanine		514-73-8			
dithranol	9(10H)-Anthracenone, 1,8-dihydroxy-[CAS]	1143-38-0		Formulation, dermal, topical	Psoriasis
Ditiocarb		148-18-5			
Dixanthogen		502-55-6			
Dixyrazine		2470-73-7			
DJ-927			WO 01027115	Anticancer, other	Cancer, general
DK-507k	(−)-7-[(7S)-7-Amino-5-azaspiro[2.4]heptan-5-yl]-6-fluoro-1-[(1R,2S)-2-fluoro-1-cyclopropyl]-1,4-dihydro-8-methoxy-4-oxo-3-quinolinecarboxylic acid hydrochloride monohydrate			Quinolone antibacterial	Infection, general
DL-Lactic Acid		598-82-3			
DMDC	Cytidine, 2'-deoxy-2'-methylene-, monohydrochloride [CAS]	113648-25-2	WO 8807049	Anticancer, antimetabolite	Cancer, general
DMXAA	5,6-dimethylxanthenone-4-acetic acid			Anticancer, other	Cancer, lung, general
DNA Stealth Nucleosides			U.S. 6,132,776	Antiviral, anti-HIV	Infection, HIV/AIDS
Dobesilate		20123-80-2			
dobutamine	1,2-Benzenediol, 4-[2-[[3-(4-hydroxyphenyl)-1-methylpropyl]amino]ethyl]-, (+/−)-[CAS]	34368-04-2 49745-95-1	U.S. 3,987,200	Cardiostimulant	

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Docarpamine		74639-40-0			
docetaxel	(2R,3S)-N-Carboxy-3-phenylisoserine, N-tert-butyl ester, 13-ester with 5β,20-epoxy-1,2Alpha,4,7β,10β,13Alpha-hexahydroxytax-11-en-9-one 4-acetate 2-benzoate-[CAS]	114977-28-5 14808-66-6	EP 253738	Anticancer, other	Cancer, breast
docosahexaenoic acid			EP 707487	Hypolipaemic/ Antiatherosclerosis	Hyper-lipidaemia, general
docosanol	1-Docosanol [CAS]	661-19-8	EP 469064	Antiviral, other	Infection, herpes simplex virus
docusate		128-49-4 577-11-7	U.S. 4,752,617	Formulation, dermal, topical	Infection, herpes simplex virus prophylaxis
dofetilide	Methanesulfonamide, N-[4-[2-[methyl[2-[4-[(methylsulfonyl)amino]phenoxy]ethyl]amino]-ethyl]phenyl]-[CAS]	115256-11-6	EP 245997	Antiarrhythmic	Fibrillation, atrial
dolasetron mesilate	1H-Indole-3-carboxylic acid, octahydro-3-oxo-2,6-methano-2H-quinolizin-8-yl ester, (2Alpha,6Alpha,8Alpha,9Alphaβ)-, monomethanesulfonate-[CAS]	115956-13-3 115956-12-2	EP 266730	Antiemetic	Chemotherapy-induced nausea and vomiting
Domiodol		61869-07-6			
Domiphen		538-71-6			
Domitroban		112966-96-8			
domperidone	2H-Benzimidazol-2-one, 5-chloro-1-[1-[3-(2,3-dihydro-2-oxo-1H-benzimidazol-1-yl)propyl]-4-piperidinyl]-1,3-dihydro-[CAS]	57808-66-9	U.S. 4,066,772	Antiemetic	
donepezil	1H-Inden-1-one, 2,3-dihydro-5,6-dimethoxy-2-((1-(phenylmethyl)-4-piperidinyl)methyl)-, [CAS]	120011-70-3 120014-06-4	EP 296560	Cognition enhancer	Alzheimer's disease
donitriptan	Piperazine, 1-(((3-(2-aminoethyl)-1H-indol-5-yl)oxy)acetyl)-4-(4-cyanophenyl)-[CAS]	170912-52-4		Antimigraine	Migraine
Dopamine		51-61-6			
Dopexamine		86197-47-9			
doramapimod	urea, N-[3-(1,1-dimethylethyl)-1-(4-methylphenyl)-1H-pyrazol-5-yl]-N'-[4-[2-(4-morpholinyl)ethoxy]-1-naphthalenyl]-	285983-48-4		Antiarthritic, immunological	Arthritis, rheumatoid
doranidazole	(±)-1,2,4-Butanetriol, 3-((2-nitro-1H-imidazol-1-yl)methoxy)-[CAS]	137339-64-1	WO 9414778	Radio/ chemosensitizer	Surgery adjunct
doripenem	(1R,5S,6S)-2-[(3S,5S)-5-(sulfamoylaminomethyl)pyrrolidin-3-yl]thio-6-[(1R)-1-hydroxyethyl]-1-methylcarbapen-2-em-3-carboxylic acid	148016-81-3	EP 528678	Beta-lactam antibiotic	Infection, urinary tract
dorzolamide	4H-Thieno(2,3-b)thiopyran-2-sulfonamide, 4-(ethylamino)-5,6-dihydro-6-methyl-,7,7-dioxide (4S-trans)-[CAS]	120279-96-1	EP 296879	Antiglaucoma	Glaucoma

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
dorzolamide + timolol	4H-Thieno(2,3-b)thiopyran-2-sulfonamide, 4-(ethylamino)-5,6-dihydro-6-methyl-7,7-dioxide (4S-trans) + ethyl 2-propanol, 1-[(1,1-dimethyl)amino]-3-[[4-(4-morpholinyl)-1,2,5-thiadiazol-3-yl]oxy]-, (S), (Z)-2-butenedioate (1:1) (salt) [CAS]	120279-96-1 26839-75-8 26921-17-5		Formulation, fixed-dose combinations	Glaucoma
dosmalfate	Aluminium, (μ7-[7-((6-O-(6-deoxy-2,3,4-tri-O-sulfo-Alpha-L-mannosyl)pyranosyl)-2,3,4-tri-O-sulfo-β-D-glucopyranosyl)oxy)-5-hydroxy-2-(4-methoxy-3-(sulfooxy)phenyl-4H-1-benzopyran-4-onato(7-))tetradeca-μ-hydroxyheneicosahydroxytetradeca-μ-hydroxyheneicosahydroxytetradeca-[CAS]	122312-55-4		Antiulcer	Ulcer, gastric
dosulepine	1-Propanamine, 3-dibenzo[b,e]thiepin-11(6H)-ylidene-N,N-dimethyl-[CAS]	113-53-1		Antidepressant	
Dotarizine		84625-59-2			
Dothiepin		113-53-1			
Doxacurium		106819-53-8			
Doxapram		309-29-5			
doxazosin	Piperazine, 1-(4-amino-6,7-dimethoxy-2-quinazolinyl)-4-[(2,3-dihydro-1,4-benzodioxin-2-yl)carbonyl]-[CAS]	74191-85-8	GB 2007656	Antihypertensive, adrenergic	Hypertension, general
Doxefazepam		40762-15-0			
Doxenitoin		3254-93-1			
doxepin	1-Propanamine, 3-dibenz[b,e]oxepin-11(6H)-ylidene-N,N-dimethyl-	1668-19-5		Formulation, dermal, topical	Pruritus
doxercalciferol	9,10-secoergosta-5,7,10(19),22-tetraene-1,3-diol (1Alpha, 3β, 5Z, 7E, 22E) [CAS]	54573-75-0	U.S. 5,104,854	Hormone	Hyperparathyroidism
doxifluridine	Uridine, 5'-deoxy-5-fluoro-[CAS]	3094-09-5	U.S. 4,071,680	Anticancer, antimetabolite	Cancer, colorectal
doxofylline	1H-Purine-2,6-dione, 7-(1,3-dioxolan-2-ylmethyl)-3,7-dihydro-1,3-dimethyl-[CAS]	69975-86-6	U.S. 4,187,308	Antiasthma	Asthma
doxorubicin	5,12-Naphthacenedione, 10-[(3-amino-2,3,6-trideoxy-Alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-8-(hydroxyacetyl)-1-methoxy-, (8S-cis)-[CAS]	23214-92-8	EP 191824	Formulation, optimized, liposomes	Cancer, general
doxycycline	2-Naphthacenecarboxamine, 4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,5,10,12,12a-pentahydroxy-6-methyl-1,11-dioxo-[4S-(4Alpha,4aAlpha,5Alpha,5aAlpha,6Alpha,12aAlpha)]-[CAS]	564-25-0 17086-28-1		Formulation, modified-release, immediate	Periodontitis
doxylamine	N,N-Dimethyl-2-[1-phenyl-1-(2-pyridinyl)ethoxy]ethanamine	469-21-4		Formulation, transmucosal, systemic	Rhinitis, allergic, general
DPC-817	β-D-2',3'-didehydro-2',3'-dideoxy-5-fluorocytidine			Antiviral, anti-HIV	Infection, HIV/AIDS

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DPI-3290			U.S. 5,681,830	Analgesic, other	Pain, general
DQ-113	5-Amino-7-[(3S,4R)-(1-aminocyclopropyl)-3-fluoropyrrolidin-1-yl]-1-[(1R,2S)-2-fluoro-]1-cyclopropyl]-1,4-dihydro-8-methyl-4-oxo-3-quinolinecarboxylic acid			Quinolone antibacterial	Infection, general
Drofenine		1679-76-1			
Droloxifene		82413-20-5			
Drometrizole		2440-22-4			
Dromostanolone		58-19-5			
dronabinol	6H-Dibenzo[b,d]pyran-1-ol, 6a,7,8,10a-tetrahydro-6,6,9-trimethyl-3-pentyl-, (6aR-trans)-[CAS]	1972-08-3		Antiemetic	Chemotherapy-induced nausea and vomiting
dronedarone	2-n-Butyl 3-[4-(3-di-n-butylamino-propoxy)benzoyl]5-methylsulfonamidobenzofuran			Antiarrhythmic	Arrhythmia, general
Droperidol		548-73-2			
Dropreinilamine		57653-27-7			
Dropropizine		17692-31-8			
Drospirenone		67392-87-4			
Drotaverine		14009-24-6			
Drotebanol		03/02/3176			
droxicam	2H,5H-1,3-Oxazino[5,6-c][1,2]benzothiazine-2,4(3H)-dione, 5-methyl-3-(2-pyridinyl)-, 6,6-dioxide [CAS]	90101-16-9	EP 99770	Anti-inflammatory	Inflammation, general
droxidopa	L-Tyrosine, β,3-dihydroxy-, threo-[CAS]	23651-95-8	EP 128684	Antiparkinsonian	Parkinson's disease
Droxidopa		23651-95-8			
DU-125530	1,2-Benzisothiazol-3(2H)-one, 2-[4-[4-(7-chloro-2,3-dihydro-1,4-benzodioxin-5-yl)-1-piperazinyl]butyl]-, 1,1-dioxide [CAS]	161611-99-0	EP 633260	Anxiolytic	Anxiety, general
duloxetine	2-Thiophenepropanamine, N-methyl-Gamma-(1-naphthalenyloxy)-, hydrochloride, (S)-[CAS]	136434-34-9 116539-59-4	U.S. 5,362,886	Antidepressant	Depression, general
duramycin			WO 9428726	Formulation, inhalable, solution	Cystic fibrosis
Durapatite		1306-06-5			
dutasteride	4-Azaandrost-1-ene-17-carboxamide, N-(2,5-bis(trifluoromethyl)phenyl)-3-oxo-, (5Alpha,17β)-[CAS]	164656-23-9	U.S. 5,565,467	Prostate disorders	Benign prostatic hyperplasia
DW-1141	N,N-diisopropyl-4-[4-(3-aminobenzo[d]isoxazol-6-yloxy)butoxy]-3-methoxybenzamide			Osteoporosis treatment	Osteoporosis
DW-286a	(R)-(−)-7-((4-aminomethyl-4-methyl-3-(Z)-methyloxyimino)pyrrolidin-1-yl)-1-cyclopropyl-6-fluoro-4-oxo-1,4-dihydro[1,8]naphthyridine-3-carboxylic acid			Quinolone antibacterial	Infection, general
DW-471			U.S. 5,922,871	Antiviral, other	Infection, hepatitis-B virus

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DX-9065a	2-Naphthaleneproparioic acid, 7-(aminoiminomethyl)-Alpha-[4-[[1-(1-iminoethyl)-3-pyrrolidinyl]oxy]phenyl]-, monohydrochloride, pentahydrate, [S-(R*,R*)]-[CAS]	155204-81-2		Antithrombotic	Thrombosis, general
DY-9760e	1H-Indazole, 3-[2-[4-(3-chloro-2-methylphenyl)-1-piperazinyl]ethyl]-1-(1H-imidazol-4-ylmethyl)-5,6-dimethoxy-[CAS]	160522-00-9	U.S. 5,681,954	Neuroprotective	Ischaemia, cerebral
Cyclonine		586-60-7			
Dydrogesterone		152-62-5			
Dymanthine		124-28-7			
Dyphylline		479-18-5			
E-1010	1-Azabicyclo[3.2.0]hept-2-ene-2-carboxylic acid, 6-[(1R)-1-hydroxyethyl]-3-[[(3S,5S)-5-[(R)-hydroxy(3R)-3-pyrrolidinylmethyl]-3-pyrrolidinyl]thio]-4-methyl-7-oxo-, monohydrochloride, (4R,5S,6S)-[CAS]	186319-97-1		Beta-lactam antibiotic	Infection, general
E-2101	N-Ethyl-(1-[1-(2-fluorophenethyl)piperidin-4-yl]-1H-indol-6-yl)acetamide			Muscle relaxant	Muscle spasm, general
E2F antagonists			WO 9606943	Anticancer, other	Cancer, general
E-3620	Benzamide, 4-amino-5-chloro-N-(8-methyl-8-azabicyclo[3.2.1]oct-3-yl)-2-[(1-methyl-2-butynyl)oxy]-, monohydrochloride, [3(S)-endo]-[CAS]	151213-86-4	EP 554794	Antacid/ Antiflatulent	Dyspepsia
E-5564	Alpha-D-Glucopyranose, 3-O-decyl-2-deoxy-6-O-(2-deoxy-3-O-((3R)-3-methoxydecyl)-6-O-methyl-2-(((11Z)-1-oxo-11-octadecenyl)amino)-4-O-phosphono-β-D-glucopyranosyl)-2-(1,3-dioxotetradecyl)amino)-1-(dihydrogen phosphate), tetrasodium salt [CAS]	185954-98-7	EP 536969	Septic shock treatment	Sepsis
E-5842	Pyridine, 4-(4-fluorophenyl)-1,2,3,6-tetrahydro-1-[4-(1H-1,3,4-triazol-1-yl)butyl]-, 2-hydroxy-1,2,3-propanetricarboxylate (1:1)[CAS]	220120-14-9		Neuroleptic	Schizophrenia
E-6259	1-(4-Aminosulfonylphenyl)-5-(2,4-difluorophenyl)-4,5-dihydro-3-trifluoromethyl-1-H-pyrazole			Antiarthritic, other	Unspecified
EAA-90	[2-(8,9-Dioxo-2,6-diazabicyclo[5.2.0]non-1(7)-en-2-yl)-ethyl]phosphonic acid			Analgesic, other	Pain, neuropathic
ε-Acetamidocaproic Acid		57-08-9			
ε-Aminocaproic Acid		60-32-2			
ebastine	1-Butanone, 1-[4-(1,1-dimethylethyl)phenyl]-4-[4-(diphenylmethoxy)-1-piperidinyl]-[CAS]	90729-43-4	EP 134124	Antiallergic, non-asthma	Rhinitis, allergic, seasonal
eberconazole	1H-Imidazole, 1-(2,4-dichloro-10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)-[CAS]	128326-82-9 130104-32-4	ES 2012297	Antifungal	Infection, derma-tological

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ebrotidine	Benzenesulfonamide, N-[[[2-[[2-[(aminoiminomethyl)amino]-4-thiazolyl]methyl]thio]ethyl]amino]methylene]-4-bromo-[CAS]	100981-43-9	EP 159012	Antiulcer	Ulcer, duodenal
ebselen	1,2-Benzisoselenazol-3(2H)-one, 2-phenyl-[CAS]	60940-34-3	EP 44971	Neuroprotective	Haemorrhage, subarachnoid
Eburnamonine		474-00-0			
Ecabapide		104775-36-2			
ecabet	1-Phenanthrenecarboxylic acid, 1,2,3,4,4a,9,10,10a-octahydro-1,4a-dimethyl-7-(1-methylethyl)-6-sulfo-, [1R-(1Alpha,4aβ,10aAlpha)]-[CAS]	33159-27-2 86408-72-2	DE 3239172	Antiulcer	Ulcer, gastric
ecadotril	Glycine, N-[2-[(acetylthio)methyl]-1-oxo-3-phenylpropyl]-,phenylmethyl ester, (S)-[CAS]	112573-73-6	EP 318377	Antihypertensive, other	Hypertension, general
Ecgonidine		484-93-5			
Ecgonine		481-37-8			
Echothiophate		513-10-0			
Econazole		27220-47-9			
ecopipam	5H-Benzo[d]naphth[2,1-b]azepin-12-ol, 11-chloro-6,6a,7,8,9,13b-hexahydro-7-methyl-, (6aS-trans)-[CAS]	112108-01-7	EP 230270	Anorectic/ Antiobesity	Obesity
ecraprost	Prosta-8,13-dien-1-oic acid, 11,15-dihydroxy-9-(1-oxobutoxy)-, butyl ester, (11Alpha,13E,15S)-[CAS]	136892-64-3	EP 423697	Vasodilator, peripheral	Peripheral vascular disease
Ectylurea		95-04-5			
ED-71	9,10-Secocholesta-5,7,10(19)-triene-1,3,25-triol, 2-(3-hydroxypropoxy)-, (1Alpha,2β,3β,5Z,7E)-[CAS]	104121-92-8	EP 184206	Osteoporosis treatment	Osteoporosis
edaravone	3H-Pyrazol-3-one, 2,4-dihydro-5-methyl-2-phenyl-[CAS]	89-25-8	JP 62108814	Neuroprotective	Infarction, cerebral
Edatrexate		80576-83-6			
Edetate Calcium Disodium		62-33-9			
Edetate Disodium		139-33-3			
Edetate Sodium		64-02-8			
Edetate Trisodium		150-38-9			
edonentan	Butanamide,N-[[2'-[[4,5-dimethyl-3-isoxazoyl)amino]sulfonyl]-4-(2-oxazolyl)[1,1'-biphenyl]-2-yl]methyl]-N,3,3-trimethyl-, monohydrate	210891-04-6		Cardiostimulant	Heart failure
edotreotide	[N-[2-[4,7-Bis[(carboxy-kappaO)methyl]-10-(carboxymethyl)-1,4,7,10-tetraazacyclododec-1-yl-kappaN1,kappaN4,kappaN10]acetyl]-D-phenylalanyl-L-cysteinyl-L-tyrosyl-D-tryptophyl-L-lysyl-L-threonyl-L-cysteinyl-L-threoninol cyclic (2-7)-disulfidato(3-)]yttrium	204318-14-9	U.S. 6,183,721	Anticancer, hormonal	Cancer, lung, small cell

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
edoxudine	Uridine, 2'-deoxy-5-ethyl-[CAS]	15176-29-1	GB 1170565	Antiviral, other	Infection, herpes virus, general
Edrecolomab		156586-89-9			
Edrophonium		116-38-1			
Efalith	Butanedioic acid, lithium salt [CAS]	16090-09-8		Antipruritic/ inflamm, allergic	Eczema, seborrhoeic
efaproxiral	Propanoic acid, 2-[4-[2-[(3,5-dimethylphenyl)amino]-2-oxoethyl]phenoxy]-2-methyl-[CAS]	131179-95-8	U.S. 5,705,521	Radio/ chemosensitizer	Cancer, brain
efavirenz	2H-3,1-Benzoxazin-2-one, 6-chloro-4-(cyclopropylethynyl)-1,4-dihydro-4-(trifluoromethyl)-, (S)-[CAS]	154598-52-4	WO 9403440	Antiviral, anti-HIV	Infection, HIV/AIDS
efletirizine	[2-[4-[Bis(p-fluorophenyl)methyl]-1-piperazinyl]ethoxy]acetic acid	150756-35-7	GB 2311940	Antiallergic, non-asthma	Allergy, general
eflornithine	DL-Ornithine, 2-(difluoromethyl)-[CAS]	70052-12-9 67037-37-0	U.S. 4,413,141	Protozoacide, dermal, topical	Infection, trypanosomiasis, African, Hirsutism
Efloxate		119-41-5			
eflucimibe	Benzeneacetamide, Alpha-(dodecylthio)-N-(4-hydroxy-2,3,5-trimethylphenyl)-(S)-[CAS]	202340-45-2		Hypolipaemic/ Antiatherosclerosis	Hyper-lipidaemia, general
efonidipine	3-pyridinecarboxylic acid, 5-(5,5-dimethyl-1,3,2-dioxaphosphorinan-2-yl)-1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, 2-(phenyl(phenylmethyl)amino)ethyl ester, P-oxide [CAS]	111011-53-1 111011-63-3 111011-76-8	EP 230944	Antihypertensive, other	Hypertension, general
EGIS-7229	5-Chloro-4-[3-[N-[2-(3,4-dimethoxyphenyl)ethyl]-N-methylamino]propylamino]-3(2H)-pyridazinone fumarate [CAS]	150800-12-7 190333-92-7	DE 4243381	Antiarrhythmic	Arrhythmia, general
eglumegad	Bicyclo[3.1.0]hexane-2,6-dicarboxylic acid, 2-amino-, (1S,2S,5R,6S)-[CAS]	176199-48-7 209216-09-1		Anxiolytic	Anxiety, general
egualen	1-Azulenesulfonic acid, 3-ethyl-7-(1-methylethyl)-,	97683-31-3 99287-30-6 10417-94-4	EP 147915	Antiulcer	Ulcer, gastric
Elcosapentaenoic Acid					
elarofiban	3-Pyridinepropanoic acid, β-[((3R)-1-[1-oxo-3-(4-piperidinyl)propyl]-3-piperidinyl]carbonyl]amino]-, (βS)-[CAS]	198958-88-2	WO 9741102	Antithrombotic	Thrombosis, general
Elcatonin		60731-46-6			
Eledoisin		69-25-0			
eletriptan	1H-Indole, 3-((1-methyl-2-pyrrolidinyl)methyl)-5-(2-(phenylsulfonyl)ethyl)-(R)-[CAS]	143322-58-1	U.S. 5,607,951	Antimigraine	Migraine
Elgodipine		119413-55-7			
Ellagic Acid		476-66-4			
Elliptinium		58337-35-2			
Eltoprazine		98224-03-4			

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
elvucitabine	β-L-2',3'-Didehydro-2',3'-dideoxy-5-fluorocytidine	181785-84-2		Antiviral, other	Infection, hepatitis-B virus
elzasonan	(2Z)-4-(3,4-dichlorophenyl)-2-[2-(4-methylpiperazin-1-yl)benzylidene]thiomorpholin-3-one monohydrochloride-[CAS]	220322-05-4 361343-20-6		Antidepressant	Depression, general
Embelin		550-24-3			
Embramine		3565-72-8			
emedastine	1H-Benzimidazole, 1-(2-ethoxyethyl)-2-(hexahydro-4-methyl-1H-1,4-diazepin-1-yl)-, (E)-2-butenedioate (1:2) [CAS]	87233-61-2 87233-62-3	EP 79545	Antiallergic, non-asthma	Rhinitis, allergic, general
Emepronium		3614-30-0			
Emetine		483-18-1			
Emifefur		110690-43-2			
EMM-210525	17Alpha-Acetoxy-6Alpha-methyl-19-nor-1β,2β-dihydrocyclopropa[1,2']pregn-4-ene-3,20-dione + Estra-1,3,5(10)-triene-3,17-diol(17β)			Formulation, fixed-dose combinations	Hormone replacement therapy
Emodin		518-82-1			
emorfazone	3(2H)-Pyridazinone, 4-ethoxy-2-methyl-5-(4-morpholinyl)-[CAS]	38957-41-4	JP 7224030	Anti-inflammatory	
EMR-62203			WO 9806722	Male sexual dysfunction	Impotence
emtricitabine	2(1H)-Pyrimidinone, 4-amino-5-fluoro-1-(2-(hydroxymethyl)-1,3-oxathiolan-5-yl)-, (2R-cis)-[CAS]	143491-57-0	WO 9214743	Antiviral, anti-HIV	Infection, HIV/AIDS
Emylcamate		78-28-4			
enalapril	L-Proline, 1-[N-[1-(ethoxycarbonyl)-3-phenylpropyl]-L-alanyl]-, (S)-, (Z)-2-butenedioate [CAS]	76095-16-4	U.S. 4,374,829	Antihypertensive, renin system	
Enalaprilat		76420-72-9			
Enallylpropymal		1861-21-8			
Encainide		66778-36-7			
Enciprazine		68576-86-3			
Endralazine		39715-02-1			
enfenamic acid	Benzoic acid, 2-[(2-phenylethyl)amino]-[CAS]	23049-93-6	IN 103066	Anti-inflammatory	
enflurane	Ethane, 2-chloro-1-(difluoromethoxy)-1,1,2-trifluoro-[CAS]	13838-16-9	U.S. 3,469,011	Anaesthetic, inhalation	Anaesthesia
Enilconazole		35554-44-0			
Enliuracil		59989-18-3			
ENMD-0995	S-3-amino-phthalidoglutarimide		U.S. 5,712,291	Anticancer, other	Cancer, myeloma
Enocitabine		55726-47-1			
Enol-3-IPA	1H-Indole-3-propanoic acid, Alpha-oxo-[CAS]	392-12-1	EP 106813	Hypnotic/Sedative	Insomnia
enoxacin	1,8-Naphthyridine-3-carboxylic acid, 1-ethyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-[CAS]	74011-58-8	U.S. 4,359,578	Quinolone antibacterial	Infection, general

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enoxaparin	Heparin, [CAS]	9005-49-6 9041-08-1	EP 40144	Antithrombotic	Thrombosis, venous
enoximone	2H-Imidazol-2-one, 1,3-dihydro-4-methyl-5-[4-(methylthio)benzoyl]-[CAS]	77671-31-9	EP 59948	Cardiostimulant	Heart failure
Enoxolone		471-53-4			
enprostil	4,5-Heptadienoic acid, 7-[3-hydroxy-2-(3-hydroxy-4-phenoxy-1-butenyl)-5-oxocyclopentyl]-, methyl ester, [1Alpha,2β(1E,3R*),3Alpha]-[CAS]	73121-56-9	GB 2025431	Prostaglandin	Ulcer, duodenal
enrasentan	1H-Indene-2-carboxylic acid, 1-(1,3-benzodioxol-5-yl)-2,3-dihydro-3-(2-(2-hydroxyethoxy)-4-methoxyphenyl)-5-propoxy-, (1S-(1Alpha,2β,3Alpha))-[CAS]	167256-08-8	U.S. 5,817,693	Antihypertensive, other	Hypertension, pulmonary
entacapone	2-Propenamide, 2-cyano-3-(4,5-dihydroxy-3-nitrophenyl)-N,N-diethyl-[CAS]	130929-57-6	EP 426468	Antiparkinsonian	Parkinson's disease
entecavir	6H-Purin-6-one, 2-amino-1,9-dihydro-9-((1S,3R,4S)-4-hydroxy-3-(hydroxymethyl)-2-methylenecyclopentyl)-[CAS]	142217-69-4	EP 481754	Antiviral, other	Infection, hepatitis-B virus
Enviomycin		33103-22-9			
epalrestat	3-Thiazolidineacetic acid, 5-(2-methyl-3-phenyl-2-propenylidene)-4-oxo-2-thioxo-, (E,E)-[CAS]	82159-09-9	EP 47109	Symptomatic antidiabetic	Neuropathy, diabetic
Epavir	L-lysine-cis-5,8,11,14,17-eicosapentanoate with L-lysine-cis-4,7,10,13,16,19-docahexanoate			Antiviral, other	Infection, herpes simplex virus
EPC-K1	L-ascorbic acid 2-[3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)-2H-1-benzopyran-6-yl-hydrogen phosphate]potassium-[CAS]	127061-56-7	EP 127471	Neuroprotective	Infarction, cerebral
eperisone	1-Propanone, 1-(4-ethylphenyl)-2-methyl-3-(1-piperidinyl)-[CAS]	64840-90-0	U.S. 3,995,047	Muscle relaxant	Spastic paralysis
epervudine	Uridine, 2'-deoxy-5-(1-methylethyl)-[CAS]	60136-25-6	DE 2918260	Antiviral, other	Infection, herpes simplex virus
Ephedrine		299-42-3			
Epicillin		26774-90-3			
Epimestrol		7004-98-0			
epinastine	1H-Dibenz[c,f]imidazo[1,5-a]azepin-3-amine, 9,13b-dihydro-[CAS]	80012-43-7	DE 3008944	Antiasthma	Asthma
eoinephrine	(R)-4-[1-hydroxy-2-(methylamino)-ethyl]-1,2-benzenediol	51-43-4		Formulation, inhalable, dry powder	Anaphylaxis
Epirizole		18694-40-1			
epirubicin	5,12-Naphthacenedione, 10-[(3-amino-2,3,6-trideoxy-Alpha-L-arabino-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-8-(hydroxyacetyl)-1-methoxy-, (8S-cis)-[CAS]	56390-09-1 56420-45-2	GB 1457632	Anticancer, antibiotic	

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Epitiostanol		2363-58-8			
eplerenone	Pregn-4-ene-7,21-dicarboxylic acid, 9,11-epoxy-17-hydroxy-3-oxo-, Gamma-lactone, methyl ester (7Alpha, 11Alpha, 17Alpha)-[CAS]	107724-20-9	EP 122232	Antihypertensive, diuretic	Hypertension, general
eplivanserin	1-Propanone, 1-(2-fluorophenyl)-3-(4-hydroxyphenyl)-, O-(2-(dimethylamino)ethyl)oxime, (Z)-, (E)-2-butenedioate (2:1) (salt) [CAS]	130580-02-8	EP 373998	Anxiolytic	Schizophrenia
epoprostenol	Prosta-5,13-dien-1-oic acid, 6,9-epoxy-11,15-dihydroxy-, (5Z,9Alpha,11Alpha,13E,15S)-[CAS]	35121-78-9 61849-14-7	DE 2720999	Prostaglandin	Hypertension, pulmonary
Epostane		80471-63-2			
Eprazinone		10402-90-1			
Epristeride		119169-78-7			
eprosartan	3-[2-Butyl-1-(4-carboxybenzyl)-1H-imidazol-5-yl]-2-(2-thienylmethyl)-2-(E)-propenoic acid	133040-01-4	EP 403159	Antihypertensive, renin system	Hypertension, general
Eprozinol		32665-36-4			
eptapirone	4-methyl-2-[4-(4-(pyrimidin-2-yl)-piperazino)-butyl]-2H,4H-1,2,4-triazin-3,5-dione	179756-85-5		Antidepressant	Depression, general
eptaplatin	Platinum, [(4R,5R)-2-(1-methylethyl)-1,3-dioxolane-4,5-dimethanamine-kappaN4,kappaN5][propanedioato(2-)-kappaO1,kappaO3]-, (SP-4-2)-[CAS]	146665-77-2	WO 9216539	Anticancer, alkylating	Cancer, lung, small cell
Eptastigmine		101246-68-8			
eptazocine	1,6-Methano-1H-4-benzazonin-10-ol, 2,3,4,5,6,7-hexahydro-1,4-dimethyl-, (1S)-[CAS]	72522-13-5	U.S. 4,082,744	Analgesic, other	
Eptifibatide		188627-80-7			
Equilenin		517-09-9			
Equilin		474-86-2			
ERA-923	ERA 923 [CAS]	352233-89-7	EP 802183	Female contraceptive	Contraceptive, female
erdosteine	Acetic acid, [[2-oxo-2-[(tetrahydro-2-oxo-3-thienyl)amino]ethyl]thio]-[CAS]	84611-23-4	EP 61386	Respiratory	Respiratory disease, general
Ergocornine		564-36-3			
Ergocorninine		564-37-4			
Ergoloid Mesylates		8067-24-1			
Ergonovine		60-79-7			
Ergosterol		57-87-4			
ergotamine	(5'Alpha)-12'-Hydroxy-2'methyl-(phenylmethyl)ergotaman-3',6',18-trione	113-15-5		Formulation, inhalable, systemic	Migraine
Eritadenine		23918-98-1			
erlotinib	4-Quinazolinamine, N-(3-ethynylphenyl)-6,7-bis(2-methoxyethoxy)-, monohydrochloride [CAS]	183319-69-9	WO 9630347	Anticancer, other	Cancer, lung, non-small cell

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ertapenem	1-Azabicyclo[3.2.0]hept-2-ene-2-carboxylic acid, 3-[[(3S,5S)-5-[[(3-carboxyphenyl)amino]carbonyl]-3-pyrrolidinyl]thio]-6-[(1R)-1-hydroxyethyl]-4-methyl-7-oxo-, [CAS]	153773-82-1 153832-46-3	WO 9315078	Beta-lactam antibiotic	Infection, GI tract
Erythrityl Tetranitrate		7297-25-8			
Erythrocentaurin		50276-98-7			
erythromycin acistrate	Erythromycin, 2'-acetate, octadecanoate (salt) [CAS]	96128-89-1	U.S. 4,599,326	Macrolide antibiotic	Infection, general
Erythromycin Estolate		3521-62-8			
Erythromycin Glucoheptonate		23067-13-2			
Erythromycin Lactobionate		3847-29-8			
Erythromycin Propionate		134-36-1			
Erythromycin Stearate		643-22-1			
erythromycin stinoprate	Erythromycin, 2'-propanoate, compd. with N-acetyl-L-cysteine (1:1) [CAS]	84252-03-9	EP 57489	Macrolide antibiotic	Infection, respiratory tract, lower
erythromycin	Erythromycin [CAS]	114-07-8		Formulation, dermal, topical	Acne
Erythrophleine		36150-73-9			
Esaprazole		64204-55-3			
escitalopram	5-Isobenzofurancarbonitrile, 1-[3-(dimethylamino)propyl]-1-(4-fluorophenyl)-1,3-dihydro-, (S)-[CAS]	128196-01-0	EP 347066	Antidepressant	Depression, general
Esculin		531-75-9			
Eseridine		25573-43-7			
esmolol	Benzenepropanoic acid, 4-[2-hydroxy-3-[(1-methylethyl)amino]propoxy]-, methyl ester, (+/−)-[CAS]	81147-92-4	U.S. 4,387,103	Antihypertensive, adrenergic	Tachycardia, supra-ventricular
esomeprazole	bis (5-methoxy-2-(((4-methoxy-3,5-dimethyl-2-pyridinyl)methyl)sulfinyl)-1H-benzimidazolato)	161973-10-0	U.S. 5,877,192	Antispasmodic	Gastro-oesophageal reflux
estazolam	4H-[1,2,4]Triazolo[4,3-a][1,4]benzodiazepine, 8-chloro-6-phenyl-[CAS]	29975-16-4	U.S. 3,987,052	Hypnotic/Sedative	
estradiol	Androst-4-en-3-one, 17-hydroxy-, (17β)-[CAS]	58-22-0	U.S. 5,460,820	Formulation, transdermal, patch	Sexual dysfunction, female
estradiol	Estra-1,2,5(10)-triene-3,17-diol (17β)-[CAS]	50-28-2	EP 430491	Formulation, transdermal, systemic	Menopausal symptoms, general
estramustine	Estra-1,3,5(10)-triene-3,17-diol (17β)-, 3-[bis(2-chloroethyl)carbamate] 17-[CAS]	2998-57-4 4891-15-0 52205-73-9		Anticancer, alkylating	Cancer, prostate
Estriol		50-27-1			

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estrogen			WO 9924041	Menopausal disorders	Menopausal symptoms, general
Estrone		53-16-7			
eszopiclone	1-Piperazinecarboxylic acid, 4-methyl-6-(5-chloro-2-pyridinyl)-6,7-dihydro-7-oxo-5H-pyrrolo(3,4-b)pyrazin-5-yl ester (S)-[CAS]	138729-47-2	U.S. 5,786,357	Hypnotic/Sedative	Insomnia
Etafedrine		7681-79-0			
Etafenone		90-54-0			
Etamiphyllin		314-35-2			
Etanercept		185243-69-0			
Etanidazole		22668-01-5			
Etaqualone		7432-25-9			
Eterobarb		27511-99-5			
Ethacridine		442-16-0			
Ethacrynic Acid		58-54-8			
Ethadion		520-77-4			
Ethambutol		74-55-5			
Ethamivan		304-84-7			
Ethamsylate		2624-44-4			
Ethanolamine		141-43-5			
Ethaverine		486-47-5			
Ethchlorvynol		113-18-8			
Ethenzamide		938-73-8			
Ethiazide		1824-58-4			
Ethinamate		126-52-3			
Ethinyl Estradiol		57-63-6			
ethinyl estradiol	19-Norpregna-1,3,5(10)-trien-20-yne-3,17-diol, 3-(2-propanesulfonate), (17Alpha)-[CAS]	28913-23-7	DE 1949095	Formulation, modified-release, >24 hr	Cancer, prostate
Ethionamide		536-33-4			
Ethisterone		434-03-7			
Ethoheptazine		77-15-6			
Ethopropazine		522-00-9			
Ethosuximide		77-67-8			
Ethotoin		86-35-1			
Ethoxzolamide		452-35-7			
Ethybenztropine		524-83-4			
Ethyl Alcohol		64-17-5			
Ethyl Biscoumacetate		548-00-5			
Ethyl Chloride		75-00-3			
Ethyl Dibunate		5560-69-0			
Ethyl Ether		60-29-7			
ethyl icosapentate	5,8,11,14,17-Eicosapentaenoic acid, ethyl ester, (all-Z)-[CAS]	86227-47-6	JP 61043143	Antithrombotic	Peripheral vascular disease
ethyl loflazepate	1H-1,4-Benzodiazepine-3-carboxylic acid, 7-chloro-5-(2-fluorophenyl)-2,3-dihydro-2-oxo-, ethyl ester [CAS]	29177-84-2	U.S. 3,657,223	Anxiolytic	Anxiety, general
Ethyl Loflazepate		29177-84-2			

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Ethylamine		75-04-7			
Ethylene		74-85-1			
Ethylestrenol		965-90-2			
Ethylidene		1821-16-5			
Dicoumarol					
Ethylmethyl-thiambutene		441-61-2			
Ethylmorphine		76-58-4			
Ethylnorepinephrine		536-24-3			
Ethynodiol		1231-93-2			
ethynylcytidine	Uridine, 3'-C-ethynyl-[CAS]	180300-49-6	WO 9618636	Anticancer, antimetabolite	Cancer, general
Etidocaine		36637-18-0			
etidronate	Phosphonic acid, (1-hydroxyethylidene)bis-, [CAS]	2809-21-4	U.S. 4,137,309	Osteoporosis treatment	Osteoporosis
		7414-83-7			
Etidronic Acid		2809-21-4			
Etifelmin		341-00-4			
etifoxine	4H-3,1-Benzoxazin-2-amine, 6-chloro-N-ethyl-4-methyl-4-phenyl-[CAS]	21715-46-8	U.S. 3,725,404	Anxiolytic	
Etilefrin		709-55-7			
etilevodopa	L-Tyrosine, 3-hydroxy-, ethyl ester [CAS]	37178-37-3	U.S. 5,354,885	Antiparkinsonian	Parkinson's disease
etiprednol	androsta-1,4-diene-17-carboxylic acid, 17-[(dichloroacetyl)oxy]-11-hydroxy-3-oxo-, ethyl ester, (11ß,17Alpha)-	199331-40-3		GI inflammatory/ bowel disorders	Crohn's disease
Etiroxate		17365-01-4			
Etizolam		40054-69-1			
etodolac	Pyrano[3,4-b]indole-1-acetic acid, 1,8-diethyl-1,3,4,9-tetrahydro-[CAS]	41340-25-4	U.S. 3,939,178	Antiarthritic, other	Arthritis, osteo
Etodroxizine		17692-34-1			
etofenamate	Benzoic acid, 2-[[3-(trifluoromethyl)phenyl]amino]-, 2-(2-hydroxyethoxy)ethyl ester [CAS]	30544-47-9	GB 1285400	Anti-inflammatory, topical	Inflammation, general
etofibrate	3-Pyridinecarboxylic acid, 2-[2-(4-chlorophenoxy)-2-methyl-1-oxopropoxy]ethyl ester [CAS]	31637-97-5	U.S. 3,723,446	Hypolipaemic/ Antiatherosclerosis	
Etofylline		519-37-9			
etofylline clofibrate	Propanoin acid, 2-(4-chlorophenoxy)-2-methyl-, 2-(1,2,3,6-tetrahydro-1,3-dimethyl-2,6-dioxo-7H-purin-7-yl)ethyl ester [CAS]	54504-70-0	DE 2308826	Hypolipaemic/ Antiatherosclerosis	
Etofylline Nicotinate		13425-39-3			
Etogluclid		1954-28-5			
Etomidate		33125-97-2			
Etomidoline		21590-92-1			
Etonitazene		911-65-9			
etonogestrel	18,19-Dinorpregn-4-en-20-yn-3-one, 13-ethyl-17-hydroxy-11-methylene, (17Alpha)-[CAS]	54048-10-1		Formulation, implant	Contraceptive, female

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Etoperidone		52942-31-1			
etoposide	Furo[3',4':6,7]naphtho[2,3-d]-1,3-dioxol-6(5aH)-one, 9-[(4,6-O-ethylidene-β-D-glucopyranosyl)oxy]-5,8,8a,9-tetrahydro-5-(4-hydroxy-3,5-dimethoxyphenyl)-, [5R-[5Alpha,5aβ,8aAlpha,9β(R*)]]-[CAS]	33419-42-0	GB 1205966	Anticancer, other	Cancer, testicular
etoposide phosphate	Furo[3',4':6,7]naphtho[2,3-d]-1,3-dioxol-6(5aH)-one, 9-[(3,5-dimethoxy-4-(phosphonooxy)phenyl]-9-[(4,6-0-ethylidene-β-D-glucopyranosyl)oxy]-5,8,8a,9-tetrahydro-, [5R-[5Alpha,5aβ,8aAlpha,9β(R*)]]-[CAS]	117091-64-2	EP 302473	Anticancer, other	Cancer, testicular
etoricoxib	2,3-Bipyridine, 5-chloro-6'-methyl-3-(4-(methylsulfonyl)phenyl) [CAS]	202409-33-4	WO 9803484	Antiarthritic, other	Arthritis, osteo
Etoxadrol		28189-85-7			
Etozolin		73-09-6			
etretinate	2,4,6,8-Nonatetraenoic acid, 9-(4-methoxy-2,3,6-trimethylphenyl)-3,7-dimethyl-, ethyl ester, (all-E)-[CAS]	54350-48-0	U.S. 4,215,215	Antipsoriasis	
Etryptamine		2235-90-7			
Etymemazine		523-54-6			
Eucatropine		100-91-4			
Eugenol		97-53-0			
EUK-134	Manganese, chloro[[2,2'-[1,2-ethanediylbis[(nitrilo-kappaN)methylidyne]]bis[6-methoxyphenolato-kappaO]]]-, (SP-5-13)-[CAS]	81065-76-1	U.S. 6,046,188	Cardiovascular	Unspecified
EUK-189			U.S. 6,046,188	Radio/ chemoprotective	Chemotherapy-induced injury, general
Evans Blue		314-13-6			
everolimus	Rapamycin, 42-O-(2-hydroxyethyl)-[CAS]	159351-69-6	WO 9409010	Immunosuppressant	Transplant rejection, general
exalamide	Benzamide, 2-(hexyloxy)-[CAS]	53370-90-4	GB 726786	Antifungal	Infection, fungal, general
Exametazime		105613-48-7			
exatecan	10H,13H-Benzo[de]pyrano[3',4':6,7]indolizino[1,2-b]quinoline-10,13-dione, 1-amino-9-ethyl-5-fluoro-1,2,3,9,12,15-hexahydro-9-hydroxy-4-methyl-, (1A,9S)-, [CAS]	171335-80-1		Anticancer, other	Cancer, pancreatic
exemestane	Androsta-1,4-diene-3,17-dione, 6-methylene-[CAS]	107868-30-4	DE 3622841	Anticancer, hormonal	Cancer, breast
Exifone		52479-85-3			
exisulind	1H-Indene-3-acetic acid 5-fluoro-2-methyl-1-((4-(methylsulfonyl)phenyl)methylene)-, (Z)-[CAS]	59973-80-7		Anticancer, other	Polyp

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Exosurf ®		99732-49-7			
ezetimibe	2-Azetidinone, 1-(4-fluorophenyl)-3-[(3S)-3-(4-fluorophenyl)-3-hydroxypropyl]-4-(4-hydroxyphenyl)-, (3R,4S)-[CAS]	163222-33-1	U.S. 5,846,966	Hypolipaemic/ Antiherosclerosis	Hypercholesterolaemia
Factor IX		9001-28-9			
Factor VIII		9001-27-8			
Factor XIII		9013-56-3			
fadolmidine	1H-Inden-5-ol, 2,3-dihydro-3-(1H-imidazol-4-ylmethyl), monohydrochloride [CAS]	189353-32-0	WO 9712874	Analgesic, other	Pain, general
Fadrozole		102676-47-1			
falecalcitriol	9,10-Secocholesta-5,7,10(19)-triene-1,3,25-triol, 26,26,26,27,27,27-hexafluoro-, (1Alpha,3β,5Z,7E)-[CAS]	83805-11-2	JP 03099022	Osteoporosis treatment	Hyperparathyroidism
famciclovir	1,3-Propanediol, 2-[2-(2-amino-9H-purin-9-yl)ethyl]-, diacetate (ester)-[CAS]	104227-87-4	JP 61085388	Antiviral, other	Infection, gynaecological
famotidine	Propanimidamide, 3-[[[2-[(aminoiminomethyl)amino]-4-thiazolyl]methyl]thio]-N-(aminosulfonyl)-[CAS]	76824-35-6	U.S. 4,283,408	Antiulcer	Ulcer, duodenal
fampridine	4-pyridamine	504-24-5	Neuroprotective		Spinal cord injury
fandofloxacin	3-Quinolinecarboxylic acid, 6-fluoro-1-(5-fluoro-2-pyridinyl)-1,4-dihydro-7-(4-methyl-1-piperazinyl)-4-oxo, [CAS]	164150-85-0 164150-99-6	U.S. 5,496,947	Quinolone antibacterial	Infection, urinary tract
Fantofarone		114432-13-2			
faropenem daloxate	(5R,6S)-6-[1(R)-Hydroxyethyl]-2-[2(R)-tetrahydrofuryl]-2-penem-3-carboxylic acid-5-methyl-2-oxo-1,3-dioxol-4-ylmethyl ester			Beta-lactam antibiotic	Infection, general
faropenem	4-Thia-1-azabicyclo[3.2.0]hept-2-ene-2-carboxylic acid, 6-(1-hydroxyethyl)-7-oxo-3-((tetrahydro-2-furanyl)-, [5R-[3(R*),5Alpha,6Alpha(R*)]]-[CAS]	122547-49-3	EP 410727	Beta-lactam antibiotic	Infection, ocular
fasidotril	L-Alanine, N-[(2S)-3-(acetylthio)-2-(1,3-benzodioxol-5-ylmethyl)-1-oxopropyl]-, phenylmethyl ester [CAS]	135038-57-2	EP 419327	Antihypertensive, renin system	Hypertension, general
fasudil	1H-1,4-Diazepine, hexahydro-1-(5-isoquinolinylsulfonyl)-[CAS]	103745-39-7 105628-07-7 49564-56-9	EP 187371	Neuroprotective	Vasospasm, general
Fazadiinium Bromide					
febarbamate	2,4,6(1H,3H,5H)-Pyrimidinetrione, 1-[2-[(aminocarbonyl)oxy]-3-butoxypropyl]-5-ethyl-5-phenyl-[CAS]	13246-02-1	U.S. 3,075,983	Psychostimulant	
Febuprol		3102-00-9			
febuxostat	5-Thiazolecarboxylic acid, 2-[3-cyano-4-(2-methylpropoxy)phenyl]-4-methyl-[CAS]	144060-53-7	WO 9209279	Antigout	Hyperuricaemia
Fedotozine		123618-00-8			
felbamate	1,3-Propanediol, 2-phenyl-, dicarbamate [CAS]	25451-15-4	U.S. 4,868,327	Antiepileptic	Epilepsy, general
felbinac	[1,1'-Biphenyl]-4-acetic acid [CAS]	5728-52-9	EP 127840	Anti-inflammatory, topical	

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felodipine	3,5-Pyridinedicarboxylic acid, 4-(2,3-dichlorophenyl)-1,4-dihydro-2,6-dimethyl-, ethyl methyl ester [CAS]	72509-76-3	U.S. 4,264,611	Antihypertensive, other	Hypertension, general
Felypressin		56-59-7			
Femoxetine		59859-58-4			
Fenbenicillin		1926-48-3			
fenbufen	[1,1'-Biphenyl]-4-butanoic acid, Gamma-oxo-[CAS]	36330-85-5	U.S. 3,784,701	Anti-inflammatory	
Fenbutrazate		4378-36-3			
Fencamfamine		1209-98-9			
Fencamine		28947-50-4			
Fenclozic Acid		17969-20-9			
Fendiline		13042-18-7			
Fendosal		53597-27-6			
Fenethylline		3736081			
Fenfluramine		458-24-2			
Fenipentol		583-03-9			
fenofibrate	Propanoic acid, 2-[4-(4-chlorobenzoyl)phenoxy]-2-methyl-, 1-methylethyl ester [CAS]	26129-32-8 49562-28-9		Formulation, modified-release, <=24 hr	Hyper-lipidaemia, general
fenoldopam	1H-3-Benzazepine-7,8-diol, 6-chloro-2,3,4,5-tetrahydro-1-(4-hydroxyphenyl)-[CAS]	67227-56-9 67227-57-0	EP 22330	Antihypertensive, other	Hypertension, general
Fenoprofen		31879-05-7			
Fenoterol		13392-18-2			
fenoverine	10H-Phenothiazine, 10-[[4-(1,3-benzodioxol-5-ylmethyl)-1-piperazinyl]acetyl]-[CAS]	37561-27-6	FR 2092639	Antispasmodic	
Fenoxazoline		4846-91-7			
Fenoxedil		54063-40-0			
Fenozolone		15302-16-6			
Fenpentadiol		15687-18-0			
Fenpiprane		3540-95-2			
Fenpiverinium Bromide		125-60-0			
Fenproporex		15686-61-0			
Fenquizone		20287-37-0			
fenretinide	Retinamide, N-(4-hydroxyphenyl)-[CAS]	65646-68-6	BE 847942	Anticancer, other	Cancer, breast
Fenspiride		5053066			
fentanyl	Propanamide, N-phenyl-N-[1-(2-phenylethyl)-4-piperidinyl]-[CAS]	437-38-7		Formulation, transmucosal, systemic	Anaesthesia, adjunct
Fentiazac		18046-21-4			
Fenticlor		97-24-5			
fenticonazole	1H-Imidazole, 1-[2-(2,4-dichlorophenyl)-2-[[4-(phenylthio)phenyl]methoxy]ethyl]-[CAS]	72479-26-6 73151-29-8	U.S. 4,221,803	Antifungal	Infection, gynaecological

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Fentonium Bromide		5868064			
fepradinol	Benzenemethanol, Alpha[[(2-hydroxy-1,1-dimethylethyl)amino]methyl]-, (+/−)-[CAS]	36981-91-6		Anti-inflammatory, topical	
		67704-50-1			
		63075-57-8			
Feprazone		30748-29-9			
Ferric Sodium Edetate		15708-41-5			
ferrioxamine B			WO 9426263	Septic shock treatment	Respiratory distress syndrome, adult
Ferrocholinate		1336-80-7			
Ferrous Gluconate		299-29-6			
ferumoxytol	Polyglucose sorbitol carboxymethyl ether-coated non-stoichiometric magnetite			Imaging agent	Diagnosis, cancer
fesoterodine	2-((1R)-3-(bis(1-methylethyl)amino)-1-phenylpropyl)-4-(hydroxymethyl)Phenyl ester, (2E)-2-butenedioate (1:1) (Salt)-[CAS]	286930-03-8		Urological	Incontinence
fexofenadine	Benzeneacetic acid, 4-[1-hydroxy-4-[4(hydroxydiphenylmethyl(-1-piperidinyl]butyl]-Alpha,Alpha-dimethyl-, [CAS]	153439-40-8	U.S. 5,345,693	Antiallergic, non-asthma	Rhinitis, allergic, seasonal
		83799-24-0			
		138452-21-8			
Fibrostat			CA 2132416	Vulnerary	Wound healing
fidarestat	Spiro(4H-1-benzopyran-4,4'-imidazolidine)-2-carboxamide, 6-fluoro-2,3-dihydro-2',5'-dioxo-, (2S-cis)-, [CAS]	136087-85-9	EP 418834	Symptomatic antidiabetic	Neuropathy, diabetic
fiduxosin	8-Phenyl-3-[4-[(3aR,9bR)-1,3a,4,9b-] tetrahydro-9-methoxy[1]benzopyrano[3,4-c]-pyrrol-2(3H)-yl]butyl]pyrazino[2',3':4,5]-thieno[3,2-d]pyrimidine-2,4(1H,3H)-dione	208993-54-8		Prostate disorders	Benign prostatic hyperplasia
finasteride	4-Azaandrost-1-ene-17-carboxamide, N-(1,1-dimethylethyl)-3-oxo-, (5Alpha,17β)-[CAS]	98319-26-7	EP 155096	Prostate disorders	Benign prostatic hyperplasia
finrozole	Benzonitrile, 4-(3-(4-fluorophenyl)-2-hydroxy-1-(1H-1,2,4-triazol-1-yl)-propyl)-[CAS]	160146-16-7	EP 476944	Urological	Urinary retention
Fipexide		34161-24-5			
FK-960	N-(4-Acetyl-1-piperazinyl)-4-fluorobenzamide monohydrate-[CAS]	133920-70-4	WO 9101979	Cognition enhancer	Alzheimer's disease
Flavopiridol		146426-40-6			
flavoxate	4H-1-Benzopyran-8-carboxylic acid, 3-methyl-4-oxo-2-phenyl-, 2-(1-piperidinyl)ethyl ester [CAS]	15301-69-6	U.S. 2,921,070	Urological	
		3717-88-2			
flecainide	Benzamide, N-(2-piperidinylmethyl)-2,5-bis(2,2,2-trifluoroethoxy)-, [CAS]	54143-55-4		Formulation, modified-release, <=24 hr	Fibrillation, atrial
		54143-56-5			
fleroxacin	3-Quinolinecarboxylic acid, 6,8-difluoro-1-(2-fluoroethyl)-1,4-dihydro-7-(4-methyl-1-piperazinyl)-4-oxo-[CAS]	79660-53-0	U.S. 4,398,029	Quinolone antibacterial	Infection, general
		79660-72-3			
Flesinoxan		98206-10-1			

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fibanserin	2H-Benzimidazol-2-one, 1,3-dihydro-2-(2-(4-(3-(trifluoromethyl)phenyl)-1-piperazinyl)ethyl)-[CAS]	167933-07-5		Reproductive/ gonadal, general	Sexual dysfunction, female
floctafenine	Benzoic acid, 2-[[8-((trifluoromethyl)-4-quinolinyl]amino]-, 2,3-dihydroxypropyl ester [CAS]	23779-99-9	U.S. 3,644,368	Analgesic, NSAID	
flomoxef	5-Oxa-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[[(difluoromethyl)thio]acetyl]amino]-3-[[[1-(2-hydroxyethyl)-1H-tetrazol-5-yl]thio]methyl]-7-methoxy-8-oxo-, (6R-cis)-[CAS]	92823-03-5 99665-00-6	EP 128536	Cephalosporin, injectable	Infection, general
Flopropione		2295-58-1			
Florantyrone		519-95-9			
Flosequinan		76568-02-0			
Floxacillin		5250-39-5			
Floxuridine		50-91-9			
Fluacizine		30223-48-4			
Fluanisone		1480-19-9			
fluasterone	Androst-5-en-17-one, 16-fluoro-, (16Alpha)-[CAS]	112859-71-9	EP 246650	Cardiovascular	Keratosis
fluazacort	5'H-Pregna-1,4-dieno[17,16-d]oxazole-3,20-dione, 21-(acetyloxy)-9-fluoro-11-hydroxy-2'-methyl-, (11β,16β)-[CAS]	19888-56-3	U.S. 3,461,119	Antipruritic/ inflamm, non-allergic	
Flucloronide		3693-39-8			
flucloxacillin		1847-24-1		Formulation, other	Infection, general
Fluconazole	1H-1,2,4-Triazole-1-ethanol, Alpha-(2,4-difluorophenyl)-Alpha-(1H-1,2,4-triazol-1-ylmethyl)-[CAS]	34214-51-2 86386-73-4	EP 96569	Antifungal	Infection, dermatological
Flucytosine		2022-85-7			
fludarabine	9H-Purin-6-amine, 2-fluoro-9-(5-O-phosphono-β-D-arabinofuranosyl)-[CAS]	75607-67-9 21679-14-1	U.S. 4,357,324	Anticancer, antimetabolite	Cancer, leukaemia, chronic lymphocytic
Fludeoxyglucose F_{18}		105851-17-0			
Fludiazepam		3900-31-0			
Fludrocortisone		127-31-1			
Flufenamic Acid		530-78-9			
Fluindione		957-56-2			
flumazenil	4H-Imidazo[1,5-a][1,4]benzodiazepine-3-carboxylic acid, 8-fluoro-5,6-dihydro-5-methyl-6-oxo-, ethyl ester [CAS]	78755-81-4	EP 27214	Neurological	
Flumecinol		56430-99-0			
Flumequine		42835-25-6			
Flumethasone		2135-17-3			
Flumethiazide		148-56-1			
fluarizine	Piperazine, 1-[bis(4-fluorophenyl)methyl]-4-(3-phenyl-2-propenyl)-, (E)-[CAS]	30484-77-6 52468-60-7 27848-84-6	GB 1268710	Antimigraine	

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flunisolide	Pregna-1,4-diene-3,20-dione, 6-fluoro-11,21-dihydroxy-16,17-[(1-methylethylidene)bis(oxy)]-, (6Alpha,11β,16Alpha)-[CAS]	3385-03-3	U.S. 3,124,571	Antiasthma	Rhinitis, allergic, general
flunitrazepam	2H-1,4-Benzodiazepin-2-one, 5-(2-fluorophenyl)-1,3-dihydro-1-methyl-7-nitro-[CAS]	1622-62-4	U.S. 3,116,203	Hypnotic/ Sedative	
Flunoxaprofen		66934-18-7			
Fluocinolone Acetonide		67-73-2			
Fluocinonide		356-12-7			
Fluocortin Butyl		41767-29-7			
Fluocortolone		152-97-6			
Fluorescein		2321-07-5			
Fluoresone		2924-67-6			
Fluoromethelone		426-13-1			
Fluorosalan		4776061			
fluorouracil	2,4(1H,3H)-Pyrimidinedione, 5-fluoro-[CAS]	51-21-8		Formulation, transdermal, enhanced	Keratosis
fluoxetine	Benzenepropanamine, N-methyl-Gamma-[4-(trifluoromethyl)phenoxy]-, (+/−)-[CAS]	54910-89-3	U.S. 4,314,081	Antidepressant	Depression, general
Fluoxymesterone		56296-78-7			
Flupentixol		76-43-7			
Fluperolone		2709-56-0			
Fluphenazine		2119-75-7			
flupirtine	Carbamic acid, [2-amino-6-[[(4-fluorophenyl)methyl]amino]-3-pyridinyl]-, ethyl ester [CAS]	69-23-8	U.S. 4,481,205	Analgesic, other	Pain, post-operative
		33400-45-2			
		56995-20-1			
		75507-68-5			
Fluprednidene Acetate		1255-35-2			
Flupredniso1one		53-34-9			
Fluproquazone		40507-23-1			
Flurandrenolide		1524-88-5			
Flurazepam		17617-23-1			
flurbiprofen	[1,1'-Biphenyl]-4-acetic acid, 2-fluoro-Alpha-methyl-[CAS]	5104-49-4	U.S. 3,793,457	Anti-inflammatory	
flurithromycin	Erythromycin, 8-fluoro-mono(ethyl butanedioate) (ester)-[CAS]	82730-23-2	EP 56291	Macrolide antibiotic	Infection, respiratory tract, lower
Flurogestone		2529-45-5			
Flurothyl		333-36-8			
Fluroxen		406-90-6			
Fluspirilene		1841-19-6			
flutamide	Propanamide, 2-methyl-N-[4-nitro-3-(trifluoromethyl)phenyl]-[CAS]	13311-84-7	U.S. 4,329,364	Anticancer, hormonal	
flutazolam	Oxazolo[3,2-d][1,4]benzodiazepin-6(5H)-one, 10-chloro-11b-(2-fluorophenyl)-2,3,7,11b-tetrahydro-7-(2-hydroxyethyl)-[CAS]	27060-91-9	U.S. 3,905,956	Anxiolytic	

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fluticasone	Androsta-1,4-diene-17-carbothioic acid, 6,9-difluoro-11,17-dihydroxy-16-methyl-3-oxo-, S-(fluoromethyl) ester, (6Alpha,11β,16Alpha,17Alpha)-[CAS]	80474-14-2 90566-53-3		Formulation, inhalable, solution	Asthma
flutoprazepam	2H-1,4-Benzodiazepin-2-one, 7-chloro-1-(cyclopropylmethyl)-5-(2-fluorophenyl)-1,3-dihydro-[CAS]	25967-29-7	GB 1253368	Anxiolytic	Psychosis, general
flutrimazole	1H-Imidazole, 1-[(2-fluorophenyl)(4-fluorophenyl)phenylmethyl]-[CAS]	119006-77-8	EP 352352	Antifungal	Infection, dermatological
Flutropium Bromide		63516-07-4			
fluvastatin	6-Heptenoic acid, 7-[3-(4-fluorophenyl)-1-(1-methylethyl)-1H-indol-2-yl]-3,5-dihydroxy-, monosodium salt, [R*,S*-(E)]-(±)-[CAS]	93957-55-2 93957-54-1	EP 114027	Hypolipaemic/ Antiatherosclerosis	Hypercholesterolaemia
fluvoxamine	1-Pentanone, 5-methoxy-1-[4-(trifluoromethyl)phenyl]-O-(2-aminoethyl)oxime, (E)-[CAS]	54739-18-3 61718-82-9	GB 1535226	Antidepressant	Depression, general, Obsessive-compulsive disorder
Folic Acid		59-30-3			
Folinic Acid		58-05-9			
Fomepizole		7554-65-6			
fominoben	Benzamide, N-[3-chloro-2-[[methyl[2-(4-morpholinyl)-2-oxoethyl]amino]methyl]phenyl]-[CAS]	18053-31-1 24600-36-0	U.S. 3,661,903	Respiratory stimulant	Eczema, general
Fomivirsen		144245-52-3			
Fomocaine		17692-39-6			
Fonazine		7456-24-8			
fondaparinux	Alpha-D-Glucopyranoside, methyl O-2-deoxy-6-O-sulfo-2-(sulfamino)-Alpha-D-glucopyranosyl-(1-4)-O-β-D-glucopyranuronosyl-(1-4)-O-2-deoxy-3,6-di O-sulfo-2-(sulfoamino)-Alpha-D-glucopyranosyl-(1-4)-O-2-O-sulfo-Alpha-L-idopyranuronosyl-(1-4)-2-deoxy-2-(sulfoamino)-6-(hydrogen sulfate) [CAS]	104993-28-4 114870-03-0		Anticoagulant	Thrombosis, venous
Formebolone		2454117			
formestane	Androst-4-ene-3,17-dione, 4-hydroxy-[CAS]	566-48-3	EP 346953	Anticancer, hormonal	Cancer, breast
Formocortal		2825-60-7			
formoterol	Formamide, N-[2-hydroxy-5-[1-hydroxy-2-[[2-(4-methoxyphenyl)-1-methylethyl]amino]ethyl]phenyl]-, (R*,R*)-(+/−)-[CAS]	43229-80-7 73573-87-2	GB 1415256	Antiasthma	Asthma
fosamprenavir	Carbamic acid, ((1S,2R)-3-(((4-aminophenyl)sulfonyl)(2-methylpropyl)amino)-1-(phenylmethyl)-2-(phosphonooxy)propyl)-C-(3S)-tetrahydro-3-furanyl ester, [CAS]	226700-81-8		Antiviral, anti-HIV	Infection, HIV/AIDS

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foscarnet	Phosphinecarboxylic acid, dihydroxy-, oxide, trisodium salt [CAS]	34156-56-4 4428-95-9	U.S. 4,839,445	Antiviral, other	Infection, cytomegalo-virus
Fosfestrol		63585-09-1 522-40-7			
fosfluconazole	2,4-difluoro-Alpha,Alpha-bis(1H-1,2,4-triazol-1-ylmethyl)benzyl alcohol, dihydrogen phosphate (ester)	194798-83-9		Antifungal	Infection, fungal, general
fosfomycin	Phosphonic acid, (3-methyloxiranyl)-, (2R-cis)-[CAS]	23155-02-4 26016-98-8	GB 1223923	Antibiotic, other	Infection, general
fosfomycin tromethamol	Phosphonic acid, (3-methyloxiranyl)-, (2R-cis)-, compd. with 2-amino-2-(hydroxymethyl)-1,3-propanediol (1:1)-[CAS]	78964-85-9	EP 27597	Antibiotic, other	Infection, urinary tract
Fosfosal		6064-83-1			
fosinopril	L-Proline, 4-cyclohexyl-1-[[[2-methyl-1-(1-oxopropoxy)propoxy](4-phenylbutyl)phosphinyl]acetyl]-, (2Alpha,4β)-[CAS]	88889-14-9 98048-97-6	EP 63896	Antihypertensive, renin system	Hypertension, general
fosphenytoin	2,4-Imidazolidinedione, 5,5-diphenyl-3-[(phosphonooxy)methyl]-[CAS]	92134-98-0 93390-81-9	U.S. 4,260,769	Antiepileptic	Epilepsy, generalized, tonic-clonic
fotemustine	Phosphonic acid, [1-[[[(2-chloroethyl)nitrosoamino]carbonyl]amino]-ethyl]-, diethyl ester [CAS]	92118-27-9	EP 117959	Anticancer, alkylating	Cancer, melanoma
Fropenem		106560-14-9			
frovatriptan	1H-Carbazole-6-carboxamide, 2,3,4,9-tetrahydro-3-(methylamino)-, (R)-[CAS]	158747-02-5	WO 9922730	Antimigraine	Migraine
Fructose		57-48-7			
Fructose-1,6-diphosphate		488-69-7			
FTC	2(1H)-Pyrimidinone, 4-amino-5-fluoro-1-(2-(hydroxymethyl)-1,3-oxathiolan-5-yl)-(4R)			Antiviral, anti-HIV	Infection, HIV/AIDS
FTY-720	1,3-Propanediol, 2-amino-2-(2-(4-octylphenyl)ethyl)-, hydrochloride [CAS]	162359-56-0	WO 9408943	Immunosuppressant	Transplant rejection, general
fudosteine	Alanine, 3-((3-hydroxypropyl)thio)-[CAS]	13189-98-5	U.S. 5,047,428	Antitussive	Cough
fulvestrant	Estra-1,3,5(10)-triene-3,17-diol, 7-[9-[(4,4,5,5,5-pentafluoropentyl)sulfinyl]nonyl]-, (7Alpha,17β)-[CAS]	129453-61-8	EP 346014	Anticancer, hormonal	Cancer, breast
fumagiline	2,4,6,8-Decatetraenedioic acid, mono[5-methoxy-4-[2-methyl-3-(3-methyl-2-butenyl)oxiranyl]-1-oxaspiro[2.5]oct-6-yl] ester, [3R-[3Alpha,4Alpha(2R*,3R*),5β,6β(all-E)]]-[CAS]	23110-15-8		Protozoacide	Infection, GI tract
Fumagillin		23110-15-8			
Furalfadone		139-91-3			
Furazabol		1239-29-8			
Furazolidone		67-45-8			

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Furazolium Chloride		5118-17-2			
Furonazide		3460-67-1			
furosemide	Benzoic acid, 5-(aminosulfonyl)-4-chloro-2-[(2-furanylmethyl)amino]-[CAS]	54-31-9		Formulation, modified-release, other	Hypertension, general
Fusultiamine		804-30-8			
Furtrethonium		7618-86-2			
Fusidic Acid		06/03/6990			
G1, YM BioSciences	1-(5-bromofur-2-yl)-2-bromo-2-nitroethene			Antifungal	Infection, gynaecological
G25			WO 9804252	Antimalarial	Infection, malaria
GABA-A Alpha5 inverse agonist,Mer			WO 0206285	Cognition enhancer	Alzheimer's disease
gabapentin	Cyclohexaneacetic acid, 1-(aminomethyl)-[CAS]	60142-96-3	U.S. 4,152,326	Antiepileptic	Epilepsy, general
gabexate	Benzoic acid, 4-[[6-[(aminoiminomethyl)amino]-1-oxohexyl]oxy]-, ethyl ester, monomethanesulfonate [CAS]	39492-01-8 56974-61-9	U.S. 3,751,447	GI inflammatory/ bowel disorders	Pancreatitis
gaboxadol	Isoxazolo[5,4-c]pyridin-3(2H)-one, 4,5,6,7-tetrahydro-[CAS]	64603-91-4	CA 1125288	Hypnotic/Sedative	Sleep disorder, general
Gadobenat		127000-20-8			
Dimeglumine					
Gadobutrol		138071-82-6			
Gadodiamide		131410-48-5			
Gadopentetic Acid		80529-93-7			
Gadoteridol		120066-54-8			
Gadoversetamide		131069-91-5			
Gadoxetic Acid		135326-11-3			
galantamine	(4aS,6R,8aS)-6-Hydroxy-3-methoxy-11-methyl-5,6,9,10,11,12-hexahydro-4aH-benzofuiro[3a,3,2-e,f][2]benzazepine			Formulation, modified-release, other	Alzheimer's disease
Galanthamine	β-Alanine, 2-[4-[(2,6-dideoxy-2-fluoro-	357-70-0			
galarubicin	Alpha-L-talopyranosyl)oxy]-1,2,3,4,6,11-hexahydro-2,5,12-trihydroxy-7-methoxy-6,11-dioxo-2-naphthacenyl]-2-oxoethyl ester, [CAS]	140637-82-7 140637-86-1	EP 424899	Anticancer, antibiotic	Cancer, breast
Gallamine Triethiodide					
Gallic Acid		65-29-2			
gallium maltolate	4H-Pyran-4-one, 3-hydroxy-2-methyl-, gallium complex	149-91-7		Anticancer, other	Cancer, myeloma
gallium nitrate	Nitric acid, gallium salt [CAS]	13494-90-1	U.S. 4,529,593	Osteoporosis treatment	Hypercalcaemia of malignancy
gallopamil	Benzeneacetonitrile, Alpha-[3-[[2-(3,4-dimethoxyphenyl)ethyl]methylamino]propyl]-3,4,5-trimethoxy-Alpha-(1-methylethyl)-[CAS]	16662-47-8	GB 1367677	Antianginal	Angina, general
γ-Aminobutyric Acid		56-12-2			
Ganaxolone		38398-32-2			

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ganciclovir	6H-Purin-6-one, 2-amino-1,9-dihydro-9-[[2-hydroxy-1-(hydroxymethyl)ethoxy]methyl]- [CAS]	107910-75-8 82410-32-0	EP	49072	Antiviral, other	Infection, cytomegalovirus
ganirelix	[N-Ac-D-Nal,D-pCl-Phe,D-Pal,D-hArg(Et)2,hArg(Et)2,D-Ala]GnRH-[CAS]	124904-93-4	EP	312052	Releasing hormones	Infertility, female
ganstigmine	Carbamic acid, (2-ethylphenyl)-, (3aS,8aS) 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl ester,	223585-99-7	EP	1023297	Cognition enhancer	Alzheimer's disease
gantofiban	1-Piperazineacetic acid, 4-[[(5R)-3-[4-[iminio[(methoxycarbonyl)amino]methyl]-phenyl]-2-oxo-5-oxazolidinyl]methyl]-, ethylester [CAS]	183547-57-1	EP	741133	Antithrombotic	Thrombosis, general
garenoxacin	3-Quinolinecarboxylic acid, 1-cyclopropyl-8-(difluoromethoxy)-7-((1R)-2,3-dihydro-1-methyl-1H-isoindol-5-yl)-1,4-dihydro-4-oxo- mononmethanesulfonate [CAS]	223652-82-2			Quinolone antibacterial	Infection, respiratory tract, lower
garnocestim	5-73-macrophage inflammatory protein 2Alpha (human gene gro2)-[CAS]	246861-96-1			Radio/ chemoprotective	Chemotherapy-induced injury, bone marrow, neutropenia
gatifloxacin	3-Quinolinecarboxylic acid, 1-cyclopropyl-6-fluoro-1,4-dihydro-8-methoxy-7-(3-methyl-1-piperazinyl)-4-oxo-, (+/-)-[CAS]	112811-59-3	EP	230295	Quinolone antibacterial	Infection, respiratory tract, general
Gefarnate		51-77-4				
gefitinib	4-Quinazolinamine, N-(3-chloro-4-fluorophenyl)-7-methoxy-6-(3-(4-morpholinyl)propoxy) [CAS]	184475-35-2	WO	9633980	Anticancer, other	Cancer, lung, non-small cell
gemcabene	6,6'-oxybis(2,2-dimethylhexanoate)	209789-08-2			Hypolipaemic/ Antiatherosclerosis	Hyperlipidaemia, general
gemcitabine	Cytidine, 2'-deoxy-2', 2'-difluoro-, [CAS]	122111-03-9 95058-81-4	GB	2136425	Anticancer, antimetabolite	Cancer, pancreatic
gemeprost	Prosta-2,13-dien-1-oic acid, 11,15-dihydroxy-16,16-dimethyl-9-oxo-, methyl ester, (2E,11Alpha,13E,15R)-[CAS]	64318-79-2	GB	1540427	Prostaglandin	
gemfibrozil	Pentanoic acid, 5-(2,5-dimethylphenoxy)-2,2-dimethyl-[CAS]	25812-30-0	U.S.	3,674,836	Hypolipaemic/ Antiatherosclerosis	Hyper-lipidaemia, general
gemifloxacin	1,8-Naphthyridine-3-carboxylic acid, 7-(3-(aminomethyl)-4-(methoxyimino)-1-pyrrolidinyl)-1-cyclopropyl-6-fluoro-1,4-dihydro-4-oxo-[CAS]	175463-14-6	U.S.	5,869,670	Quinolone antibacterial	Infection, respiratory tract, general
gentamicin	Gentamicin [CAS]	1403-66-3			Formulation, implant	Infection, general
Gentian Violet		548-62-9				
Gentiopicrin		20831-76-9				
Gentisic Acid		490-79-9				
Gepefrine		18840-47-6				

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gepirone	2,6-Piperidinedione, 4,4-dimethyl-1-[4-[4-(2-pyrimidinyl)-1-piperazinyl]butyl]-[CAS]			Formulation, modified-release, other	Depression, general
gestodene	18,19-Dinorpregna-4,15-dien-20-yn-3-one, 13-ethyl-17-hydroxy-, (17Alpha)-[CAS]	109852-02-0 60282-87-3	GB 1569135	Formulation, fixed-dose conbinations	Contraceptive, female
gestodene + ethinylest	18,19-Dinorpregna-4,15-dien-20-yn-3-one, 13-ethyl-17-hydroxy-, (17Alpha) mixt with 19-Norpregna-1,3,5(10)-trien-20-yne-13,17-diol (17Alpha)			Formulation, modified-release, >24 hr	Contraceptive, female
Gestonorone Caproate		1253-28-7			
Gestrinone		16320-04-0			
γ-Hydroxybutyrate		591-81-1			
gimatecan	(4S)-11-[(E)-[(1,1-dimethylethoxy)imino]methyl]-4-ethyl-4-hydroxy-1-12-dihydro-14H-pyrano[3',4':6,7]indolizino[1,2-b]quinoline-3,14(4H)-dione	292618-32-7		Anticancer, other	Cancer, brain
Giractide		24870-04-0			
Gitoxin		4562-36-1			
GL-406349	N,N'-Bis[2-[N-[2-(N2,N5-dimethyl-DL-lysylamino)-ethyl]carbamoyl]1H-indol-6-yl]-1H-indole-2,5-dicarboxamide			Antifungal	Infection, fungal, general
Glafenine		3820-67-5			
glatiramer	L-Glutamic acid, polymer with L-alanine, L-lysine and L-tyrosine, [CAS]	147245-92-9 28704-27-0	WO 5800808	Multiple sclerosis treatment	Multiple sclerosis, relapsing-remitting
Glibornuride		26944-48-9			
gliclazide	Benzenesulfonamide, N-[[(hexahydrocyclopenta[c]pyrrol-2(1H)-yl)amino]carbonyl]-4-methyl-[CAS]	21187-98-4	GB 1153982	Antidiabetic	Diabetes, Type II
glimepiride	1H-Pyrrole-1-carboxamide, 3-ethyl-2,5-dihydro-4-methyl-N-[2-[4-[[[[(4-methylcyclohexyl)amino]carbonyl]amino]-sulfonyl]phenyl]ethyl]-2-oxo-[CAS]	93479-97-1	WO 9303724	Antidiabetic	Diabetes, Type II
γ-Linolenic Acid		506-26-3			
glipizide	Pyrazinecarboxamide, N-[2-[4-[[[(cyclohexylamino)carbonyl]amino]sulfonyl]-phenyl]ethyl]-5-methyl-[CAS]	29094-61-9	U.S. 3,669,966	Antidiabetic	
gliquidone	Benzenesulfonamide, N-[(cyclohexylamino)carbonyl]-4-[2-(3,4-dihydro-7-methoxy-4,4-dimethyl-1,3-dioxo-2(1H)-isoquinolinyl)ethyl]-[CAS]	33342-05-1	GB 1277847	Antidiabetic	Diabetes, general
glisolamide	3-Isoxazolecarboxamide, N-[2-[4-[[[(cyclohexylamino)carbonyl]amino]-sulfonyl]phenyl]ethyl]-5-methyl-[CAS]	24477-37-0		Antidiabetic	Diabetes, general
Glisoxepid		25046-79-1			
Glucametacin		52443-21-7			
Glucoheptonic Acid		87-74-1			

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Gluconic Acid glucosamine	D-Glucose, 2-amino-2-deoxy-, [CAS]	526-95-4 29031-19-4 3416-24-8	DE	1953689	Antiarthritic, other	Arthritis, osteo
Glucosulfone glufosfamide	β-D-Glucopyranose, 1-(N,N'-bis(2-chloroethyl)phcophorodiamidate)-[CAS]	554-18-7 132682-98-5	DE	3835772	Anticancer, alkylating	Cancer, general
Glutamic Acid		56-86-0				
Glutaraldehyde		111-30-8				
Glutethimide		77-21-4				
Glyburide		10238-21-8				
Glybuthiazol(e)		535-65-9				
Glybuzole		1492-02-0				
Glycerol		56-81-5				
Glycocyamine		352-97-6				
Glycol Salicylate		87-28-5				
Glyconiazide		3691-74-5				
Glycopyrrolate		596-51-0				
Glyhexamide		451-71-8				
Glymidine		339-44-6				
Glypinamide		1228-19-9				
GMDP	N-acetylglucosaminyl-N-acetylmuramyl dipeptide				Anti-infective, other	Infection, general
Gold Sodium Thiomalat		12244-57-4				
Gold Sodium Thiosulfate		10233-88-2				
goserelin	Luteinizing hormone-releasing factor (pig), 6-[O-(1,1-dimethylethyl)-D-serine]-10-deglycinamide-, 2-(aminocarbonyl)hydrazide [CAS]	65807-02-5	U.S.	4,100,274	Releasing hormones	Cancer, prostate
GPI-1485	L-Proline, 1-(3,3-dimethyl-1,2-dioxopentyl)-, 3-(3-pyridinyl)propyl ester [CAS]	186452-09-5			Antiparkinsonian	Parkinson's disease
GPI-5693	2-(Phosphonomethyl)pentanedioic acid		U.S.	5,672,592	Analgesic, other	Pain, neuropathic
Grafiskin						
granisetron	1H-Indazole-3-carboxamide, 1-methyl-N-(9-methyl-9-azabicyclo[3.3.1]non-3-yl)-, endo-[CAS]	107007-99-8 109889-09-0	EP	200444	Antiemetic	Chemotherapy-induced nausea and vomiting
Grepafloxacin		119914-60-2				
griseofulvin	Spiro[benzofuran-2(3H),1'-[2]cyclohexane]-3,4'-dione, 7-chloro-2',4,6-trimeth-oxy-6'methyl-, (1'S-trans)-[CAS]	126-07-8			Formulation, dermal, topical	Infection, dermatological
Guaiacol		90-05-1				
Guaiapate		852-42-6				
Guaiazulene		489-84-9				
Guaifenesin		93-14-1				
guainesal	4H-1,3-Benzodioxin-4-one, 2-(2-methoxyphenoxy)-2-methyl-[CAS]	81674-79-5	GB	2098201	Anti-inflammatory	
Guamecycline		16545-11-2				
Guanabenz		5051-62-7				

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Guanadrel		40580-59-4			
Guanethidine		55-65-2			
Guanfacine		29110-47-2			
Guanoxabenz		24047-25-4			
Guanoxan		2165-19-7			
gugulipid	Pregna-4,17(20)-diene-3,16-dione [CAS]	95975-55-6	EP 447706	Hypolipaemic/ Antiatherosclerosis	
Gusperimus		104317-84-2			
GW-280430A	(Z)-2-Chlorofumaric acid 1-[3-[(6,7-dimethoxy-2(S)-methyl-1(R)-(3,4,5-trimethoxybenzyl)-1,2,3,4-tetrahydroisoquinoliniium-2-yl]propyl] [2S,3S,5R]-2-[3,5-difluorophenyl]-3,5-dimethyl-2-morpholinol			Muscle relaxant	Anaesthesia, adjunct
GW-320659				Anorectic/ Antiobesity	Obesity
GYKI-16084	(+)-R-2-[3-[N-(2-Benzo[1,4]dioxanylmethyl)amino]-1-propyl)-3(2H)-pyridazinone hydrochloride		U.S. 6,194,411	Prostate disorders	Benign prostatic hyperplasia
Hachimycin		1394-02-1			
Halazepam		23092-17-3			
Halcinonide		3093-35-4			
halobetasol	Pregna-1,4-diene-3,20-dioe, 21-chloro-6,9-difluoro-11-hydroxy-16-methyl-17-(1-oxopropoxy)-, (6Alpha,11β,16(-[CAS]	66852-54-8	U.S. 4,619,921	Antipsoriasis	Psoriasis
halofantrine	9-Phenanthrenemethanol, 1,3-dichloro-Alpha-[2-(dibutylamino)ethyl]-6-(trifluoromethyl)-[CAS]	36167-63-2 69756-53-2	EP 138374	Antimalrial	Infection, malaria
halometasone	Pregna-1,4-diene-3,20-dione, 2-chloro-6,9-difluoro-11,17,21-trihydroxy-16-methyl-, (6Alpha,11β,16Alpha)-[CAS]	50629-82-8	U.S. 4,076,737	Antipruritic/ inflamm. allergic	
Haloperidol		52-86-8			
Halopredone		57781-14-3			
Haloprogin		777-11-7			
Halopropane		679-84-5			
Halothane		151-67-7			
Haloxazolam		59128-97-1			
harkoseride	2(R)-Acetamido-N-benzyl-3-methoxypropionamide		WO 9733861	Antiepileptic	Epilepsy, general
HE-2000	16Alpha-Bromo-3β-hydroxy-5Alpha-androstane-17-one			Antiviral, anti-HIV	Infection, HIV/AIDS
Healos			WO 9714376	Musculoskeletal	Regeneration, bone
Hematoporphyrin		14459-29-1			
Hepronicate		7237-81-2			
Heptabarbital		509-86-4			
Heptaminol		372-66-7			
Hetacillin		3511-16-8			
Hetastarch		9004-62-0			
Hexachlorophene		70-30-4			
Hexadimethrine Bromide		28728-55-4			

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Hexafluorenium Bromide		317-52-2			
Hexamethonium		60-26-4			
Hexamidine		3811-75-4			
Hexapropymate		358-52-1			
Hexedine		5980-31-4			
Hexestrol		84-16-2			
Hexestrol Bis(β-diethylaminoethyl ether)		2691-45-4			
Hexethal		144-00-3			
Hexetidine		141-94-6			
Hexobarbital		56-29-1			
Hexobendine		54-03-5			
Hexocyclium Methyl Sulfate		115-63-9			
Hexoprenaline		3215-70-1			
Hextend	Hextend [CAS]	235746-51-7	U.S. 5,407,428	Plasma substitute	Surgery adjunct
Hexylcaine		532-76-3			
HF-0299	11b-hydroxy androstenedione			Osteoporosis treatment	Osteoporosis
HGP-2	Benzeneacetic acid, 4-[2-hydroxy-3-[(1-methylethyl)amino]propoxy]-, 2-tricyclo[3.3.1.13,7]dec-1-ylethyl ester, (2Z)-2-butenedioate (1:1) (salt) [CAS]	121009-31-2		Antiglaucoma	Glaucoma
HGP-6[4]	8-Azoniabicyclo[3.2.1]octane, 3-(3-ethoxy-1,3-dioxo-2-phenylpropoxy)-8,8-dimethyl-, (3-endo)-, methyl sulfate [CAS]	113932-41-5		Antiepileptic	Epilepsy, general
hidrosmin	Hydrosmin-[CAS]	120250-44-4		Vasoprotective, systemic	
histamine	histamine	51-45-6	EP 0493468	Anticancer, immunological	Cancer, melanoma
Histapyrrodine		493-80-1			
histrelin	Luteinizing hormone-releasing factor (pig), 6-[1-(phenylmethyl)-D-histidine]-9-(N-ethyl-L-prolinamide)-10-deglycinamide-[CAS]	76712-82-8	EP 217659	Releasing hormones	Precocious puberty
HM-101	HM 101 [CAS]	217311-70-1		Osteoporosis treatment	Osteoporosis
HMN-214	(E)-4-[2-[2-(p-methoxybenzenesulfonamide)-phenyl]ethenyl]pyridine-1-oxide			Anticancer, other	Cancer, general
Homatropine		87-00-3			
Homocamfin		535-86-4			
Homochlorcyclizine		848-53-3			
Hopantenic Acid		18679-90-8			
HP-228	Glycinamide, N-acetyl-L-norleucyl-L-glutaminyl-L-histidyl-D-phenylalanyl-L-arginyl-D-tryptophyl-[CAS]	172617-89-9	EP 759770	Analgesic, other	Pain, post-operative
Huperzine A		102518-79-6			

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hyaluronan	Hyaluronic acid [CAS]	9004-61-9		Formulation, other	Restenosis
Hycanthone		3105-97-3			
Hydnocarpic Acid		459-67-6			
Hydralazine		86-54-4			
Hydrastine		118-08-1			
Hydrastinine		6592-85-4			
Hydrochlorothiazide		58-93-5			
hydrocodone	Morphinan-6-one, 4,5-epoxy-3-hydroxy-17-methyl-,(5Alpha)-[CAS]	466-99-9 125-29-1		Formulation, modified-release, other	Pain, general
Hydrocortamate		76-47-1			
hydrocortisone	Pregn-4-ene-3,20-dione, 21-(acetyloxy)-11-hydroxy-17-(1-oxopropoxy)-, (11β)-[CAS]	74050-20-7 50-23-7	DE 2826257	Dermatological	Unspecified
hydrocortisone butyrate propio	Pregn-4-ene-3,20-dione, 11-hydroxy-17-(1-oxobutoxy)-21-(1-oxopropoxy)-, (11β)-[CAS]	72590-77-3	DE 2910899	Antipruritic/inflamm, allergic	
Hydroflumethiazide		135-09-1			
hydromorphone	Morphinan-6-one,4,5-epoxy-3-hydroxy-17-methyl-,(5Alpha)-, mixt with acetamide, N-(4-hydroxyphenyl)-, mixt with morphinan-6-one, 17-(cyclopropylmethyl)-4,5-epoxy-3,14-dihydroxy-, (5Alpha)-	103-90-2 16590-41-3 466-99-9		Formulation, fixed-dose combinations	Pain, general
Hydroquinidine		1435-55-8			
Hydroquinine		522-66-7			
Hydroquinone		123-31-9			
Hydroxocobalamin		13422-51-0			
Hydroxyamphetamine		1518-86-1			
Hydroxychloroquine		118-42-3			
Hydroxydione		53-10-1			
Hydroxypethidine		468-56-4			
Hydroxyphenamate		50-19-1			
Hydroxypropyl Cellulose		9004-64-2			
Hydroxystilbamidine		495-99-8			
Hydroxytetracaine		490-98-2			
Hydroxyzine		68-88-2			
Hylan G-F 20					
Hymecromone		90-33-5			
hyoscyamine	benzeneacetic acid, Alpha(hydroxymethyl)-, 8-methyl-8-azabicyclo [3.2.1.]oct-3-yl ester, [3(S)-endo],	101-31-5		Formulation, oral, orally-disintegrating	Ulcer, GI, general
hypericin	Phenanthro[1,10,9,8-opqra]perylene-7,14-dione, 1,3,4,6,8,13-hexahydroxy-10,11-dimethyl-[CAS]	548-04-9		Anticancer, other	Cancer, brain
IACFT		180468-34-2			
ibandronic acid	Phosphonic acid, [1-hydroxy-3-(methylpentylamino)propylidene]bis-[CAS]	114084-78-5	EP 252504	Osteoporosis treatment	Hypercalcaemia of malignancy

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ibopamine	Propanoic acid, 2-methyl-, 4-[2-(methylamino)ethyl]-1,2-phenylene ester-[CAS]	66195-31-1	GB	1551661	Cardiostimulant	Heart failure
ibopamine	Propanoic acid, 2-methyl-, 4-[2-(methylamino)ethyl]-1,2-phenylene ester-[CAS]	66195-31-1			Formulation, mucosal, topical	Surgery adjunct
Ibritumomab Tiuxetan		206181-63-7				
ibrolipim	Phosphonic acid, [[4-[[(4-bromo-2-cyanophenyl)amino]carbonyl]phenyl]-methyl]-, diethyl ester [CAS]	133208-93-2	EP	402033	Hypolipaemic/ Antiatherosclerosis	Hypertri-glyceridaemia
ibudilast	1-Propanone, 2-methyl-1-[2-(1-methylethyl)pyrazolo[1,5-a]pyridin-3-yl]-[CAS]	50847-11-5	EP	215438	Antiasthma	Asthma
Ibufenac		1553-60-2				
ibuprofen piconol	Benzeneacetic acid, Alpha-methyl-4-(2-methylpropyl)-, 2-pyridinylmethyl ester [CAS]	64622-45-3	DE	2658610	Antipruritic/inflamm, non-allergic	Eczema, contact
ibuprofen	Benzeneacetic acid, Alpha-methyl-4-(2-methylpropyl)-[CAS]	15687-27-1			Formulation, modified-release, other	Inflammation, general
Ibuproxam		53648-05-8				
ibutilide	Methanesulfonamide, N-[4-[4-(ethylheptylamino)-1-hydroxybutyl]phenyl]-, (+/−)-, [CAS]	122647-31-8 122647-32-9	JP	60239458	Antiarrhythmic	Fibrilation, atrial
ICA-17043			U.S.	6,288,122	Antisickling	Anaemia, sickle cell
icodextrin	Dextrin-[CAS]	9004-53-9			Urological	Renal failure
idarubicin	5,12-Naphthacenedione, 9-acetyl-7-[(3-amino-2,3,6-trideoxy-Alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,9,11-trihydroxy-, (7S-cis)-[CAS]	58957-92-9 86189-66-4	U.S.	4,471,052	Anticancer, antibiotic	Cancer, leukaemia, acute lymphocytic
Idazoxan		79944-58-4				
IdB-1016	2-(2,3-dihydro-2-(4-hydroxy-3-methoxyphenyl)-3-(hydroxymethyl)-1,4-benzodioxin-6-yl)-2,3-dihydro-3,5,7-trihydroxy-4H-1-benzopyran-4-one phosphatidylcholine complex	134499-06-2	EP	209038	Anticancer, hormonal	Cancer, ovarian
idebenone	2,5-Cyclohexadiene-1,4-dione, 2-(10-hydroxydecyl)-5,6-dimethoxy-3-methyl-[CAS]	58186-27-9	EP	58057	Neuroprotective	Ischaemia, cerebral
IDN-5109	4-Hexenoic acid, 3-[[(1,1-dimethylethoxy)carbonyl]amino]-2-hydroxy-5-methyl-, (3aS,4R,7R,8aS,9S,10aR,12aS,12bR,13S,13aS)-7,12a-bis(acetyloxy)-13-(benzoyloxy)-3a,4,7,8,8a,9,10,10a,12,12a,12b,13-dodecahydro-9-hydroxy-5,8a,14,14-tetramethyl-2,8-dioxo-6,13a-methano-	186348-05-0	U.S.	5,264,591	Anticancer, other	Cancer, colorectal

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	13aH-oxeto [2",3",5',6'] benzo[1,2:4,5] cyclodeca [1,2-d] dioxyl-4-yl ester, 2R,3S) [CAS]					
Idoxifen		116057-75-1				
idraparinux	Alpha-D-Glucopyranoside, methyl O-2,3,4-tri-O-methyl-6-O-sulfo-Alpha-D-glucopyranosyl-(1,4)-O-2,3-di-O-methyl-β-D-glucopyranuronosyl-(1,4)-O-2,3,6-tri-O-sulfo-Alpha-D-glucopyranosyl-(1-4)-O-2,3-di-O-methyl-Alpha-L-idopyranuronosyl-(1-4)-, tris(hydrogen sulfate) nonasodium salt [CAS]	149920-56-9	AU	698456	Antithrombotic	Thrombosis, venous
idrocilamide	2-Propenamide, N-(2-hydroxyethyl)-3-phenyl-[CAS]	6961-46-2	U.S.	3,659,014	Anti-inflammatory, topical	
ifenprodil	(7)-2-(4-benzyl piperidino)-1-p-hydroxyphenylpropanol tartrate	23210-58-4				
ifosfamide	2H-1,3,2-Oxazaphosphorin-2-amine, N,3-bis(2-chloroethyl)tetrahydro-,2-oxide [CAS]	23210-56-2	U.S.	3,509,164	Neuroprotective	
		3778-73-2	U.S.	3,732,340	Anticancer, alkylating	Cancer, lung, general
iguratimod	N-[3-(Formylamino)-4-oxo-6-phenoxy-4H-chromen-7-yl] methanesulfonamide	123663-49-0	DE	3834204	Antiarthritic, other	Arthritis, rheumatoid
ilaprazole	1H-Benzimidazole, 2-(((4-methoxy-3-methyl-2-pyridinyl) methyl)sulfinyl)-5-(1H-pyrrol-1-yl)-[CAS]	172152-36-2	U.S.	5,703,097	Antiulcer	Ulcer, GI, general
ilomastat	Butanediamide, N4-hydroxy-N1-(1-(1H-indol-3-yl)methyl)-2-(methylamino)-2-oxoethyl)-2-(2-methylpropyl)-, (S-(R*,S*))-[CAS]	142880-36-2	U.S.	5,892,112	COPD treatment	Emphysema, smoking-related
iloperidone	Ethanone, 1-[4-[3-[4-(6-fluoro-1,2-benzisoxazol-3-yl)-1-piperidinyl]propoxy]-3-methoxyphenyl]-[CAS]	133454-47-4	U.S.	5,776,963	Neuroleptic	Schizophrenia
iloprost trometamol	Pentanoic acid, 5-[hexahydro-5-hydroxy-4-(3-hydroxy-4-methyl-1-octen-6-ynyl)-2(1H)-pentalenylidene]-[CAS]	78919-13-8	DE	3417638	Prostaglandin	Peripheral vascular disease
ILX23-7553	1Alpha,25-Hydroxy-16-yne vitamin D3				Anticancer, other	Cancer, general
imatinib	4-((Methyl-1-piperazinyl)methyl)-N-[4-methyl-3-[[4-(3-pyridinyl)-2-pyrimidinyl]amino]-phenyl]benzamide methanesulfonate	152459-95-5	U.S.	5,521,184	Anticancer, other	Cancer, leukaemia, chronic myelogenous
imidapril	4-Imidazolidinecarboxylic acid, 3-[2-[[(1-(ethoxycarbonyl)-3-phenylpropyl]amino]-1-oxopropyl]-1-methyl-2-oxo-, [4S-[3[R*(R*),4R*]]-[CAS]	89371-37-9 89396-94-1	EP	95163	Antihypertensive, renin system, Musculoskeletal	Hypertension, general, Cachexia
imidazole salicylate	Benzoic acid, 2-hydroxy-, compd. with 1H-imidazole (1:1) [CAS]	36364-49-5	U.S.	4,329,340	Anti-inflammatory	Pain, general
imipenem	1-Azabicyclo[3.2.0]hept-2-ene-2-carboxylic acid, 6-(1-hydroxyethyl)-3-[[2-[(iminomethyl)amino]ethyl]thio]-7-oxo-, [5R-[5Alpha,6Alpha(R*)]]-[CAS]	64221-86-9 74431-23-5 81129-83-1	GB	1570990	Beta-lactam antibiotic	Infection, general
Imipramine		50-49-7				

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Imipramine N-Oxide		6929-98-7			
imiquimod	1H-Imidazol[4,5-c]quinolin-4-amine, 1-(2-methylpropyl)-[CAS]	99011-02-6	EP 145340	Antiviral, other	Infection, human papilloma virus
Imolamine		318-23-0			
implitapide	Benzeneacetamide, Alpha-cyclopentyl-4-((2,4-dimethyl-9H-pyrido(2,3-b)indol-9-yl)methyl)-N-((1R)-2-hydroxy-1-phenylethyl)-(AlphaS)-[CAS]	177469-96-4	EP 705831	Hypolipaemic/ Antiatherosclerosis	Athero-sclerosis
Improsulfan		13425-98-4			
Inaperisone		99323-21-4			
incadronate	Phosphonic acid, [(cycloheptylamino)methylene]bis-, [CAS]	138330-18-4		Musculoskeletal	Hypercalcaemia of malignancy
Incadronic Acid		124351-85-5			
Indalpine		63758-79-2			
Indanazoline		40507-78-6			
indapamide	4-chloro-N-(2-methylindolin-1-yl)-3-sulfamoylbenzamide	26807-65-8	GB 1203691	Antihypertensive, diuretic	Hypertension, general
Indecainid		74517-78-5			
indeloxazine	Morpholine, 2-[(1H-inden-7-yloxy)methyl]-[CAS]	60929-23-9	JP 52083773	Cognition enhancer	Alzheimer's disease
Indeloxazine		65043-22-3			
indenolol	2-Propanol, 1-[1H-inden-4(or 7)-yloxy]-3-[(1-methylethyl)amino]-[CAS]	65043-22-3			
		30190-87-5	GB 1290343	Antihypertensive, adrenergic	
		60607-68-3			
		68906-88-7			
indinavir	D-erthro-Pentonamide, 2,3,5-trideoxy-N-(2,3-dihydro-2-hydroxy-1H-inden-1-yl)-5-(2-(((1,1-dimethylethyl)amino)carbonyl)-4-(3-pyridinylmethyl)-1-piperazinyl)-2-(phenylmethyl), [1S-[1Alpha(R*),2Alpha]]-, [CAS]	150378-17-9	EP 0541168	Antiviral, anti-HIV	Infection, HIV/AIDS
		157810-81-6			
indiplon	Acetamide, N-methyl-N-(3-(2-thienylcarbonyl)pyrazolo(1,5-a) pyrimidin-7-yl)phenyl)-[CAS]	325715-02-4	U.S. 6,399,621	Hypnotic/Sedative	Insomnia
indisetron	1H-Indazole-3-carboxamide, N-(3,9-dimethyl-3,9-diazabicyclo(3.3.1)non-7-yl)-, diendo-[CAS]	160472-97-9		Antiemetic	Nausea and vomiting, general
indisulam	1,4-Benzenedisulfonamide, N-(3-chloro-1H-indol-7-yl)-[CAS]	165668-41-7		AAnticancer, other	Cancer, lung, non-small cell
Indobufen		63610-08-2			
Indocyanine Green		3599-32-4			
indometacin	1H-Indole-3-acetic acid, 1-(4-chlorobenzoyl)-5-methoxy-2-methyl-[CAS]	53-86-1		Formulation, modified-release, other	Inflammation, general
Indoprofen		31842-01-0			
indoramin	Benzamide, N-[1-[2-(1H-indol-3-yl)ethyl]-4-piperidinyl]-[CAS]	26844-12-2	GB 1218570	Antihypertensive, adrenergic	
		38821-52-2	U.S. 5,993,810	Labour inducer	Labour, induction
Induclem					

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Infliximab		170277-31-3			
Inosine Pranobex		36703-88-5			
Inositol		87-89-8			
Inositol Niacinate		6556112			
Iobenguane		80663-95-2			
Iobenzamic Acid		3115057			
Iobitridol		136949-58-1			
Iocarmic Acid		10397-75-8			
Iocetamic Acid		16034-77-8			
Iodamide		440-58-4			
iodine	Iodine [CAS]	7553-56-2		Formulation, oral, other	Fibrocystic breast disorder
Iodipamide		606-17-7			
Iodixanol		92339-11-2			
Iodoalphionic Acid		577-91-3			
iodochlorhydroxyquin	5-Chloro-7-iodo-8-quinolinol	130-26-7		Cognition enhancer	Alzheimer's disease
Iodoform		75-47-8			
Iodopyracet		300-37-8			
Iodopyrrole		87-58-1			
Iodoquinol		83-73-8			
Iofetamine $_{123}$I		75917-92-9			
Ioglycamic Acid		2618-25-9			
Iohexol		66108-95-0			
Ioneglamic Acid		25827-76-3			
Ioneprol		78649-41-9			
Iopanidol		60166-93-0			
Iopanoic Acid		96-83-3			
Iopeutol		89797-00-2			
Iophendylate		99-79-6			
Iophenoxic Acid		96-84-4			
Iopromide		73334-07-3			
Iopronic Acid		41473-08-9			
Iopydol		5579-92-0			
Iopydone		5579-93-1			
Iothalamic Acid		2276-90-6			
Iotrolan		79770-24-4			
Ioversol		87771-40-2			
Ioxaglic Acid		59017-64-0			
Ioxilan		107793-72-6			
IP-751	(3R,4R)-(delta6)-THC-DMH-11-oic acid		WO 9401429	Analgesic, other	Pain, neuropathic
Ipidacrine		62732-44-9			
IPL-576092	Stigmastan-15-one, 22,29-epoxy-3,4,6,7,29-pentahydroxy-, (3Alpha,4β,5Alpha,6Alpha,7β,14β,22S)-[CAS]	137571-30-3	U.S. 6,046,185	Antiasthma	Asthma

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Ipodate		5587-89-3			
ipratropium bromide		66985-17-9		Formulation, inhalable, solution	Chronic obstructive pulmonary disease
		22254-24-6			
ipratpopium	(endo,syn)-(±)-3-(3-Hydroxy-1-oxo-2-phenylpropoxy)-8-methyl-8-(1-methylethyl)-8-azoniabicyclo[3.2.1]octane			Formulation, inhalable, topical	Asthma
ipratropium	(endo,syn)-(±)-3-(3-Hydroxy-1-oxo-2-phenylpropoxy)-8-methyl-8-(1-methylethyl)-8-azoniabicyclo[3.2.1]octane			Formulation, inhalable, topical	Asthma
iprazochrome	Hydrazinecarboxamide, 2-[1,2,3,6-tetrahydro-3-hydroxy-1-(1-methylethyl)-6-oxo-5H-indol-5-ylidene]-[CAS]	7248-21-7		Haemostatic	
iprifiavone	4H-1-Benzopyran-4-one, 7-(1-methylethoxy)-3-phenyl-[CAS]	35212-22-7	EP 214647	Osteoporosis treatment	Osteoporosis
Iprindole		5560-72-5			
Iproclozid		3544-35-2			
Iponiazid		54-92-2			
Ipsapiron		95847-70-4			
irbesartan	2-n-butyl-4-spirocyclopentane-1-[((2'-tetrazol-5-yl)biphenyl-4-yl)methyl]-2-imidazolin-5-one	138402-11-6	WO 9114679	Antihypertensive, renin system	Hypertension, general
IRFI-042	Butanedioic acid, mono[2-[2-(acetylthio)ethyl]-2,3-dihydro-4,6,7-trimethyl-5-benzofuranyl] ester, (+/−)-[CAS]	134867-62-2	U.S. 5,114,966	Cardiovascular	Atherosclerosis
IRFI-165	N-Cyclopentyl-1-methylimidazo[1,2-a]quinoxalin-4-amine	191349-26-5	EP 865442	Antidepressant	Depression, general
Iridomymecin		485-43-8			
irindalone	-Imidazolidinone, 1-[2-[4-[3-(4-fluorophenyl)-2,3-dihydro-1H-inden-1-yl]-1-piperazinyl]ethyl]-, (1R-trans)-[CAS]	104113-57-7	EP 183349	Antidepressant	Depression, general
		96478-43-2			
Irinotecan		97682-44-5			
irofulven	Spiro[cyclopropane-1,5'-[5H]inden]-7'(6'H)-one, 6'-hydroxy-2',4',6'-trimethyl-, (R)-[CAS]	125392-76-9	U.S. 5,563,176	Anticancer, other	Cancer, prostate
Iron Sorbitex		1338-16-5			
irsogladine	1,3,5-Triazine-2,4-diamine, 6-(2,5-dichlorophenyl)-[CAS]	57381-26-7	U.S. 4,657,907	Antihypertensive, diuretic	Hypertension, general
		57381-28-9			
		57381-33-6			
IS-741	Cyclohexanecarboxamide, N-[2-[(ethylsulfonyl)amino]-5-(trifluoromethyl)-3-pyridinyl]-[CAS]	141283-87-6	EP 465913	GI inflammatory/ bowel disorders	Pancreatitis
isaglitazone	2,4-Thiazolidinedione, 5-[[6-[(2-fluorophenyl)methoxy]-2-naphthalenyl]methyl]-[CAS]	161600-01-7	U.S. 5,594,016	Antidiabetic	Diabetes, Type II
ISAtx-247			NZ 502362	Immunosuppressant	Transplant rejection, general

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Isbogrel		89667-40-3			
isepamicin	D-Streptamine, O-6-amino-6-deoxy-Alpha-D-glucopyranosyl-(1-4)-O-[3-deoxy-4-C-methyl-3-(methylamino)-β-L-arabinopyranosyl-(1-6)]-N1-(3-amino-2-hydroxy-1-oxopropyl)-2-deoxy-, (S)-[CAS]	58152-01-5 58152-03-7	U.S. 4,029,882	Aminoglycoside antibiotic	Infection, dermatological
Isoaminile		77-51-0			
Isobutyl p-Aminobenzoate		94-14-4			
Isocarboxazid		59-63-2			
isoconazole	1-[2-[2-6-dichlorobenzyloxy)-2-(2,4-dichlorophenyl)ethyl]	24168-96-5 27523-40-6	GB 1244530	Antifungal	Infection, fungal, general
Isoetharine		530-08-5			
isofloxythepin	1-Piperazineethanol, 4-[3-fluoro-10,11-dihydro-8-(1-methylethyl)dibenzo[b,f]thiepin-10-yl]-[CAS]	106819-39-0 106819-41-4 70931-18-9	GB 2010843	Neuroleptic	
isoflurane	Ethane, 2-chloro-2-(difluoromethoxy)-1,1,1-trifluoro-[CAS]	26675-46-7	U.S. 3,535,388	Anaesthetic, inhalation	Anaesthesia
Isoflurophate		55-91-4			
Isoladol		530-34-7			
Isomethadone		466-40-0			
Isomethepiene		503-01-5			
Isoniazid		54-85-3			
Isonixin		57021-61-1			
Ispromethazine		303-14-0			
Isopropamide Iodide		71-81-8			
Isopropyl Alcohol		67-63-0			
isopropyl unoprostone	5-Heptenoic acid, 7-(3,5-dihydroxy-2-(3-oxodecyl)cyclopentyl)-, 1-methylethylester, (1R-(1Alpha(Z), 2β,3Alpha,5Alpha))-[CAS]	120373-24-2	EP 289349	Prostaglandin	Glaucoma
Isoproterenol		7683-59-2			
Isosorbide		652-67-5			
isosorbide dinitrate	D-Glucitol, 1,4:3,6-dianhydro-, dinitrate [CAS]	87-33-2		Formulation, modified-release, other	Angina, general
isosorbide mononitrate	D-Glucitol, 1,4:3,6-dianhydro-, 5-nitrate [CAS]	16051-77-7		Formulation, modified-release, other	Angina, general
Isothipendyl		482-15-5			
isotretinoin	Retinoic acid, 13-cis-[CAS]	4759-48-2 533-32-4	U.S. 4,843,096	Antiacne	Acne
Isovaleryl Diethylamide					
Isoxepac		55453-87-7			
Isoxicam		34552-84-6			
Isoxsuprine		395-28-8			

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isradipine	3,5-Pyridinedicarboxylic acid, 4-(4-benzofurazanyl)-1,4-dihydro-2,6-dimethyl-, methyl 1-methylethyl ester [CAS]	75695-93-1	GB	2037766	Antihypertensive, other	Hypertension, general
israpafant	6H-Thieno[3,2-f][1,2,4]triazolo[4,3-a][1,4]diazepine, 4-(2-chlorophenyl)-6,9-dimethyl-2-[2-[4-(2-methylpropyl)phenyl]ethyl]- [CAS]	117279-73-9	EP	268242	Antiasthma	Asthma
ISV-403			U.S.	5,447,926	Formulation, mucosal, topical	Conjunctivitis
Itasetron		123258-84-4				
ITF-282	ITF 282 [CAS]	93615-44-2	GB	2115821	Antianaemic	Anaemia, general
itopride	Benzamide, N-[[4-[2-(dimethylamino)ethoxy]phenyl]methyl]-3,4-dimethoxy-, monohydrochloride [CAS]	122892-31-3	EP	306827	Gastroprokinetic	Gastritis
itraconazole	3H-1,2,4-Triazol-3-one, 4-[4-[4-[[2-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-ylmethyl)-1,3-dioxolan-4-yl]methoxy]phenyl]-1-piperazinyl]phenyl]-2,4-dihydro-2-(1-methylpropyl)-[CAS]	84625-61-8	EP	6711	Antifungal	Infection, fungal, general
Itramin		13445-63-1				
itriglumide	1-Naphthalenepropanoic acid, β-[2-[[2-(8-azaspiro[4.5]dec-8-ylcarbonyl)-4,6-dimethylphenyl]amino]-2-oxoethyl]-, (βR)- [CAS]	201605-51-8	WO	9800404	Anxiolytic	Anxiety, general
iturelix	D-Alaninamide N-acetyl-3-(2-naphthalenyl)D-alanyl-4-chloro-D-phenylalanyl-3-(3-pyridinyl)-D-alanyl-L-seryl-N6-(3-pyridinylcarbonyl)-L-lysyl-N6-(3-pyridinylcarbonyl)-D-lysyl-L-leucyl-N6-(1-methylethyl)-L-lysyl-L-prolyl-[CAS]	112568-12-4	WO	8901944	Fertility enhancer	Infertility, female
ivabradine	7,8-dimethoxy-3-(3-[[(1S)(4,5-dimethoxybenzocyclobutan-1-yl)methyl]methylamino]propyl)-1,3,4,5-tetrahydro-2H-benzazepin-2-one	219989-84-1			Antianginal	Angina, general
ixabepilone	17-Oxa-4-azabicyclo(14.1.0)heptadecane-5,9-dione, 7,11-dihydroxy-8,8,10,12,16-pentamethyl-3-(1-methyl-2-(2-methyl-4-thiazolyl)ethenyl), (1R,3S,7S,10R,11S,12S,16R) [CAS]				Anticancer, other	Cancer, breast
J-104132	5H-Cyclopenta[b]pyridine-6-carboxylic acid, 5-(1,3-benzodioxol-5-yl)-2-butyl-7-[2[(2S)-2-carboxypropyl]-4-methoxyphenyl]-6,7-dihydro-, (5S,6R,7R)-[CAS]	198279-45-7	WO	9737665	Antihypertensive, other	Heart failure
J-107088	5H-Indolo(2,3-a)pyrrolo(3,4-c)carbazole-5,7(6H)-dione, 12-β-D-glucopyranosyl-12,13-dihydro-2,10-dihydroxy-6-((2-hydroxy-1-(hydroxymethyl)ethyl)amino-[CAS]	174402-32-5			Anticancer, other	Cancer, bladder

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J-113397	1-[(3R,4R)-1-Cyclooctylmethyl-3-hydroxymethyl-4-piperidyl]-3-ethyl-1,3-dihydro-2H-benzimidazole-2-one			Analgesic, other	Pain, general
Janex-1	Phenol, 4-[(6,7-dimethoxy-4-quinazolinyl)amino]-[CAS]	202475-60-3		Anticancer, other	Cancer, leukaemia, general
josamycin	Leucomycin V, 3-acetate 4B-(3-methylbutanoate) [CAS]	16846-24-5	JP 41021759	Macrolide antibiotic	Infection, general
JTV-519	1,4-Benzothiazepine, 2,3,4,5-tetrahydro-7-methoxy-4-[1-oxo-3-[4-(phenylmethyl)-1-piperidinyl]propyl]-[CAS]	145903-06-6	WO 9212148	Cardiovascular	Infarction, myocardial
K-777			U.S. 6,287,840	Protozoacide	Infection, trypano-somiasis, American
Kainic Acid		487-79-6			
Kalimate	Kalimate-[CAS]	92354-70-6		Urological	
Kallidin		342-10-9			
KB-130015	Acetic acid (2,6-diodo-4-((2-methyl-3-benzofuranyl)methyl)phenoxy)-[CAS]	147030-48-6		Antiarrhythmic	Arrhythmia, general
KCB-328	Methanesulfonamide, N-[3-amino-4-[[2-(3,4-dimethoxyphenyl)ethyl]methylamino]ethoxy]-phenyl]-, monohydrochloride [CAS]	177596-55-3	WO 9604231	Antiarrhythmic	Arrhythmia, general
Kebuzone		853-34-9			
ketamine	2-(2-Chlorophenyl)-2-(methylamino)-cyclohexanone hydrochloride	6740-88-1		Formulation, transmucosal, nasal	Pain, post-operative
ketanserin	2,4(1H,3H)-Quinazolinedione, 3-[2-[4-(4-fluorobenzoyl)-1-piperidinyl]ethyl]-[CAS]	74050-98-9	EP 13612	Antihypertensive, other	Hypertension, general
ketazolam	4H-[1,3]Oxazino[3,2-d][1,4]benzodiazepine-4,7(6H)-dione, 11-chloro-8,12b-dihydro-2,8-dimethyl-12b-phenyl-[CAS]	27223-35-4	GB 1222294	Anxiolytic	
Kethoxal		27762-78-3			
Ketobemidone		469-79-4			
ketoconazole	Piperazine, 1-acetyl-4-[4-[[2-(2,4-dichlorophenyl)-2-(1H-imidazol-1-ylmethyl)-1,3-dioxolan-4-yl]methoxy]phenyl]-, cis-[CAS]	65277-42-1	U.S. 4,335,125	Antifungal	Infection, fungal, general
ketoprofen	mono(3-benzoyl-Alpha-methylbenzeneacetate) [CAS]	173011-11-5	EP 502502	Formulation, transdermal, systemic	Pain, general
ketorolac	1H-Pyrrolizine-1-carboxylic acid, 5-benzoyl-2,3-dihydro-, (+/−)-[CAS]	74103-06-3 74103-07-4	EP 53021	Analgesic, NSAID	
Ketorolac Tromethamine					
ketotifen	10-H-Benzo[4,5]cyclohepta[1,2-b]thiophen-10-one, 4,9-dihydro-4-(1-methyl-4-piperidinylidene)-, (E)-2-butenedioate (1:1)-[CAS]	34580-13-7 34580-14-8	GB 1355539	Antiasthma	Asthma

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Khellin		82-02-0			
kinetin		9001-29-0		Dermatological	Photodamage
KNI-272	4-Thiazolidinecarboxamide, N-(1,1-dimethylethyl)-3-[2-hydroxy-3-[[2-[[(5-isoquinolinyloxy)acetyl]amino]-3-(methylthio)-1-oxopropyl]amino]-1-oxo-4-phenylbutyl]-, [4R-[3[2S*,3S*(R*)],4R*]]-[CAS]	147318-81-8	U.S. 5,466,028	Antiviral, anti-HIV	Infection, HIV/AIDS
KP-103	(R,R)-2-(2,4-Difluorophenyl)-3-(4-methylenepiperidin-1-yl)-1-(1,2,4-triazol-1-yl)-2-butanol		U.S. 6,110,961	Antifungal	Infection, general
KP-157			WO 9919305	Antidepressant	Depression, general
KP-544			WO 9015811	Cognition enhancer	Unspecified
KRN-5500	L-glycero-β-L-manno-Heptopyranosylamine, 4-deoxy-4-[[[[(2E,4E)-1-oxo-2,4-tetradecadienyl]amino]acetyl]amino]-N-1H-purin-6-yl-[CAS]	151276-95-8		Anticancer, antibiotic	Cancer, colorectal
KT-136	Alpha-D-Glucopyranoside, β-D-fructofuranosyl, mixt. with 1-ethenyl-2-pyrrolidinone homopolymer compd. with iodine [CAS]	121602-88-8		Formulation, dermal, topical	Ulcer, decubitus
KUL-7211	(−)-2-[(2S)-1,2,3,4-tetrahydro-2-[[(2R)-2-hydroxy-2-(4-hydroxphenyl)ethyl]amino]naphthalen-7-yloxy]-N,N-dimethylacetamide hydrochloride monohydrate			Urological	Urinary calculus
KW-2170	6H-Pyrazolo[4,5,1-de]acridin-6-one,5-[(3-aminopropyl)amino]-7,10-dihydroxy-2-[[(2-hydroxyethyl)amino]methyl-, dihydrochloride [CAS]	207862-44-0		Anticancer, alkylating	Cancer, lung, non-small cell
KW-6002	1H-Purine-2,6-dione, 8-(2-(3,4-dimethoxyphenyl)ethenyl)-1,3-diethyl-3,7-dihydro-7-methyl-(E)-[CAS]	155270-99-8		Antiparkinsonian	Parkinson's disease
KW-7158	3,3,3-Trifluoro-2-hydroxy-2-methyl-N-(10-oxo-4,10-dihydrothieno[3,2-C][1] benzothiepin-9-yl)propanamide 5,5 dioxide			Urological	Incontinence
L-365260	Urea, N-(2,3-dihydro-1-methyl-2-oxo-5-phenyl-1H-1,4-benzodiazepin-3-yl)-N'-(3-methyl)phenyl)- , (R)-[CAS]	118101-09-0	EP 284256	Anticancer, other	Cancer, general
L-5-hydroxy-tryptophan	L-Tryptophan, 5-hydroxy-[CAS]	4350-09-8		Metabolic and enzyme disorders	Unspecified
L-745337	Methanesulfonamide, N-[6-[(2,4-difluorophenyl)thio]-2,3-dihydro-1-oxo-1H-inden-5-yl]-[CAS]	158205-05-1	WO 9413635	Analgesic, NSAID	Pain, general
L-758298	Phosphonic acid, [3-[[(2R,3S)-2-,(,(1R)-1-[3,5-bis(trifluoromethyl)phenyl]ethoxy]-3-(4-fluorophenyl)-4-morpholinyl]methyl]-2,5-dihydro-5-oxo-1H-1,2,4-triazol-1-yl]-[CAS]	172673-20-0	WO 9523798	Antimetic	Chemotherapy-induced nausea and vomiting

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L-826141			WO	9722585	Antiasthma	Unspecified
labetalol	5-[1-hydroxy-2-[(1-methyl-3-phenylpropyl)amino]ethyl]salicylamide HCl	32780-64-6 36894-69-6	U.S.	4,012,444	Antihypertensive, adrenergic	
lacidipine	3,5-Pyridinedicarboxylic acid, 4-[2-[3-(1,1-dimethylethoxy)-3-oxo-1-propenyl]phenyl]-1,4-dihydro-2,6-dimethyl-, diethyl ester, (E)-[CAS]	103890-78-4	GB	2164336	Antihypertensive, other	Hypertension, general
Lactic Acid						
lactitol	D-Glucitol, 4-O-β-D-galactopyranosyl-[CAS]	585-86-4			Hepatoprotective	Infection, neurological
Lactulose		4618-18-2				
lafutidine	Acetamide, 2-[(2-furanylmethyl)sulfinyl]-N-[4-[[4-(1-piperidinylmethyl)-2-pyridinyl]oxy]-2-butenyl]-, (Z)-[CAS]	118288-08-7 169899-19-8	EP	282077	Antiulcer	Ulcer, gastric
Lamifiban		144412-49-7				
lamivudine	2(1H)-Pyrimidinone, 4-amino-1-[2-(hydroxymethyl)-1,3-oxathiolan-5-yl]-, (2R-cis)-[CAS]	134678-17-4	EP	51397	Antiviral, anti-HIV	Infection, HIV/AIDS
lamotrigine	1,2,4-Triazine-3,5-diamine, 6-(2,3-dichlorophenyl)-[CAS]	84057-84-1	EP	21121	Antiepileptic	Epilepsy, partial (focal, local)
landiolol	Benzenepropanoic acid, 4-[2-hydroxy-3-[[2-[(4-morpholinylcarbonyl)amino]ethyl]amino]-propoxy]-, (2,2-dimethyl-1,3-dioxolan-4-yl)methyl ester, [S-(R*,R*)]-HCL	133242-30-5	EP	397031	Antiarrhythmic	Tachycardia, general
lanicemine	(S)-Alpha-phenyl-2-pyridine ethanamine dihydrochloride	153322-05-5			Neurological	Unspecified
laniquidar	Methyl 6,11-dihydro-11-[1-[2-[4-(-2-quinolylmethoxy)phenyl]ethyl]-4-piperidinylidene]-5H-imidazo[2,1-b][3]benzazepine-3-carboxylate	197509-46-9	WO	9734897	Radio/ chemosensitizer	Cancer, general
lanoconazole	1H-Imidazole-1-acetonitrile, Alpha-[4-(2-chlorophenyl)-1,3-dithiolan-2-ylidene]-, (E)-(±)-[CAS]	101530-10-3	U.S.	4,738,976	Antifungal	Infection, fungal, general
Lanoteplase		171870-23-8				
Lanreotide		108736-35-2				
lansoprazole	1H-Benzimidazole, 2-[[[3-methyl-4-(2,2,2-trifluoroethoxy)-2-pyridyl]methyl]sulfinyl]-[CAS]	103577-45-3	EP	174726	Antiulcer	Ulcer, duodenal
lanthanum carbonate	Carbonic acid, lanthanum(3+) salt (3:2)[CAS]	587-26-8	U.S.	5,968,976	Urological	Hyperphos-phataemia
lapatinib	4-Quinazolinamine, N-[3-chloro-4-[(3-fluorobenzyl)methoxy phenyl]-6-[5-[[[2-[methylsulfonyl]ethyl]amino]methyl]furan-2-yl]	388082-78-8			Anticancer, other	Cancer, breast
laquinimod		248281-84-7			Multiple sclerosis treatment	Multiple sclerosis, general

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lasofoxifene	2-Naphthalenol, 5,6,7,8-tetrahydro-6-phenyl-5-(4-(2-(1-pyrrolidinyl)ethoxy)phenyl-(5R-cis)-, (S-(R*,R*))-2,3-dihydroxybutanedioate [CAS]	190791-29-8	WO	9716434	Menopausal disorders	Hormone replacement therapy
latamoxef	5-Oxa-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[carboxy(4-hydroxyphenyl)acetyl]amino]-7-methoxy-3-[[(1-methyl-1H-tetrazol-5-yl)thio]methyl]-8-oxo-[CAS]	64952-97-2 64953-12-4	GB	1547351	Beta-lactam antibiotic	Infection, general
latanoprost	5-Heptenoic acid, 7-(3,5-dihydroxy-2-(3-hydroxy-5-phenylpentyl)cyclopentyl)-, 1-methylethyl ester, (1R-(1Alpha(Z),2β(R*),3Alpha,5Alpha))-[CAS]	130209-82-4	WO	9002553	Prostaglandin	Glaucoma
Lauroguadine		135-43-3				
Laurolinium Acetate		146-37-2				
Lawsone		83-72-7				
LAX-111	1-(Z,Z,Z,Z,Z-eicosa-5,8,11,14,17-pentaenoyloxy)-3-(Z,Z,Z,Z,Z-eicosa-5,8,11,14,17-pentaenoyloxy)-propane				Neuroleptic	Schizophrenia
Lazabemide		103878-84-8				
LB-30057	Benzenecarboximidic acid, 4-[(2S)-3-(cyclopentylmethylamino)-2-[(2-naphthalenylsulfonyl)amino]-3-oxopropyl]-, hydrazide [CAS]		WO	9749673	Antithrombotic	Thrombosis, venous
L-Cystine		7262-75-1				
Lefetamine		75706-12-6				
lefluomide	4-Isoxazolecarboxamide, 5-methyl-N-[4-(trifluoromethyl)phenyl]-[CAS]		EP	13376	Antiarthritic, immunological	Arthritis, rheumatoid
leflunomide	4-Isoxazolecarboxamide, 5-methyl-N-[4-(trifluoromethyl)phenyl]-[CAS]	104981-93-3 75706-12-6	U.S.	5,610,173	Anticancer, other	Cancer, ovarian
Leiopyrrole		5633-16-9				
lenampicillin	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 6-[(aminophenylacetyl)amino]-3,3-dimethyl-7-oxo-, (5-methyl-2-oxo-1,3-dioxol-4-yl)methyl ester, [2S-[2Alpha,5Alpha,6β(S*)]]-[CAS]	80734-02-7 86273-18-9	EP	61206	Penicillin, oral	Infection, general
lentinan	Lentinan [CAS]	37339-90-5			Anticancer, immunological	Cancer, stomach
Lepirudin						
lercanidipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, 2-[(3,3-diphenylpropyl)methylamino]-1,1-dimethylethyl methyl ester-, hydrochloride [CAS]	100427-26-7 132866-11-6	U.S.	4,705,797	Antihypertenzive, other	Hypertension, general
lerisetron	1H-Benzimidazole, 1-(phenylmethyl)-2-(1-piperazinyl)-[CAS]	143257-98-1	U.S.	5,256,665	Antimetic	Nausea and vomiting, general

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Lesopitron		132449-46-8			
letepriniim	Benzoic acid, 4-((3-(1,6-dihydro-6-oxo-9H-purin-9-yl)-1-oxopropyl)amino)-, monopotassium salt [CAS]	138117-50-7	U.S. 6,338,963	Antiparkinsonian	Parkinson's disease
letosteine	4-Thiazolidinecarboxylic acid, 2-[2-[(2-ethoxy-2-oxoethyl)thio]ethyl]-[CAS]	53943-88-7	U.S. 4,032,534	COPD treatment	Bronchitis, chronic
letrozole	Benzonitrile, 4,4'-(1H-1,2,4-triazol-1-ylmethylene)bis-[CAS]	112809-51-5	EP 236940	Anticancer, hormonal	Cancer, breast
Leucocyanidin		480-17-1			
Leuprolide		53714-56-0			
leuprolide acetate	Luteinizing hormone-releasing factor (pig), 6-D-leucine-9-(N-ethyl-L-prolinamide)-10-deglycinamide-, monoacetate (salt) [CAS]	53714-56-0 74381-53-6		Formulation, implant	Cancer, prostate
leuprorelin	Luteinizing hormone-releasing factor (pig), 6-D-leucine-9-(N-ethyl-L-prolinamide)-10-deglycinamide-, [CAS]	53714-56-0		Formulation, implant	Cancer, prostate
Levallorphan		152-02-3			
levamisole	Imidazo[2,1-b]thiazole, 2,3,5,6-tetrahydro-6-phenyl-, (S)-[CAS]	14769-73-4 16895-80-5	U.S. 4,584,305	Anthelmintic	Infection, helminth, general
Levcromakalim		94535-50-9			
levetiracetam	1-Pyrrolidineacetamide, Alpha-ethyl-2-oxo-, (S)-[CAS]	102767-28-2	EP 162036	Antiepileptic	Epilepsy, general
levobetaxolol	2-Propanol, 1-(4-(2-(cyclopropylmethoxy)ethyl)phenoxy)-3-((1-methylethyl)amino) hydrochloride [CAS]	116209-55-3		Formulation, mucosal, topical	Glaucoma
levobunolol	1(2H)-Naphthalenone, 5-[3-[(1,1-dimethylethyl)amino]-2-hydroxypropoxy]-3,4-dihydro-, (S)-[CAS]	27912-14-7 47141-42-4	U.S. 3,641,152	Formulation, mucosal, topical	Glaucoma
levobupivacaine	2-Piperidinecarboxamide, 1-butyl-N-(2,6-dimethylphenyl)-, (S)-[CAS]	27262-47-1	WO 9510276	Anaesthetic, injectable	Anaesthesia
levocabastine	4-Piperidinecarboxylic acid, 1-[4-cyano-4-(4-fluorophenyl)cyclohexyl]-3-methyl-4-phenyl-, [3S-[1(cis),3Alpha,4β]]-[CAS]	79449-98-2 79516-68-0 79547-78-7	U.S. 4,369,184	Antiallergic, non-asthma	Rhinitis, allergic, general
levocetirizine	Acetic acid, (2-(4-((4-chlorophenyl)phenylmethyl)-1-piperazinyl)ethoxy)-, (R)-[CAS]	130018-77-8	WO 9406429	Antiallergic, non-asthma	Allergy, general
Levodopa		59-92-7			
levodropropizine	1,2-Propanediol, 3-(4-phenyl-1-piperazinyl)-, (S)-[CAS]	99291-25-5	EP 147847	Antitussive	Cough
levofloxacin	7H-Pyrido[1,2,3-de]-1,4-benzoxazine-6-carboxylic acid, 9-fluoro-2,3-dihydro-3-methyl-10-(4-methyl-1-piperazinyl)-7-oxo-, (S)-[CAS]	100986-85-4 138199-71-0	EP 206283	Quinolone antibacterial	Infection, respiratory tract, lower
Levomethadyl Acetate		1477-40-3			
levonoprolol	2-Propanol, 1-(2-methoxyphenoxy)-3-[(1-methylethyl)amino]-, (S)-[CAS]	27058-84-0 5741-22-0 77164-20-6	EP 15418	Antihypertensive, adrenergic	
levonorgestrel	18,19-Dinorpregn-4-en-20-yn-3-one, 13-ethyl-17-hydroxy-, (17Alpha)-[CAS]	797-63-7		Formulation, implant	Contraceptive, female

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Levophacetoperane		24558-01-8			
Levopropoxyphene		2338-37-6			
Levorphanol		77-07-6			
levosimendan	Propanedinitrile, [[4-(1,4,5,6-tetrahydro-4-methyl-6-oxo-3-pyridazinyl)phenyl]hydrazono]-, (R)-[CAS]	131741-08-7 141505-33-1	EP 383449	Cardiostimulant	Heart failure
levosulpride	Benzamide, 5-(aminosulfonyl)-N-[(1-ethyl-2-pyrrolidinyl)methyl]-2-methoxy-, (S)-[CAS]	23672-07-3	GB 2014990	Antiemetic	Dyspepsia
Levothyroxine					
levoviriin	1-β-L-ribofuranosyl-1,2,4-triazole-3-carboxamide			Antiviral, other	Infection, hepatitis-C virus
lexipafant	L-Leucine, N-methyl-N-[[4-[(2-methyl-1H-imidazo[4,5-c]pyridin-1-yl)methyl]phenyl]sulfonyl]-, ethyl ester-[CAS]	139133-26-9	WO 9203423	Neurological	Dementia, AIDS-related
LF-15-0195			WO 9624579	Immunosuppressant	Lupus erythematosus, general
LF-16-0687	2-Pyrrolidinecarboxamide, N-[3-[[4-(aminoiminomethyl)benzoyl]amino]propyl]-1-[[2,4-dichloro-3-[[(2,4-dimethyl-8-quinolinyl)oxy]methyl]phenyl]sulfonyl]-, (2S)-[CAS]	209733-45-9	FR 2756562	Neuroprotective	Head trauma
LGD-1550	2,4,6-Octatrienoic acid, 7-(3,5-bis(1,1-dimethylethyl)phenyl)-3-methyl-(2E,4E,6E)-[CAS]	178600-20-9		Anticancer, other	Cancer, cervical
LH		902-67-9			
LH-RH		934-40-6			
liarozote	1H-Benzimidazole, 5-[(3-chlorophenyl)-1H-imidazol-1-ylmethyl]-[CAS]	115575-11-6		Formulation, other	Psoriasis
licofelone	1H-Pyrrolizine-5-acetic acid, 6-(4-chlorophenyl)-2,3-dihydro-2,2-dimethyl-7-phenyl-[CAS]	156897-06-2		Antiarthritic, other	Arthritis, osteo
Licostinel		153504-81-5			
lidadronate	Phosphonic acid, [1-amino-3-(dimethylamino)propylidene]bis-[CAS]	63132-38-7	WO 9702827	Urological	Unspecified
Lidamidine		66871-56-5			
lidocaine	Acetamide, 2-(diethylamino)-N-(2,6-dimethylphenyl)-[CAS]	137-58-6		Formulation, transdermal, patch	Pain, post-herpetic
Lidofenin		59160-29-1			
Lidoflazine		3416-26-0			
limaprost	Prosta-2,13-dien-1-oic acid, 11,15-dihydroxy-17,20-dimethyl-9-oxo-, (2E,11Alpha,13E,15S,17S)-, [CAS]	74397-12-9	GB 2041368	Prostaglandin	Buerger's syndrome
Lincomycin		154-21-2			
Lindan		58-89-9			

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linezolid	Acetamide, N-((3-(3-fluoro-4-(4-morpholinyl)phenyl)-2-oxo-5-oxazolidinyl)methyl)-, (S)-[CAS]	165800-03-3	WO	9507271	Antibiotic, other	Infection, dermatological
Linoleic Acid		60-33-3				
Linolenic Acid		463-40-1				
Liothyronine		6893023				
Lipase		9001-62-1				
Lipo-dexamethasone	Pregna-1,4-diene-3,20-dione, 9-fluoro-11,17-dihydroxy-16-methyl-21-[(1-oxohexadecyl)oxy]-, (11β,16Alpha)-[CAS]	14899-36-6			Formulation, optimized, microemulsion	Arthritis, rheumatoid
lipo-flurbiprofen	[1,1'-Biphenyl]-4-acetic acid, 2-fluoro-Alpha-methyl-, 1-(acetyloxy)ethyl ester [CAS]	91503-79-6	JP	60208910	Formulation, optimized, microemulsion	Pain, cancer
Lipogel HA			EP	525655	Formulation, optimized, liposomes	Unspecified
LiquiVent	perfluorooctylbromide	423-55-2	U.S.	5,437,272	Lung Surfactant	Respiratory distress syndrome, adult
liranaftate	Carbamothioic acid, (6-methoxy-2-pyridinyl)methyl-, O-(5,6,7,8-tetrahydro-2-naphthalenyl) ester [CAS]	88678-31-3	GB	2124617	Antifungal	Infection, dermatological
lisinopril	L-Proline, 1-[N2-(1-carboxy-3-phenylpropyl)-L-lysyl]-, (S)-[CAS]	76547-98-3 83915-83-7 100324-81-0	EP	12401	Antihypertensive, renin system	Hypertension, general
Lisofyllin						
lisuride	Urea, N'-[(8Alpha)-9,10-didehydro-6-methylergolin-8-yl]-N,N-diethyl-, [CAS]	19875-60-8 305-13-5 18016-80-3			Antiprolactin	Acromegaly
Lithium Citrate		919-16-4				
lithium	Carbonic acid, dilithium salt [CAS]	554-13-2			Formulation, modified-release, <=24 hr	Depression, bipolar
lixivaptan	Benzamide, N-[3-chloro-4-(5H-pyrrolo[2,1-c][1,4]benzodiazepin-10(11H)-ylcarbonyl)phenyl]-5-fluoro-2-methyl-[CAS]	168079-32-1	U.S.	5,736,540	Cardiovascular	Heart failure
LJP-1082			U.S.	6,207,160	Immunosuppressant	Thrombosis, venous
LLUAlpha	S-2,7,8-Trimethyl-6-(β-carboxyethyl)-6-hydroxychroman				Antihypertensive, other	Hypertension, general
LMP-160			U.S.	5,643,893	Antiasthma	Asthma
LMP-420			U.S.	5,643,893	Antiarthritic, other	Arthritis,
lobaplatin	Platinum, (1,2-cyclobutanedimethanamine-N,N')[2-hydroxypropanoato(2-)-O1,O2]-, [SP-4-3-(S),(trans)]-[CAS]	135558-11-1	DE	4115559	Anticancer, alkylating	Cancer, lung, small cell
Lobeline		90-69-7				
Lobenzarit		63329-53-3				

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Iodoxamide	2,2'-((2-chloro-5-cyano-1,3-phenylene)diimino)bis(2-oxoacetate);2-amino-2-(hydroxymethyl)-1,3-propanediol (1:2)	63610-09-3 53882-12-5	U.S.	4,439,445	Antiasthma	Asthma
Lofentanil		61380-40-3				
Lofepramine	Ethanone, 1-(4-chlorophenyl)-2-[[3-(10,11-dihydro-5H-dibenz[b,f]azepin-5-yl)propyl]methylamino]-[CAS]	23047-25-8 26786-32-3	GB	1177525	Antidepressant	
Lofexidine	1H-Imidazole, 2-[1-(2,6-dichlorophenoxy)ethyl]-4,5-dihydro-[CAS]	31036-80-3	GB	1181356	Antihypertensive, adrenergic	Hypertension, general
Lofucarban		790-69-2				
Lomefloxacin	3-Quinolinecarboxylic acid, 1-ethyl-6,8-difluoro-1,4-dihydro-7-(3-methyl-1-piperazinyl)-4-oxo-[CAS]	98079-51-7 98079-52-8	EP	140116	Quinolone antibacterial	Infection, respiratory tract, lower
Lomerizine	Piperazine, 1-[bis(4-fluorophenyl)methyl]-4-[(2,3,4-trimethoxyphenyl)methyl]-, [CAS]	101477-54-7 101477-55-8	EP	159566	Antimigraine	Migraine
Lomifylline	7-(5-oxohexyl)theophylline	10226-54-7	DE	2207860	Neurological	
Lomustine	Urea, N-(2-chloroethyl)-N'-cyclohexyl-N-nitroso-[CAS]	13010-47-4	JP	48075526	Anticancer, alkylating	
Lonafarnib	1-Piperidinecarboxamide, 4-[2-[4-[(11R)-3,10-dibromo-8-chloro-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridin-11-yl]-1-piperidinyl]-2-oxoethyl]-[CAS]	193275-84-2	U.S.	5,874,442	Anticancer, other	Cancer, lung, non-small cell
Lonapalene		91431-42-4				
Lonazolac		53808-88-1				
Lonidamine	1H-Indazole-3-carboxylic acid, 1-[(2,4-dichlorophenyl)methyl]-[CAS]	50264-69-2	DE	2310031	Radio/ chemosensitizer	Cancer, breast
Loperamide	4-(p-chlorophenyl)-4-hydroxy-N,N-dimethyl-Alpha,Alpha-diphenyl-1-piperidine butyramide HCl	34552-83-5 53179-11-6	U.S.	3,714,159	Antidiarrhoeal	Diarrhoea, general
Loperamide oxide	1-Piperidinebutanamide, 4-(4-chlorophenyl)-4-hydroxy-N,N-dimethyl-Alpha,Alpha-diphenyl-, 1-oxide, trans-[CAS]	106900-12-3	EP	219898	Antidiarrhoeal	Diarrhoea, general
Loprazolam	1H-Imidazo[1,2-a][1,4]benzodiazepin-1-one, 6-(2-chlorophenyl)-2,4-dihydro-2-[(4-methyl-1-piperazinyl)methylene]-8-nitro-[CAS]	61197-73-7 61197-93-1 70111-54-5	GB	1496426	Hypnotic/ Sedative	
Lopnnone		106730-54-5				
Loracarbef	1-Azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[(aminophenylacetyl)amino]-3-chloro-8-oxo-, [6R-[6Alpha,7Beta(R*)]]-[CAS]	76470-66-1 121961-22-6	EP	14475	Cephalosporin, oral	Infection, respiratory tract, lower
Lorajmine		47562-08-3				
Loratadine	1-Piperidinecarboxylic acid, 4-(8-chloro-5,6-dihydro-11H-benzo[5,6]cyclohepta[1,2-b]pyridin-11-ylidene)-, ethyl ester-[CAS]	79794-75-5	EP	42544	Antiallergic, non-asthma	Rhinitis, allergic, general
Lorazepam	2H,1,4-Benzodiazepin-2-one, 7-chloro-5-(2-chlorophenyl)-1,3-dihydro-3-hydroxy-[CAS]	846-49-1			Formulation, oral, orally-disintegrating	Epilepsy, general
Lorcainide	Benzeneacetamide, N-(4-chlorophenyl)-N-[1-(1-methylethyl)-4-piperidinyl]-[CAS]	58934-46-6 59729-31-6	DE	2642856	Antiarrhythmic	

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lormetazepam	2H-1,4-Benzodiazepin-2-one, 7-chloro-5-(2-chlorophenyl)-1,3-dihydro-3-hydroxy-1-methyl-[CAS]	848-75-9	U.S. 3,296,249	Hypnotic/Sedative	Insomnia
lornoxicam	2H-Thieno[2,3-e]-1,2-thiazine-3-carboxamide, 6-chloro-4-hydroxy-2-methyl-N-2-pyridinyl-, 1,1-dioxide-[CAS]	70374-39-9	EP 313935	Analgesic, NSAID	Pain, post-operative
losartan	1H-Imidazole-5-methanol, 2-butyl-4-chloro-1-[[2'-(1H-tetrazol-5-yl)[1,1'-biphenyl]-4-yl]methyl]-, [CAS]	124750-99-8 114798-26-4	EP 253310	Antihypertensive, renin system	Hypertension, general
lotepredinol	Androsta-1,4-diene-17-carboxylic acid, 17-[(ethoxycarbonyl)oxy]-11-hydroxy-3-oxo-, chloromethyl ester, (11β,17Alpha)-[CAS]	82034-46-6	GB 2079755	Anti-inflammatory, topical	Uveitis
Lotrafiban		171049-14-2			
Lovastatin		75330-75-5			
Loxapine		10/02/1977			
loxiglumide	Pentanoic acid, 4-[(3,4-dichlorobenzoyl)amino]-[(3-methoxypropyl)pentylamino]-5-oxo-, (±)-[CAS]	107097-80-3	WO 8703869	GI inflammatory/ bowel disorders	Pancreatitis
loxoprofen	Benzeneacetic acid, Alpha-methyl-4-[(2-oxocyclopentyl)methyl]-[CAS]	68767-14-6 80382-23-6 87828-36-2	EP 55588	Antiarthritic, other	Arthritis, rheumatoid
Lu-35-138	1-[3[[2-[5-chloro-1-(4-fluorophenyl)-3-1H-indolyl]ethyl]methylamino)propyl]-2-imidazolidinone hydrochloride]		WO 9516684	Neuroleptic	Psychosis, general
Lubeluzole		144665-07-6			
lubiprostone	(−)-7-[(2R,4aR,5R,7aR)-2-(1,1-difluoropentyl)-2-hydroxy-6-oxooctahydrocyclopenta[b]pyran-5-yl]heptanoic acid	136790-76-6		Laxative	Constipation
lucanthone	Thioxanthen-9-one, 1-((2-(diethylamino)ethyl)amino-4-methyl-[CAS]	479-50-5		Radio/ chemosensitizer	Cancer, brain
Lucanthone		548-57-2			
Lumefantrine		82186-77-4			
lumiracoxib	Benzeneacetic acid, 2-(2-chloro-6-fluorophenyl)amino)-5-methyl-[CAS]	220991-20-8		Analgesic, NSAID	Pain, general
lurtotecan	1,1H-1,4-Dioxino[2,3-g]pyrano[3',4':6,7]indolizino[1,2-b]quinoline 9,12-[8H,14H]-dione, 8-ethyl-2,3-dihydro-8-hydroxy-15-[[4-methyl-1-piperazinyl]methyl]-, [CAS]	155773-58-3		Formulation, optimized, lipocomes	Cancer, ovarian
lutetium texaphyrin	Lutetium, bis[acetato-O]9,10-diethyl-20,21-bis-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]-4,15-dimethyl-8,11-imino-3,6:16,13-dinitrilo-1,18-benzodiazacycloeicosine-5,14-dipropanolato-N1,N18,N23,N24,N25]-, (PB 7-11-233*24)-[CAS]	156436-90-7	WO 9906411	Radio/ chemosensitizer	Athero-sclerosis
LV-216	Zinc[2-(2,6-dichloroanilino)phenyl]acetate			Anti-inflammatory	Arthritis, rheumatoid

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LX-104	Hexadecanamide, N-[4-[[2-[2-[[O-(N-acetyl-Alpha-neuraminosyl)-(2-3)-O-β-D-galactopyranosyl-(1-4)-O-(6-deoxy-Alpha-L-galactopyranosyl)oxy]ethoxy]ethoxy]-methyl]phenyl]-2-tetradecyl-[CAS]	158792-45-1		Cognition enhancer	Dementia, senile, general
LY-156735	β-methyl-6-chloromelatonin		EP 655243	Hypnotic/Sedative	Sleep disorder, general
LY-293111	Benzoic acid, 2-[3-[3-[(5-ethyl-4'-fluoro-2-hydroxy[1,1'-biphenyl]-4-yl)oxy]propoxy]-2-propyliphenoxy]-[CAS]	161172-51-6		Anticancer, other	Cancer, melanoma
LY-293558	3-Isoquinolinecarboxylic acid, decahydro-6-[2-(1H-tetrazol-5-yl)ethyl]-, [3S-(3Alpha,4aAlpha,6β,8aAlpha,)]-[CAS]	154652-83-2		Anticancer, other	Pain, neuropathic
LY-355703	1,4-Dioxa-8,11-diazacyclohexadec-13-ene-2,5,9,12-tetrone, 10-[(3-chloro-4-methoxyphenyl)methyl]-6,6-dimethyl-3-(2-methylpropyl)-16-[(1S)-1-[(2S,3R)-3-phenyloxiranyl]ethyl]-, (3S,10R,13E,16S)-[CAS]	18256-67-7	WO 9707798	Anticancer, other	Cancer, lung, non-small cell
Lyapolate		25053-27-4			
Lymecycline		992-21-2			
Lynestrenol		52-76-6			
Lypressin		50-57-7			
Lysine Acetylsalicylate		62952-06-1			
lysine salicylate	L-Lysine, 2-hydroxybenzoate [CAS]	59535-08-9	WO 9624331	Analgesic, NSAID	
lysophospholipids			WO 9843093	Diagnostic	Diagnostic, cancer
M-40403	Dichloro[(4aR,13aR,17aR,21aR)-1,2,3,4,4a,5,6,12,13a,14,15,16,17,17a,18,19,20,21,21a-eicosahydro-1,7-nitrilo-7H-dibenzo[b,h][1,4,7,10]tetraazacyclo-heptadecine-kappaN5,kappaN13,kappaN18,kappaN21,kappaN22]manganese	82821-47-4	U.S. 6,180,620	Anticancer, other	Unspecified
mabuprofen	Benzeneacetamide, N-(2-hydroxyethyl)-Alpha-methyl-4-(2-methylpropyl)-, (+/-)-[CAS]	82821-47-4	DE 3121595	Anti-inflammatory	
Mabuterol		56341-08-3			
Macrophage Colony-Stimulating Factor		81627-83-0			
MADU		840-50-6			
mafenide	Benzenesulfonamide, 4-(aminomethyl)-monoacetate [CAS]	13009-99-9 138-39-6		Vulnerary	Burns
mafosfamide	Ethanesulfonic acid, 2-[[2-[bis(2-chloroethyl)amino]tetrahydro-2H-1,3,2-oxazaphosphorin-4-yl]thio]-, P-oxide, cis-(±)-[CAS]	88859-04-5 98845-64-8	EP 393575	Anticancer, alkylating	Cancer, renal
magaldrate	Aluminum magnesium hydroxide sulfate (Al5Mg10(OH)31(SO4)2), hydrate [CAS]	74978-16-8	U.S. 2,923,660	Antacid/ Antiflatulent	
Magenta I		632-99-5			

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Magnesium Acetylsalicylate		132-49-0			
Magnesium Carbonate Hydroxid		39409-82-0			
magnesium chloride	Magnesium chloride (MgCl2) [CAS]	7786-30-3		Formulation, oral, enteric-coated	Nutrition
Magnesium Citrate		3344-18-1			
magnesium gluconate	D-Gluconic acid, magnesium salt (2:1) [CAS]	3632-91-5		Formulation, other	Hypertension, general
Magnesium Lactate		18917-93-6			
Magnesium Salicylate		18917-89-0			
Malathion		121-75-5			
Malotilate		59937-28-9			
Mandelic Acid		90-64-2			
Mandelic Acid Isoamyl Ester		5421045			
Mangafodipir		118248-94-5 (free acid); 155319-91-8 (hexa-hydrogen)			
manidipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, 2-[4-(diphenylmethyl)-1-piperazinyl]ethyl methyl ester [CAS]	89226-50-6 89226-75-5	EP 94159	Antihypertensive, other	Hypertension, general
Mannomustine		551-74-6			
mannose-6-phosphate	mannose-6-phosphate	10262-69-8		Vulnerary	Wound healing
Maprotilline		176161-24-3			
maribavir	1H-Benzimidazol-2-amine, 5,6-dichloro-N-(1-methylethyl)-1-β-L-ribofuranosyl-[CAS]			Antiviral, other	Infection, cytomegalo-virus
marimastat	N-[2,2-Dimethyl-a(S)-(N-methylcarbamoyl)propyl]-N,3(S)-dihydroxy-2(R)-isobutylsuccinamide	154039-60-8	WO 9402447	Anticancer, other	Cancer, pancreatic
maxacalcitol	1,3-Cyclohexanediol, 4-methylene-5-(2-(octahydro-1-(1-(3-hydroxy-3-methylbutoxy)ethyl)-7a-methyl-4H-inden-4-ylidene)ethylidene)-, (1S-(1Alpha(R*),3aβ,4E(1S*,3R*,5Z),7aAlpha))-[CAS]	103909-75-7	U.S. 4,891,364	Hormone	Hyperpara-thyroidism
mazindol	3H-Imidazo[2,1-a]isoindol-5-ol, 5-(4-chlorophenyl)-2,5-dihydro-[CAS]	22232-71-9	U.S. 3,763,178	Anorectic/ Antiobesity	Obesity
Mazipredone		13085-08-0			
MC-5723			U.S. 6,043,259	Cardiovascular	Unspecified Infection, hepatitis-B virus
MCC-478	(2-amino-6-(4-methoxyphenylthio)-9-[2-(phosphonomethoxy)ethyl]purine bis(2,2,2-trifluoroethyl)ester)			Antiviral, other	
MCI-154	3(2H)-Pyridazinone, 4,5-dihydro-6-[4-(4-pyridinylamino)phenyl]-, monohydrochloride [CAS]	98326-32-0 98326-33-1	EP 145019	Cardiostimulant	Heart failure

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TABLE IV-continued

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m-Cresyl Acetate		122-46-3			
MDAM	Gamma-Methylene-10-deazaaminopterin			Anticancer, antimetabolite	Cancer, general
			U.S. 4,885,311	Antiacne	Acne
MDI-101		403849-94-5	U.S. 4,677,120	Antiacne	Acne
MDI-403					
MDL-100907	4-Piperidinemethanol, Alpha-(2,3-dimethoxyphenyl)-1-(2-(4-fluorophenyl)ethyl)-, (R)-[CAS]	139290-65-6		Hypnotic/Sedative	Sleep disorder, general
mebendazole	methyl-5-benzoylbenzimidazole-2-carbamate	31431-39-7	GB 1307306	Anthelmintic	
mebeverine	Benzoic acid, 3,4-dimethoxy-, 4-[ethyl[2-(4-methoxyphenyl)-1-methylethyl]amino]butyl ester [CAS]	3625-06-7		Antispasmodic	Irritable bowel syndrome
Mebhydroline		524-81-2			
Mebrofenin		78266-06-5			
Mebutamate		64-55-1			
mecamylamine	Bicyclo(2.2.1)heptan-2-amine, N,2,3,3-tetramethyl-[CAS]	60-40-2		Neurological	Unspecified
Mechlorethamine		51-75-2			
Mechlorethamine Oxide		302-70-5			
mecillinam	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 6-[[(hexahydro-1H-azepin-1-yl)methylene]amino]-3,3-dimethyl-7-oxo-, [2S-(2Alpha,5Alpha,6beta.)]-[CAS]	32887-01-7 32887-03-9	GB 1293590	Penicillin, injectable	Infection, general
Meclizine		569-65-3			
Meclocycline		2013-58-3			
meclofenamate	Benzoic acid, 2-[(2,6-dichloro-3-methylphenyl)amino]-, monosodium salt [CAS]	6385-02-0 644-62-2		Antiarthritic, other	Arthritis, osteo
Meclofenamic Acid		644-62-2			
Meclofenoxate		51-68-3			
Mecloqualone		340-57-8			
Mecysteine		18598-63-5			
Medazepam		12/06/2898			
medifoxamine	Ethanamine, N,N-dimethyl-2,2-diphenoxy-[CAS]	32359-34-5	FR M5498	Antidepressant	
Medrogestone		977-79-7			
Medronic Acid		1984-15-2			
medroxyprogesterone	Pregn-4-ene-3,20-dione, 17-(acetyloxy)-6-methyl-,(6Alpha)	71-58-9 520-85-4		Formulation, fixed-dose combinations	Contraceptive, female
Medrysone		2668-66-8			
Mefenamic Acid		61-68-7			
Mefenorex		17243-57-1			
Mefexamide		1227-61-8			
mefloquine	4-Quinolinemethanol, Alpha-2-piperidinyl-2,8-bis(trifluoromethyl)-, (R*,S*)-(±)-[CAS]	51773-92-3 53230-10-7 69191-18-0	GB 1594282	Antimalarial	
Mefruside		7195-27-9			
Megestrol		595-33-5			

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Meglumin		22154-43-4 131-49-7			
meglutol	2-hydroxy-2-methyl-1,3-propanedicarboxylic acid	503-49-1	U.S. 3,629,449	Hypolipaemic/ Antiatherosclerosis	Hyper-lipidaemia, general
melagatran	Glycine, N-[(1R)-2-[(2S)-2-[[[[4-(aminoiminomethyl)phenyl]methyl]amino]-carbonyl]-1-azetidinyl]-1-cyclohexyl-2-oxoethyl]-[CAS]	159776-70-2	WO 9616671	Antithrombotic	Thrombosis, general
melanocortin-4 agonist	N-[(3R)-1,2,3,4-Tetrahydroisoquinolinium-3-ylcarbonyl]-(1R)-1-(4-chlorobenzyl)-2-[4-cyclohexyl-4-(1H-1,2,4-triazol-1-ylmethyl)piperidin-1-yl]-2-oxoethylamine(1)			Anorectic/ Antiobesity	Obesity
Melarsoprol		494-79-1			
Melengestrol		5633-18-1			
melevodopa	Alanine, 3-(3,4-dihydroxyphenyl)-methylester [CAS]	7101-51-1	EP 252290	Antiparkinsonian	Parkinson's disease
Melinamide		14417-88-0			
Melitracen		5118-29-6			
meloxicam	2H-1,2-Benzothiazine-3-carboxamide, 4-hydroxy-2-methyl-N-(5-methyl-2-thiazolyl)-, 1,1-dioxide-[CAS]	71125-38-7	U.S. 4,233,299	Antiarthritic, other	Arthritis, rheumatoid
melperone	1-Butanone, 1-(4-fluorophenyl)-4-(4-methyl-1-piperidinyl)-[CAS]	1622-79-3 3575-80-2	BE 651144	Neuroleptic	
Melphalan		148-82-3			
meluadrine	Benzenemethanol, 2-chloro-Alpha-(((1,1-dimethylethyl)amino)methyl)-4-hydroxy-, (R)-, (R*,R*))-2,3-dihydroxybutanedioate (1:1) (salt) [CAS]	134865-37-5	EP 420120	Labour inhibitor	Labour, preterm
memantine	Tricyclo[3.3.1.13,7]decan-1-amine, 3,5-dimethyl [CAS]	41100-52-1 19982-08-2	EP 392059	Cognition enhancer	Dementia, AIDS-related
MEN-10700	Acetamide, 2-[[[(5R,6S)-6-[(1R)-1-hydroxyethyl]-2-methyl-7-oxo-4-thia-1-azabicyclo[3.2.0]hept-2-en-3-yl]methyl]methylamino]-[CAS]	195874-55-6	WO 9406803	Beta-lactam antibiotic	Infection, general
MEN-10755	5,12-Naphthacenedione, 7-[[4-O-(3-amino-2,3,6-trideoxy-Alpha-L-lyxo-hexopyranosyl)-2,6-dideoxy-Alpha-L-lyxo-hexopyranosyl]oxy]-7,8,9,10-tetrahydro-6,9,11-trihydroxy-9-(hydroxyacetyl)-, hydrochloride, (7S,9S)-[CAS]	169317-77-5	WO 9509173	Anticancer, antibiotic	Cancer, breast
Menadiol		481-85-6			
Menadione		58-27-5			
Menadoxime		573-01-3			
Menbutone		3562-99-0			
Menoganil		71628-96-1			
MENT	7Alpha-Methyl-19-nortestosterone			Formulation, transdermal, systemic	Contraceptive, male
menthol	Cyclohexanol, 5-methyl-2-(1-methlethyl)-[CAS]	1490-04-6 89-78-1		Formulation, dermal, topical	Pruritus

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Menthyl Valerate		89-47-4			
Meobentine		46464-11-3			
Meparfynol		77-75-8			
mepartricin	Partricin, methyl ester [CAS]	11121-32-7	U.S. 3,780,173	Antifungal	Infection, Candida, general
Mepazine		60-89-9			
Mepenzolate Bromide		76-90-4			
Meperidine		57-42-1			
Mephenesin		59-47-2			
Mephenoxalone		70-07-5			
Mephentermine		100-92-5			
Mephenytoin		50-12-4			
Mephobarbital		115-38-8			
Mepindolol		23694-81-7			
Mepitiostane		21362-69-6			
mepivacaine	N-(2,6-Dimethylphenyl)-1-methyl-2-piperidinecarboxamide	96-88-8		Formulation, modified-release, >24 hr	Pain, post-operative
Mepixanox		17854-59-0			
Meprednisone		1247-42-3			
Meprobamate		57-53-4			
meproscillarin	Bufa-4,20,22-trienolide, 3-[(6-deoxy-4-O-methyl-Alpha-L-mannopyranosyl)oxy]-14-hydroxy-, (3β)-[CAS]	33396-37-1	DE 1910207	Cardiostimulant	Heart failure
meptazinol	Phenol, 3-(3-ethylhexahydro-1-methyl-1H-azepin-3-yl)-[CAS]	54340-58-8	GB 1285025	Analgesic, other	Pain, general
mequitazine	10H-Phenothiazine, 10-(1-azabicyclo[2.2.2]oct-3-ylmethyl)-[CAS]	59263-76-2 29216-28-2	GB 1250534	Antiallergic, non-asthma	
Meralein		4386-35-0			
Meralluride		8069-64-5			
Merbromin		129-16-8			
Mercaptomerin		21259-76-7			
Mercumallylic Acid		86-36-2			
Mercuric Chloride, Ammoniated		10124-48-8			
Mercuric Oleate		1191-80-6			
Mercuric Oxycyanide		1335-31-5			
merimepodib	Carbamic acid, ((3-(((3-methoxy-4-(5-oxazolyl)phenyl)amino)carbonyl)amino)-phenyl)methyl)-(3S)-tetrahydro-3-furanyl ester [CAS]	198821-22-6	U.S. 5,807,878	Antiviral, other	Infection, hepatitis-C virus
meropenem	1-Azabicyclo[3.2.0]hept-2-ene-2-carboxylic acid, 3-[[5-[(dimethylamino)carbonyl]-3-pyrrolidinyl]thio]-6-(1-hydroxyethyl)-4-methyl-7-oxo-, [4R-[3(3S*,5S*),4Alpha,5β,6β(R*)]]-[CAS]	96036-03-2	EP 126587	Beta-lactam antibiotic	Infection, respiratory tract, lower
Mersalyl		492-18-2			
Mesalamine		89-57-6			

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mesalazine	Benzoic acid, 5-amino-2-hydroxy-[CAS]	89-57-6	WO 5541170	Formulation, oral, other	Colitis, ulcerative
Mesna		19767-45-4			
Mesoridazine		5588-33-0			
Mestanolone		521-11-9			
Mesterolone		1424-00-6			
Mestranol		72-33-3			
Mesulfen		135-58-0			
Metaclazepam		84031-17-4			
Metampicillin		6489-97-0			
Metapramine		21730-16-5			
Metaproterenol		586-06-1			
Metaraminol		54-49-9			
Metazocine		3734-52-9			
metergoline	Carbamic acid, [[(8β)-1,6-dimethylergolin-8-yl]methyl]-, phenylmethyl ester [CAS]	17692-51-2 21631-37-8 2706-42-5	GB 1401935	Antiprolactin	Amenorrhoea
metformin	Imidodicarbonimidic diamide, N,N-dimethyl [CAS]	657-24-9		Formulation, modified-release, <=24 hr	Diabetes, Type II
Methacholine		62-51-1			
Methacycline		914-00-1			
Methadone		76-99-3			
Methaflurylene		531-06-6			
Methamphetamine		537-46-2			
Methandriol		521-10-8			
Methandrostenolone		72-63-9			
Methantheline		53-46-3			
Methapyrilene		91-80-5			
Methaqualone		72-44-6			
Metharbital		50-11-3			
Methazolamide		554-57-4			
Methdilazine		1982-37-2			
Methenamine		100-97-0			
Methenolone		153-00-4			
Methestrol		130-73-4			
Methetoin		5696-06-0			
Methicillin		132-92-3			
Methimazole		60-56-0			
Methiodal		126-31-8			
Methionic Acid		503-40-2			
Methionine		63-68-3			
Methisazone		1910-68-5			
Methitural		467-43-6			
Methixene		02/02/4969			
Methocarbamol		532-03-6			
Methohexital		22151-68-4			
methotrexate	L-Glutamic acid, N-[4-[[(2,4-diamino-6-pteridinyl)methyl]methylamino]benzoyl]-[CAS]	59-05-2	U.S. 2,512,572	Anticancer, antimetabolite	Cancer, general

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Methotrimeprazine		60-99-1			
Methoxamine		390-28-3			
Methoxsalen		298-81-7			
Methoxyflurane		76-38-0			
Methoxyphenamine		93-30-1			
Methoxypromazine		61-01-8			
Methscopolamine		155-41-9			
Methsuximide		77-41-8			
Methyclothiazide		135-07-9			
Methyl Blue		28983-56-4			
Methyl Nicotinate		93-60-7			
Methyl Propyl Ether		557-17-5			
Methyl Salicylate		119-36-8			
Methyl tert-Butyl Ether		1634-04-4			
Methylbenzethonium Chloride		25155-18-4			
Methylcobalamin		13422-55-4			
methyldopa	L-Tyrosine, 3-hydroxy-Alpha-methyl- [CAS]	555-30-6		Formulation, modified-release, <=24 hr	Hypertension, general
Methylene Blue		61-73-4			
Methylergonovine		113-42-8			
Methylhexaneamide		105-41-9			
methylphenidate	2-Piperidineacetic acid, Alpha-phenyl-, methyl ester [CAS]	113-45-1 298-59-9		Formulation, modified-release, multi	Attention deficit disorder
Methylprednisolone		83-43-2			
methylprednisolone aceponate	Pregna-1,4-diene-3,20-dione, 21-(acetyloxy)-11-hydroxy-6-methyl-17-(1-oxopropoxy)-, (6Alpha,11β)-[CAS]	86401-95-8	EP 72547	Antipruritic/ inflamm, allergic	Pruritus
methylprednisolone suleptanate	Pregna-1,4-diene-3,20-dione, 11,17-dihydroxy-6-methyl-21-[[8-[methyl(2-sulfoethyl)amino]-1,8-dioxooctyl]oxy]-, monosodium salt, (6Alpha,11β)-[CAS]	90350-40-6	JP 59137500	Antiasthma	Asthma
Methylthiouracil		56-04-2			
Methyltrienolone		965-93-5			
Methyprylon		125-64-4			
Methysergide		361-37-5			
Metiazinic Acid		13993-65-2			
metipranolol	Phenol, 4-[2-hydroxy-3-[(1-methylethyl)amino]propoxy]-2,3,6-trimethyl-, 1-acetate [CAS]	22664-55-7	GB 1206148	Antihypertensive, adrenergic	
metoclopramide	Benzamide, 4-amino-5-chloro-N-[2-(diethylamino)ethyl]-2-methoxy-[CAS]	364-62-5		Formulation, modified-release, <=24 hr	Gastro-oesophageal reflux
Metocurine Iodide		7601-55-0			
Metofenazate		388-51-2			

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
metolazone	6-Quinazolinesulfonamide, 7-chloro-1,2,3,4-tetrahydro-2-methyl-3-(2-methylphenyl)-4-oxo-[CAS]	17560-51-9	U.S. 4,517,179	Antihypertensive, diuretic	
Metopimazine		14008-44-7			
Metopon		143-52-2			
metoprolol	2-Propanol, 1-[4-(2-methoxyethyl)phenoxy]-3-[(1-methylethyl)amino]-, (+/−)-[CAS]	51384-51-1 56392-17-7 37350-58-6		Formulation, modified-release, other	Hypertension, general
Metralindole		54188-38-4			
Metrizamide		31112-62-6			
Metrizoic Acid		1949-45-7			
Metron S		13946-02-6			
Metyrapone		54-36-4			
Metyrosine		672-87-7			
Mexazolam		31868-18-5			
Mexenone		1641-17-4			
Mexiletine		31828-71-4			
mezlocillin	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 3,3-dimethyl-6-[[[[[3-(methylsulfonyl)-2-oxo-1-imidazolidinyl]carbonyl]amino]-phenylacetyl]amino]-7-oxo-, [2S-[2Alpha,5Alpha,6β(S*)]]-[CAS]	42057-22-7 51481-65-3 72539-76-5	GB 1301961	Penicillin, injectable	Infection, general
MFH-244	Benzenecarboximidic acid, 3,4,5-trihydroxy-, ethyl ester, hydrochloride	95933-76-9	U.S. 4,623,659	Cardiovascular	Reperfusion injury
mianserin	Dibenzo[c,f]pyrazino[1,2-a]azepine, 1,2,3,4,10,14b-hexahydro-2-methyl-[CAS]	21535-47-7 24219-97-4 116644-53-2 103775-75-3 235114-32-6	GB 1173783	Antidepressant	Depression, general
Mibefradil					
Miboplatin					
Micafungin					
miconazole	1H-Imidazole, 1-(2,4-dichlorophenyl)-2[2,4-dichlorophenyl)methoxy]ethyl]	22916-47-8		Formulation, modified-release, other	Infection, Candida, general
Micronomicin		52093-21-7			
midaxifylline	1H-Purine-2,6-dione-8-(1-aminocyclopentyl)-3,7-dihydro-1,3-dipropyl-[CAS]	151159-23-8	U.S. 5,378,844	Cardiovascular	Unspecified
midazolam	4H-Imidazo[1,5-a][1,4]benzodiazepine, 8-chloro-6-(2-fluorophenyl)-1-methyl-[CAS]	59467-70-8 59467-94-6	U.S. 4,280,957	Anaesthetic, injectable	
midecamycin	Leucomycin V; 3,4B-dipropanoate [CAS]	35457-80-8	U.S. 3,761,588	Macrolide antibiotic	Infection, general
midecamycin acetate	Leucomycin V; 3B,9-diacetate 3,4B-dipropanoate [CAS]	55881-07-7	JP 49124087	Macrolide antibiotic	Infection, general
midesteine	2-Thiophenecarbothioic acid, S-[1-methyl-2-oxo-2-[(tetrahydro-2-oxo-3-thienyl)amino]ethyl] ester [CAS]	94149-41-4	EP 120534	COPD treatment	Emphysema, general
midodrine	Acetamide, 2-amino-N-[2-(2,5-dimethoxyphenyl)-2-hydroxyethyl]-[CAS]	42318-56-0 42794-76-3	EP 164571	Urological	Incontinence

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midostaurin	Benzamide, N-(2,3,10,11,12,13-hexahydro-10-methoxy-9-methyl-1-oxo-9,13-epoxy-1H,9H-diindolo[1,2,3-gh:3',2',1'-lm]pyrrolo[3,4-j][1,7]benzodiazonin-11-yl)-N-methyl-, (9Alpha,10β,11β,13Alpha)-[CAS]	120685-11-2	EP	296110	Anticancer, other	Cancer, leukaemia, acute myelogenous
mifepristone	Estra-4,9-dien-3-one, 11-[4-(dimethylamino)phenyl]-17-hydroxy-17-(1-propynyl)-, (11β,17β)-[CAS]	84371-65-3	EP	57115	Abortifacient	Abortion
miglitol	3,4,5-Piperidinetriol, 1-(2-hydroxyethyl)-2-(hydroxymethyl)-, [2R-(2Alpha,3β,4Alpha,5β)]-[CAS]	72432-03-2	EP	55431	Antidiabetic	Diabetes, Type I
miglustat	3,4,5-Piperidinetriol, 1-butyl-2-(hydroxymethyl)-(2R-(2Alpha, 3β, 4Alpha, 5β)) [CAS]	72599-27-0	DE	2758025	Metabolic and enzyme disorders	Gaucher's disease
mildronate	Hydrazinium, 2-(2-carboxyethyl)-1,1,1-trimethyl), inner salt-[CAS]	76144-81-5	WO	8001068	Cardiostimulant	Heart failure
milnacipran	Cyclopropanecarboxamide, 2-(aminomethyl)-N,N-diethyl-1-phenyl-, cis-(±)-[CAS]	101152-94-7 92623-85-3	U.S.	4,478,836	Antidepressant	Depression, general
Miloxacin		37065-29-5				
milrinone	[3,4'-Bipyridine]-5-carbonitrile, 1,6-dihydro-2-methyl-6-oxo-[CAS]	78415-72-2	U.S.	4,313,951	Cardiostimulant	Heart failure
miltefosine	Ethanaminium, 2-[(hexadecyloxy)hydroxyphosphinyl]oxy]-N,N,N-trimethyl-, hydroxide, inner salt [CAS]	53949-20-5 58066-85-6	EP	225608	Anticancer, other	Cancer, skin, general
minaprine	4-Morpholineethanamine, N-(4-methyl-6-phenyl-3-pyridazinyl)-[CAS]	25905-77-5 25953-17-7	GB	1345880	Antidepressant	Depression, general
minocycline	2-Naphthacenecarboxamide, 4,7-bis(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-, [4S-(4Alpha,4aAlpha,5a,alpha.,12aAlpha)]-[CAS]	10118-90-8			Formulation, optimized, microparticles	Infection, oral
minodronic acid	Phosphonic acid, (1-hydroxy-2-imidazo(1,2-a)pyridin-3-ylethylidene)bis-, [CAS]	180064-38-4	EP	354806	Anticancer, other	Cancer, myeloma
minoxidil	2,4-Pyrimidinediamine, 6-(1-piperidinyl)-, 3-oxide [CAS]	38304-91-5	U.S.	4,139,619	Vasodilator, peripheral	Hypertension, general
Miokamycin		55881-07-7				
mirtazapine	Pyrazino[2,1-a]pyrido[2,3-c][2]benzazepine, 1,2,3,4,10,14b-hexahydro-2-methyl-[CAS]	85650-52-8 61337-67-5	GB	1543171	Antidepressant	Depression, general
misoprostol	Prost-13-en-1-oic acid, 11,16-dihydroxy-16 methyl-9-oxo-, methyl ester, (11Alpha,13E)-(±)-[CAS]	59122-46-2 59122-48-4	U.S.	4,301,146	Prostaglandin	Ulcer, gastric

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API Generic Name	API Chemical Name	CAS No.		Patent Reference	Example of Therapeutic Use	Example of Indication
miteneinal	Erythromycin, 8,9-didehydro-N-demethyl-9-deoxo-6,11-dideoxy-6,9-epoxy-12-O-methyl-N-(1-methylethyl)-11-oxo-, (2E)-2-butenedioate (2:1) [CAS]	154802-96-7	WO	9324509	Gastroprokinetic	Gastro-oesophageal reflux
mitiglinide	Calcium (2S)-2-benzyl-3-(cis-hexahydro-2-isoindolinylcarbonyl)propionate, dihydrate-[CAS]	145525-41-3	EP	507534	Antidiabetic	Diabetes, Type II
Mitobronitol		488-41-5				
Mitoguazone		459-86-9				
mitolactol	Galactitol, 1,6-dibromo-1,6-dideoxy-[CAS]	10318-26-0	U.S.	3,993,781	Anticancer, alkylating	Cancer, cervical
mitomycin	Azino[2',3':3,4]pyrrolo[1,2-a]indole-4,7-dione, 5-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1aAlpha,8Beta,8aAlpha,8bAlpha)]-[CAS]	50-07-7			Formulation, parenteral, other	Cancer, stomach
Mitotane		53-19-0				
mitoxantrone	9,10-Anthracenedione, 1,4-dihydroxy-5,8-bis[[2-[(2-hydroxyethyl)amino]ethyl]amino]-[CAS]	65271-80-9 70476-82-3	U.S.	4,197,249	Anticancer, other	Cancer, breast
mitoxantrone	9,10-Anthracenedione, 1,4-dihydroxy-5,8-bis[[2-[(2-hydroxyethyl)amino]ethyl]amino]-[CAS]	65271-80-9 70476-82-9			Formulation, optimized, liposomes	Cancer, general
MIV-210	(3'-Fluoro-2',3'-dideoxy guanosine)				Antiviral, other	Infection, hepatitis-B virus
mivacurium	Isoquinolinium, 2,2'-[(1,8-dioxo-4-octene-1,8-diyl)bis(oxy-3,1-propanediyl)]bis[1,2,3,4-tetrahydro-6,7-dimethoxy-2-methyl-1-[(3,4,5-trimethoxyphenyl)methyl]-, dichloride, [R-[R*,R*-(E)]]-[CAS]	106861-44-3	EP	181055	Muscle relaxant	Anaesthesia, adjunct
Mivazerol		125472-02-8				
mizolastine	4(1H)-Pyrimidinone, 2-[[1-[[1-[(4-fluorophenyl)methyl]-1H-benzimidazol-2-yl]-4-piperidinyl]methyl]amino]-[CAS]	108612-45-9	EP	217700	Antiallergic, non-asthma	Rhinitis, allergic, general
Mizoribine		50924-49-7				
MKC-733	(R)-N-(3-quinuclidinyl)-7-oxo-4,7-dihydrothieno[3,2-b]pyridine-6-carboxamide hydrochloride	194093-42-0	JP	09216888	Gastroprokinetic	Gastro-oesophageal reflux
MLN-519	6-Oxa-2-azabicyclo[3.2.0]heptane-3,7-dione, 1-[(1S)-1-hydroxy-2-methylpropyl]-4-propyl-, (1R,4R,5S)-[CAS]	211866-70-5	WO	9915183	Neuroprotective	Ischaemia, cerebral
MLN-576	4-Methoxy-benzo[a]phenazine-11-carboxylic acid (2-dimethylamino)-1-(R)-methyl)ethyl)-amide				Anticancer, other	Cancer, general
moclobemide	Benzamide, 4-chloro-N-[2-(4-morpholinyl)ethyl]-[CAS]	71320-77-9	EP	326023	Antidepressant	Depression, general

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.		Patent Reference	Example of Therapeutic Use	Example of Indication
modafinil	Acetamide, 2-[(diphenylmethyl)sulfinyl]- [CAS]	68693-11-8	DE	2809625	Psychostimulant	Narcolepsy
moexipril	3-Isoquinolinecarboxylic acid, 2-[2-[[1-(ethoxycarbonyl)-3-phenylpropyl]amino]-1-oxopropyl]-1,2,3,4-tetrahydro-6,7-dimethoxy-(3S-(2(R*(R*)),3R*))-[CAS]	103775-10-6 103775-14-0	U.S.	4,344,949	Antihypertensive, renin system	Hypertension, general
Mofarotene		125533-88-2				
Mofebutazone		2210-63-1				
Mofegiline		119386-96-8				
mofezolac	5-Isoxazoleacetic acid, 3,4-bis(4-methoxyphenyl)-[CAS]	78967-07-4	EP	26928	Analgesic, NSAID	Pain, post-operative
MOL-6131	N-[4-(aminomethyl)benzyl]-8(S)-[1-[4-[2-(4-aminophenyl)-acetamido]butyryl]piperidin-4-yl]-2-(naphthalen-1-ylmethyl)-1,3-dioxo-2,3,5,8-tetrahydro-1H-[1,2,4]triazolo[1,2-a]-pyridazine-5(R)-carboxamide				Antiasthma	Asthma
Molindone		7416-34-4				
molsidomine	Sydnone imine, N-(ethoxycarbonyl)-3-(4-morpholinyl)-[CAS]	25717-80-0	U.S.	3,769,283	Vasodilator, coronary	
mometasone	Pregna-1,4-diene-3,20-dione, 9,21-dichloro-11,17-dihydroxy-16-methyl-, (11β,16Alpha)-[CAS]	105102-22-5 83919-23-7	EP	57401	Antipruritic/inflamm, allergic	Psoriasis
Monatepil		103377-41-9				
Monobenzone		103-16-2				
monolaurin	Dodecanoic acid, monoester with 1,2,3-propanetriol [CAS]	27215-38-9	U.S.	4,885,282	Dermatological	Ichthyosis
montelukast	Cyclopropaneacetic acid, 1-[[[1-[3-[2-(7-Chloro-2-quinolinyl)ethenyl]phenyl]-3-[2-(1-hydroxy-1-methylethyl)phenyl]propyl]thio]methyl]-, [CAS]	151767-02-1 158966-92-8			Antiasthma	Asthma
Monteplase		122007-85-6				
Moperone		1050-79-9				
Mopidamol		13665-88-8				
Moprolol		5741-22-0				
moracizine	Carbamic acid, [10-[3-(4-morpholinyl)-1-oxopropyl]-10H-phenothiazin-2-yl]-, ethyl ester [CAS]	29560-58-5 31883-05-3	U.S.	3,864,487	Antiarrhythmic	Tachycardia, ventricular
Morazone		6536-18-1				
Moricizine		31883-05-3				
Moroxydine		3731-59-7				
Morphazinamide		952-54-5				
morphine	Morphine-3,6-diol, 7,8-didehydro-4,5-epoxy-17-methyl-(5Alpha,6Alpha)-, [CAS]	57-27-2 6055-06-7			Formulation, parenteral, other	Pain, cancer
morphine-6-glucuronide	morphine-6-glucuronide	64-31-3			Formulation, inhalable, systemic	Pain, general

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mosapramine	Spiro[imidazo[1,2-a]pyridine-3(2H),4'-piperidin]-2-one, 1'-[3-(3-chloro-10,11-dihydro-5H-dibenz[b,f]azepin-5-yl)propyl]hexahydro-, (+/−)-[CAS]	89419-40-9 98043-60-8	U.S. 4,337,260	Neuroleptic	
mosapride	Benzamide, 4-amino-5-chloro-2-ethoxy-N-((4-(4-fluorophenyl)methyl)-2-morpholinyl)methyl)-[CAS]	112885-41-3 112885-42-4	EP 243959	GI inflammatory/ bowel disorders	Gastritis
motexafin gadolinium	Gadolinium, bis(acetato-kappaO)(9,10-diethyl-20,21-bis(2-(2-methoxy)ethoxy)ethoxy)-4,15-dimethyl-8,11-imino-3,16:16,13-dinitrilo-1,18-benzodiazacycloeicosine-5,14-dipropanalato-kappaN1,kappaN18, kappaN23, kappaN24, kappaN25), (PB-7-11-233'24') [CAS]	246252-06-2		Radio/ chemosensitizer	Cancer, brain
Motretinide		56281-36-8			
Moveltipril		85856-54-8			
Moxalactam		64952-97-2			
Moxastine		3572-74-5			
Moxaverine		10539-19-2			
Moxestrol		34816-55-2			
moxifloxacin	3-Quinolinecarboxylic acid, 1-cyclopropyl-6-fluoro-1,4-dihydro-8-methoxy-7-(octahydro-6H-pyrrolo(3,4-b)pyridin-6-yl)-4-oxo-, hydrochloride (4aS-cis)-[CAS]	186826-86-8 151096-09-2	DE 19546249	Quinolone antibacterial	Infection, respiratory tract, general
moxisylyte	Phenol, 4-[2-(dimethylamino)ethoxy]-2-methyl-5-(1-methylethyl)-, acetate (ester), [CAS]	964-52-3 54-32-0		Male sexual dysfunction	Impotence
moxonidine	5-Pyrimidinamine, 4-chloro-N-(4,5-dihydro-1H-imidazol-2-yl)-6-methoxy-2-methyl-[CAS]	75438-57-2	DE 2849537	Antihypertensive, other	Hypertension, general
M-PGA	(−)-(S)-2-Methyl-2-(1-oxo-2,3-dihydro-1H-isoindol-2-yl)pentanedioic acid		U.S. 5,712,291	Anticancer, other	Cancer, general
MPI-5010	Platinum diamminedichloro-, (SP-4-2) + (R)-4-[1-hydroxy-2-(methylamino)-ethyl]-1,2-benzenediol		U.S. 6,224,883	Formulation, parenteral, other	Cancer, head and neck
MPI-5020	2,4(1H,3H)-Pyrimidinedione, 5-fluoro-[CAS]	51-21-8	U.S. 5,750,146	Formulation, parenteral, other	Cancer, breast
MPL		198076-81-2		Immunostimulant, other	Vaccine adjunct
MRS-1754			U.S. 6,060,481	Antiasthma	Asthma
MS-209	1-Piperazineethanol, 4-(diphenylacetyl)-Alpha-[(5-quinolinyloxy)methyl]-, (2E)-2-butenedioate(2:3) (salt) [CAS]	158681-49-3		Radio/ chemosensitizer	Cancer, breast
MS-275	N-(2-Aminophenyl)-4-[N-(pyridin-3-yl-methoxycarbonyl)aminomethyl]benzamide			Anticancer, antimetabolite	Cancer, lung, general
MS-325		201688-00-8			
MS-377			EP 839805	Neuroleptic	Schizophrenia
Mupirocin		12650-69-0			
Muscarin		300-54-9			

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Muzolimine		55294-15-0			
MX-1013			U.S. 6,153,591	Hepatoprotective	Unspecified
mycophenolate mofetil	4-Hexenoic acid, 6-(1,3-dihydro-4-hydroxy-6-methoxy-7-methyl-3-oxo-5-isobenzofuranyl)-4-methyl-, 2-(4-morpholinyl)ethyl ester, (E)-[CAS]	116680-01-4 128794-94-5	WO 9119498	Immunosuppressant	Transplant rejection, general
mycophenolic acid	4-hexanoic acid, 6-(1,3-dihydro-4-hydroxy-6-methoxy-7-methyl-3-oxo-5-isobenzofuranyl)-4-methyl-,	37415-62-6 24280-93-1		Formulation, oral, enteric-coated	Transplant rejection, general
Myrophine		467-18-5			
N-(Hydroxymethyl)-nicotinamide		3569-99-1			
N,N,N'-Tetraethylphthalamide		83-81-8			
N_2-Formyl-sulfisomidine		795-13-1			
N_4-β-D-Glucosylsulfanilamide		53274-53-6			
N_4-Sulfanilylsulfanilamide		547-52-4			
Nabilone		51022-71-0			
nabumetone	2-Butanone, 4-(6-methoxy-2-naphthalenyl)-[CAS]	42924-53-8	GB 1476721	Anti-inflammatory	Arthritis, osteo
N-acetylcysteine	L-Cysteine, N-acetyl-[CAS]	616-91-1		Anticancer, other	Cancer, general
N-Acetylmethionine		65-82-7			
nadifloxacin	1H,5H-Benzo[ij]quinolizine-2-carboxylic acid, 9-fluoro-6,7-dihydro-8-(4-hydroxy-1-piperidinyl)-5-methyl-1-oxo-, (+/−)-[CAS]	124858-35-1	U.S. 4,399,134	Quinolone antibacterial	Acne
nadolol	2,3-Naphthalenediol, 5-[3-[(1,1-dimethylethyl)amino]-2-hydroxypropoxy]-1,2,3,4-tetrahydro-[CAS]	42200-33-9	U.S. 4,346,106	Antihypertensive, adrenergic	
Nadoxolol		54063-51-3			
nafamostat	Benzoic acid, 4-[(aminoiminomethyl)amino]-, 6-(aminoiminomethyl)-2-naphthalenyl ester-[CAS]	80251-32-7 81525-10-2 82956-11-4	EP 450232	GI inflammatory/ bowel disorders	Pancreatitis
nafarelin	Luteinizing hormone-releasing factor (pig), 6-[3-(2-naphthalenyl)-D-alanine]-[CAS]	76932-56-4 86220-42-0	EP 21234	Releasing hormones	Endometriosis
Nafcillin		147-52-4			
Nafronyl		31329-57-4			
naftidofuryl	2-Furanpropanoic acid, tetrahydro-Alpha-(1-naphthalenylmethyl)-, 2-(diethylamino)ethyl ester	31329-57-4		Formulation, modified-release, other	Unspecified
naftifine	1-Naphthalenemethanamine, N-methyl-N-(3-phenyl-2-propenyl)-, (E)-[CAS]	65472-88-0 65473-14-5	U.S. 4,282,251	Antifungal	Infection, dermatological
naftopidil	1-Piperazineethanol, 4-(2-methoxyphenyl)-Alpha-[(1-naphthalenyloxy)methyl]-[CAS]	57149-07-2	U.S. 3,997,666	Antihypertensive, adrenergic	Hypertension, general

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API Generic Name	API Chemical Name	CAS No.		Patent Reference	Example of Therapeutic Use	Example of Indication
nalbuphine	Morphinan-3,6,14-triol, 17-(cyclobutylmethyl)-4,5-epoxy-, (5Alpha,6Alpha)-[CAS]	20594-83-6 23277-43-2	U.S.	3,393,197	Analgesic, other	Pain, general
Nalidixic Acid		389-08-2				
nalmefene	Morphinan-3,14-diol, 17-(cyclopropylmethyl)-4,5-epoxy-6-methylene-,(5Alpha)-[CAS]	55096-26-9	JP	56167687	Dependence treatment	Poisoning, drug
Nalorphine		62-67-9				
naloxone	Morphinan-6-one, 17-allyl-4,5Alpha-epoxy-3,14-dihydroxy-, hydrochloride [CAS]	357-08-4 465-65-6			Septic shock treatment	
naltrexone	Morphinan-6-one, 17-(cyclopropylmethyl)-4,5-epoxy-3,14-dihydroxy-, (5Alpha)-[CAS]	16590-41-3 16676-29-2	U.S.	3,332,950	Dependence treatment	Addiction, narcotic/opiate
NAMI	Imidazolium trans(imidazole)(dimethylsulfoxide)-tetrachlororuthenate (III)				Anticancer, other	Cancer, general
naminidil	Guanidine, N-cyano-N'-(4-cyanophenyl)-N"-[(1R)-1,2,2-trimethylpropyl]-[CAS]	220641-11-2			Dermatological	Alopecia, general
Nandrolone		434-22-0				
Naphazoline		835-31-4				
Naphthalene		91-20-3				
naproxen betainate	Methanaminium, 1-carboxy-N,N,N-trimethyl-salt with (R)-6-methoxy-Alpha-methyl-2-naphthaleneacetic acid (1:1), sodium salt [CAS]	104124-26-7	U.S..	4,672,077	Antiarthritic, other	Arthritis, rheumatoid
naproxen	2-Naphthaleneacetic acid, 6-methoxy-Alpha-methyl-, [CAS]	26159-34-2 22204-53-1	GB	1211134	Analgesic, NSAID	Pain, general
naratriptan	1H-Indole-5-ethanesulfonamide, N-methyl-3-(1-methyl-4-piperidinyl)-[CAS]	121679-13-8	EP	303507	Antimigraine	Migraine
Narceine		131-28-2				
Narcobarbital		125-55-3				
Nataamycin		7681-93-8				
nateglinide	D-phenylalanine, N-((4-(1-methylethyl)cyclohexyl)carbonyl)-, trans-[CAS]	105816-04-4	EP	196222	Antidiabetic	Diabetes, Type II
N-Butyldeoxynojirimycin		72599-27-0				
N-Butylscopolammonium Bromide		149-64-4				
NC-503			U.S.	5,643,562	Anti-inflammatory	Amyloidosis
NC-531			U.S.	5,643,562	Cognition enhancer	Alzheimer's disease
NCX-1000			WO	0061604	Hepatoprotective	Cirrhosis, hepatic
NCX-4016	Benzoic acid, 2-(acetyloxy)-, 2-((nitrooxy)methyl)phenyl ester [CAS]	175033-36-0	WO	9716405	Symptomatic antidiabetic	Insulin-related metabolic syndrome
NCX-456	Benzoic acid, 5-amino-2-hydroxy-, 4-(nitrooxy)butyl ester [CAS]	256499-26-0			GI inflammatory/ bowel disorders	Inflammatory bowel disease

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
NCX-950	Alpha'-[[(1,1-dimethylethyl)amino]methyl]-4 hydroxy-1,3-benzenedimethanol nitrate			Antiasthma	Asthma
n-Docosanol		661-19-8			
NE-100	Benzeneethanamine, 4-methoxy-3-(2-phenylethoxy)-N,N-dipropyl-, hydrochloride [CAS]	149409-57-4	WO 9307113	Neuroleptic	Schizophrenia
Nealbarbital		561-83-1			
nebivolol	2H-1-Benzopyran-2-methanol, Alpha,Alpha'-[iminobis(methylene)]bis[6-fluoro-3,4-dihydro]-, (2R*(R*(S*)))-(1+)-[CAS]	118457-14-0 99200-09-6	EP 145067	Antihypertensive, adrenergic	Hypertension, general
nebostinel	N1-(4,4-Dimethylcyclohexyl)-L-isoglutamine	163000-63-3	EP 0688312	Cognition enhancer	Unspecified
Nebracetam		97205-34-0			
nedaplatin	Platinum, diammine[hydroxyacetato(2-)-O1,O2]-, (SP-4-3)-[CAS]	95734-82-0	EP 216362	Anticancer, alkylating	
nedocromil	4H-Pyrano[3,2-g]quinoline-2,8-dicarboxylic acid, 9-ethyl-6,9-dihydro-4,6-dioxo-10-propyl-[CAS]	69049-73-6 69049-74-7	EP 555718	Antiasthma, Ophthalmological	Rhinitis, allergic, general, Ocular disorder, general
nefazodone	3H-1,2,4-Triazol-3-one, 2-[3-[4-(3-chlorophenyl)-1-piperazinyl]propyl]-5-ethyl-2,4-dihydro-4-(2-phenoxyethyl)-, [CAS]	82752-99-6 83366-66-9	U.S. 4,338,317	Antidepressant	Depression, general
nefiracetam	1-Pyrrolidineacetamide, N-(2,6-dimethylphenyl)-2-oxo-[CAS]	77191-36-7	U.S. 4,341,790	Cognition enhancer	Dementia, senile, general
nefopam	1H-2,5-Benzoxazocine, 3,4,5,6-tetrahydro-5-methyl-1-phenyl-[CAS]	13669-70-0 23327-57-3	U.S. 3,487,153	Analgesic, NSAID	
Negamycin		33404-78-3			
nelfinavir	3-Isoquinolinecarboxamide, N-(1,1-dimethylethyl)decahydro-2-(2-hydroxy-3-((3-hydroxy-2-methylbenzoyl)amino)-4-(phenylthio)butyl)-, (3S-(2(2S*,3S*),3Alpha,4aβ,8aβ))-, [CAS]	159989-65-8 159989-64-7		Antiviral, anti-HIV	Infection, HIV/AIDS
Nemonapride		75272-39-8			
Neostigmine		59-99-4			
nepadutant	Cyclo[3-amino-L-alanyl-L-leucyl-N-[2-(acetylamino)-2-deoxy-β-D-glucopyranosyl]-L-asparaginyl-L-Alpha-aspartyl-L-tryptophyl-L-phenylalanyl], (4-1)-lactam [CAS]	183747-35-5	WO 9628467	Antiasthma	Asthma
neramexane	1,3,3,5,5-pentamethylcyclohexylamine	202807-80-5 219810-59-0		Dependence treatment	Addiction, alcohol
neridronic acid	Phosphonic acid, (6-amino-1-hydroxyhexylidene)bis-[CAS]	79778-41-9		Musculoskeletal	Osteogenesis imperfecta
Neriifolin		466-07-9			
N-Ethylamphetamine		457-87-4			
neticonazole	1H-Imidazole, 1-[2-(methylthio)-1-[2-(pentyloxy)phenyl]ethenyl]-, monohydrochloride, (E)-[CAS]	130773-02-3 130726-68-0	EP 445540	Antifungal	Infection, Candida, general

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netilmicin	D-Streptamine, O-3-deoxy-4-C-methyl-3-(methylamino)-β-L-arabinopyranosyl-(1-6)-O-[2,6-diamino-2,3,4,6-tetradeoxy-Alpha-D glycero-hex-4-enopyranosyl-(1-4)]-2-deoxy-N1-ethyl-[CAS]	56391-56-1 56391-57-2	GB	1473733	Aminoglycoside antibiotic	Infection, general
nevirapine	6H-Dipyrido[3,2-b:2',3'-e][1,4]diazepin-6-one, 11-cyclopropyl-5,11-dihtdro-4-methyl-[CAS]	129618-40-2	EP	429987	Antiviral, anti-HIV	Infection, HIV/AIDS
NGD-98-2			WO	9635689	Anxiolytic	Anxiety, general
Nialamide		51-12-7				
Niaprazine		27367-90-4				
Nicametate		3099-52-3				
nicaraven	3-Pyridinecarboxamide, N,N'-(1-methyl-1,2-ethanediyl)bis-[CAS]	79455-30-4	EP	29602	Neuroprotective	Haemorrhage, subarachnoid
nicardipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, methyl 2-[methyl(phenylmethyl)amino]ethyl ester [CAS]	54527-84-3 55985-32-5	U.S.	3,985,758	Neuroprotective	Hypertension, general
nicergoline	Ergoline-8-methanol, 10-methoxy-1,6-dimethyl-, (8'b)-, 5-bromo-3-pyridinecarboxylate(ester)	27848-84-6			Formulation, modified-release, other	Unspecified
Niceritrol		5868053				
Niclosamide		50-65-7				
Nicoclonate		10571-59-2				
Nicofuranose		15351-13-0				
Niconol		27959-26-8				
Nicomorphine		639-48-5				
nicorandil	3-Pyridinecarboxamide, N-[2-(nitrooxy)ethyl]-[CAS]	65141-46-0	U.S.	4,792,564	Vasodilator, coronary	Hypertension, general
Nicotinamide		98-92-0				
nicotine	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-[CAS]	54-11-5			Formulation, inhalable, other	Addiction, nicotine
Nicotinic Acid		59-67-6				
Nicotinic Acid Benzyl Ester		94-44-0				
Nicotinyl Alcohol		100-55-0				
nifedipine	4-(2'-nitrophenyl)-2,6-dimethyl-3,5-dicarbomethoxy-1,4-dihydropyridine	21829-25-4	GB	1173862	Vasodilator, coronary	Hypertension, general
nifekalant	2,4(1H,3H)-Pyrimidinedione, 6-[[2-[(2-hydroxyethyl)[3-(4-nitrophenyl)propyl]amino]ethyl]amino]-1,3-dimethyl-, [CAS]	130636-43-0 130656-51-8	EP	369627	Antiarrhythmic	Arrhythmia, general
Nifenalol		7413-36-7				
Niflumic Acid		4394-00-7				
Nifuratel		4936-47-4				
Nifurfoline		3363-58-4				
Nifuroxazide		965-52-6				
Nifuroxime		6236051				
Nifuprinol		13411-16-0				

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Nifuprazine		1614-20-6			
Nifurtimox		23256-30-6			
Nifurtoinol		1088-92-2			
nifurzide	2-Thiophenecarboxylic acid, 5-nitro-, [3-(5-nitro-2-furanyl)-2-propenylidene]hydrazide [CAS]	39978-42-2	U.S. 3,847,911	Antidiarrhoeal	Infection, GI tract
NIK-254	Gentamicin, sulfate (salt) [CAS]	1405-41-0		Formulation, other	Infection, general
Nikethamide		59-26-7			
nilutamide	2,4-Imidazolidinedione, 5,5-dimethyl-3-[4-nitro-3-(trifluoromethyl)phenyl]-[CAS]	63612-50-0	U.S. 4,472,382	Anticancer, hormonal	Cancer, prostate
nilvadipine	3,5-Pyridinedicarboxylic acid, 2-cyano-1,4-dihydro-6-methyl-4-(3-nitrophenyl)-, 3-methyl 5-(1-methylethyl) ester [CAS]	75530-68-6	U.S. 4,338,322	Antihypertensive, other	Hypertension, general
nimesulide	Methanesulfonamide, N-(4-nitro-2-phenoxyphenyl)-[CAS]	51803-78-2	U.S. 3,840,597	Anti-inflammatory	Pain, general
Nimetazepam		2011-67-8			
nimodipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, 2-methoxyethyl 1-methylethyl ester [CAS]	66085-59-4	EP 533014	Neuroprotective	
Nimorazole		6506-37-2			
nimustine	Urea, N'-[(4-amino-2-methyl-5-pyrimidinyl)methyl]-N-(2-chloroethyl)-N-nitroso-[CAS]	103745-00-2 42471-28-3 55661-38-6	GB 1374344	Anticancer, alkylating	Cancer, brain
Ninopterin		2179-16-0			
NIP-142	N-[4(S)-(Cyclopropylamino)-3-(R)-hydroxy-2,2-dimethyl-7-nitro-3,4-dihydro-2H-1-benzopyran-6-yl]-4-methoxybenzeneacetamide		WO 9804542	Antiarrhythmic	Fibrillation, atrial
NIP-531	N'-[3,5-Bis(trifluoromethyl)benzyl]-N-[3-[N-[1-(4-fluorobenzyl)benzimidazol-2-yl]-amino]propyl-N-methylurea hydrochloride			Antipruritic/inflamm, allergic	Eczema, atopic
niperotidine	N-[2-[[5-[(dimethylamino)methyl]furfuryl]thio]ethyl]-2-nitro-N'-piperonyl-1,1-ethenediamine	84845-75-0	GB 2104071	Antiulcer	Ulcer, GI, general
nipradilol	2H-1-Benzopyran-3-ol, 3,4-dihydro-8-[2-hydroxy-3-[(1-methylethyl)amino]propoxy]-, 3-nitrate [CAS]	81486-22-8 86247-86-1	EP 42299	Formulation, mucosal, topical	Glaucoma
Niridazole		61-57-4			
nisoldipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(2-nitrophenyl)-, methyl 2-methylpropyl ester-[CAS]	63675-72-9	GB 1516793	Antihypertensive, other	Hypertension, general
nitazoxanide	Benzamide, 2-(acetyloxy)-N-(5-nitro-2-thiazolyl)-[CAS]	55981-09-4	U.S. 5,387,598	Protozoacide	Infection, GI tract
nitisinone	1,3-Cyclohexanedione, 2-[2-nitro-4-(trifluoromethyl)benzoyl]-[CAS]	104206-65-7	EP 186118	Metabolic and enzyme disorders	Cirrhosis, hepatic
nitracrine	1,3-Propanediamine, N,N-dimethyl-N'-(1-nitro-9-acridinyl)-[CAS]	4533-39-5 6514-85-8 146-22-5	FR 1458183	Anticancer, other	Cancer, ovarian
Nitrazepam					

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nitrendipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, ethyl methyl ester-[CAS]	39562-70-4	GB	1358951	Antihypertensive, other	Hypertension, general
nitroflurbiprofen	(1,1'-Biphenyl)-4-acetic acid, 2-fluoro-Alpha-methyl-, 4-(nitrooxy)butyl ester [CAS]	158836-71-6	EP	670825	Urological	Incontinence
Nitrofurantoin		67-20-9				
Nitrofurazone		59-87-0				
nitroglycerin	1,2,3-Propanetriol, trinitrate [CAS]	55-63-0			Formulation, transdermal, patch	Angina, general
Nitromersol		133-58-4				
nitronaproxen	2-Naphthaleneacetic acid, 6-methoxy-Alpha-methyl 4-(nitrooxy)butyl ester (AlphaS)-[CAS]	163133-43-5	WO	9509831	Analgesic, NSAID	Pain, post-operative
nitroxazepine	Dibenz[b,f][1,4]oxazepin-11(10H)-one, 10-[3-(dimethylamino)propyl]-2-nitro-, monohydrochloride [CAS]	16398-39-3	NL	6608671	Antidepressant	
Nitroxoline		4008-48-4				
nizatidine	1,1-Ethenediamine, N-[2-[[[2-[(dimethylamino)methyl]-4-thiazolyl]methyl]thio]ethyl]-N'-methyl-2-nitro-[CAS]	76963-41-2	EP	49618	Antiulcer	Ulcer, duodenal
Nizofenone		54533-85-6				
NM-3	3-(2-methylcarboxymethyl)-6-methoxy-8-hydroxy-isocoumarin		JP	08176138	Anticancer, other	Cancer, general
NM-702	4-Bromo-5-(3-pyridylmethylamino)-6-[3-(4-chlorophenyl)propoxy]-3(2H)pyridazinone hydrochloride				Antithrombotic	Peripheral vascular disease
N-Methylephedrine		552-79-4				
N-Methylepinephrine		554-99-4				
N-Methylglucamine		6284-40-8				
NN-414	6-chloro-3-(1-methylcyclopropylamino)-4H-thieno[3,2-e]-[1,2,4]thiadiazine-1,1-dioxide				Antidiabetic	Diabetes, Type II
NNC-05-1869	(R)-1-(3-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-ylidene)-1-propyl)-3-piperidine carboxylic acid				Symptomatic antidiabetic	Neuropathy, diabetic
Nogalamycin		1404-15-5				
nolatrexed	4(1H)-Quinazolinone, 2-amino-6-methyl-5-(4-pyridinylthio)-, [CAS]	152946-68-4	WO	9320055	Anticancer, antimetabolite	Cancer, liver
nolomirole	Propanoic acid, 2-methyl-, 5,6,7,8-tetrahydro-6-(methylamino)-1,2-naphthalenediyl ester, hydrochloride, (+/−)-[CAS]	147149-76-6 138531-51-8	WO	9529147	Cardiostimulant	Heart failure
nolpitantium	1-Azoniabicyclo[2.2.2]octane, 1-[2-[3-(3,4-dichlorophenyl)-1-[[3-(1-methylethoxy)phenyl]acetyl]-3-piperidinyl]ethyl]-4-phenyl-, chloride, (S)-[CAS]	153050-21-6	EP	591040	GI inflammatory/ bowel disorders	Inflammatory bowel disease

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nomegestrol	19-Norpregna-4,6-diene-3,20-dione, 17-(acetyloxy)-6-methyl-[CAS]	58652-20-3	DE 2522533	Menstruation disorders	Menstrual disorder, general
Nomifensine		24526-64-5			
Noprylsulfamide		576-97-6			
Norbolethone		1235-15-0			
Nordazepam		1088-11-5			
Nordefrin		6539-57-7 (unspecified); 74812-63-8 (R*,S*)-(±)-form			
Nordihydroguaiaretic Acid		27686-84-6 (meso-form); 500-38-9 (unspecified)			
Norelgestromin, Ethinyl Estradiol					
Norepinephrine		51-41-2			
Norethandrolone		52-78-8			
Norethindrone		68-22-4			
Norethynodrel		68-23-5			
Norfenefrine		536-21-0			
norfloxacin	3-Quinolinecarboxylic acid, 1-ethyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-[CAS]	68077-27-0	U.S. 4,146,719	Quinolone antibacterial	Infection, general
Norgesterone		70458-96-7			
Norgestimate		13563-60-5			
Norgestrel		35189-28-7			
Norgestrienone		6533-00-2			
Norlevorphanol		848-21-5			
Normethadone		1531-12-0			
Normethandrone		467-85-6			
Normorphine		514-61-4			
Norphenazone		466-97-7			
Norpipanone		89-25-8			
Norpseudoephedrine		561-48-8			
Nortriptyline		492-39-7			
Norvinisterone		72-69-5			
Noscapine		6795-60-4			
Novembichin		128-62-1			
Novobiocin		1936-40-9			
Noxiptiilin		303-81-1			
Noxythiolin		3362-45-6			
NS-1209	Butanoic acid, 2-[[5-[4-[(dimethylamino)sulfonyl]phenyl]-1,2,6,7,8,9-hexahydro-8-methyl-2-oxo-3H-pyrrolo[3,2-h]isoquinolin-3-ylidene]amino]oxy]-3-hydroxy-[CAS]	15599-39-0			
		254751-28-5	WO 9426747	Antiepileptic	Epilepsy, general

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NS-1231	5-(4-chlorophenyl)-6,7,8,9-tetrahydro-1H-pyrolo-(3,2-h)naphthalene-2,3-dione-3-oxime			Neuroprotective	Ischaemia, cerebral
NS-126			U.S. 5,063,222	Antiallergic, non-asthma	Rhinitis, allergic, general
NS-220	2-Methyl-c-5-[4-[5-methyl-2-(4-methylphenyl)-4-oxazolyl]butyl]-1,3-dioxane-r-2-carboxylic acid			Hypolipaemic/ Antiatherosclerosis	Athero-sclerosis
NS-2330	NS 2330 [CAS]	402856-42-2		Cognition enhancer	Alzheimer's disease
NS5A inhibitors			U.S. 6,030,785	Antiviral, other	Infection, hepatitis-C virus
NS-7	Pyrimidine, 4-(4-fluorophenyl)-2-methyl-6-[[5-(1-piperidinyl)pentyl]oxy]-, monohydrochloride [CAS]	178429-67-9	WO 9607641	Neuroprotective	Ischaemia, cerebral
NS-8	2-Amino-5-(2-fluorophenyl)-4-methyl-1H-pyrrole-3-carbonitrile			Urological	Incontinence
NSC-330507	17-Allylaminogeldanamycin			Anticancer, antibiotic	Cancer, general
NSC-619534	2-chloroethyl phenyl selenone			Anticancer, alkylating	Cancer, general
NSC-697726	2,5-diazinidinyl-3-[hydroxymethyl]6-methyl-1,4-benzoquinone			Anticancer, antibiotic	Cancer, general
N-Sulfanilyl-3,4-xylamide		120-34-3			
NU-6027	2,4-Pyrimidinediamine, 6-(cyclohexylmethoxy)-5-nitroso-[CAS]	220036-08-8		Anticancer, other	Cancer, general
NV-07	2,4,6(1H,3H,5H)-Pyrimidinetrione, 5-ethyl-5-sec-pentyl-, 2-oxime [CAS]	53745-16-7	U.S. 6,455,032	Antipruritic/inflamm, non-allergic	Keratosis
NVP-SRA880	([3R,4aR,10aR]-1,2,3,4,4a,5,10,10a-Octahydro-6-methoxy-1-methyl-benz[g]quinoline-3-carboxylic acid-4-(4-nitrophenyl)piperazine amide, hydrogen maleate			Neurological	Unspecified
NW-1029	(S)-(+)-2-[4-(2-fluorobenzyloxy)benzylamino]propanamide methansulfonate			Analgesic, other	Pain, general
NXY-059	CPI 22 [CAS]	168021-79-2	U.S. 5,780,510	Neuroprotective	Ischaemia, cerebral
Nylidrin		447-41-6			
NZ-314	1-Imidazolidineacetic acid, 3-[(3-nitrophenyl)methyl]-2,4,5-trioxo-[CAS]	128043-99-2	EP 353198	Symptomatic antidiabetic	Neuropathy, diabetic
NZ-419	5-hydroxy-1-methylimidazolidine-2,4-dione		EP 412940	Urological	Renal failure
Obidoxime Chloride		114-90-9			
OC-108	OC 108 [CAS]	162602-62-2		Vasoprotective, topical	Venous insufficiency

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ocinaplon	Methanone, 2-pyridinyl[7-(4-pyridinyl)pyrazolo[1,5-a]pyrimidin-3-yl]-[CAS]	96604-21-6	EP	129847	Anxiolytic	Generalized anxiety disorder
Octabenzone		1843-05-6				
Octacaine		13912-77-1				
Octamoxin		4684-87-1				
Octaverine		549-68-8				
octenidine	1-Octanamine, N,N'-(1,10-decanediyldi-1(4H)-pyridinyl-4-ylidene)bis-[CAS]	70775-75-6	WO	8705501	Stomatological	Periodontitis
		71251-02-0				
		86767-75-1				
Octodrine		543-82-8				
Octopamine		104-14-3				
Octotiamine		137-86-0				
octreotide	L-Cysteinamide, D-phenylalanyl-L-cysteinyl-L-phenylalanyl-D-tryptophy-L-lysyl-L-threonyl-N-[2-hydroxy-1-(hydroxymethyl)propyl]-, cyclic (2-7)-disulfide, [R-(R*,R*)]-[CAS]	83150-76-9			Formulation, fixed-dose combinations	Cancer, general
Octyl Methoxycinnamate		5466-77-3				
ofloxacin	7H-Pyrido[1,2,3-de]-1,4-benzoxazine-6-carboxylic acid, 9-fluoro-2,3-dihydro-3-methyl-10-(4-methyl-1-piperazinyl)-7-oxo-, (+/−)-[CAS]	82419-36-1	EP	47005	Quinolone antibacterial	
o-Iodohippurate		133-17-5				
olanzapine	10H-Thieno[2,3-b][1,5]benzodiazepine, 2-methyl-4-(4-methyl-1-piperazinyl)-[CAS]	132539-06-1	EP	454436	Neuroleptic	Schizophrenia
Oleandrin		465-16-7				
Oleic Acid		112-80-1				
olmesartan - medoxomil	1H-Imidazole-5-carboxylic acid, 4-(1-hydroxy-1-methylethyl)-2-propyl-1-((2'-(1H-tetrazol-5-yl)(1,1'-biphenyl)-4-yl)methyl)-, (5-methyl-2-oxo-1,3-dioxol-4-yl) methyl ester [CAS]	144689-63-4	EP	503785	Antihypertensive, renin system	Hypertension, general
olopatadine	11-[(Z)-3-(Dimethylamino)propylidene]-6,11-dihydrodibenz[b,e]oxepin-2-acetic acid, monohydrochloride	113806-05-6 140462-76-6	EP	235796	Ophthalmological	Conjunctivitis
olpadronic acid	Monosodium 3-dimethylamino-1-(hydroxypropylidene)-1,1-bisphosphonate	63132-39-8	WO	9619998	Osteoporosis treatment	Osteoporosis
olsalazine	Benzoic acid, 3,3'-azobis[6-hydroxy-[CAS]	15722-48-2 53200-51-4	U.S.	4,559,330	GI inflammatory/ bowel disorders	Colitis, ulcerative
oltipraz	3H-1,2-Dithiole-3-thione, 4-methyl-5-pyrazinyl-[CAS]	64224-21-1	DE	2705641	Anticancer, other	Cancer, general
OM-294DP	2-[3(R)-(Dodecanoyloxy)tetradecanamido]-N-[4-[3(R)-hydroxytetradecanamido]-5-(phosphonooxy)pentyl]-4-(phosphonooxy)butyramide				Anticancer, immunological	Unspecified

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Omacor	ethyl (5Z,8Z,11Z,14Z,17Z)-eicosa-5,8,11,14,17-pentaenoate + ethyl (4Z,7Z,10Z,13Z,16Z,19Z)-docosa-4,7,10,13,16,19-hexaenoate	81926-94-5 86227-47-6		Hypolipaemic/ Antiatherosclerosis	Hypertrigly-ceridaemia
omapatrilat	7H-Pyrido[2,1-b][1,3]thiazepine-7-carboxylic acid, octahydro-4-((2-mercapto-1-oxo-3-phenylpropyl)amino)-5-oxo, (4S-(4Alpha(R*),7Alpha,10aβ))-[CAS]	167305-00-2	U.S. 5,508,272	Antihypertensive, renin system	Hypertension, general
omeprazole	1H-Benzimidazole, 5-methoxy-2-[(4-methoxy-3,5-dimethyl-2-pyridinyl)methyl]sulfinyl]-[CAS]	73590-58-6	U.S. 4,255,431	Antiulcer	Ulcer, GI, general
omiloxetine	Ethanone, 2-[(3R,4S)-3-[(1,3-benzodioxol-5-yloxy)methyl]-4-(4-fluorophenyl)-1-piperidinyl]-1-(4-fluorophenyl)-, rel-[CAS]	176894-09-0		Antidepressant	Depression, general
omoconazole	1H-Imidazole, 1-[2-[2-(4-chlorophenoxy)ethoxy]-2-(2,4-dichlorophenyl)-1-methylethenyl]-, (Z)-[CAS]	74512-12-2	EP 8804	Antifungal	Infection, dermatological
Onapristone		96346-61-1			
ondansetron	4H-Carbazol-4-one, 1,2,3,9-tetrahydro-9-methyl-3-[(2-methyl-1H-imidazol-1-yl)methyl]-[CAS]	99614-01-4 99614-02-5	U.S. 4,847,281	Antiemetic	Chemotherapy-induced nausea and vomiting
ONO-3403	Benzoic acid, 4-[(1E)-3-[(2-ethoxy-2-oxoethyl)-2-propenylamino]-2-methyl-3-oxo-1-propenyl]-, 4-(aminoiminomethyl)phenyl ester, monomethanesulfonate [CAS]	181586-07-2		GI inflammatory/ bowel disorders	Unspecified
ONO-4128	1,4,9-Triazaspiro[5.5]undecane-2,5-dione, 1-butyl-3-(cyclohexylmethyl)-9-((2,3-dihydro-1,4-benzodioxin-6-yl)methyl-[CAS]	342394-93-8		Antiviral, anti-HIV	Infection, HIV/AIDS
ONO-8815 Ly	L-lysine (Z)-7-[(1R,2R,3R,5R)-5-chloro-3-hydroxy-2-[(E)-(S)-4-(1-ethylcyclobutyl)-4-hydroxy-1-butenyl]cyclopentyl]-5-heptenoate			Labour inhibitor	Labour, preterm
ONT-093			U.S. 5,756,527	Radio/ chemosensitizer	Cancer, general
OPC-14523	2(1H)-Quinolinone, 1-[3-[4-(3-chlorophenyl)-1-piperazinyl]propyl]-3,4-dihydro-5-methoxy-[CAS]	145969-30-8	EP 512525	Antidepressant	Depression, general
OPC-31260	Benzamide, N-[4-[5-(dimethylamino)-2,3,4,5-tetrahydro-1H-1-benzazepin-1-yl]carbonyl]phenyl]-2-methyl-(5R)-2-[1-(2-chloro-4-(1-pyrolidinyl)benzoyl)-2,3,4,5-tetrahydro-1H-1-benzazepin-5-yl]-N-isopropylacetamide	137975-06-5	WO 9105549	Urological	Unspecified
OPC-51803	2-Pyridinecarboxylic acid, 6-[2-(3,4-diethoxyphenyl)-4-thiazolyl]-[CAS]	145739-56-6	WO 9209586	Antidiabetic GI inflammatory/ bowel disorders	Diabetes, insipidus Inflammatory bowel disease
OPC-6535					
Opiniazide		2779-55-7			

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opioid analgesics	2-(4-trifluoromethylphenyl)-N-methyl-[1-phenyl-2-(1-pyrrolidinyl)ethyl]acetamide]			Analgesic, other	Pain, general
Opipramol		315-72-0			
Orazamide		2574-78-9			
orazipone	2,4-Pentanedione, 3-((4-methylsulfonyl)phenyl)methylene)-[CAS]	137109-78-5	EP 440324	Antiasthma	Unspecified
Org-12962	Piperazine, 1-[6-chloro-5-(trifluoromethyl)-2-pyridinyl]-, monohydrochloride [CAS]	210821-63-9		Antidepressant	Depression, general
Org-24448			U.S. 6,166,008	Neuroleptic	Schizophrenia
oritavancin	Vancomycin, 22-O-(3-amino-2,3,6-trideoxy-3-C-methyl-Alpha-L-arabino-hexopyranosyl)-N3"-[(4'-chloro[1,1'-biphenyl]-4-yl)methyl]-,(4"R)-[CAS]	171099-57-3	U.S. 5,840,684	Peptide antibiotic	Infection, dermatological
orlistat	L-Leucine, N-formyl-, 1-[(3-hexyl-4-oxo-2-oxetanyl)methyl]dodecyl ester, [2S-[2Alpha(R*),3β]]-[CAS]	96829-58-2	EP 129748	Anorectic/ Antiobesity	Obesity
ormeloxifene	Pyrrolidine, 1-[2-(p-(7-methoxy-2,2-dimethyl-3-phenyl-4-chromanyl)phenoxy)ethyl]-, trans-[CAS]	31477-60-8	DE 2329201	Female contraceptive	Contraceptive, female
Ornidazole		16773-42-5			
Ornipressin		3397-23-7			
Ornithine		70-26-8			
ornoprostil	Prost-13-en-1-oic acid, 11,15-dihydroxy-17,20-dimethyl-6,9-dioxo-, methyl ester, (11Alpha,13E,15S,17S)-[CAS]	70667-26-4	U.S. 4,278,688	Prostaglandin	Ulcer, gastric
Orotic Acid		65-86-1			
Orphenadrine		83-98-7			
Orthocaine		536-25-4			
Osalmid		526-18-1			
osanetant	Acetamide, N-[1-[3-[(3R)-1-benzoyl-3-(3,4-dichlorophenyl)-3-piperidinyl]propyl]-4-phenyl-4-piperidinyl]-N-methyl-[CAS]	160492-56-8	EP 673928	Neuroleptic	Schizophrenia
osaterone	2-Oxapregna-4,6-diene-3,20-dione, 17-(acetyloxy)-6-chloro-[CAS]	105149-00-6	EP 193871	Prostate disorders	Benign prostatic hyperplasia
oseltamivir	1-Cyclohexene-1-carboxylic acid, 4-(acetylamino)-5-amino-3-(1-ethylpropoxy)-, ethyl ester, (3R-(3Alpha,4β,5Alpha))-[CAS]	196618-13-0	WO 9626933	Antiviral, other	Infection, influenza virus
OSI-7836	4'-Thio-β-D-arabinofuranosylcytosine			Anticancer, antimetabolite	Cancer, general
OSI-7904	Pentanedioic acid, 2-[5-[[(1,2-dihydro-3-methyl-1-oxobenzo[f]quinazolin-9-yl)methyl]amino]-1,3-dihydro-1-oxo-2H-isoindol-2-yl]-, (S)-[CAS]	139987-54-5	WO 9119700	Formulation, optimized, liposomes	Cancer, general
ospemifene	Ethanol, 2-[4-[(1Z)-4-chloro-1,2-diphenyl-1-butenyl]phenoxy]-[CAS]	128607-22-7	WO 9607402	Menopausal disorders	Osteoporosis
otilonium bromide	Ethanaminium, N,N-diethyl-N-methyl-2-[[4-[[2-(octyloxy)benzoyl]amino]benzoyl]oxy]-, bromide [CAS]	26095-59-0	GB 1181406	Antispasmodic	Irritable bowel syndrome
Ouabain		630-60-4			

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Oxaceprol		33966-33-7			
Oxacillin		66-79-5			
Oxaflozane		26629-87-8			
oxaliplatin	Platinum, (1,2-cyclohexanediamine-N,N')[ethanedioato(2-)-O,O']-, [SP-4-2-(1R-trans)]-[CAS]	61825-94-3	EP 393575	Anticancer, alkylating	Cancer, colorectal
Oxalyt-C	1,2,3-Propanetricarboxylic acid, 2-hydroxy-, potassium sodium salt [CAS]	28060-67-5	DE 2249274	Urological	
Oxamarin		15301-80-1			
Oxametacine		27035-30-9			
Oxamniquine		21738-42-1			
oxandrolone	2-Oxaandrostan-3-one, 17-hydroxy-17-methyl-, (5Alpha,17β)-[CAS]	53-39-4	U.S. 3,128,283	Reproductive/ gonadal, general	Sex-chromosome abnormality, Turner's syndrome
Oxantel		36531-26-7			
Oxapropanium		541-66-2			
oxaprozin	2-Oxazolepropanoic acid, 4,5-diphenyl-[CAS]	21256-18-8	GB 1206403	Antiarthritic, other	Arthritis, osteo
oxatomide	2H-Benzimidazol-2-one, 1-[3-[4-(diphenylmethyl)-1-piperazinyl]propyl]-1,3-dihydro-[CAS]	60607-34-3	GB 1579365	Antiallergic, non-asthma	Rhinitis, allergic, general
oxazepam	7-Chloro-1,3-dihydro-3-hydroxy-5-phenyl-2H-1,4-benzodiazepin-2-one	604-75-1		Formulation, oral, orally-disintegrating	Anxiety, general
oxazolam	Oxazolo[3,2-d][1,4]benzodiazepin-6(5H)-one, 10-chloro-2,3,7,11b-tetrahydro-2-methyl-11b-phenyl-[CAS]	27167-30-2	U.S. 3,772,371	Anxiolytic	
oxcarbazepine	5H-Dibenz[b,f]azepine-5-carboxamide, 10,11-dihydro-10-oxo-[CAS]	28721-07-5	DE 2011087	Antiepileptic	Epilepsy, general
Oxeladin		29331-92-8			
Oxendolone		468-61-1			
Oxethazaine		33765-68-3			
Oxetoron		126-27-2			
oxiconazole	Ethanone, 1-(2,4-dichlorophenyl)-2-(1H-imidazol-1-yl)-, O-[(2,4-dichlorophenyl)methyl]oxime, (Z)-[CAS]	26020-55-3			
		64211-45-6	GB 1514870	Antifungal	Infection, fungal, general
Oxidronic Acid		15468-10-7			
Oxiniacic Acid		2398-81-4			
Oxiracetam		62613-82-5			
oxitropium	3-Oxa-9-azoniatricyclo[3.3.1.02,4]nonane, 9-ethyl-7-(3-hydroxy-1-oxo-2-phenylpropoxy)-9-methyl-, bromide, [7(S)-(1Alpha,2β,4β,5Alpha,7β)]-[CAS]	30286-75-0	GB 1178305	Antiasthma	
Oxolamin		959-14-8			
Oxolinix Acid		14698-29-4			
Oxophenarsine		538-03-4			
Oxprenolol		6452-71-7			
Oxybenzone		131-57-7			

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
oxybutynin	Benzeneacetic acid, Alpha-cyclohexyl-Alpha-hydroxy-, 4-(diethylamino)-2-butynyl ester-[CAS]	5633-20-5		Formulation, modified-release, other	Incontinence
Oxycinchophen		485-89-2			
oxycodone	Morphinan-6-one, 4,5-epoxy-14-hydroxy-3-methoxy-17-methyl-, (5Alpha)-	76-42-6		Formulation, transmucosal, nasal	Pain, general
Oxytedrine		15687-41-9			
Oxygent	Octane, 1-bromo-1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-[CAS]	423-55-2		Haematological	Surgery adjunct
Oxymesterone		145-12-0			
Oxymetazoline		1491-59-4			
oxymetholone	Androstan-3-one, 17-hydroxy-2-(hydroxymethylene)-17-methyl-, (5Alpha,17β)-[CAS]	434-07-1		Hormone	Anaemia, general
Oxymethurea		140-95-4			
oxymorphone	(5Alpha)-4,5-Epoxy-3,14-dihydroxy-17-methylmorphinan-6-one [CAS]	76-41-5		Formulation, modified-release, immediate	Pain, general
Oxypendyl		5585-93-3			
Oxypertine		153-87-7			
Oxyphenbutazone		129-20-4			
Oxyphencyclimine		125-53-1			
Oxyphenisatin		115-33-3			
Oxyphenonium		50-10-2			
Oxypinocamphone		10136-65-9			
oxypurinol	1H-Pyrazolo[3,4-d]pyrimidine-4,6(5H,7H)-dione [CAS]	2465-59-0		Antigout	Hyper-uricaemia
Oxytetracycline		79-57-2			
ozagrel	2-Propenoic acid, 3-[4-(1H-imidazol-1-ylmethyl)phenyl]-, (E)-[CAS]	78712-43-3	GB 2025946	Antithrombotic	Vasospasm, cerebral
p-(Benzyl-sulfonamido)-benzoic Acid		82571-53-7 536-95-8			
P-100			U.S. 6,313,777	Antiviral, anti-HIV	Infection, HIV/AIDS
P-1202	Pentanoic acid, 5-amino-4-oxo, methyl ester, hydrochloride [CAS]	79416-27-6	U.S. 6,034,267	Dermatological	Keratosis
P32/98	Di-(3N-[(2S,3S)-2-amino-3-methyl-pentanoyl]-1,3-thiazolidine)fumarate			Antidiabetic	Diabetes, Type II
PA-824			WO 9701562	Antimycobacterial	Infection, tuberculosis
PACAP 38	Pituitary adenylate cyclase-activating peptide-38 [CAS]	128606-20-2	U.S. 5,128,242	Neuroprotective	Nerve injury, general
paclitaxel	5β,20-Epoxy-1,2Alpha,4,7β,10β,13Alpha-hexahydroxytax-11-en-9-one-4,10-diacetate-2-benzoate-13-(Alpha-phenylhippurate)	33069-62-4		Formulation, optimized, nanoparticles	Cancer, breast
PADRE			U.S. 6,413,935	Immunostimulant, other	Vaccine adjunct

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TABLE IV-continued

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pagoclone	1H-Isoindol-1-one, 2-(7-chloro-1,8-naphthyridin-2-yl)-2,3-dihydro-3-(5-methyl-2-oxohexyl)-(R)-[CAS]	133737-32-3	U.S. 4,960,779	Anxiolytic	Panic disorder
PAI inhibs			WO 9404512	Antithrombotic	Thrombosis, venous
palindore	8H-1,4-dioxino[2,3-e]indol-8-one,2,3,7,9-tetrahydro-2-[(phenylmethyl)amino]methyl]-, 2(S)-, (2E)-2-butendioate (1:1)	189681-71-8		Neuroleptic	Schizophrenia
Palivizumab		188039-54-5			
palonosetron	3aS-2-[(S)-1-Azabicyclo[2.2.2]oct-3-yl]-2,3,3a,4,5,6-hexahydro-1-oxo-1H-benz[de]isoquinoline hydrochloride	135729-62-3	U.S. 5,202,333	Antiemetic	Chemotherapy-induced nausea and vomiting
Pamabrom		606-04-2			
Panaquine		491-92-9			
pamicogral	1H-Pyrrole-1-acetic acid, 2-[4,5-bis(4-methoxyphenyl)-2-thiazolyl]-, ethyl ester [CAS]	101001-34-7	EP 159677	Antithrombotic	Thrombosis, cerebral
pamidronate	(3-Amino-1-hydroxypropylidene)diphosphonic acid-[CAS]	40391-99-9		Formulation, implant	Hyper-calcaemia of malignancy
p-Aminobenzoic Acid		150-13-0			
p-Aminohippuric Acid		61-78-9			
p-Amino-propiophenone		70-69-9			
p-Aminosalicylic Acid		65-49-6			
Panavir	4,4'-isopropylidenedithiobis-2,6-di-t-butylphenol			Neuroprotective	Vasospasm, cerebral
Pancuronium		15500-66-0			
Panipenem		87726-17-8			
Pantethine		16816-67-4			
pantoprazole	1H-Benzimidazole, 5-(difluoromethoxy)-2-[[(3,4-dimethyloxy-2-pyridinyl)methyl]-sulfinyl]-[CAS]	102625-70-7	EP 166287	Antiulcer	Ulcer, duodenal
Pantothenic Acid		79-83-4			
Papain					
Papaverine		58-74-2			
paracetamol	Acetamide, N-(4-hydroxyphenyl)-[CAS]	103-90-2		Formulation, oral, other, modified-release	Pain, general
Paraflutizide		1580-83-2			
Paraldehyde		123-63-7			
Paramethadione		115-67-3			
Paramethasone		53-33-8			
Paranyline		1729-61-9			
Parathyroid Hormone		9002-64-6			
parecoxib	Propanamide, N-((4-(5-methyl-3-phenyl-4-isoxazolyl)phenyl)sulfonyl)-, sodium salt [CAS]	198470-85-8	WO 9738986	Analgesic, NSAID	Pain, post-operative

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Parethoxycaine		94-23-5			
Pargyline		555-57-7			
paricalcitol	19-Nor-9,10-secoergosta-5,7,22-triene-1,3,25-triol, (1Alpha,3β,7E,22E)-[CAS]	131918-61-1	EP 387077	Hormone	Hyperparathyroidsm
paromomycin	O-2-Amino-2-deoxy-Alpha-D-glucopyranosyl-(1-4)-O-[O-2,6-diamino-2,6-dideoxy-β-L-idopyranosyl-(1-3)-β-D-ribofuranosyl-(1-5)]-2-deoxy-D-streptamine	7542-37-2		Protozoacide	Infection, leishmaniasis
paroxetine	Piperidine, 3-[(1,3-benzodioxol-5-yloxy)methyl]-4-(4-fluorophenyl)-, (3S-trans)-[CAS]	61869-08-7	EP 223403	Antidepressant, formulation, oral, orally-disintegrating	Depression, general
Paroxypropione		70-70-2			
Parsalmide		30653-83-9			
PaTrin-2	4-Bromothenylguanine			Radio/chemosensitizer	Cancer, melanoma
Pazinaclone		103255-66-9			
pazufloxacin	7H-Pyrido[1,2,3-de]-1,4-benzoxazine-6-carboxylic acid, 10-(1-aminocyclopropyl)-9-fluoro-2,3-dihydro-3-methyl-7-oxo-, (S)-[CAS]	127045-41-4 127046-45-1 136905-87-8	DE 3913245	Quinolone antibacterial	Infection, general
p-Bromoacetanilide		103-88-8			
PC-NSAIDs			U.S. 4,918,063	Formulation, other	Arthritis, general
PD-0166285	6-(2,6-Dichlorophenyl)-2-[[4-(diethylamino-ethoxy)-phenylamino]-8-pyrido[2,3-D]pyrimidine-7-one			Anticancer, other	Cancer, general
Pecilocin		19504-77-9			
pefloxacin	3-Quinolinecarboxylic acid, 1-ethyl-6-fluoro-1,4-dihydro-7-(4-methyl-1-piperazinyl)-4-oxo-[CAS]	70458-92-3	GB 1598915	Quinolone antibacterial	Infection, urinary tract
pegvisomant	Somatotropin (18-aspartic acid, 21-asparagine, 120-lysine, 167-asparagine, 168-alanine, 171-serine, 172-arginine, 174-serine, 179-threonine (human), pegylated [CAS]	218620-50-9		Somatostatin	Acromegaly
Pelletierine		4396-1-4			
pemetrexed	L-Glutamic acid, N-[4-[2-(2-amino-4,7-dihydro-4-oxo-1H-pyrrolo[2,3-d]pyrimidin-5-yl)ethyl]benzoyl]-, disodium salt [CAS]	137281-23-3 150399-23-8	U.S. 5,248,775	Anticancer, antimetabolite	Cancer, mesothelioma
pemirolast	4H-Pyrido[1,2-a]pyrimidin-4-one, 9-methyl-3-(1H-tetrazol-5-yl)-[CAS]	100299-08-9 69372-19-6	U.S. 4,457,932	Antiasthma	Asthma
Pemoline		2152-34-3			
Pempidine		79-55-0			
PEN-203			U.S. 5,955,446	Antiviral, other	Infection, human papilloma virus

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Penamecillin		983-85-7				
penbutolol	2-Propanol, 1-(2-cyclopentylphenoxy)-3-[(1,1-dimethylethyl)amino]-, (S)-, sulfate (2:1) (salt) [CAS]	38363-32-5 38363-40-5	GB	1215751	Antihypertensive, adrenergic	
penciclovir	6H-Purin-6-one, 2-amino-1,9-dihydro-9-[4-hydroxy-3-(hydroxymethyl)butyl]-[CAS]	39809-25-1	JP	60058982	Antiviral, other	Infection, herpes simplex virus
Penethamate		808-71-9				
penfluridol	4-Piperidinol, 1-[4,4-bis(4-fluorophenyl)butyl]-4-[4-chloro-3-(trifluoromethyl)phenyl]-[CAS]	26864-56-2	DE	2040231	Neuroleptic	
Penicillamine		52-67-5				
Penicillin G		61-33-6				
Penicillin G Benzathine		1538-09-6				
Penicillin G Procaine		6130-64-9				
Penicillin N		525-94-0				
Penicillin O		87-09-2				
Penicillin V		87-08-1				
Peninepicycline		4599-60-4				
Penntuss			U.S.	4,221,778	Formulation, modified-release, other	Rhinitis, allergic, general
Pentaerythritol Chloral		78-12-6				
Pentaerythritol Dichlorohydrin		2209-86-1				
Pentaerythritol		597-71-7				
Pentagastrin		5534-95-2				
Pentagestrone		7001-56-1				
PentaLyte	Starch, 2-hydroxyethyl ether [CAS]	9005-27-0	U.S.	5,407,428	Plasma substitute	Surgery adjunct
Pentam thonium		541-20-8				
pentamidine	Benzenecarboximidamide, 4,4'-[1,5-pentanediylbis(oxy)]bis-[CAS]	100-33-4			Formulation, inhalable, systemic	Infection, *Pneumocystis jirovect prophylaxis*
Pentazocine		359-83-1				
Pentetate		12111-24-9				
Pentetic Acid		67-43-6				
Pentetreotide		138661-02-6				
Pentlienate		60-44-6				
Pentifylin		1028-33-7				
Pentigetide		62087-72-3				
Pentisomide		78833-03-1				
Pentobarbital		76-74-4				
Pentolinium		52-62-0				
Pentorex		434-43-5				
pentosan	Xylan, [CAS]	37319-17-8	U.S.	5,180,715	Urological	Inflammation, urinary tract

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pentostatin	Imidazo[4,5-d][1,3]diazepin-8-ol, 3-(2-deoxy-β-D-erythro-pentofuranosyl)-3,6,7,8-tetrahydro-, (R)-[CAS]	53910-25-1	U.S.	3,923,785	Anticancer, antimetabolite	Cancer, leukaemia, hairy cell
pentoxifylline	1H-Purine-2,6-dione, 3,7-dihydro-3,7-dimethyl-1-(5-oxohexyl)-[CAS]				Neuroprotective	Amyotrophic lateral sclerosis
Pentoxyl		147-61-5				
Pentrinitrol		1607-17-6				
Pentylenetrazole		54-95-5				
peplomycin	Bleomycinamide, N1-[3-[(1-phenylethyl)amino]propyl]-, (S)-[CAS]	68247-85-8	U.S.	4,195,018	Anticancer, antibiotic	
Perazine		84-97-9				
Perflubron		423-55-2				
Perfosfamide		62435-42-1; 39800-16-3 (unspecified)				
pergolide	Ergoline, 8-[(methylthio)methyl]-6-propyl-, (8β)-, monomethanesulfonate-[CAS]	66104-22-1 66104-23-2	U.S.	4,797,405	Antiparkinsonian	Parkinson's disease
Perhexiline		6621-47-2				
Pericyazine		2622-26-6				
perifosine	Piperidinium, 4-[[hydroxy(octadecyloxy)phosphinyl]oxy]-1,1-dimethyl-, inner salt [CAS]	157716-52-4	EP	594999	Anticancer, other	Cancer, prostate
perillyl alcohol	1-Cyclohexene-1-methanol, 4-(1-methylethenyl)-[CAS]	536-59-4	U.S.	5,110,832	Anticancer, other	Cancer, breast
Perimethazine		13093-88-4				
perindopril	1H-Indole-2-carboxylic acid, 1-[2-[[1-(ethoxycarbonyl)butyl]amino]-1-oxopropyl]octahydro-, [2S-[1-[R*(R*)],2A1pha,3aβ,7aβ]]-, compd. with 2-methyl-2-propanamine (1:1) [CAS]	107133-36-8 82834-16-0 95153-31-4	EP	49658	Antihypertensive, renin system	Hypertension, general
Periodyl		53586-99-5				
perisoxal	1-Piperidineethanol, Alpha-(5-phenyl-3-isoxazolyl)-, 2-hydroxy-1,2,3-propanetricarboxylate (2:1) (salt) [CAS]	2139-25-5 2055-44-9	JP	04217925	Anti-inflammatory	
Perlapine		1977-11-3				
Permethrin		52645-53-1				
perospirone	1H-Isoindole-1,3(2H)-dione, 2-[4-[4-(1,2-benzisothiazol-3-yl)-1-piperazinyl]butyl]hexahydro-, cis-[CAS]	129273-38-7 150915-41-6	CA	2167004	Neuroleptic	Schizophrenia
Perphenazine		58-39-9				
Petroleum Benzin		8030-30-6				
PH-10			U.S.	6,331,286	Antipsoriasis	Psoriasis
Phanquinone		84-12-8				
Pharmaprojects No. 4994			WO	9638482	Immunological	Unspecified
Pharmaprojects No. 5325			WO	9703986	Neuroleptic	Schizophrenia
Pharmaprojects No. 5972			WO	0204426	Antiasthma	Asthma
Pharmaprojects No.			U.S.	6,057,346	Antiviral, anti-HIV	Infection,

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6362					HIV/AIDS
Pharmaprojects No. 6446	(R)-N-[4-[2-[[2-Hydroxy-2-(3-pyridinyl)ethyl]amino]ethyl]phenyl]-4-[4-[4-(trifluoromethyl)phenyl]thiazo-2-yl]-benzenesulfonamide			Anorectic/ Antiobesity	Obesity
Pharmaprojects No. 6590			WO 0206223	Psychostimulant	Attention deficit disorder
Pharmaprojects No. 6656			U.S. 6,455,026	Genomics-based drug discovery	Cancer, brain
Pharmaprojects No. 6691			U.S. 6,299,900	Formulation, other	Pain, general
Pharmaprojects No. 6743	3-(6-Aminopyridin-3-yl)-N-methyl-N-[(1-methyl-1H-indol-2-yl)methyl]acrylamide			Antibacterial, other	Infection, general
Pharmaprojects No. 6748	1,2,3,4,10,14b-Hexahydro-6-methoxy-2-methyldibenzo[c,f]pyrazino[1,2-a]azepin			Antidepressant	Depression, general
Phenacaine		620-99-5			
Phenacemide		63-98-9			
Phenacetin		62-44-2			
Phenadoxone		467-84-5			
Phenallymal		115-43-5			
Phenamet		3819-34-9			
Phenazocine		127-35-5			
Phenazopyridine		136-40-3			
Phenbutamide		3149-00-6			
Phencyclidine		77-10-1			
Phendimetrazine		634-03-7			
Phenelzine		51-71-8			
Phenesterine		3546-10-9			
Phenetharbital		357-67-5			
Phenethicillin		132-93-4			
Pheneturide		90-49-3			
Phenformin		114-86-3			
Phenglutarimide		1156-05-4			
Phenindamine		82-88-2			
Phenindione		83-12-5			
Phenprazine		55-52-7			
Pheniramine		86-21-5			
Phenmetrazine		134-49-6			
Phenobarbital		50-06-6			
Phenobutiodil		554-24-5			
Phenocoll		103-97-9			
Phenoctide		78-05-7			
Phenolphthalein		77-09-8			
Phenolphthalol		81-92-5			
Phenolsulfonphthalein		143-74-8			
Phenol-tetrachlorophthalein		639-44-1			
Phenoperidine		562-26-5			
Phenosulfazole		515-54-8			

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Phenoxybenzamine		59-96-1			
Phenoxypropazine		3818-37-9			
Phenprobamate		673-31-4			
Phenprocoumon		435-97-2			
phenserine	Pyrrolo(2,3-b)indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, phenylcarbamate (ester), (3aS-cis)-[CAS]	101246-66-6		Cognition enhancer	Alzheimer's disease
Phensuximide		86-34-0			
Phentermine		122-09-8			
Phentetiothalein		18265-54-8			
phentolamine	Phenol, 3-(((4,5-dihydro-1H-imidazol-2-yl)methyl)(4-methylphenyl)amino)-, monomethanesulfonate (salt) [CAS]	65-28-1		Formulation, oral, other	Impotence
		50-60-2			
Phenyl Acetylsalicylate		134-55-4			
Phenyl Aminosalicylate		133-11-9			
Phenyl Salicylate		118-55-8			
Phenylbutazone		50-33-9			
Phenylephrine		61-76-7			
Phenylethanolamine		7568-93-6			
Phenylmercury		102-98-7			
Phenylmethylbarbituric Acid		76-94-8			
phenylpropanolamine	Benzenemethanol, Alpha-(1-aminoethyl)-, (R*,S*)-(+/−)-[CAS]	14838-15-4		Anorectic/ Antiobesity, formulation, optimized, microparticles	
Phenylpropyl-methylamine		93-88-9			
Phenyltoloxamine		92-12-6			
Phenyramidol		553-69-5			
phenytoin	2,4-Imidazolidinedione, 5,5-diphenyl-[CAS]	57-41-0		Formulation, oral, other	Epilepsy, general
Plethenylate		510-34-9			
Phloroglucinol		108-73-6			
Pholcodine		509-67-1			
Pholedrine		370-14-9			
Phosphocreatine		67-07-2			
Phosphocysteamine		5746-40-7			
Phosphorylcholine		107-73-3			
Plithalysulfacetamide		131-69-1			
Plithalysulfathiazole		85-73-4			
p-Hydroxyephedrine		365-26-4			
Phylloquinone		84-80-0			
Physostigmine		57-47-6			
Phytic Acid		83-86-3			

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PI-88	D-Mannose, O-6-O-phosphono-Alpha-D-mannopyranosyl-(1-3)-O-Alpha-D-mannopyranosyl-(1-3)-O-Alpha-D-mannopyranosyl-(1-3)-O-Alpha-D-mannopyranosyl-(1-2)-hydrogen sulphate [CAS]	185077-23-0		Anticancer, other	Cancer, melanoma
Piberaline		39640-15-8			
piboserod	2H-(1,3)Oxazino(3,2-a)indole-10-carboxamide, N-((1-butyl-4-piperidinyl)methyl)-3,4-dihydro-[CAS]	152811-62-6	WO 9318036	Antiarrhythmic	Fibrillation, atrial
Picilorex		62510-56-9			
Picloxydine		5636-92-0			
Picoperine		21755-66-8			
Picosulfate		10040-45-6			
Picotamide		32828-81-2			
Picumast		39577-19-0			
pidotimod	4-Thiazolidinecarboxylic acid, 3-(5-oxo-2-pyrrolidinyl)carbonyl]-[CAS]	121808-62-6	EP 276752	Immunomodulator, anti-infective	Infection, respiratory tract, lower
Pifamine		56208-01-6			
piketoprofen	Benzeneacetamide, 3-benzoyl-Alpha-methyl-N-(4-methyl-2-pyridinyl)-[CAS]	60576-13-8	GB 1436502	Anti-inflammatory, topical	
Pildralazine		64000-73-3			
pilocarpine	2(3H)-Furanone, 3-ethyldihydro-4-[(1-methyl-1H-imidazol-5-yl)methyl]-, (3S-cis)-[CAS]	92-13-7		Formulation, implant, Stomatological	
Piloplex	2-Propenoic acid, 2-methyl-, dodecyl ester, polymer with 2-propenoicacid, compd. with (3S-cis)-3-ethyldihydro-4-[(1-methyl-1H-imidazol-5-yl)methyl]-2(3H)-furanone [CAS]	62783-28-2	DE 2636559	Formulation, mucosal, topical	Glaucome
pilsicainide	1H-Pyrrolizine-7a(5H)-acetamide, N-(2,6-dimethylphenyl)tetrahydro-, monohydrochloride [CAS]	88069-49-2 88069-67-4	U.S. 4,564,624	Antiarrhythmic	Arrhythmia, general
Pimeclone		534-84-9			
pimecrolimus	15,19-Epoxy-3H-pyrido(2,1-c)(1,4)oxaazacyclotricosine-1,7,20,21(4H,23H)-tetrone, 3-(2-(4-chloro-3-methoxycyclohexyl)-1-methylethenyl)-8-ethyl-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-14,16-dimethoxy-4,10,12,18-tetramethyl-(3S-(3R*E(1S*,3S*,4R*)),4S*,5R*,8S*,9E*,12R*,14R*,5S*,16R*,18S8,19S*,26aR*))-[CAS]	137071-32-0	EP 626385	Antipruritic/ inflamm, allergic	Eczema, atopic

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TABLE IV-continued

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Pimefylline		10001-43-1			
pimiprost	Acetic acid, [2-[octahydro-5-hydroxy-6-(3-hydroxy-5-methyl-1-nonenyl)-2-pentalenyl]ethoxy]-, methyl ester, [2R-[2Alpha,3Alpha,4Alpha(1E,3S*,5S*),5β,6aAlpha]]-[CAS]	139403-31-9		Dermatological	Ulcer, general
Piminodine		13495-09-5			
Pimobendan		74150-27-9			
pimozide	2H-Benzimidazol-2-one, 1-[1-[4,4-bis(4-fluorophenyl)butyl]-4-piperidinyl]-1,3-dihydro-[CAS]	2062-78-4	FR M3695	Neuroleptic	
Pinacidil		85371-64-8			
pinaverium	Morpholinium, 4-[(2-bromo-4,5-dimethoxyphenyl)methyl]-4-[2-[2-(6,6-dimethylbicyclo[3.1.1]hept-2-yl)ethoxy]ethyl]-, [CAS]	53251-94-8 59995-65-2	EP 406743	Antispasmodic	Irritable bowel syndrome
pinazepam	2H-1,4-Benzodiazepin-2-one, 7-chloro-1,3-dihydro-5-phenyl-1-(2-propynyl)-[CAS]	52463-83-9	DE 2339790	Anxiolytic	
Pindolol		13523-86-9			
pioglitazone	2,4-Thiazolidinedione, 5-[[4-[2-(5-ethyl-2-pyridinyl)ethoxy]phenyl]methyl]-, monohydrochloride (+/−)-[CAS]	111025-46-8 112529-15-4	EP 193256	Antidiabetic	Diabetes, Type II
Pipacycline		1110-80-1			
Pipamazine		84-04-8			
Piparmperone		1893-33-0			
Pipazethate		2167-85-3			
Pipebuzone		27315-91-9			
Pipecurium		52212-02-9			
pipecuronium	Piperazinium, 4,4'-[(2β,3Alpha,5Alpha,16β,17β)-3,17-bis(acetyloxy)androstane-2,16-diyl]bis[1,1]-dimethyl-, [CAS]	52212-02-9 68399-57-5	GB 1398050	Muscle relaxant	Anaesthesia, adjunct
pipemidic acid	Pyrido[2,3-d]pyrimidine-6-carboxylic acid, 8-ethyl-5,8-dihydro-5-oxo-2-(1-piperazinyl)-[CAS]	51940-44-4	GB 1451911	Antibacterial, other	Infection, urinary tract
Pipenzolate Bromide		125-51-9			
Piperacetazine		3819-00-9			
piperacillin	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 6-[[[[(4-ethyl-2,3-dioxo-1-piperazinyl)carbonyl]amino]phenylacetyl]-amino]-3,3-dimethyl-7-oxo-,[2S-[2Alpha,5Alpha,6β(S*)]]-[CAS]	59703-84-3 61477-96-1	GB 1508062	Penicillin, injectable	Infection, general
Piperazine Adipate		142-88-1			
Piperidione		77-03-2			
Piperidolate		82-98-4			
Piperilate		4546-39-8			
piperine analogues			WO 002544	Dermatological	Vitiligo
Piperocaine		136-82-3			
Piperonal		120-57-0			
Piperoxan		59-39-2			

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Piperylone		25 314-6			
Pipobroman		54-91-1			
Piposulfan		2608-24-4			
pipotiazine	Hexadecanoic acid, 2-[1-[3-[2-[(dimethylamino)sulfonyl]-10H-phenothiazin-10-yl]propyl]-4-piperidinyl]ethyl ester [CAS]	37517-26-3 39860-99-6	U.S. 4,782,077	Neuroleptic	
Pipoxolan		18174-58-8			
Pipradrol		467-60-7			
piprozolin	Acetic acid, [3-ethyl-4-oxo-5-(1-piperidinyl)-2-thiazolidinylidene]-, ethyl ester [CAS]	17243-64-0	U.S. 3,971,794	GI inflammatory/ bowel disorders	Motility dysfunction, GI, general
Piracetam		7491-74-9			
pirarubicin	5,12-Naphthacenedione, 10-[[3-amino-2,3,6-trideoxy-4-O-(tetrahydro-2H-pyran-2-yl)-Alpha-L-lyxo-hexopyranosyl]oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-8-(hydroxyacetyl)-1-methoxy-, [8S-[8Alpha,10Alpha(S*)]]-[CAS]	72496-41-4	U.S. 4,303,785	Anticancer, antibiotic	Cancer, breast
Pirazolac		71002-09-0			
pirbuterol	2,6-Pyridinedimethanol, Alpha6-[[(1,1-dimethylethyl)amino]methyl]-3-hydroxy-, monoacetate (salt) [CAS]	38029-10-6 38677-81-5 65652-44-0	U.S. 3,786,160	Antiasthma	Asthma
Pirenoxine		1043-21-6			
pirenzepine	6H-Pyrido[2,3-b][1,4]benzodiazepin-6-one, 5,11-dihydro-11-[(4-methyl-1-piperazinyl)acetyl]-[CAS]	28797-61-7 29868-97-1	FR 1505795	Antiulcer	
piretanide	Benzoic acid, 3-(aminosulfonyl)-4-phenoxy-5-(1-pyrrolidinyl)-[CAS]	55837-27-9	U.S. 4,010,273	Antihypertensive, diuretic	Hypertension, general
pirfenidone	2(1H)-Pyridinone, 5-methyl-1-phenyl-[CAS]	53179-13-8		Respiratory	Fibrosis, pulmonary
piribedil	Pyrimidine, 2-[4-(1,3-benzodioxol-5-ylmethyl)-1-piperazinyl]-[CAS]	3605-01-4	U.S. 3,299,067	Vasodilator, peripheral	Parkinson's disease
Piridocaine		87-21-8			
Pirifibrate		55285-45-5			
Piritramide		302-41-0			
Pirlindole	1H-Pyrazine[3,2,1-jk]carbazole, 2,3,3a,4,5,6-hexahydro-8-methyl-[CAS]	72732-56-0 16154-78-2	SU 276060	Antidepressant	Depression, general
pirmenol	(2-Pyridinemethanol, Alpha-[3-(2,6-dimethyl-1-piperidinyl)propyl]-Alpha-phenyl-, cis-(+)-[CAS]	60762-57-4 61477-94-9 68252-19-7	U.S. 4,112,103	Antiarrhythmic	Tachycardia, supra-ventricular
Pirocetone		50650-76-5			
Piroheptine		16378-21-5			
Piromidic Acid		19562-30-2			
piroxicam	2H-1,2-Benzothiazine-3-carboxamide, 4-hydroxy-2-methyl-N-2-pyridinyl-, 1,1-dioxide [CAS]	36322-90-4	U.S. 3,862,319	Anti-inflammatory	

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piroxicam betadex	β-Cyclodextrin, compd. with 4-hydroxy-2-methyl-N-2-pyridinyl-2H-1,2-benzothiazine-3-carboxamide 1,1-dioxide-[CAS]	121696-62-6 96684-39-8	EP	153998	Formulation, other	Pain, musculo-skeletal
piroxicam cinnamate	2-Propenoic acid, 3-phenyl-, 2-methyl-3-[(2-pyridinylamino)carbonyl]-2H-1,2-benzothiazin-4-yl ester, S,S-dioxide [CAS]	87234-24-0	EP	79639	Antiarthritic, other	Inflammation, general
Pirozadil		54110-25-7				
Piprofen		31793-07-4				
pitavastatin	6-Heptenoic acid, 7-[2-cyclopropyl-4-(4-fluorophenyl)-3-quinolinyl]-3,5-dihydroxy-, calcium salt (2:1), [S-[R*,S*-(E)]]-[CAS]	147526-32-7	EP	304063	Hypolipaemic/ Antiatherosclerosis	Hyper-lipidaemia, general
pivagabine	N-trimethylacetyl-4-aminobutyric acid	69542-93-4			Neurological	Anxiety, general
pivaloyloxymethyl	Butanoic acid, (2,2-dimethyl-1-oxopropoxy)methyl ester [CAS]	122110-53-6	EP	302349	Anticancer, other	Cancer, lung, non-small cell
Pivalylbenzhydrazine		306-19-4				
Pivampicillin		33817-20-8				
pivampicillin/ pivmecillinam		98445-47-7			Penicillin, oral	Infection, general
Pivcefalexin		63836-75-9				
pivmecillinam	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 6-[[(hexahydro-1H-azepin-1-yl)methylene]amino]-3,3-dimethyl-7-oxo-, (2,2-dimethyl-1-oxopropoxy)methyl ester, [2S-(2Alpha,5Alpha,6β)]-[CAS]	32886-97-8	GB	1293590	Penicillin, oral	Infection, general
pixantrone	Benz[g]isoquinoline-5,10-dione, 6,9-bis[(2-aminoethyl)amino]-, (2Z)-2-butenedioate(1:2) [CAS]	144675-97-8	EP	503537	Anticancer, other	Cancer, lymphoma, non-Hodgkin's
pizotifen	4-(9,10-dihydro-4H-benzo[4,5]cyclohepta[1,2-b]thien-4-ylidene)-1-methylpiperidine	15574-96-6	DE	2346747	Antimigraine	
Pizotyline		15574-96-6				
PKI-166	Phenol, 4-(4-((1R)-1-phenylethyl)amino)-1H-pyrrolo(2,3-d)pyrimidin-6-yl)-[CAS]	187724-61-4			Anticancer, other	Cancer, general
p-Lactophenetide		539-08-2				
Plafibride		63394-05-8				
plasminogen activator	Plasminogen activator [CAS]	105913-11-9	EP	151996	Fibrinolytic	Infarction, myocardial
Plasmocid		551-01-9				
Platonin		3571-88-8				
Plaunotol		64218-02-6				
PLD-118	Cyclopentanecarboxylic acid, 2-amino-4-methylene-, (1R,2S)-[CAS]	198022-65-0	EP	805145	Antifungal	Infection, Candida, general
PLD-147	(OC-6-43)-Bis(acetato)(1-adamantylamine)ammine-dichloro-platinum (IV)				Anticancer, alkylating	Cancer, general
pleconaril	1,2,4-Oxadiazole, 3-(3,5-dimethyl-4-(3-(3-methyl-5-isoxazolyl)propoxy)phenyl)-5-(trifluoromethyl)-[CAS]	153168-05-9	U.S.	5,464,848	Antiviral, other	Infection, respiratory tract, general

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Plicamycin		18379-89-7			
p-Methyldiphenhydramine		19804-27-4			
PMS-601			WO 0001677	Antiviral, Anti-HIV	Infection, HIV/AIDS
Pneumococcal Vaccine, Diphtheria Conjugate					
Pneumococcal Vaccine, Polyvalent					
PNU-288034	N-[[(5s)-3[4[(1,1-dioxido-4-thiomorpholinyl)3,5-difluorophenyl]-2-oxo-5-oxazolidinyl]methyl]acetamide]			Antibiotic, other	Infection, general
Podophyllotoxin		518-28-5			
polaprezinc	Zinc, bis(N-β-alanyl-L-histidinato-N3,OAlpha)-, (T-4)-[CAS]	107667-60-7	EP 303380	Antiulcer	Ulcer, duodenal
Poldine Methylsulfate		545-80-2			
Policresulen		9011-2-3			
Polidexide		9064-92-0			
polidocanol	Polyethylene glycol monododecyl ether	3055-99-0		Vasoprotective, systemic	Venous insufficiency
		9002-92-0			
Poliovirus Vaccine Inactivated					
poly-ADPRT inhibitors			WO 9845253	Anticancer, other	Cancer, general
Polyestradiol Phosphate		28014-46-2			
Polyphenon E	Polyphenon E [CAS]	188265-33-0		Antiviral, other	Infection, human papilloma virus
Polythiazide		346-18-9			
porfimer	Photofrin [CAS]	87806-31-3	U.S. 4,882,234	Anticancer, other	Cancer, lung, non-small cell
Perfironycin		801-52-5			
posaconazole	D-threo-Pentitol, 2,5-anhydro-1,3,4-trideoxy-2-C-(2,4-difluorophenyl)-4-((4-(4-(4-(1(1S,2S)-1-ethyl-2-hydroxypropyl)-1,5-dihydro-5-oxo-4H-1,2,4-triazol-4-yl)phenyl)-1-piperazinyl)phenoxy)methyl)-1-(1H-1,2,4-triazol-1-yl)-[CAS]	171228-49-2	U.S. 5,714,490	Antifungal	Infection, fungal, general
Posatirelin		7866473-0			
potassium chloride	Potassium chloride (KCl) [CAS]	7447-40-7		Formulation, oral, enteric-coated	
Potassium Gluconate		299-27-4			
Potassium Gualacolsulfonate		1321-14-8			
Potassium p-Aminobenzoate		138-84-1			

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Potassium Permanganate		7722-64-7			
Povidone		9003-39-8			
Povidone-Iodine		25655-41-8			
PP-117	3-Pyridinemethanol, hydrofluoride [CAS]	62756-44-9	DE 2633028	Formulation, oral, other	Unspecified
PR-2699	(−)-(E)-[4-(2,4-dichlorophenyl)-1,3-dithiolan-2-ylidene]-1-imidazolylacetonitrile			Antifungal	Infection, fungal, general
PR-608	(S)-(−)-1-[4,4-bis(4-fluorophenyl)butyl]-4-(2-hydroxy-3-phenylaminopropyl)piperazine trihydrochloride			Antiparkinsonian	Parkinson's disease
Practolol		6673-35-4			
Prajmaline		35080-11-6			
Pralidoxime		51-15-0			
pralnacasan	6H-Pyridazino[1,2-a][1,2]diazepine-1-carboxamide, N-((2R,3S)-2-ethoxytetrahydro-5-oxo-3-furanyl)octahydro-9-((1-isoquinolinylcarbonyl)amino)-6,10-dioxo-, (1S,9S)-[CAS]	192755-52-5		Antiarthritic, immunological	Arthritis, rheumatoid
pramipexole	2,6-Benzothiazolediamine, 4,5,6,7-tetrahydro-N6-propyl-, (S)-[CAS]	104632-26-0	EP 186087	Antiparkinsonian	Parkinson's disease
pramiracetam	1-Pyrrolidineacetamide, N-[2-[bis(1-methylethyl)amino]ethyl]-2-oxo-, monohydrochloride [CAS]	68497-62-1 72869-16-0 75733-50-5	U.S. 4,145,347	Cognition enhancer	Amnesia
Pramiverin		14334-40-8			
pramlintide	1,2-Dithia-5,8,11,14,17-pentaazacycloeicosane, cyclic peptide deriv. [CAS]	151126-32-8	U.S. 5,124,314	Antidiabetic	Diabetes, Type I
Pramoxine		140-65-8			
pranidipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, methyl 3-phenyl-2-propenyl ester, (E)-[CAS]	99522-79-9	EP 173126	Antihypertensive, other	Hypertension, general
Pranlukast		103177-37-3			
pranoprofen	5H-[1]Benzopyrano[2,3-b]pyridine-7-acetic acid, Alpha-methyl-[CAS]	52549-17-4		Formulation, mucosal, topical	Ocular disorder, general
prasterone	Androst-5-en-17-one, 3-hydroxy-, (3β)-[CAS]	53-43-0		Labour inducer	
pratosartan	4(3H)-Cycloheptimidazolone, 5,6,7,8-tetrahydro-2-propyl-3-[[2'-(1H-tetrazol-5-yl)[1,1'-biphenyl]-4-yl]methyl]-[CAS]	153804-05-8	U.S. 5,409,947	Antihypertensive, renin system	Hypertension, general
pravastatin	1-Naphthaleneheptanoic acid, 1,2,6,7,8,8a-hexahydro-β,delta,6-trihydroxy-2-methyl-8-(2-methyl-1-oxobutoxy)-, monosodium salt, [1S-[1Alpha(βS*,deltaS*),2Alpha,6Alpha,8β(R*),8aAlpha]]-[CAS]	81093-37-0 81131-70-6	U.S. 4,346,227	Hypolipaemic/ Antiatherosclerosis	Atherosclerosis
Prazepam		2955-38-6			

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praziquantel	4H-Pyrazino[2,1-a]isoquinolin-4-one, 2-(cyclohexylcarbonyl)-1,2,3,6,7,11b-hexahydro-[CAS]	55268-74-1	U.S. 4,001,411	Schistosomicide	
prazosin	Piperazine, 1-(4-amino-6,7-dimethoxy-2-quinazolinyl)-4-(2-furanylcarbonyl)-[CAS]	19216-56-9 19237-84-4 73771-04-7	U.S. 4,092,315	Antihypertensive, adrenergic	Hypertension, general
Prednicarbate					
prednimustine	Pregna-1,4-diene-3,20-dione, 21-[4-[4-[bis(2-chloroethyl)amino]phenyl]-1-oxobutoxy]-11,17-dihydroxy-, (11β)-[CAS]	29069-24-7	GB 1272841	Anticancer, alkylating	
Prednisolone		50-24-8			
Prednisolone 21-Diethylaminoacetate		5626-34-6			
prednisolone farnesil	Pregna-1,4-diene-3,20-dione, 11,17-dihydroxy-21-[(3,7,11-trimethyl-1-oxo-2,6,10-dodecatrienyl)oxy]-, [11β,21(2E,6E)]-[CAS]	118244-44-3	EP 332143	Antiarthritic, other	Arthritis, rheumatoid
Prednisolone Sodium Phosphate		125-02-0			
Prednisone		53-03-2			
Prednival		15180-00-4			
Prednylidene		599-33-7			
pregabalin	Hexanoic acid, 3-(aminomethyl)-5-methyl, (S)-[CAS]	148553-50-8		Antiepileptic	Epilepsy, general
Pregnan-3α-ol-20-one		128-20-1			
Premarin + trimegestone	Estra-4,9-dien-3-one, 17-(2-hydroxy-1-oxopropyl)-17-methyl-, [17β(S)]-[CAS]	74513-62-5		Menopausal disorders	Hormone replacement therapy
prenalterol	Phenol, 4-[2-hydroxy-3-[(1-methylethyl)amino]propoxy]-, hydrochloride, (S)-[CAS]	57526-81-5 61260-05-7	GB 1470039	Cardiostimulant	
Prenoxdiazine		982-43-4			
Prenylamine		390-64-7			
prezatide	Cuprate(1-), (N2-(N-glycyl-L-histidyl)-L-lysinato)(N2-(N-glycyl-L-histidyl)-L-lysinato(2-))-, hydrogen, [CAS]	130120-57-9		Vulnerary	Wound healing
Pridinol		511-45-5			
Prifinium		4630-95-9			
Prilocaine		721-50-6			
Primaquine		90-34-6			
Primidone		125-33-7			
Prinomastat		192329-42-3			
PRO-2000			U.S. 5,614,599	Antiviral, anti-HIV	Infection, HIV prophylaxis
Probenecid		57-66-9			
Probucol		23288-49-5			
procainamide	Benzamide, 4-amino-N-[2-(diethylamino)ethyl]-[CAS]	51-06-9 614-39-1		Formulation, other	Arrhythmia, general
Procaine		59-46-1			
Procarbazine		671-16-9			

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procaterol	2(1H)-Quinolinone, 8-hydroxy-5-[1-hydroxy-2-[(1-methylethyl)amino]butyl]-monohydrochloride [CAS]	59828-07-8 60443-17-6 72332-33-3	GB 1496766	Antiasthma	
prochlorperazine	10H-Phenothiazine,2-chloro-10-[3-(4-methyl-1-piperazinyl)propyl]-, (Z)-2-butenedioate	58-38-8 84-02-6		Formulation, oral, other	Nausea and vomiting, general
procodazol	1H-Benzimidazole-2-propanoic acid [CAS]	23249-97-0	ES 407882	Anticancer, immunological	Cancer, general
Procyclidine		77-37-2			
Procymate		13931-64-1			
Prodipine		31314-38-2			
Proflavine		92-62-6			
Progabide		62666-20-0			
progesterone	Prefn-4-ene-3,20-dione [CAS]	57-83-0		Formulation, transmucosal, systemic	Amenorrhoea
proglumetacin	1H-Indole-3-acetic acid, 1-(4-chlorobenzoyl)-5-methoxy-2-methyl-, 2-(4-(3-((4-(benzoylamino)-5-(dipropylamino)-1,5-dioxopentyl)oxy)propyl)-1-piperazinyl)ethyl ester, (+/−)-[CAS]	57132-53-3 59209-40-4	GB 1467568	Anti-inflammatory	Inflammation, general
proglumide	Pentanoic acid, 4-(benzoylamino)-5-(dipropylamino)-5-oxo-, (+/−)-[CAS]	6620-60-6	DE 1518125	Antiulcer	Ulcer, gastric
Proheptazine		77-14-5			
Prolactin		9002-62-4			
Prolintane		493-92-5			
Prolonium		123-47-7			
Promazine		58-40-2			
Promedol		64-39-1			
Promegestone		34184-77-5			
promestriene	Estra-1,3,5(10)-triene, 17-methoxy-3-propoxy-, (17β)-[CAS]	39219-28-8	GB 1337198	Reproductive/ gonadal, general	Acne
Promethazine		60-87-7			
Pronethalol		54-80-8			
propacetamol	Glycine, N,N-diethyl-, 4-(acetylamino)phenyl ester [CAS]	66532-85-2 66532-86-3	U.S. 4,127,671	Formulation, parenteral, other	
propafenone	1-Propanone, 1-[2-[2-hydroxy-3-(propylamino)propoxy]phenyl]-3-phenyl-[CAS]	54063-53-5	GB 1307455	Antiarrhythmic	Fibrillation, ventricular
Propagermanium		12758-40-6			
Propallylonal		545-93-7			
Propamidine		104-32-5			
propane-1,2-diol	1,2-propanediol	57-55-6		Formulation, dermal, topical	Infection, fungal, general
Propanidid		1421-14-3			
Propantheline		50-34-0			
Proparacaine		499-67-2			
Propatyl		2921-92-8			

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
propenidazole	ethyl trans-Alpha-acetyl-1-methyl-5-nitroimidazole-2-acrylate	76448-31-2		Antifungal	Infection, trichomoniasis
propentofylline	1H-Purine-2,6-dione, 3,7-dihydro-3-methyl-1-(5-oxohexyl)-7-propyl-[CAS]	55242-55-2	GB 1470220	Neuroprotective	Ischaemia, cerebral
Propicillin		551-27-9			
Propiomazine		362-29-8			
Propionic Acid		79-09-4			
propionyl L-carnitine	1-Propanaminium, 3-carboxy-N,N,N-trimethyl-2-(1-oxopropoxy)-, chloride, (R)-[CAS]	119793-66-7	GB 2008578	Vasodilator, peripheral	Peripheral vascular disease
Propipocaine		20084-19-1			
Propiram		3670-68-6			
propiverine	2,2-diphenyl-2-(1-propoxy)acetic acid (1-methyl)piperid-4-yl) ester hydrochloride	15686-91-6		Urological	Incontinence
		54536-98-8			
Propizepine		60569-19-9			
propofol	Phenol, 2,6-bis(1-methylethyl)-[CAS]	10321-12-7	U.S. 4,056,635	Anaesthetic, injectable	Anaesthesia
		2078-54-8			
Propoxycaine		550-83-4			
Propoxyphene		469-62-5			
propranolol	2-Propanol, 1-[(1-methylethyl)amino]-3-(1-naphthalenyloxy)-[CAS]	318-98-9		Formulation, modified-release, <=24 hr	Hypertension, general
		525-66-6			
Propylhexedrine		101-40-6			
Propyliodone		587-61-1			
Propylthiouracil		51-25-5			
Propyphenazone		479-92-5			
Proquazone		22760-18-5			
Proscillaridin		466-06-8			
Prostacyclin		35121-78-9			
Prostaglandin E_1		745-65-3			
Prostaglandin E_2		363-24-6			
Prostaglandin $F_{2\alpha}$		551-11-1			
Prosultiamine		59-58-5			
Protein C		60202-16-6			
Protheobromine		50-39-5			
Prothipendyl		303-69-5			
Protiofate		58416-00-5			
Protionamide		14222-60-7			
protizinic acid	10H-Phenothiazine-2-acetic acid, 7-methoxy-Alpha,10-dimethyl-, (+/−)-[CAS]	13799-03-6	U.S. 3,450,698	Anti-inflammatory	
Protoanemonin		108-28-1			
Protokfol		136-70-9			
Protoporphyrin IX		553-12-8			
Protriptyline		438-60-8			
Pro-Urokinase		82657-92-9			
Proxazole		5696-9-3			
Proxibarbal		2537-29-3			
proxigermanium	Propanoic acid, 3,3'-(1,3-dioxo-1,3-digermoxanediyl)bis-[CAS]	12758-40-6	FR 2005110	Antiviral, other	Infection, hepatitis-B virus

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Proxyphylline		603-00-9			
Prozapine		3426-8-2			
Prucalopride		179474-81-8			
prulifloxacin	1H,4H-[1,3]Thiazeto[3,2-a]quinoline-3-carboxylic acid, 6-fluoro-1-methyl-7-[4-[(5-methyl-2-oxo-1,3-dioxol-4-yl)methyl]-1-piperazinyl]-4-oxo-[CAS]	123447-62-1	EP 315828	Quinolone antibacterial	Infection, respiratory tract, general
Pseudococaine		478-73-9			
pseudoephedrine + triprolidine	Benzenemethanol, Alpha-[1-(methylamino)ethyl]-, hydrochloride, [S-(R*,R*)]-, mixt. with (E)-2-[1-(4-methylphenyl)-3-(1-pyrrolidinyl)-1-propenyl]pyridine monohydrochloride [CAS]			Formulation, modified-release, other	Rhinitis, allergic, general
pseudoephedrine	Benzenemethanol, Alpha-[1-(methylamino)ethyl]-, [S-(R*,R*)]-[CAS]	90-82-4, 8054-27-1, 345-78-8		Formulation, oral, other	Infection, respiratory tract, general
Psilocybin		520-52-5			
PSK-3841	Benzonitrile, 4-[3-(4-hydroxybutyl)-4,4-dimethyl-2,5-dioxo-1-imidazolidinyl]-2-(trifluoromethyl)-[CAS]	154992-24-2		Dermatological	Alopecia, general
p-Sulfanilyl-benzylamine		4393-19-5			
PT-141			U.S. 6,051,555	Male sexual dysfunction	Impotence
Pteropterin		89-38-3			
Puromycin		53-79-2			
PX-12	1-Methylpropyl 2-mercaptoimidazolyl disulfide			Anticancer, other	Cancer, general
Pyrantel		15686-83-6			
Pyrazinamide		98-96-4			
Pyridinol Carbamate		1882-26-4			
Pyridostigmine Bromide		101-26-8			
Pyridoxal 5-Phosphate		54-47-7			
Pyridoxine		58-56-0			
Pyrilamine		91-84-9			
Pyrimethamine		58-14-0			
Pyrinoline		1740-22-3			
Pyrisuccideanol		33605-94-6			
Pyrithione		1121-30-8			
Pyrithyldione		77-04-3			
Pyritinol		1098-97-1			
Pyrocatechol		120-80-9			
Pyrogallol		87-66-1			
Pyronaridine		74847-35-1			
Pyrovalerone		3563-49-3			
Pyroxylin		9004-70-0			
Pyrrobutamine		91-82-7			
Pyrrocaine		2210-77-7			

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Pyrrolnitrin		1018-71-9			
Pyrvinium Pamoate		3546-41-6			
quazepam	2H-1,4-Benzodiazepine-2-thione, 7-chloro-5-(2-fluorophenyl)-1,3-dihydro-1-(2,2,2-trifluoroethyl)-[CAS]	36735-22-5	U.S. 3,845,039	Hypnotic/Sedative	Insomnia
Quercetin		117-39-5			
quetiapine	Ethanol, 2-[2-(4-dibenzo[b,f][1,4]thiazepin-11-yl-1-piperazinyl)ethoxy]-, (E)-2-butenedioate (2:1) (salt) [CAS]	111974-69-7 111974-72-2	EP 240228	Neuroleptic	Schizophrenia
Quinacillin		1596-63-0			
quinacrine	N-(6-Chloro-2-methoxy-9-acridinyl)-N,N-diethyl-1,4-pentanediamine + 10H-Phenothiazine-10-propanamine, 2-chloro-N,N-dimethyl	83-89-6		Neurological	Creutzfeldt-Jakob disease
quinagolide	Sulfamide, N,N-diethyl-N'-(1,2,3,4,4a,5,10,10a-octahydro-6-hydroxy-1-propylbenzo[g]quinolin-3-yl)-, (3Alpha,4aAlpha,10aβ)-(+/−)-[CAS]	87056-78-8 94424-50-7 97805-49-7	EP 77754	Antiprolactin	Hyperprolactinaemia
quinapril	3-Isoquinolinecarboxylic acid, 2-[2-[[1-(ethoxycarbonyl)-3-phenylpropyl]amino]-1-oxopropyl]-1,2,3,4-tetrahydro-, [3S-[2[R*(R*)],3R*]]-[CAS]	82586-55-8 85441-61-8 90243-99-5	EP 49605	Antihypertensive, renin system	Hypertension, general
quinaprilat	3-Isoquinolinecarboxylic acid, 2-[2-[(1-carboxy-3-phenylpropyl)amino]-1-oxopropyl]-1,2,3,4-tetrahydro-, [3S-[2[R*(R*)],3R*]]-[CAS]	82768-85-2	EP 46953	Antihypertensive, renin system	Hypertension, general
Quinapyramine		20493-41-8			
Quinbolone		2487-63-0			
Quinestradiol		1169-79-5			
Quinestrol		152-43-2			
Quinethazone		73-49-4			
quinfamide	2-Furancarboxylic acid, 1-(dichloroacetyl)-1,2,3,4-tetrahydro-6-quinolinyl ester [CAS]	62265-68-3	U.S. 3,997,542	Amoebicide	
quinidine	Cinchonan-9-ol, 6'-methoxy-, (9S)-, sulfate (1:1) (salt) [CAS]	747-45-5 56-54-2		Formulation, modified-release, other	Arrhythmia, general
Quinine		130-95-0			
Quinocide		525-61-1			
Quinupramine		31721-17-2			
Quinupristin		120138-50-3			
R-107500	cis-2,3,3a,8-tetrahydro-N,N-dimethyldibenz[c,f]isoxazolo[2,3-a]azepine-2-methanamine		WO 9614320	Anxiolytic	Anxiety, general
R-667			WO 0204439	COPD treatment	Emphysema, general
rabeprazole	1H-Benzimidazole, 2-[[[4-(3-methoxypropoxy)-3-methyl-2-pyridinyl]methyl]sulfinyl]-, sodium salt-[CAS]	117976-89-3 117976-90-6	EP 268956	Antiulcer	Ulcer, gastric

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
racecadotril	Glycine, N-[2-[(acetylthio)methyl]-1-oxo-3-phenylpropyl]-, phenylmethyl ester, (+/−)-[CAS]	112573-72-5 81110-73-8	EP 38758	Antidiarrhoeal	Diarrhoea, general
Racemethorphan		510-53-2			
raloxifene	Methanone, [6-hydroxy-2-(4-hydroxyphenyl)benzo[b]thien-3-yl][4-[2-(1-piperidinyl)ethoxy]phenyl]-, hydrochloride [CAS]	82640-04-8 84449-90-1	EP 62503	Osteoporosis treatment	Osteoporosis
raltitrexed	L-glutamic acid, N-[[5-[[(1,4-dihydro-2-methyl-4-oxo-6-quinazolinyl)methyl]methylamino]-2-thienyl]carbonyl]-[CAS]	112887-68-0	EP 239362	Anticancer, antimetabolite	Cancer, colorectal
ramatroban	9H-Carbazole-9-propanoic acid, 3-[[(4-fluorophenyl)sulfonyl]amino]-1,2,3,4-tetrahydro-, (R)-[CAS]	116649-85-5	EP 242518	Antiallergic, non-asthma	Rhinitis, allergic, perennial
Ramifenazone		3615-24-5			
ramipril	Cyclopenta[b]pyrrole-2-carboxylic acid, 1-[2-[[1-(ethoxycarbonyl)-3-phenylpropyl]amino]-1-oxopropyl]octahydro-, [2S-[1[R*(R*)],2Alpha,3aβ,6aβ]]-[CAS]	87269-97-4 87333-19-5	EP 79022	Antihypertensive, renin system	Heart failure
ramosetron	Methanone, (1-methyl-1H-indol-3-yl)(4,5,6,7-tetrahydro-1H-benzimidazol-5-yl)-, monohydrochloride, (R)-[CAS]	132907-72-3 132036-88-5	EP 381422	Antiemetic	Nausea and vomitting, general
Ramot project No. 1097			U.S. 5,730,992	Dermatological	Unspecified
Ranimustine		58994-96-0			
ranitidine	1,1-Ethenediamine, N-[2-[[5-[(dimethylamino)methyl]-2-furanyl]methyl]thio]ethyl]-N'-methyl-2-nitro-[CAS]	66357-35-5	U.S. 4,128,658	Antiulcer	Ulcer, duodenal
ranitidine bismuth citrate	1,2,3-Propanetricarboxylic acid, 2-hydroxy-, bismuth(3+) salt (1:1), compd. with N-(2-((5-((dimethylamino)methyl)-2-furanyl)methyl)thio)ethyl)-N'-methyl-2-nitro-1,1-ethenediamine (1:1)-[CAS]	128345-62-0	EP 533281	Antiulcer	Ulcer, duodenal
ranolazine	1-Piperazineacetamide, N-(2,6-dimethylphenyl)-4-[2-hydroxy-3-(2-methoxyphenoxy)propyl]-, (+/−)-[CAS]	95635-55-5 95635-56-6	EP 126449	Antianginal	Angina, general
Ranpirnase		133737-96-9			
Rapacuronium		156137-99-4			
rasagiline	1H-Inden-1-amine, 2,3-dihydro-N-2-propynyl-, (R)-, [CAS]	161735-79-1	U.S. 5,457,133	Antiparkinsonian	Parkinson's disease
Raubasine		483-04-5			
ravuconazole	Benzonitrile, 4-[2-[(1R,2R)-2-(2,4-difluorophenyl)-2-hydroxy-1-methyl-3-(1H-1,2,4-triazol-1-yl)propyl]-4-thiazolyl]-[CAS]	182760-06-1		Antifungal	Infection, meningitis, general
raxofelast	2-Benzofuranacetic acid, 5-(acetyloxy)-2,3-dihydro-4,6,7-trimethyl-, (+)-[CAS]	128232-14-4	U.S. 4,999,350	Symptomatic antidiabetic	Nephropathy, diabetic

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razoxane	2,6-Piperazinedione, 4,4'-(1-methyl-1,2-ethanediyl)bis- [CAS]	21416-67-1, 21416-87-5	GB	1234935	Anticancer, other	Cancer, general
RC-529	Tetradecanoic acid (1R)-1-(2-((2-deoxy 3-O-((3R)-1-oxo-3-((1-oxotetradecyl)oxy)tetradecyl)amino-4-O-phosphono-β-D-glucopyranosyl)oxy)ethyl)amino)-2-oxoethyl)dodecyl ester, compd. with N,N-diethylethanamine (1:1) [CAS]	216014-46-9			Immunostimulant, other	Vaccine adjunct
rebamipide	4-Quinolinepropanoic acid, Alpha-[(4-chlorobenzoyl)amino]-1,2-dihydro-2-oxo- [CAS]	90098-04-7	DE	3324034	Antiulcer	
rebimastat	L-Valinamide, N-((2S)-2-mercapto-1-oxo-4-(3,4,4-trimethyl-2,5-dioxo-1-imidazolidinyl)butyl)-L-leucyl-N,3-dimethyl- [CAS]	259188-38-0			Anticancer, other	Cancer, lung, non-small cell
reboxetine	Morpholine, 2-[(2-ethoxyphenoxy)phenylmethyl]-, (R*,S*)- [CAS]	71620-89-8, 98769-81-4	U.S.	4,229,449	Antidepressant	Depression, general
Remacemide		128298-28-2				
remifentanil	1-Piperidinepropanoic acid, 4-(methoxycarbonyl)-4-((1-oxopropyl)phenylamino)-methyl ester- [CAS]	132539-07-2, 132875-61-7	EP	383579	Analgesic, other	Pain, general
reminetant	Tricyclo[3.3.1.13,7]decane-2-carboxylic acid, 2-[[[1-(7-chloro-4-quinolinyl)-5-(2,6-dimethoxyphenyl)-1H-pyrazol-3-yl]carbonyl]amino]- [CAS]	146362-70-1	EP	699438	Neuroleptic	Schizophrenia
Remoxipride		80125-14-0				
renzapride	Benzamide, 4-amino-N-1-azabicyclo[3.3.1]non-4-yl-5-chloro-2-methoxy- [CAS]	109872-41-5 88721-77-1	JP	58188885	Gastroprokinetic	Irritable bowel syndrome
repaglinide	Benzoic acid, 2-ethoxy-4-[2-[[3-methyl-1-[2-(1-piperidinyl)phenyl]butyl]amino]-2-oxoethyl]-, (S)- [CAS]	135062-02-1	WO	9300337	Antidiabetic	Diabetes, Type II
repertaxin L-lysine salt	2(R)-4-Isobutylphenylpropionyl methanesulfonamide L-lysine salt		WO	0024710	Cardiovascular	Reperfusion injury
repinotan	1,2-Benzisothiazol-3(2H)-one, 2-(4-((3,4-dihydro-2H-1-benzopyran-2-yl)methyl)amino)butyl)-, 1,1-dioxide, monohydrochloride [CAS]	144980-29-0 144980-77-8	U.S.	5,137,901	Neuroprotective	Ischaemia, cerebral
repirinast	4H-Pyrano[3,2-c]quinoline-2-carboxylic acid, 5,6-dihydro-7,8-dimethyl-4,5-dioxo-, 3-methylbutyl ester [CAS]	73080-51-0	U.S.	4,298,610	Antiasthma	
Reposal		3625-25-0				
reproterol	1H-Purine-2,6-dione, 7-[3-[[2-(3,5-dihydroxyethyl]amino]propyl]-3,7-dihydro-1,3-dimethyl- [CAS]	13055-82-8 54063-54-6	FR	M5969	Antiasthma	Asthma
Rescimetol		73573-42-9				
Rescinnamine		24815-24-5				

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Reserpiline		131-02-2			
Reserpine		50-55-5			
Resibufogenin		465-39-4			
resiquimod	1H-Imidazo(4,5-c)quinoline-1-ethanol(ethoxymethyl)-Alpha, Alpha-dimethyl-[CAS]	144875-48-9	U.S. 5,389,640	Antiviral, other	Infection, hepatitis-C virus
Resorcinol		108-46-3			
Reteplase		133652-38-7			
retigabine	Carbamic acid, (2-amino-4-(((4-fluorophenyl)methyl)amino)phenyl)-, ethyl ester [CAS]	150812-12-7	DE 4200259	Antiepileptic	Epilepsy, general
retinoic acid	Retinoic acid [CAS]	302-79-4		Formulation, parenteral, other	Cancer, leukaemia, acute myelogenous
			U.S. 6,281,230	Anticancer, other	Cancer, myelome
Revimid					
R-flurbiprofen	[1,1'-Biphenyl]-4-acetic acid, 2-fluoro-Alpha-methyl	5104-49-4		Anticancer, other	Cancer, prostate
Rho (D) Immune Globulin (Human)			WO 0156988	Antiasthma	Unspcified
Rho-kinase inhibitors			U.S. 4,122,771	Antiviral, other	Infection, haemorrhagic fever
ribavirin	1H-1,2,4-Triazole-3-carboxamide, 1-β-D-ribofuranosyl-[CAS]	36791-04-5			
Riboflavin		146-17-8			
ribostamycin	D-Streptamine, O-2,6-diamono-2,6-dideoxy-Alpha-D-glucopyranosyl-(1-4)-O-[β-D-ribofuranosyl-(1-5)]-2-deoxy-[CAS]	25546-65-0	GB 1254883	Aminoglycoside antibiotic	Infection, general
Ricinoleic Acid		141-22-0			
Ridogrel		110140-89-1			
rifabutin	Rifamycin XIV, 1',4-didehydro-1-deoxy-1,4-dihydro-5'-(2-methylpropyl)-1-oxo-[CAS]	72559-06-9	U.S. 4,219,478	Antimycobacterial	Infection, Mycobacterium avium complex
rifalazil	Rifamycin VIII, 1',4-didehydro-1-deoxy-1,4-dihydro-3'-hydroxy-5'-[4-(2-methylpropyl)-1-piperazinyl]-1-oxo-[CAS]	129791-92-0	EP 366914	Antimycobacterial	Infection, tuberculosis
		129791-94-2			
		133633-12-2			
rifametane	Rifamycin, 3-[[[1-(diethylamino)ethylidene]hydrazono]methyl]-[CAS]	94168-98-6	EP 119571	Antimycobacterial	Infection, general
Rifamide		2750-76-7			
rifampicin + trimethoprim	Rifamycin, 3-[[(4-methyl-1-piperazinyl)imino]methyl]-, mixt. with 5-[(3,4,5-trimethoxyphenyl)methyl]-2,4-pyrimidinediamine [CAS]	61498-94-0		Formulation, fixed-dose combinations	Infection, general
Rifampin		13292-46-1			
Rifamycin SV		6998-60-3			
rifapentine	Rifamycin, 3-[[(4-cyclopentyl-1-piperazinyl)imino]methyl]-[CAS]	61379-65-5	DE 2608218	Antibiotic, other	Infection, tuberculosis

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rifaximin	Epoxypentadeca[1,11,13]trieniminobenzofuro[4,5-e]-pyrido[1,2-a]benzimidazole-1,15(2H)-dione, 25-(acetyloxy)-5,6,21,23-tetrahydroxy-27-methoxy-2,4,11,16,20,22,25,26-octamethyl-, [2S-(2R*,16Z,18E,20R*,22S*,23S*,24S*,25R*,26S*,27R*,28E)]	80621-81-4	GB	2079270	Antibiotic, other	Infection, GI tract
rifaximine cream	4-deoxy-4'-methylpyrido[1',2'-1,2]imidazo[5,4-c]rifamycin SV	80621-81-4	BE	888895	Formulation, dermal, topical	Infection, dermatological
Rilmazafone		99593-25-6				
rilmenidine	2-Oxazolamine, N-(dicyclopropylmethyl)-4,5-dihydro-[CAS]	54187-04-1	DE	2362754	Antihypertensive, adrenergic	Hypertension, general
riluzole	2-Benzothiazolamine, 6-(trifluoromethoxy)-[CAS]	54249-57-9 1744-22-5	EP	50551	Neuroprotective	Amyotrophic lateral sclerosis
Rimantadine		13392-28-4				
rimazolium	4H-Pyrido[1,2-a]pyrimidinium, 3-(ethoxycarbonyl)-6,7,8,9-tetrahydro-1,6-dimethyl-4-oxo-, [CAS]	28610-84-6 35615-72-6	DE	2461349	Analgesic, NSAID	
rimexolone	Androsta-1,4-dien-3-one, 11-hydroxy-16,17-dimethyl-17-(1-oxopropyl)-, (11β,16Alpha,17β)-[CAS]	49697-38-3	DE	2301317	Ophthalmological	Inflammation, ocular
Riniterol		32953-89-2				
rimonabant	1H-Pyrazole-3-carboxamide, 5-(4-chlorophenyl)-1-(2,4-dichlorophenyl)-4-methyl-N-1-piperidinyl-, monohydrochloride [CAS]	158681-13-1	U.S.	5,624,941	Anorectic/ Antiobesity	Obesity
riodoxol	1,3-Benzenediol, 2,4,6-triiodo-[CAS]	19403-92-0	U.S.	3,755,251	Antiviral, other	
Rioprostil		77287-05-9				
risedronate	Phosphonic acid, (1-hydroxy-2-(3-pyridinyl)ethylidene)bis-, monosodium salt	115436-72-1	EP	304961	Osteoporosis treatment	Pagets disease
Risedronic Acid		105492-24-6				
risperidone	4H-Pyrido[1,2-a]pyrimidin-4-one, 3-[2-[4-(6-fluoro-1,2-benzisoxazol-3-yl)-1-piperidinyl]ethyl]-6,7,8,9-tetrahydro-2-methyl-[CAS]	106266-06-2	EP	196132	Neuroleptic, formulation, optimized, microencapsulate	Schizophrenia
Ritanserin		87051-43-2				
Ritipenem		84845-57-8				
ritodrine	Benzenemethanol, 4-hydroxy-Alpha-[1-[[2-(4-hydroxyphenyl)ethyl]amino]ethyl]-, (R*,S*)-[CAS]	23239-51-2 26652-09-5	U.S.	3,410,944	Labour inhibitor	Labour, preterm
ritonavir	2,4,7,12-Tetraazatridecan-13-oic acid, 10-hydroxy-2-methyl-5-(1-methylethyl)-1-(2-(1-methylethyl)-4-thiazolyl)-3,6-dioxo-8,11-bis(phenylmethyl)-, 5-thiazolylmethyl ester, (5S-(5R*,8R*,10R*,11R*))-[CAS]	155213-67-5	WO	9414436	Antiviral, anti-HIV	Infection, HIV / AIDS
Rituximab		174722-31-7				
rivastigmine	Carbamic acid, ethylmethyl-, 3[1-(dimethylamino)ethyl]phenyl ester, (S)-[CAS]	123441-03-2 129101-54-8	DE	3805744	Cognition enhancer	Alzheimer's disease

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rizatriptan	1H-Indole-3-ethanamine, N,N-dimethyl-5-(1H-1,2,4-triazol-1-ylmethyl)-, [CAS]	145202-66-0 159776-67-7 144034-80-0	EP 497512	Antimigraine	Migraine
RJR-2403	3-Buten-1-amine, N-methyl-4-(3-pyridinyl)-, (3E)-, (2E)-2-butenedioate (1:1) [CAS]	183288-99-5		Cognition enhancer	Alzheimer's disease
RNA Stealth Nucleosides	5-Formyluridine			Antiviral, other	Infection, hepatitis-C virus
Ro-0094889	2',3'-Di-O-acetyl-5'-vinylcytidine			Anticancer, antimetabolite	Cancer, general
Ro-61-1790	2-Pyridinesulfonamide, N-[6-(2-hydroxyethoxy)-5-(2-methoxyphenoxy)-2-[2-(1H-tetrazol-5-yl)-4-pyridinyl]-4-pyrimidinyl]-5-methyl-[CAS]	180384-56-9	WO 9619459	Cardiovascular	Haemorrhage, subarachnoid
Rociverine		53716-44-2			
rocuronium	Pyrrolidinium, 1-[(2β,3Alpha,5Alpha,16β,17β)-17-(acetyloxy)-3-hydroxy-2-(4-morpholinyl)androstan-16-yl]-1-(2-propenyl)-, bromide-[CAS]	104855-17-6 104884-91-5 119302-91-9 143558-00-3	EP 287150	Muscle relaxant	Muscle spasm, general
rofecoxib	2(5H)-Furanone, 4-(4-(methylsulfonyl)phenyl)-3-phenyl-[CAS]	162011-90-7	U.S. 5,474,995	Analgesic, NSAID	Arthritis, osteo
roflumilast	Benzamide, 3-(cyclopropylmethoxy)-N-(3,5-dichloro-4-pyridinyl)-4-(difluoromethoxy)-[CAS]	162401-32-3	WO 9501338	COPD treatment	Chronic obstructive pulmonary disease
rokitamycin	Leucomycin V, 4B-butanoate 3B-propanoate [CAS]	74014-51-0	U.S. 4,242,504	Macrolide antibiotic	Infection, general
Rolipram		61413-54-5			
Rolitetracycline		751-97-3			
Romurtide		78113-36-7			
Ronifibrate		42597-57-9			
ropinirole	2H-Indol-2-one, 4-[2-(dipropylamino)ethyl]-1,3-dihydro-, monohydrochloride-[CAS]	91374-20-8 91374-21-9	EP 266033	Antiparkinsonian	Parkinson's disease
ropivacaine	2-Piperidinecarboxamide, N-(2,6-dimethylphenyl)-1-propyl-, (S)-[CAS]	84057-95-4 98717-15-8	EP 239710	Anaesthetic, local	Anaesthesia
Roquinimex		84088-42-6			
rosaprostol	Cyclopentaneheptanoic acid, 2-hexyl-5-hydroxy-[CAS]	56695-65-9	GB 1523355	Prostaglandin	
Rosaramicin		35834-26-5			
Rose Bengal		632-68-8			
rosiglitazone	2,4-Thiazolidinedione, 5-((4-(2-methyl-2-pyridinylamino)ethoxy)phenyl)methyl)-, (Z)-2-butenedioate (1:1) [CAS]	122320-73-4 155141-29-0	U.S. 5,002,953	Antidiabetic	Diabetes, Type II
rosoxacin	3-Quinolinecarboxylic acid, 1-ethyl-1,4-dihydro-4-oxo-7-(4-pyridinyl)-[CAS]	40034-42-2	U.S. 3,753,993	Quinolone antibacterial	Infection, gonorrhoea

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rostaporfin	Tin, dichloro[ethyl 3,4,10,21-tetrahydro-4,9,14,19-tetraethyl-18,19-dihydro-3,8,13,18-tetramethyl-20-phorbinecarboxylato(2-)-kappaN23,kappaN24,kappaN25,kappaN26]-, (OC-6-13)-[CAS]	114494-17-6		Ophthalmological	Macular degeneration
rosuvastatin	6-Heptenoic acid, 7-(4-(4-fluorophenyl)-6-(1-methylethyl)-2-(methyl(methylsulfonyl)amino)-5-pyrimidinyl)-3,5-dihydroxy- (S-(R*,S*-(E))) [CAS]	147098-20-2	JP 2648897	Hypolipaemic/ Antiherosclerosis	Hyper-lipidaemia, general
rotigotine	1-Naphthalenol, 5,6,7,8-tetrahydro-6-[propyl[2-(2-thienyl)ethyl]amino]-, (S)-[CAS]	99755-59-6	U.S. 4,564,628	Antiparkinsonian	Parkinson's disease
Rotraxate		92071-51-7			
Roxarsone		121-19-7			
roxatidine	Acetamide, 2-(acetyloxy)-N-[3-(1-piperidinylmethyl)phenoxy]propyl]-, [CAS]	78628-28-1 93793-83-0	EP 24510	Antiulcer	Ulcer, gastric
roxifiban	L-Alanine, 3-((3-(4-(aminoiminomethyl)phenyl)-4,5-dihydro-5-isoxazolyl)acetyl)amino)-N-(butoxycarbonyl)-, methyl ester, (R)-, [CAS]	176022-59-6	U.S. 5,849,736	Antithrombotic	Thrombosis, general
Roxindol		112192-04-8			
roxithromycin	Erythromycin, 9-[O-[(2-methoxyethoxy)methyl]oxime][CAS]	80214-83-1 80214-86-4	EP 33255	Macrolide antibiotic	Infection, general
RPR-109881A	Benzenepropanoic acid, β-(((1,1-dimethylethoxy)carbonyl)amino)-Alpha-hydroxy-(1S,2S,4S,7R,8aR,9aS,10aR,12aS,12bR)-7,12a-bis(acetyloxy)-1-(benzoyloxy)-1,3,4,7,8,9,9a,10,10a,12,12a,12b-dodecahydro-2-hydroxy-5,13,13-trimethyl-8-oxo-2,6-methano-2H-cyclodeca(3,4)cyclopropa (4,5) benz (1,2-b) oxet-4-yl ester, dihydrate Alpha R, betaS [CAS]	192573-38-9		Anticancer, other	Cancer, lung, general
RPR-130401	4,9-Ethano-3aH-benz[f]isoindole-3a-carboxylicacid, 1,2,3,4,9,9a-hexahydro-2-[2-(2-methoxyphenyl)-1-oxo-2-propenyl]-9-(4-methylphenyl)-, (3aR,4S,9S,9aR)-rel-[CAS]	210282-69-2	WO 9829390	Anticancer, other	Cancer, general
R-roscovitine			U.S. 6,316,456	Anticancer, other	Cancer, lung, non-small cell
RS-0406	N'N'-bis(3-hydroxyphenyl)pyridazine-3,6-diamine			Neuroprotective	Alzheimer's disease
RSR-13		131179-95-8			
Rubijervine		79-58-3			
rubitecan	1H-Pyrano(3',4':6,7)indolizino(1,2-b)quinoline-3,14(4H,12H)-dione, 4-ethyl-4-hydroxy-10-nitro-, (S)-[CAS]	91421-42-0	U.S. 6,485,514	Anticancer, other	Cancer, pancreatic

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ruboxistaurin	9H,18H-5,21:12,17-Dimethenodibenzo[e,k]pyrrolo[3,4-h][1,4,13]oxadiazacyclohexadecine-18,20(19H)-dione,9-((dimethylamino)methyl)-6,7,10,11-tetrahydro-, (S)-[CAS]	169939-94-0		Symptomatic antidiabetic	Retinopathy, diabetic
Rufinamide		106308-44-5			
rufloxacin	7H-Pyrido[1,2,3-de]-1,4-benzothiazine-6-carboxylic acid, 9-fluoro-2,3-dihydro-10-(4-methyl-1-piperazinyl)-7-oxo-[CAS]	101363-10-4 102052-47-1	EP 165375	Quinolone antibacterial	Infection, general
rupatadine	5H-Benzo[5,6]cyclohepta[1,2-b]pyridine, 8-chloro-6,11-dihydro-11-[1-[(5-methyl-3-pyridinyl)methyl]-4-piperidinylidene]-, trihydrochloride-[CAS]	106017-08-7 156611-76-6	EP 0577957	Antiallergic, non-asthma	Rhinitis, allergic, seasonal
Rutin		153-18-4			
RWJ-54428	5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2Z)-(2-amino-5-chloro-4-thiazolyl)(hydroxyimino)acetyl]amino]-3-[(3-[[(2-aminoethyl)thio]methyl]-4-pyridinyl]thio]methyl]-4-	189448-35-9	WO 3713772	Cephalosporin, injectable	Infection, beta-lactamase resistant
S-0139	Olean-12-en-28-oic acid, 27-[[3-[5-hydroxy-2-[(4-methoxy-1,4-dioxo-2-butenyl)]amino]phenyl]-1-oxo-2-propenyl]oxy]-3-oxo-[CAS]	193969-54-9	WO 9727314	Cardiovascular	Ischaemia, cerebral
S-15535	Piperazine, 1-(2,3-dihydro-1,4-benzodioxin-5-yl)-4-(2,3-dihydro-1H-inden-2-yl)-[CAS]	146998-34-7		Cognition enhancer	Cognitive disorder, general
S-18886	1-Naphthalenepropanoic acid, 6-(((4-chlorophenyl)sulfonyl)amino)-5,6,7,8-tetrahydro-2-methyl [CAS]	165537-73-5		Antithrombotic	Thrombosis, general
S-34730	7-chloro-6-sulfamoyl-2-(1H)-quinoleinone-3-phosphonic acid			Neuroprotective	Unspecified
S-3578	7[b-[2-(5-amino-1,2,4-thiadiazol-3-yl)-2(Z)-ethoxyiminoacetamido]-3-(1-(N-methyl)aminopropyl)-1H-imidazo[4,5-b]pyridinium-4-methyl-3-cephem-4-carboxylate monosulfate			Cephalosporin, injectable	Infection, general
S-36496	2-[N-[4-[4-Chlorophenylsulfonyl)amino)butyl]-N-[3-[(4-isopropylthiazol-2-yl)methyloxy]benzyl]sulfamoyl]benzoic acid			Antiasthma	Asthma
S-36527	2-[N-[4-[4-Chlorophenylsulfonyl)amino)butyl]-N-[3-[(4-(4-cyclobutylthiazol-2-yl)ethyl]benzyl]sulfamoyl]benzoic acid			Antiasthma	Asthma

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S-5751	(1R,2R,3S,5S)-7-[2-(5-Hydroxybenzothiophen-3-ylcarboxamido)-6,6-dimethylbicyclo[3.1.1]hept-3-yl]-5(Z)-heptenoic acid			Antiallergic, non-asthma	Allergy, general
S-8510	Imidazo[4,5-d]pyrano[4,3-b]pyridine, 1,6,7,9-tetrahydro-2-(3-isoxazolyl)-, phosphate (1:1) [CAS]	151466-23-8	EP 556008	Cognition enhancer	Alzheimer's disease
S-8921	2-Naphthalenecarboxylis acid, 1-(3,4-dimethoxyphenyl)-3-(3-ethyl-1-oxopentyl)-4-hydroxy-6,7,8-trimethoxy-, methyl ester [CAS]	151165-96-7	WO 9308155	Hypolipaemic/ Antiatherosclerosis	Hypercholesterolaemia
Sabcomeline		159912-53-5			
Sabeluzole		104383-17-7			
S-Adenosylmethionine		29908-03-0			
safinamide	(S)-(+)-2-[4-(3-fluorobenzyloxy)benzylamino]propanamide methansulfonate	133865-89-1	AU 711309	Antiepileptic	Epilepsy, general
Salacetamide		487-48-9			
Salazosulfadimidine		2315-8-4			
salbutamol	1,3-Benzenedimethanol,Alpha1-[[(1,1-dimethylethyl)amino]methyl]-4-hydroxy- [CAS]	18559-94-9	EP 451745	Formulation, inhalable, topical, dry powder	Asthma
Salicin		138-52-3			
Salicyl Alcohol		90-01-7			
Salicylamide		65-45-2			
Salicylamide O-Acetic Acid		25395-22-6			
Salicylanilide		87-17-2			
Salicylic Acid		69-72-7			
Salicylsilfuric Acid		89-45-2			
Salinazid		495-84-1			
salmeterol	1,3-Benzenedimethanol, 4-hydroxy-Alpha1-[[[6-(4-phenylbutoxy)hexyl]amino]methyl]-, (±)-1-hydroxy-2-naphthalenecarboxylate [CAS]	89365-50-4 94749-08-3	WO 9006775	Antiasthma	Asthma
Salsalate		552-94-3			
Salverine		6376-26-7			
Samarium $_{153}$Sm Lexidronam		154427-83-5			
sampatrilat	L-Tyrosine, N2-(methylsulfonyl)-L-lysyl-1-[(2S)-3-amino-2-carboxypropyl]cyclopentanecarbonyl- [CAS]	129981-36-8	EP 358398	Antihypertensive, renin system	Hypertension, general
Sancycline		808-26-4			
Saperconazole		110588-57-3			
sapropterin	4(1H)-Pteridinone, 2-amino-6-(1,2-dihydroxypropyl)-5,6,7,8-tetrahydro-, dihydrochloride, [6R-[6R*(1R*,2S)]]- [CAS]	69056-38-8 62989-33-7	EP 191335	Antidepressant	Hyperphenylalaninaemia

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saquinavir	Butanediamide, N1-[3-[3-[[(1,1-dimethylethyl)amino]carbonyl]octahydro-2(1H)-isoquinolinyl]-2-hydroxy-1-(phenylmethyl)propyl]-2-[(2-quinolinylcarbonyl)amino]-, [3S-[2[1R*(R*),2S*],3Alpha,4aβ,8aβ]]-[CAS]	127779-20-8	EP 432695	Antiviral, anti-HIV	Infection, HIV/AIDS
Saralasin		34273-10-4			
saredutant	Benzamide, N-[4-[4-(acetylamino)-4-phenyl-1-piperidinyl]-2-(3,4-dichlorophenyl)butyl]-N-methyl-, (S)-[CAS]	142001-63-6	EP 474561	Antiasthma	Asthma
sarizotan	3-Pyridinemethanamine, N-((3,4-dihydro-2H-1-benzopyran-2-yl)methyl)-5-(4-fluorophenyl)-[CAS]	177975-08-5		Antiparkinsonian	Parkinson's disease
sarpogrelate	Butanedioic acid, mono[2-(dimethylamino)-1-[[2-[(3-methoxyphenyl)ethyl]phenoxy]methyl]ethyl] ester [CAS]	125926-17-2	EP 398326	Antithrombotic	
Satigrel		111753-73-2			
satraplatin	Platinum, bis(acetato-O)amminedichloro(cyclohexanamine)-, (OC-6-43)-[CAS]	129580-63-8	EP 328274	Anticancer, alkylating	Cancer, prostate
Satumomab		144058-40-2			
SB-237376	N-[3-[[2-(3,4-dimethoxyphenyl)ethyl]amino]propyl]-4-nitrobenzamide, HCl			Antiarrhythmic	Fibrillation, atrial
SB-238039	(5-(-2-phenylamino-4-pyrimidinyl)-4-)(4-fluorophenyl)-1-(4-piperidinyl)imidazole			Anticancer, other	Cancer, general
SB-277011	trans-N-[4-[2-(Cyano-1,2,3,4-tetrahydroisoquinolin-2-yl)ethyl]cyclohexyl]-4-quinolinecarboxamide			Neuroleptic	Schizophrenia
Scarlet Red		85-83-6			
SCH-00013	Benzonitrile, 4-[2-[3,6-dihydro-4-(1,4,5,6-tetrahydro-6-oxo-3-pyridazinyl)-1(2H)-pyridinyl]-1-hydroxyethyl]-[CAS]	217963-18-3	EP 618204	Cardiostimulant	Heart failure
Sch-23863	(2-[10,11-Dihydro-5-ethoxy-5H-dibenzo[a,d] cycloheptен-S-yl]-N,N-dimethyl-ethanamine			Immunosuppressant	Inflammation, general
saredutant	Benzamide, N-[4-[4-(acetylamino)-4-phenyl-1-piperidinyl]-2-(3,4-dichlorophenyl)butyl]-N-methyl-, (S)-[CAS]	142001-63-6	EP 474561	Antiasthma	Asthma
sarizotan	3-Pyridinemethanamine, N-((3,4-dihydro-2H-1-benzopyran-2-yl)methyl)-5-(4-fluorophenyl)-[CAS]	177975-08-5		Antiparkinsonian	Parkinson's disease
sarpogrelate	Butanedioic acid, mono[2-(dimethylamino)-1-[[2-[(3-methoxyphenyl)ethyl]phenoxy]methyl]-ethyl] ester [CAS]	125926-17-2	EP 398326	Antithrombotic	
Satigrel		111753-73-2			

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satraplatin	Platinum, bis(acetato-O)ammine dichloro(cyclohexanamine)-, (OC-6-43)-[CAS]	129580-63-8	EP 328274	Anticancer, alkylating	Cancer, prostate
Saturnomab		144058-40-2			
SB-237376	N-[3-[[2-(3,4-dimethoxyphenyl)ethyl]amino]propyl]-4-nitrobenzamide, HCl			Antiarrhythmic	Fibrillation, atrial
SB-238039	(5-(-2-phenylamino-4-pyrimidinyl)-4-)(4-fluorophenyl)-1-(4-piperidinyl)imidazole			Anticancer, other	Cancer, general
SB-277011	trans-N-[4-[2-(6-Cyano-1,2,3,4-tetrahydroisoquinolin-2-yl)ethyl]cyclohexyl]-4-quinolinecarboxamide			Neuroleptic	Schizophrenia
Scarlet Red		85-83-6			
SCH-00013	Benzonitrile, 4-[2-[3,6-dihydro-4-(1,4,5,6-tetrahydro-6-oxo-3-pyridazinyl)-1(2H)-pyridinyl]-1-hydroxyethyl]-[CAS]	217963-18-3	EP 618204	Cardiostimulant	Heart failure
Sch-23863	(2-[10,11-Dihydro-5-ethoxy-5H-dibenzo[a,d]cycloheptен-S-yl]-N,N-dimethyl-ethanamine			Immunosuppressant	Inflammation, general
sertaconazole	1H-Imidazole, 1-[2-[(7-chlorobenzo[b]thien-3-yl)methoxy]-2-(2,4-dichlorophenyl)ethyl]-[CAS]	99592-32-2	EP 151477	Antifungal	Infection, dermatological
sertindole	2-Imidazolidinone, 1-[2-[4-[5-chloro-1-(4-fluorophenyl)-1H-indol-3-yl]-1-piperidinyl]ethyl]-[CAS]	106516-24-9	EP 392959	Neuroleptic	Schizophrenia
sertraline	1-Naphthalenamine, 4-(3,4-dichlorophenyl)-1,2,3,4-tetrahydro-N-methyl-, (1S-cis)-[CAS]	79559-97-0 79617-96-2 79617-97-3 64294-95-7	EP 30081	Antidepressant	Depression, general
Setastine					
sevelamer	2-Propen-1-amine polymer with (chloromethyl)oxirane, hydrochloride [CAS]	152751-57-0 52757-95-6	U.S. 5,496,545	Urological	Renal failure
sevoflurane	Propane, 1,1,1,3,3,3-hexafluoro-2-(fluoromethoxy)-[CAS]	28523-86-6	DE 1954268	Anaesthetic, inhalation	Anaesthesia
SG-210	2H-1,4-Benzothiazine-2-acetic acid, 3,4-dihydro-3-oxo-4-((4,5,7-trifluoro-2-benzothiazolyl)methyl)-[CAS]	143162-65-6		Symptomatic antidiabetic	Neuropathy, diabetic
sibutramine	Cyclobutanemethanamine, 1-(4-chlorophenyl)-N,N-dimethyl-Alpha-(2-methylpropyl)-[CAS]	106650-56-0 84485-00-7	GB 2098602	Anorectic/ Antiobesity	Obesity
siccanin	(4aS-(4aAlpha,6aAlpha,11bAlpha,13aR*,13bAlpha))-1,2,3,4,4a,5,6a,11b,13b-decahydro-4,4,6a,9-tetramethyl-13H-benzo[a]furo[2,3,4-mn]xanthen-11-ol	22733-60-4	JP 37003548	Antifungal	
sildenafil	Piperazine, 1-((3-(4,7-dihydro-1-methyl-7-oxo-3-propyl-1H-pyrazolo(4,3-d)pyrimidin-5-yl)-4-ethoxyphenyl)sulfonyl)-4-methyl, 2-hydroxy-1,2,3-propanetricarboxylate-(1:1) [CAS]	171599-83-0 139755-83-2	WO 9428902	Male sexual dysfunction	Impotence

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silodosin	1H-Indole-7-carboxamide, 2,3-dihydro-1-(3-hydroxypropyl)-5-[(2R)-2-[[2-[2-(2,2,2-trifluoroethoxy)phenoxy]ethyl]amino]-propyl]-[CAS]	160970-54-7	EP 600675	Urological	Dysuria
Silver Lactate		128-00-7			
Sch-57790	1-Piperazineacetonitrile, 4-cyclohexyl-alpha-[4-[(S)-(4-methoxyphenyl)sulfinyl]phenyl]-[CAS]	221660-80-6		Cognition enhancer	Alzheimer's disease
Sch-63390	7H-Pyrazolo[4,3-e][1,2,4]triazolo[1,5-c]pyrimidin-5-amine, 2-(2-furanyl)-7-(3-phenylpropyl)-[CAS]	174648-45-4		Antiparkinsonian	Parkinson's disease
Scillarenin		465-22-5			
Scopolamine		51-34-3			
Scopolamine N-Oxide		97-75-6			
scopolamine	Benzeneacetic acid, Alpha-(hydroxymethyl)-, 9-methyl-3-oxa-9-azatricyclo[3.3.1.02,4]non-7-yl ester, [7(S)-(1Alpha.,2β,4β,5Alpha.,7β)]-[CAS]	51-34-3	U.S. 4,262,003	Formulation, transdermal, other	Nausea and vomitting, general
SCS technology			U.S. 6,046,188	Antiasthma	Unspecified
secalciferol	9,10-Secocholesta-5,7,10(19)-triene-3,24,25-triol, (3β,5Z,7E,24R)-[CAS]	55721-11-4	EP 301167	Osteoporosis treatment	Osteo-dystrophy
secnidazole	1H-Imidazole-1-ethanol, Alpha,2-dimethyl 5-nitro-[CAS]	3366-95-8	FR M3270	Protozoacide	Infection, trichomoniasis
Secobarbital		309-43-3			
selegiline	Benzeneethanamine, N,Alpha-dimethyl-N-2-propynyl, (R)-[CAS]	14611-51-9	GB 1153578	Antiparkinsonian	
Selenomethionine		1464-42-2			
Sematilide		101526-83-4			
Semotiadil		116476-13-2			
seocalcitol	1,3-Cyclohexanediol, 5-((1-(6-ethyl-6-hydroxy-1-methyl-2,4-octadienyl)octahydro-7a-methyl-4H-inden-4-ylidene)ethylidene)-4-methylene-, (1R-(1Alpha(1R*,2E,4E),3aβ,4E(1R*,3S*,5Z),7aAlpha))-[CAS]	134404-52-7	WO 9100855	Anticancer, other	Cancer, liver
Sepimostat		103926-64-3			
seratrodast	Benzeneheptanoic acid, zeta-(2,4,5-trimethyl-3,6-dioxo-1,4-cyclohexadien-1-yl)-, (+/−)-[CAS]	103187-07-1 112665-43-7	EP 232089	Antiasthma	Asthma
sertaconazole	1H-Imidazole, 1-[2-[(7-chlorobenzo[b]thien-3-yl)methoxy]-2-(2,4-dichlorophenyl)ethyl]-[CAS]	99592-32-2	EP 151477	Antifungal	Infection, derma-tological
sertindole	2-Imidazolidinone, 1-[2-[4-[5-chloro-1-(4-fluorophenyl)-1H-indol-3-yl]-1-piperidinyl]ethyl]-[CAS]	106516-24-9	EP 392959	Neuroleptic	Schizophrenia
sertraline	1-Naphthalenamine, 4-(3,4-dichlorophenyl)-1,2,3,4-tetrahydro-N-methyl-, (1S-cis)-[CAS]	79559-97-0 79617-96-2 79617-97-3 64294-95-7	EP 30081	Antidepressant	Depression, general
Setastine					

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sevelamer	2-Propen-1-amine polymer with (chloromethyl)oxirane, hydrochloride [CAS]	152751-57-0 52757-95-6	U.S.	5,496,545	Urological	Renal failure
sevoflurane	Propane, 1,1,1,3,3,3-hexafluoro-2-(fluoromethoxy)-[CAS]	28523-86-6	DE	1954268	Anaesthetic, inhalation	Anaesthesia
SG-210	2H-1,4-Benzothiazine-2-acetic acid, 3,4-dihydro-3-oxo-4-((4,5,7-trifluoro-2-benzothiazolyl)methyl)-[CAS]	143162-65-6			Symptomatic antidiabetic	Neuropathy, diabetic
sibutramine	Cyclobutanemethanamine, 1-(4-chlorophenyl)-N,N-dimethyl-Alpha-(2-methylpropyl)-[CAS]	106650-56-0 84485-00-7	GB	2098602	Anorectic/ Antiobesity	Obesity
siccanin	(4aS-(4aAlpha,6aAlpha,11bAlpha,13aR*,13bAlpha))-1,2,3,4,4a,5,6a,11b,13b-decahydro-4,4,6a,9-tetramethyl-13H-benzo[a]furo[2,3,4-mn]xanthen-11-ol	22733-60-4	JP	37003548	Antifungal	
sildenafil	Piperazine, 1-((3-(4,7-dihydro-1-methyl-7-oxo-3-propyl-1H-pyrazolo(4,3-d)pyrimidin-5-yl)-4-ethoxyphenyl)sulfonyl)-4-methyl, 2-hydroxy-1,2,3-propanetricarboxylate-(1:1) [CAS]	171599-83-0 139755-83-2	WO	9428902	Male sexual dysfunction	Impotence
silodosin	1H-Indole-7-carboxamide, 2,3-dihydro-1-(3-hydroxypropyl)-5-[(2R)-2-[[2-(2,2,2-trifluoroethoxy)phenoxy]ethyl]amino]-propyl]-[CAS]	160970-54-7	EP	600675	Urological	Dysuria
Silver Lactate		128-00-7				
Silver Picrate		146-84-9				
silver sulfadiazine	N'-2-pyrimidinylsulfanilamide monosilver salt	22199-08-2 68-35-9 154-82-5 14929-11-4			Anti-infective, other	Infection, general
Simetride						
Simfibrate						
simvastatin	Butanoic acid, 2,2-dimethyl-, 1,2,3,7,8,8a-hexahydro-3,7-dimethyl-8-[2-(tetrahydro-4-hydroxy-6-oxo-2H-pyran-2-yl)ethyl]-1-naphthalenyl ester, [1S-[1Alpha,3Alpha,7beta,8Beta(2S*,4S*),8aBeta]]-[CAS]	79902-63-9	U.S.	4,444,784	Hypolipaemic/ Antiatherosclerosis	Hyper-lipidaemia, general
Sincalide		25126-32-3				
Sintropium Bromide		79467-19-9				
Sisomicin		32385-11-8				
sitafloxacin	3-Quinolinecarboxylic acid, 7-(7-amino-5-azaspiro[2.4]hept-5-yl)-8-chloro-6-fluoro-1-(2-fluorocyclopropyl)-1,4-dihydro-4-oxo-, [1R-[1Alpha(S*),2Alpha]]-, hydrate	127254-12-0	EP	341493	Quinolone antibacterial	Infection, general
sitamaquine	1,6-Hexanediamine, N,N-diethyl-N'-(6-methoxy-4-methyl-8-quinolinyl)-[CAS]	5330-29-0 57695-04-2			Protozoacide	Infection, leishmaniasis
sitaxsentan	N-(4-Chloro-3-methyl-5-isoxazolyl)-2-[[4,5-(methylenedioxy)-o-tolyl]acetyl]-3-thiophenesulfonamide	184036-34-8	U.S.	5,464,853	Antihypertensive, other	Hypertension, pulmonary

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sivelestat	Glycine, N-[2-[[[4-(2,2-dimethyl-1-oxopropoxy)phenyl]sulfonyl]amino]benzoyl]-[CAS]	127373-66-4	EP 347168	Respiratory	Systemic inflammatory response syndrome
SJA-6017	Butanamide, 2-[[(4-fluorophenyl)sulfonyl]amino]-N-[(1S)-1-formyl-3-methylbutyl,],-3-methyl-, (2S)-[CAS]	190274-53-4	EP 771565	Ophthalmological	Cataract
SL-65-1498	6-Fluoro-9-methyl-2-phenyl-4-pyrrolidin-1-ylcarbonyl)-2,9-dihydro-1H-pyrido[3,4-b]indole-1-one		EP 607076	Anxiolytic	Anxiety, general
SLV-306	(3S,2'R)-3-[1-[2'-(Ethoxycarbonyl)-4'-phenyl-butyl-]cyclopentan-1-carbonyl]amino]-2,3,4,5-tetra-hydro-2-oxo-1H-benzapin-1-acetic acid			Antihypertensive, diuretic	Hypertension, general
SLV-308	2(3H)-Benzoxazolone, 7-(4-methyl-1-piperazinyl)-, monohydrochloride	269718-83-4		Antiparkinsonian	Parkinson's disease
Sm153 lexidronam	Samarate(5-)-153Sm, (((1,2-ethanediylbis(nitrilobis(methylene)))tetrakis(phosphonato))(8-)-N,N',O1P,O3P,O5P"",O7P"")-, pentasodium, (OC-6-21)-[CAS]	160369-78-8		Analgesic, other	Pain, cancer
S-Methylmethionine		4727-40-6			
SMP-300	N-(Aminoiminomethyl)-11-chloro-5,6,7,8-tetrahydro-8-oxo-4H-pyrrolo[3,2,1-k][1]benzazocine-2-carboxamide monomethanesulfonate monohydrate			Antianginal	Angina, general
SN-38	(4S)-4,7,11-triethyl-3,4,12,14-tetrahydro-4,10-dihydroxy-3,14-dioxo-1H-pyrano[3',4':6,7]indolizino[1,2-b]quinidin-9-yl	100286-90-6		Formulation, optimized, liposomes	Cancer, colorectal
SNAP-7941	((+)-methyl (4S)-3-[[(3-(4-[3-(acetylamino)phenyl]-1-piperidinyl)propyl)amino]carbonyl]-4-(3,4-difluorophenyl)-6-(methoxymethyl)-2-oxo-1,2,3,4-tetrahydro-5-pyrimidinecarboxylate hydrochloride)			Anxiolytic	Anxiety, general
SOA-132	2-Naphthalenecarboxamide, N-[2-[4-(diphenylmethoxy)-1-piperidinyl]ethyl]-3-hydroxy-5-(3-pyridinylmethoxy)-[CAS]	143964-80-1		Formulation, inhalable, topical	Asthma
soblidotin	L-valinamide, N,N-dimethyl-L-valyl-N-[2-methoxy-4-[2-[1-methoxy-2-methyl-2-oxo-3-((2-phenylethyl)amino]propyl]-1-pyrrolidinyl]-1-(2-methylpropyl)-4-oxobutyl]-N-methyl-, [2S-[1[1R*(R*),2S*],2R*(1S*,2S*)]]-[CAS]	149606-27-0	WO 9303054	Anticancer, other	Cancer, lung, non-small cell
Sobrerol		498-71-5			
sobuzoxane	Carbonic acid, 1,2-ethanediylbis[(2,6-dioxo 4,1-piperazinediyl)methylene]bis(2-methylpropyl) ester [CAS]	98631-95-9	EP 140327	Anticancer, other	Cancer, lymphoma, T-cell

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Sodium Arsanilate		127-85-5			
Sodium Arsphenamine		1936-28-3			
Sodium Chloride					
Sodium Dibunate		14992-59-7			
Sodium Folate		6484-89-5			
Sodium Formaldehy desulfoxylate		149-44-0			
Sodium Glycerophosphate		1334-74-3			
Sodium Hyaluronate					
Sodium Iodomethamate		519-26-6			
Sodium Nitrite		7632-00-0			
Sodium Nitroprusside		14402-89-2			
sodium oxybate	Butyric acid, 4-hydroxy monosodium salt [CAS]	502-85-2		Psychostimulant	Narcolepsy
Sodium Phenol-sulfonate		1300-51-2			
sodium phenylbutyrate	Butyric acid, 4-phenyl-, sodium salt-[CAS]	1716-12-7		Formulation, other	Hyper-ammonaemia
sodium phosphate	Sodium phosphate monobasic monohydrate + sodium phosphate dibasic anhydrous		U.S. 6,162,464	Formulation, oral, other	Surgery adjunct
sodium prasterone sulfate	3β-hydroxy-5-androsten-17-one(sodium sulfate dihydrate)		EP 380036	Formulation, mucosal, topical	Labour, induction
Sodium Propionate		137-40-6			
sodium salicylate	Benzoic acid, 2-hydroxy-, monosodium salt [CAS]	54-21-7		Formulation, oral, solubility-enhanced	Pain, general
Sodium Tetradecyl Sulfate		139-88-8			
sofalcone	Acetic acid, [5-[(3-methyl-2-butenyl)oxy]-2-[3-[4-[(3-methyl-2-butenyl)oxy]phenyl]-1-oxo-2-propenyl]phenoxy]-[CAS]	64506-49-6	GB 1523241	Antiulcer	
Solasulfone		133-65-3			
solifenacin	Butanedioic acid compd with (1S)-(3R)-1-azabicyclo(2.2.2)oct-3-yl 3,4-dihydro-1-phenyl-2(1H)-isoquinolinecarboxylate (1:1) [CAS]	242478-38-2		Urological	Overactive bladder
Sorbinicate	D-Glucitol, hexa-3-ptridinecarboxylate [CAS]	6184-06-1	BE 883352	Hypolipaemic/ Antiatherosclerosis	
Sorbitol		50-70-4			
Sorivudine		77181-69-2			
sotalol	Methanesulfonamide, N-[4-[1-hydroxy-2-[(1-methylethyl)amino]ethyl]phenyl]-[CAS]	3930-20-9		Antiarrhythmic	
Soterenol		959-24-0			
Sozoiodolic Acid		13642-52-9			
spaglumic acid	L-Glutamic acid, N-(N-acetyl-L-Alpha-aspartyl)-[CAS]	554-71-2 3106-85-2		Formulation, mucosal, topical	Conjunctivitis
sparfloxacin	3-Quinolinecarboxylic acid, 5-amino-1-cyclopropyl-7-(3,5-dimethyl-1-piperazinyl)-6,8-difluoro-1,4-dihydro-4-oxo-, cis-[CAS]	80619-64-3 110871-86-8	EP 221463	Quinolone antibacterial	Infection, respiratory tract, general

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Sparteine		90-39-1			
SPA-S-843	Candicin D, 18-decarboxy-40-demethyl-3,7-dideoxo-N3'-((dimethylamino)acetyl)-18-(((2-(dimethylamino)ethyl)amino)carbonyl)-3,7-dihydroxy-N47-methyl-5-oxo cyclic 15,19-hemiacetal, comp with L-ascorbic acid (1:2) [CAS]	202748-83-2	U.S. 5,298,495	Antifungal	Infection, fungal, general
Spasmolytol		25333-96-4			
SPD-754	2(1H)-Pyrimidinone, 4-amino-1-(2-(hydroxymethyl)-1,3-oxathiolan-4-yl-(2R-cis)-	160707-69-7	U.S. 6,228,860	Antiviral, anti-HIV	Infection, HIV/AIDS
Spectinomycin		1695-77-8			
SPI-339	4-[3-(4-Oxo-4,5,6,7-tetrahydroindol-yl)propionylamino]benzoic acid ethyl ester			Cognition enhancer	Alzheimer's disease
Spiperone		749-02-0			
spirapril	1,4-Dithia-7-azaspiro[4.4]nonane-8-carboxylic acid, 7-[2-[[1-(ethoxycarbonyl)-3-phenyl]propyl]amino]-1-oxopropyl]-, [8S-[7[R*(R*)],8R*]]-[CAS]	83647-97-6	EP 50800	Antihypertensive, renin system	Hypertension, general
Spirogermanium		41992-23-8			
spironolactone	Pregn-4-ene-21-carboxylic acid, 7-(acetylthio)-17-hydroxy-3-oxo-, Gamma-lactone,(7Alpha,17Alpha)-[CAS]	52-01-7	EP 124147	Formulation, dermal, topical	Acne
SR-121463	Benzamide, N-(1,1-dimethylethyl)-4-[[cis-5'-ethoxy-4-[2-(4-morpholinyl)ethoxy]-2'-oxospiro[cyclohexane-1,3'-[3H]indol]-1'(2'H)-yl]sulfonyl]-3-methoxy-[CAS]	185913-78-4	WO 9715556	Cardiostimulant	Heart failure
SR-144190	Morpholine, 4-benzoyl-2-(3,4-difluorophenyl)-2-[2-[4-[[(dimethylamino)carbonyl]amino]-4-phenyl-1-piperidinyl]ethyl]-, (2R)-[CAS]	201152-86-5	WO 9623787	Anxiolytic	Anxiety, general
SR-146131	1H-Indole-1-acetic acid, 2-[[[4-(4-chloro-2,5-dimethoxyphenyl)-5-(2-cyclohexylethyl)-2-thiazolyl]amino]carbonyl]-5,7-dimethyl-[CAS]	221671-61-0	WO 9915525	Anorectic/ Antiobesity	Obesity
SR-271425	N-[1-[2-(diethylamino)ethyl]amino]-7-methoxy-9-oxo-9H-thioxanthen-4-ylmethyl]formamide			Anticancer, alkylating	Cancer, general
SR-27897	1H-Indole-1-acetic acid, 2-[[[4-(2-chlorophenyl)-2-thiazolyl]amino]carbonyl]-[CAS]	136381-85-6	EP 432040	Anticancer, other	Cancer, pancreatic
SR-31747	Cyclohexanamine, N-(3-(3-chloro-4-cyclohexylphenyl)-2-propenyl)-N-ethyl-, hydrochloride, (Z)-[CAS]	132173-07-0	EP 376850	Anticancer, other	Cancer, myeloma
SR-58611	Acetic acid, [[(7S)-7-[[(2R)-2-(3-chlorophenyl)-2-hydroxyethyl]amino]-5,6,7,8-tetrahydro-2-naphthalenyl]oxy]-, ethyl ester, hydrochloride [CAS]	121524-09-2	EP 303546	GI inflammatory/ bowel disorders	Irritable bowel syndrome

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SS732			U.S. 5,385,900	Formulation, mucosal, topical	Infection, ocular
SS-750	(R)-(−)-2-(2,4-difluorophenyl)-1-(ethylsulfonyl)-1,1-difluoro-3-(1H-1,2,4-triazol-1-yl)-2-propanol		U.S. 6,083,968	Antifungal	Infection, fungal, general
β-alethine	Propanamide, N,N′(dithiodi-2,1-ethanediyl)bis(3-amino)-[CAS]	646-08-2		Anticancer, immunological	Cancer, myeloma
SSR-149415	(2S,4R)-1-[5-chloro-1-[(2,4-dimethoxyphenyl)sulfonyl]-3-(2-methoxy-phenyl)-2-oxo-2,3-dihydro-1H-indol-3-yl]-4-hydroxy-N,N-dimethyl-2-pyrrolidone carboxamide		WO 0155130	Antidepressant	Depression, general
SSR-180575	2-(7-chloro-5-methyl-4-oxo-3-phenyl-4,5-dihydro-3H-pyridazino[4,5-6]indol-1-yl)-N,N-dimethylacetamide			Neuroprotective	Unspecified
SSR-181507	(3-Exo)-8-benzoyl-N-[[(2S)-7-chloro-2,3-dihydro-1,4-benzodioxin-2-yl]methyl]-8-azabicyclo[3.2.1]octane-3-methanamine HCl		U.S. 6,221,879	Neuroleptic	Schizophrenia
SSR-591813	(5aS,8S,10aR)-5a,6,9,10-tetrahydro, 7H,11H-8,10a-methanopyrido[2′,3′:5,6]pyrano[2,3-d]azepine			Dependence treatment	Addiction, nicotine
SST-101	D-Glucitol, 1,4:3,6-dianhydro-, dinitrate [CAS]	87-33-2		Formulation, transdermal, other	Angina, general
SSY-726	(−)-(R)-3-Methyl-3-(methylsulfonyl)-1-(1,2,4-triazol-1-yl)-2-[4-(trifluoromethyl)-phenyl]-2-butanol		U.S. 5,147,886	Antifungal	Infection, fungal, general
ST-200	1-Propanaminium, 2-(acetyloxy)-3-carboxy-N,N,N-trimethyl-, chloride, (R)-[CAS]	5080-50-2	DE 3015635	Cognition enhancer	Dementia, senile, general
stachyfilin			WO 9711947	Antiviral, other	Infection, influenza virus
Stallimycin		636-47-5			
Stampidine			U.S. 6,350,736	Antiviral, anti-HIV	Infection, HIV/AIDS
Stannous Pyrophosphate		15578-26-4			
stannsoporfin	(OC-6-13)-Dihydrogen dichloro[7,12-diethyl-3,8,13,17-tetramethyl-21H,23H-porphine-2,18-dipropanoato(4-)-N21,N22,N23,N24]stannate(2-)	106344-20-1		Hepatoprotective	Hyperbilirubinaemia
Stanolone		521-18-6			
Stanozolol		10418-03-8 (2′H form); 302-96-5 (1′H form)			
Staph aureus ther			U.S. 6,376,652	Genomics-based drug discovery	Infection, MRSA

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STAT4 inhibitors			WO	9629341	Immunosuppressant	Unspecified
stavudine	Thymidine, 2',3'-didehydro-3'-deoxy-[CAS]	3056-17-5	EP	501511	Antiviral, anti-HIV	Infection, HIV/AIDS
Stenbolone		5197-58-0				
stepronim	Glycine, N-[1-oxo-2-[(2-thienylcarbonyl)thio]propyl]-[CAS]	72324-18-6	U.S.	4,242,354	Antitussive	Cough
Stibocaptate		27279-76-1				
Stibophen		15489-16-4				
Stilbamidine		122-06-5				
stiripentol	1-Penten-3-ol, 1-(1,3-benzodioxol-5-yl)-4,4-dimethyl-[CAS]	49763-96-4			Antiepileptic	Epilepsy, general
Streptodornase		37340-82-2				
Streptomycin		57-92-1				
Streptonicozid		5667-71-0				
Streptonigrin		3930-19-6				
Streptozocin		18883-66-4				
strontium ranelate	3-Thiopheneacetic acid, 5-[bis(carboxymethyl)amino]-2-carboxy-4-cyano-, strontium salt (1:2)-[CAS]	135459-87-9	EP	415850	Osteoporosis treatment	Osteoporosis
strontium-89 chloride	Strontium chloride (89SrCl2) [CAS]	38270-90-5			Analgesic, other	Pain, cancer
Succimer		304-55-2				
Succinimide		123-56-8				
Succinylcholine		55-94-7				
Succinylcholine		71-27-2				
Succinylsulfathiazole		116-43-8				
Succisulfone		5934-14-5				
Suclofenide		30279-49-3				
sucralfate	Aluminium, hexadeca-μ-hydroxytetracosahydroxy(μ8-(1,3,4,6-tetra-O-sulfo-β-D-fructofuranosyl-Alpha-D-glucopyranoside tetrakis(hydrogen sulfato)(8-))hexadeca-[CAS]	54182-58-0	JP	58208233	Antiulcer, Formulation, oral, other	Ulcer, general
sufentanil	Propanamide, N-[4-(methoxymethyl)-1-[2-(2-thienyl)ethyl]-4-piperidinyl]-N-phenyl-[CAS]	56030-54-7	U.S.	3,998,834	Analgesic, other, formulation implant	Pain, general
sulbactam	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 3,3-dimethyl-7-oxo-, 4,4-dioxide, (2S-cis)-[CAS]	68373-14-8	GB	2000138	Antibiotic, other	Infection, general
sulbactam + ampicillin		117060-71-6	U.S.	4,234,579	Antibiotic, other	Infection, general
sulbenicillin	4-Thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, 3,3-dimethyl-7-oxo-6-[(phenylsulfoacetyl)amino]-, [2S-[2Alpha,5Alpha,6β(S*)]]-[CAS]	28002-18-8 41744-40-5	GB	1289358	Penicillin, injectable	Infection, pseudomonal
Sulbentine		350-12-9				
sulbutiamine	Propanoic acid, 2-methyl-, dithiobis[3-[1-[[4-amino-2-methyl-5-pyrimidinyl]methyl]formylamino]-ethylidene]-3,1-propanediyl] ester [CAS]	3286-46-2 67-16-3			Neurological	Unspecified

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sulconazole	1H-Imidazole, 1-[2-[[(4-chlorophenyl)methyl]thio]-2-(2,4-dichlorophenyl)ethyl]-, (+/−)-[CAS]	61318-90-9 61318-91-0	U.S. 4,055,652	Antifungal	Infection, fungal, general
Sulesomab		167747-19-5			
Sulfabenzamide		127-71-9			
Sulfacetamide		144-80-9			
Sulfachlorpyridazine		80-32-0			
Sulfachrysoidine		485-41-6			
Sulfacytine		17784-12-2			
Sulfadiazine		68-35-9			
Sulfadicramide		115-68-4			
Sulfadimethoxine		122-11-2			
Sulfadoxine		2447-57-6			
Sulfaethidole		94-19-9			
Sulfaguanidine		57-67-0			
Sulfaguanole		27031-08-9			
Sulfalene		152-47-6			
Sulfaloxic Acid		14376-16-0			
Sulfamerazine		127-79-7			
Sulfameter		651-06-9			
Sulfamethazine		57-68-1			
Sulfamethizole		144-82-1			
Sulfamethomidine		3772-76-7			
Sulfamethoxazole		723-46-6			
Sulfamethoxy-pyridazine		80-35-3			
Sulfametrole		32909-92-5			
Sulfamidochrysoidine		103-12-8			
Sulfamoxole		729-99-7			
Sulfanilamide		63-74-1			
Sulfanilic Acid		121-57-3			
Sulfanilylurea		547-44-4			
Sulfaperine		599-88-2			
Sulfaphenazole		526-08-9			
Sulfaproxyline		116-42-7			
Sulfapyrazine		116-44-9			
Sulfapyridine		144-83-2			
Sulfarside		1134-98-1			
Sulfarsphenamine		618-82-6			
sulfasalazine	Benzoic acid, 2-hydroxy-5-[[4-[(2-pyridinylamino)sulfonyl]phenyl]azo]-[CAS]	599-79-1		Formulation, oral, enteric-coated	Arthritis, rheumatoid
Sulfasomizole		632-00-8			
Sulfasymazine		1984-94-7			
Sulfathiazole		72-14-0			
Sulfathiourea		515-49-1			
Sulfinalol		66264-77-5			
Sulfinpyrazone		57-96-5			
Sulfiram		95-05-6			
Sulfisomidine		515-64-0			
Sulfisoxazole		127-69-5			

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Sulfobromophthalein		71-67-0			
Sulfonethylmethane		76-20-0			
Sulfoniazide		3691-81-4			
Sulfonmethane		115-24-2			
Sulforidazine		14759-06-9			
Sulfoxone		144-75-2			
sulindac	cis-5-fluoro-2-methyl-1-[(p-methylsulfinyl)benzylidene]indene-3-acetic acid	38194-50-2	U.S. 3,725,548	Anti-inflammatory	Inflammation, general
Sulisatin		54935-03-4			
Sulisobenzone		4065-45-6			
Sulmarin		29334-07-4			
Sulmazole		73384-60-8			
Suloctidil		54063-56-8			
Sulphan Blue		129-17-9			
sulpiride	Benzamide, 5-(aminosulfonyl)-N-[(1-ethyl-2-pyrrolidinyl)methyl]-2-methoxy-[CAS]	15676-16-1		Alimentary/ Metabolic, other	
silprostone	5-Heptenamide, 7-[3-hydroxy-2-(3-hydroxy-4-phenoxy-1-butenyl)-5-oxocyclopentyl]-N-(methylsulfonyl)-, [1R-[1Alpha(Z),2β(1E,3R*),3Alpha]]-[CAS]	60325-46-4	U.S. 4,024,179	Prostaglandin	Abortion
sultamicillin	4-Thia-1-azabicyclo(3.2.0)heptane-2-carboxylic acid, 6-((aminophenylacetyl)amino)-3,3-dimethyl-7-oxo-, (((3,3-dimethyl-7-oxo-4-thia-1-azabicyclo(3.2.0)hept-2-yl)carbonyl)oxy)methyl ester, S, S-dioxide, (2S-(2.alpha.(2R*.5S*),5.alpha..6.beta.(S*)))-[CAS]	117060-71-6 76497-13-7	GB 2044255	Penicillin, oral	Infection, general
Suthiame		61-56-3			
sultopride	Benzamide, N-[(1-ethyl-2-pyrrolidinyl)methyl]-5-(ethylsulfonyl)-2-methoxy-[CAS]	53583-79-2	FR M5916	Neuroleptic	Psychosis, general
Sultosilic Acid		57775-26-5			
sumanirole	4H-Imidazo[4,5,1-ij]quinolin-2(1H)-one, 5,6-dihydro-5-(methylamino)-, (5R)-, (2Z)-2-butenedioate (1:1) [CAS]	179386-44-8	WO 9514020	Antiparkinsonian	Parkinson's disease
sumatriptan	1H-Indole-5-methanesulfonamide, 3-[2-(dimethylamino)ethyl]-N-methyl-, butanedioate (1:1)-[CAS]	103628-46-2 103628-48-4	EP 147107	Antimigraine	Migraine
SUN-N8075	1-(4-amino-2,3,5-trimethylphenoxy)-3-(4-[4-(4-fluorobenzyl)phenyl]piperazin-1-yl)propan-2(s)-ol dimethanesulfonate			Neuroprotective	Infarction, cerebral
suplatast	Sulfonium, [3-[[4-(3-ethoxy-2-hydroxypropoxy)phenyl]amino]-3-oxopropyl]dimethyl-, [CAS]	94055-76-2	JP 59167564	Antiasthma	Asthma
Suprofen		40828-46-4			
Suramin		129-46-4			

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TABLE IV-continued

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surfactant TA	Benactant [CAS]	108778-82-1	WO 91177766	Lung Surfactant	Respiratory distress syndrome, general
Suriclone		53813-83-5			
Suxibuzone		27470-51-5			
SYM-1010			U.S. 5,830,998	Antiapileptic	Epilepsy, general
SYM-2081	L-Glutamic acid, 4-methyl-, (4R)-[CAS]	31137-74-3		Analgesic, other	Pain, general
SYM-2207	4-(Aminophenyl)-1-methyl-6,7-(methylenedioxy)-N-butyl-1,2-dihydrophthalazine-2-carboxamide			Neuroprotective	Ischaemia, cerebral
Symclosene		87-90-1			
Syn-1253	1-cyclopropyl-6-fluoro-8-methoxy-7-[3-(4-methyl-1,2,3-triazol-1-yl)pyrrolidin-1-yl]-4-oxo-1,4-dihydroquinoline 3-carboxylic acid			Quinolone antibacterial	Infection, perifoneum
Syn-2190	1-Azetidinesulfonic acid, 3-[[(2E)-[[(1,4-dihydro-1,5-dihydroxy-4-oxo-2-pyridinyl)methoxy]imino]-2-thienyl]acetyl]amino]-2-methyl-4-oxo, (2S,3S)-[CAS]	214963-75-4	WO 9847895	Antibacterial, other	Infection, general
Syn-2869	3H-1,2,4-Triazol-3-one, 4-(4-(4-((1R,2R)-2-(2,4-difluorophenyl)-2-hydroxy-1-methyl-3-(1H-1,2,4-triazol-1-yl)propyl)-1-piperazinyl)phenyl)-2,4-dihydro-2((4-(trifluoromethoxy)phenyl)methyl)-[CAS]	210562-98-4	U.S. 6,153,616	Antifungal	Infection, Aspergillus
Synephrine		94-07-5			
Syrosingopine		84-36-6			
T-1095	1-Propanone, 3-(5-benzofuranyl)-1-(2-hydroxy-6-((6-O-methoxycarbonyl)-β-D-glucopyranosyl)oxy)-4-methylphenyl-[CAS]	209746-59-8	EP 850948	Antidiabetic	Diabetes, general
T-1249	L-Phenylalaninamide, N-acetyl-L-tryptophyl-L-glutaminyl-L-Alpha-glutamyl-L-tryptophyl-L-Alpha-glutamyl-L-glutaminyl-L-lysyl-L-isoleucyl-L-threonyl-L-alanyl-L-leucyl-L-leucyl-L-Alpha-glutamyl-L-glutaminyl-L-alanyl-L-glutaminyl-L-isoleucyl-L-glutaminyl-L-glutaminyl-L-Alpha-glutamyl-L-lysyl-L-Alpha-glutamyl-asparaginyl-L-tyrosyl-L-Alpha-glutamyl-L-leucyl-L-glutaminyl-L-lysyl-L-leucyl-L-Alpha-aspartyl-L-lysyl-l-tryptophyl-L-anaanyl-L-seryl-L-leucyl-L-tryptophyl-L-Alpha-glutamyl-L-tryptophyl-[CAS]	251562-00-2	WO 9959615	Antiviral, anti-HIV	Infection, HIV/AIDS
T-3912	1-cyclopropyl-8-methyl-7-[5-methyl-6-(methylamino)-3-pyridinyl]-4-oxo-1,4-dihydro-3-quinolinecarboxylic acid			Quinolone antibacterial	Infection, derma-tological

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T-588	Benzo(b)thiophene-5-methanol, Alpha-((2-(diethylamino)ethoxy)methyl)-, hydrochloride, (R)-[CAS]	142935-03-3	EP	565965	Cognition enhancer	Alzheimer's disease
T-67	Benzenesulfonamide, 2,3,4,5,6-pentafluoro-N-(3-fluoro-4-methoxyphenyl)-[CAS]	195533-53-0			Anticancer, other	Cancer, liver
T-82			U.S.	5,190,951	Cognition enhancer	Alzheimer's disease
TA-2005	2(1H)-Quinolinone, 8-hydroxy-5-[1-hydroxy 2-[[2-(4-methoxyphenyl)-1-methylethyl]amino]ethyl]-, monohydrochloride, [R-(R*,R*)]-[CAS]	137888-11-0	U.S.	4,579,854	Antiasthma	Asthma
TA-2005	2(1H)-Quinolinone, 8-hydroxy-5-[1-hydroxy 2-[[2-(4-methoxyphenyl)-1-methylethyl]amino]ethyl]-, monohydrochloride, [R-(R*,R*)]-[CAS]		WO	189480	Formulation, inhalable, solution	Asthma
TA-993	1,5-Benzothiazepin-4(5H)-one, 3-(acetyloxy)-5-[2-(dimethylamino)ethyl]-2,3-dihydro-8-methyl-2-(4-methylphenyl)-, (2R,3R)-rel-(−)-, (2Z)-2-butenedioate [CAS]	122024-98-0	JP	01045376	Antithrombotic	Peripheral vascular disease
tabimorelin	(R)-Alpha-[(E)-5-Amino-N,5-dimethyl-2-hexenamido]-N-methyl-N-[(R)-Alpha-(methylcarbamoyl)phenethyl]-2-naphthalenepropionamide	170851-70-4 193079-69-5			Releasing hormones	Growth hormone deficiency
tacalcitol	9,10-Secocholesta-5,7,10(19)-triene-1,3,24-triol, (1Alpha,3β,5Z,7E,24R)-[CAS]	57333-96-7 93129-94-3	EP	129003	Antipsoriasis	Keratosis
tacedinaline	Benzamide, 4-(acetylamino)-N-(2-aminophenyl)-[CAS]	112522-64-2	DE	3613571	Anticancer, other	Cancer, pancreatic
tacrine	9-Acridinamine, 1,2,3,4-tetrahydro-[CAS]	1684-40-8 321-64-2 104987-11-3	EP	332147	Cognition enhancer	Alzheimer's disease
Tacrolimus						
tadalafil	Pyrazino(1',2':1,6)pyrido(3,4-b)indole 1,4-dione, 6-(1,3-benzodioxol-5-yl)-2,3,6,7,12,12a-hexahydro-2-methyl-, (6R-trans) [CAS]	171596-29-5	U.S.	6,143,746	Male sexual dysfunction	Impotence
tafenoquine	1,4-Pentanediamine, N4-[2,6-dimethoxy-4-methyl-5-[3-(trifluoromethyl)phenoxy]-8-quinolinyl]-[CAS]	106635-80-7 106635-81-8 80065-55-0	U.S.	4,617,394	Antimalarial	Infection, malaria
tafluposide		179067-42-6	WO	9612727	Anticancer, other	Cancer, general
TAK-375	(S)-N-[2-(1,6,7,8-Tetrahydro-2H-indeno-[5,4-b]furan-8-yl)]propionamide				Hypnotic/ Sedative	Insomnia
TAK-427	2-[6-[[3-[4-(Diphenylmethoxy)-piperidino]imidazo[1,2-b]pyridazin-2-yl-2-methylpropionic acid dihydrate				Antipruritic/ allergic	Eczema, atopic
TAK-559	(E)-4-[4-[5-Methyl-2-phenyl-1,3-oxazol-4-yl)methoxy]benzyl(oxyimino]-4-phenylbutyric acid				Antidiabetic	Diabetes, general

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Taka-Diastase		9001-19-8			
talampanel	7H-1,3-Dioxolo[4,5-h][2,3]benzodiazepine,7-acetyl-5-(4-aminophenyl)-8,9-dihydro-8-methyl-,(8R)-[CAS]	161832-65-1	U.S. 5,639,751	Antiepileptic	Epilepsy, general
Talampicillin		47747-56-8			
talaporfin	N-[(2S,3S)-18-Carboxy-2-(2-carboxyethyl)-13-ethyl-2,3-dihydro-3,7,12,17-tetramethyl-8-vinyl porphyrin-20-yl]acetyl]-L-aspartic acid	220201-34-3		Radio/ chemosensitizer	Cancer, lung, general
Talastine		16188-61-7			
Talbutal		115-44-6			
Talinolol		57460-41-0			
talipexole	4H-Thiazolo[4,5-d]azepin-2-amine, 5,6,7,8-tetrahydro-6-(2-propenyl)-[CAS]	101626-70-4	DE 3503963	Antiparkinsonian	Schizophrenia
talnetant	4-Quinolinecarboxamide, 3-hydroxy-2-phenyl-N-[(1S)-1-phenylpropyl]-[CAS]	36085-73-1	WO 9532948	GI inflammatory/ bowel disorders	Irritable bowel syndrome
talniflumate	3-Pyridinecarboxylic acid, 2-[[3-(trifluoromethyl)phenyl]amino]-, 1,3-dihydro-3-oxo-1-isobenzofuranyl ester [CAS]	66898-62-2	BE 858864	Anti-inflammatory	Inflammation, ocular
taltirelin	L-Prolinamide, N-[(hexahydro-1-methyl-2,6-dioxo-4-pyrimidinyl)carbonyl]-L-histidyl-, (S)-[CAS]	103300-74-9	JP 61033197	Neurological	Dyskinesia, general
tamoxifen	Ethanamine, 2-[4-(1,2-diphenyl-1-butenyl)phenoxy]-N,N-dimethyl-, (Z)-[CAS]	10540-29-1	U.S. 4,536,516	Anticancer, hormonal	
tamsulosin	Benzenesulfonamide, 5-[2-[[2-(2-ethoxyphenoxy)ethyl]amino]propyl]-2-methoxy-, (R)-[CAS]	106133-20-4 80223-99-0	EP 34432	Prostate disorders	Benign prostatic hyperplasia
tandospirone	4,7-Methano-1H-isoindole-1,3(2H)-dione, hexahydro-2-[4-[4-(2-pyrimidinyl)-1-piperazinyl]butyl]-, (3aAlpha,4β,7β,7aAlpha)-, 2-hydroxy-1,2,3-propanetricarboxylate (1:1) [CAS]	112457-95-1 87760-53-0	EP 82402	Anxiolytic	Anxiety, general
Tannoform		9010-29-1			
Taprostene		108945-33-3			
tariquidar	3-Quinolinecarboxamide, N-[2-[[[4-[2-(3,4-dihydro-6,7-dimethoxy-2(1H)-isoquinolinyl)ethyl]phenyl]amino]carbonyl]-4,5-dimethoxyphenyl]-[CAS]	206873-63-4	WO 9817648	Radio/ chemosensitizer	Cancer, lung, non-small cell
TAS-103	6-[[2-(Dimethyl-amino)ethyl]amino]-3-hydroxy-7H-indeno[2,1-c]quinolin-7-one dihydrochloride	174634-09-4	WO 9532187	Anticancer, other	Cancer, lung, non-small cell
Tasosartan		145733-36-4			
Taurocholic Acid		81-24-3			
Taurolidine		19388-87-5			
tazanolast	Acetic acid, oxo[[3-(1H-tetrazol-5-yl)phenyl]amino]-, butyl ester [CAS]	82989-25-1	U.S. 4,778,816	Antiasthma	

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tazarotene	3-Pyridinecarboxylic acid, 6-[(3,4-dihydro-4,4-dimethyl-2H-1-benzothiopyran-6-yl)ethynyl]-, ethyl ester [CAS]	118292-40-3	EP	284288	Antipsoriasis	Psoriasis
Tazobactam tazobactam + piperacillin		89786-04-9	JP	58225091	Antibiotic, other	Infection, general
TBC-3711		374680-51-0			Cardiovascular	Heart failure
TCH-346	N-Methyl-N-propargyl-10-aminomethyl-dibenzo(b,f)oxepin				Neuroprotective	Amyotrophic lateral sclerosis
tebipenem	5-Hexenoic acid, 4-hydroxy-, polymer with 4-ethenyl-1H-imidazole [CAS]	82200-24-6			Beta-lactam antibiotic	Infection, streptococcal
tecadenoson	Adenosine, N-[(3R)-tetrahydro-3-furanyl]- [CAS]	204512-90-3	WO	9808855	Antiarrhythmic	Tachycardia, supra-ventricular
tecastemizole	1H-Benzimidazol-2-amine, 1-((4-fluorophenyl)methyl)-N-4-piperidinyl- [CAS]	75970-99-9	U.S.	4,219,559	Antiallergic, non-asthma	Rhinitis, allergic, seasonal
Technetium ^{99m}Tc Bicisate		121281-41-2				
Technetium ^{99m}Tc Mertiatide		125224-05-7; 104348-91-6				
Technetium ^{99m}Tc Sestamibi		109581-73-9				
Technetium ^{99m}Tc Teboroxime		104716-22-5				
Teclothiazide		4267-5-4				
Teclozan		5560-78-1				
tedisamil	Spiro[cyclopentane-1,9'-[3,7]diazabicyclo[3.3.1]nonane], 3',7'-bis(cyclopropylmethyl)-[CAS]	90961-53-8	EP	102833	Antiarrhythmic	Fibrillation, atrial
Tefluране		124-72-1				
tegafur	2,4(1H.3H)-Pyrimidinedione, 5-fluoro-1-(tetrahydro-2-furanyl)-[CAS]	17902-23-7	GB	1168391	Anticancer, antimetabolite	Cancer, general
tegafur + uracil	2,4(1H.3H)-Pyrimidinedione, 5-fluoro-1-(tetrahydro-2-furanyl)-, mixt. with 2,4(1H.3H)-pyrimidinedione-[CAS]	74578-38-4	EP	224885	Anticancer, antimetabolite	Cancer, breast
tegaserod	Hydrazinecarboximidamine, 2-((5-methoxy-1H-indol-3-yl)methylene)-N-pentyl-, (Z)-2-butenedioate [CAS]	189188-57-6 145158-71-0			GI inflammatory/ bowel disorders	Irritable bowel syndrome
Teicoplanin		61036-64-4				
telbivudine	β-L-2'-deoxythymidine	3424-98-4			Antiviral, other	Infection, hepatitis-B virus
Telenzepine		80880-90-6				
telithromycin	3-De((2,6-dideoxy-3-C-methyl-3-O-methyl-Alpha-L-ribo-hexopyranosyl)oxy)-11,12-dideoxy-6-O-methyl-3-oxo-12,11-(oxycarbonyl((4-(4-(3-pyridinyl)-1H-imidazol-1-yl)butyl)imino))-[CAS]	191114-48-4	EP	680967	Macrolide antibiotic	Infection, respiratory tract, general

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telmesteine	3,4-Thiazolidinedicarboxylic acid, 3-ethyl ester, (R)-[CAS]	122946-43-4		COPD treatment	Bronchitis, chronic
telmisartan	(1,1'-Biphenyl)-2-carboxylic acid, 4'-((1,4-dimethyl-2'-propyl(2,6'-bi-1H-benzimidazol)-1'-yl)methyl)-[CAS]	144701-48-4	EP 502314	Antihypertensive, renin system	Hypertension, general
telomerase inhibs			WO 9941261	Anticancer, other	Cancer, general
temazepam	7-chloro-1,3-dihydro-3-hydroxy-1-methyl-5-phenyl-2H-1,4-benzodiazepin-2-one	846-50-4	U.S. 3,197,467	Hypnotic/ Sedative	Insomnia
temiverine	Benzeneacetic acid, Alpha-cyclohexyl-Alpha-hydroxy-, 4-(diethylamino)-1,1-dimethyl-2-butyny ester, [CAS]	129927-33-9	GB 2222828	Urological	Pollakisuria
temocapril	1,4-Thiazepine-4(5H)-acetic acid, 6-[[1-(ethoxycarbonyl)-3-phenylpropyl]amino]tetrahydro-5-oxo-2-(2-thienyl)-, [2S-[2Alpha,6β(R*)]]-[CAS]	102090-90-4 110221-44-8 111902-57-9	U.S. 4,495,188	Antihypertensive, renin system	Hypertension, general
Temocillin		66148-78-5			
temoporfin	Phenol, 3,3',3'',3'''-(2,3-dihydro-21H,23H-porphine-5,10,15,20-tetrayl)tetrakis-[CAS]	122341-38-2	EP 337601	Radio/ chemosensitizer	Cancer, head and neck
temozolomide	Imidazo[5,1-d]-1,2,3,5-tetrazine-8-carboxamide, 3,4-dihydro-3-methyl-4-oxo-[CAS]	85622-93-1	DE 3231255	Anticancer, alkylating	Cancer, brain, general
tenatoprazole	1H-Imidazo(4,5-b)pyridine, 5-methoxy-2-(((4-methoxy-3,5-dimethyl-2-pyridinyl)methyl)sulfinyl)-[CAS]	113712-98-4	U.S. 4,808,596	Antiulcer	Ulcer, gastric
Tenecteplase		191588-94-0			
Tenidap		120210-48-2			
teniposide	Furo[3',4':6,7]naphtho[2,3-d]-1,3-dioxol-6(5aH)-one, 5,8,8a,9-tetrahydro-5-(4-hydroxy-3,5-dimethoxyphenyl)-9-[[4,6-O-(2-thienylmethylene)-β-D-glucopyranosyl]oxy]-, [5R-[5Alpha,5aβ,8aAlpha,9β(R*)]]-[CAS]	29767-20-2	U.S. 3,524,844	Anticancer, other	Cancer, lymphoma, non-Hodgkin's
tenofovir	Phosphonic acid, (((1R)-2-(6-amino-9H-purin-9-yl)-1-methylethoxy)methyl)-[CAS]	147127-20-6		Antiviral, anti-HIV	Infection, HIV/AIDS
tenofovir disoproxil	2,4,6,8-tetraoxa-5-phosphanonanedioic acid, 5-(2-(6-amino-9H-purin-9-yl)-1-methylethoxy)methyl) bis(1-methylethyl)ester, 5-oxide (R)-, (E)-2-butenedioate	202138-50-9		Antiviral, anti-HIV	Infection, HIV/AIDS
Tenonitrozole		3810-35-3			
tenoxicam	2H-Thieno[2,3-e]-1,2-thiazine-3-carboxamide, 4-hydroxy-2-methyl-N-2-pyridinyl-, 1,1-dioxide [CAS]	59804-37-4	GB 1519811	Antiarthritic, other	
Tenuazonic Acid		610-88-8			
teprenone	5,9,13,17-Nonadecatetraen-2-one, 6,10,14,18-tetramethyl-[CAS]	3796-63-2 6809-52-5		Antiulcer	
terazosin	Piperazine, 1-(4-amino-6,7-dimethoxy-2-quinazolinyl)-4-[(tetrahydro-2-furanyl)carbonyl]-[CAS]	63074-08-8 63590-64-7 70024-40-7	U.S. 4,112,097	Antihypertensive, adrenergic	Hypertension, general

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terbinafine	1-Naphthalenemethanamine, N-(6,6-dimethyl-2-hepten-4-ynyl)-N-methyl-, (E)-[CAS]	78628-80-5 91191-71-6	EP	24587	Antifungal	Infection, dermatological
terbutaline	1,3-Benzenediol, 5-[2-[(1,1-dimethylethyl)amino]-1-hydroxyethyl]-[CAS]	23031-25-6			Formulation, mucosal, topical	Dysmenorrhoea
terconazole	Piperazine, 1-[4-[[2-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-ylmethyl)-1,3-dioxolan-4-yl]methoxy]phenyl]-4-(1-methylethyl)-, cis-[CAS]	67915-31-5	U.S.	4,358,449	Antifungal	Vaginitis
terfenadine	1-Piperidinebutanol, Alpha-[4-(1,1-dimethylethyl)phenyl]-4-(hydroxydiphenylmethyl)-[CAS]	50679-08-8	U.S.	3,878,217	Antiallergic, non-asthma	
terguride	Urea, N,N-diethyl-N'-[(8Alpha)-6-methylergolin-8-yl]-[CAS]	37686-84-3	EP	159522	Antiprolactin	Hyperprolactinaemia
Terlipressin		14636-12-5				
Terodiline		15793-40-5				
Terofenamate		29098-15-5				
Terpin		80-53-5				
terfalolol	2-Propanol, 1-[(3,4-dihydro-2H-1-benzothiopyran-8-yl)oxy]-3-[(1,1-dimethylethyl)amino]-, hydrochloride, (+/-)-[CAS]	33580-30-2 83688-84-0 34784-64-0	GB	1308191	Antihypertensive, adrenergic	Hypertension, general
tert-Pentyl Alcohol		75-85-4				
tesaglitazar	(2S)-2-ethoxy-3-[4-[2-[4-[(methylsulfonyl)oxy]phenyl]ethoxy]phenyl]propanoic acid				Antidiabetic	Diabetes, Type II
tesmilifene	Ethanamine, N,N-Diethyl-2-(4-(phenylmethyl)phenoxy)-[CAS]	92981-78-7			Radio/ chemosensitizer	Cancer, breast
Testolactone		968-93-4				
Testosterone	androst-4-en-3-one, 17-hydroxy-, (17β)-[CAS]	58-22-0 5949-44-0			Formulation, transdermal, systemic	Hormone replacement therapy
tetrabamate		60763-47-5	DE	2748794	Anxiolytic	Addiction, alcohol
Tetrabarbital		76-23-3				
Tetrabenazine		58-46-8				
Tetracaine		136-47-0				
Tetrachloroethylene		127-18-4				
tetracrine	Benzoic acid, 4-(butylamino)-, 2-(dimethylamino)ethyl ester [CAS]	94-24-6			Formulation, transdermal, systemic	Pain, general
tetracycline	2-Naphthacenecarboxamide, 4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,6,10,112,12a-pentahydroxy-6-methyl-1,11-dioxo-, [4S-(4Alpha,4aAlpha,5aAlpha,6β,12aAlpha)]-[CAS]	60-54-8			Formulation, oral, other	Infection, oral
Tetrahydrozoline		84-22-0				
Tetrandrine		518-34-3				

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Tetrantoin		52094-70-9			
Tetrazepam		10379-14-3			
Tetrofosmin		127502-06-1			
tetroxoprim	2,4-Pyrimidinediamine, 5-[[3,5-dimethoxy-4-(2-methoxyethoxy)phenyl]methyl]-[CAS]	53808-87-0	U.S. 3,992,379	Trimethoprim and analogues	Infection, general
Tevenel ®		74515-38-1			
tezacitabine	Cytidine, 2'-deoxy-2'-(fluoromethylene)-, (2E)-[CAS]	4302-95-8			
		130306-02-4	U.S. 5,616,702	Anticancer, antimetabolite	Cancer, colorectal
tezosentan	2-Pyridinesulfonamide, N-(6-(2-hydroxyethanoxy)-5-(2-methoxyphenoxy)-2-(2-(1H-tetrazol-5-yl)-4-pyridinyl)-4-pyrimidinyl)-5-(1-methylethyl)-[CAS]	180384-57-0		Cardiostimulant	Oedema, general
thalidomide	1H-Isoindole-1,3(2H)-dione, 2-(2,6-dioxo-3-piperidinyl)-[CAS]	50-35-1		Dermatological	Infection, derma-tological
Thenaldine		86-12-4			
Thenyldiamine		91-79-2			
Theobromine		83-67-0			
Theofibrate		54504-70-0			
theophylline	1H-Purine-2,6-dione, 3,7-dihydro-1,3-dimethyl-[CAS]	58-55-9		Formulation, modified-release, other	Asthma
		5967-84-0			
Thiabendazole		148-79-8			
Thiacetazone		104-06-3			
thiacynserine	Carbamic acid, [4-(1-methylethyl)phenyl]-, (3aS,8aS)-3,3a,8,8a-tetrahydro-3a,8-dimethyl-2H-thieno[2,3-b]indol-5-yl ester [CAS]	145209-51-4		Cognition enhancer	Alzheimer's disease
Thialbarbital		467-36-7			
Thiamine		59-43-8			
Thiamine		154-87-0			
Thiamine		67-16-3			
Thiamiprine		5581-52-2			
Thiamphenicol		15318-45-3			
Thianylal		77-27-0			
Thiazesim		5845-26-1			
Thiazinamium		58-34-4			
Thiazolinobutazone		54749-86-9			
Thiazolsulfone		473-30-3			
Thibenzazoline		6028-35-9			
Thiethylperazine		1420-55-9			
Thimerfonate		5964-24-9			
Thimerosal		54-64-8			
Thiobarbital		77-32-7			
Thiobutabarbital		2095-57-0			
Thiocarbamizine		91-71-4			
Thiocarbarsone		120-02-5			
Thiocolchicine		2730-71-4			
Thiocresol		26445-03-4			
Thioctic Acid		62-46-4			

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Thioglycerol		96-27-5			
Thioguanine		154-42-7			
Thioinrag	L-Thiolyrosinyl-glycinyl-glycine			Anticancer, immunological	Cancer, general
Thiopental		71-73-8			
Thiopropazate		84-06-0			
Thioproperazine		316-81-4			
Thioridazine		50-52-2			
Thiothixene		5591-45-7			
Thiovir	Thiophosphonoformic acid			Antiviral, anti-HIV	Infection, HIV/AIDS
Thiphenamil		82-99-5			
Thiram		137-26-8			
Thonzylamine		63-56-9			
Thozalinone		655-05-0			
Thromboplastin		9035-58-9			
Thurfyl Nicotinate		70-19-9			
thymectacin			U.S. 6,245,750	Anticancer, other	Cancer, colorectal
Thymol		89-83-8			
Thymopentin		69558-55-0			
Thymyl N-Isoamylcarbamate		578-20-1			
Thyropropic Acid		51-26-3			
Thyroxine		51-48-9			
Tiadenol		6964-20-1			
tiagabine	3-Piperidinecarboxylic acid, 1-[4,4-bis(3-methyl-2-thienyl)-3-butenyl]-, (R)-[CAS]	115103-54-3	WO 8700171	Antiepileptic	Epilepsy, general
Tiamenidine		31428-61-2			
tianeptine	Heptanoic acid, 7-[(3-chloro-6,11-dihydro-6-methyldibenzo[c,f][1,2]thiazepin-11-yl)amino]-, S,S-dioxide [CAS]	72797-41-2 66981-73-5	GB 1269551	Antidepressant	Depression, general
tiapride	Benzamide, N-[2-(diethylamino)ethyl]-2-methoxy-5-(methylsulfonyl)-[CAS]	51012-32-9	GB 1394563	Neuroleptic	
tiaprofenic acid	2-Thiopheneacetic acid, 5-benzoyl-Alpha-methyl-[CAS]	33005-95-7	GB 1331505	Antiarthritic, other	
Tiaramide		32527-55-2			
tiazofurin	4-Thiazolecarboxamide, 2-β-D-ribofuranosyl-[CAS]	60084-10-8	EP 54432	Anticancer, antimetabolite	Cancer, leukaemia, chronic myelogenous
Tibezonium		54663-47-7			
tibolone	19-Norpregn-5(10)-en-20-yn-3-one, 17-hydroxy-7-methyl-, (7Alpha,17Alpha)-[CAS]	5630-53-5	EP 389035	Menopausal disorders	Hormone replacement therapy
Ticarcillin		34787-01-4			
ticlopidine	Thieno[3,2-c]pyridine, 5-[(2-chlorophenyl)methyl]-4,5,6,7-tetrahydro-[CAS]	53885-35-1 55142-85-3	GB 1554424	Antithrombotic	
Tiecynafen		40180-04-9			

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TABLE IV-continued

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tiemonium	4-(3-hydroxy-3-phenyl-3-thien-2-yl-propyl)-4-methylmorpholinium	6252-92-2 144-12-7		Antispasmodic	
tigecycline	2-Naphthacenecarboxamide, 4,7-bis(dimethylamino)-9-[[[(1,1-dimethylethyl)amino]acetyl]amino]-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-, (4S,4aS,5aR,12aS)-[CAS]	220620-09-7	EP 582829	Tetracycline	Infection, general
Tigemonam		102507-71-1			
Tigloidine		495-83-0			
Tilidine		20380-58-9			
Tilisolol		85136-71-6			
tilmacoxib	Benzenesulfonamide, 4-(4-cyclohexyl-2-methyl-5-oxazolyl)-2-fluoro-[CAS]	180200-68-4	WO 9619463	Alimentary/ Metabolic, other	Polyp
tiludronic acid	Phosphonic acid, [[(4-chlorophenyl)thio]methylene]bis-[CAS]	89987-06-4	EP 100718	Osteoporosis treatment	Paget's disease
Timentin		86482-18-0		Antibiotic, other	Infection, general
timepidium	Piperidinium, 3-(di-2-thienylmethylene)-5-methoxy-1,1-dimethyl-, [CAS]	35035-05-3	GB 1358446	Antispasmodic	
Timiperone		57648-21-2			
timolol	(-)-1-(t-butylamino)-3-[(4-morpholino-1,2,5-thiadiazol-3-yl)oxy]-2-propanolmaleate (1:1) salt	26839-75-8 26921-17-5 444-27-9	GB 1253709	Antihypertensive, adrenergic, antiglaucoma	
Tinonacic		113471-15-1			
Tin Ethyl Etiopurpurin					
tinazoline	1H-Indole, 3-[(4,5-dihydro-1H-imidazol-2-yl)thio]-[CAS]	62882-99-9	U.S. 3,376,311	Vasodilator, peripheral	
Tinidazole		19387-91-8			
Tinoridine		24237-54-5			
Tiocarlide		910-86-1			
Tioclomarol		22619-35-8			
tioconazole	1H-Imidazole, 1-[2-[(2-chloro-3-thienyl)methoxy]-2-(2,4-dichlorophenyl)ethyl]-[CAS]	61675-64-7 65899-73-2	U.S. 4,062,966	Antifungal	Infection, fungal, general
tiopronin	Glycine, N-(2-mercapto-1-oxopropyl)-[CAS]	1953-02-2	U.S. 3,246,025	Urological	Homo-cystinuria
tiotropium	3-Oxa-9-azoniatricyclo(3.3.1.02,4)nonane, 7-((hydroxydi-2-thienylacetyl)oxy)-9,9-dimethyl-, [CAS]	136310-93-5	EP 418716	COPD treatment	Chronic obstructive pulmonary disease
Tioxolone		4991-65-5			
Tipepidine		5169-78-8			
tipifarnib	2(1H)-Quinolone, 6-(amino(4-chlorophenyl)(1-methyl-1H-imidazol-5-yl)methyl)-4-(3-chlorophenyl)-1-methyl [CAS]	192185-68-5 192185-72-1	WO 9716443	Anticancer, other	Cancer, breast

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
tipranavir	N-[3-[1(R)-[4-Hydroxy-2-oxo-6(R)-(2-phenylethyl)-6-propyl-5,6-dihydro-2H-pyran-3-yl]propyl]phenyl]-5-(trifluoromethyl)pyridine-2-sulfonamide	174484-41-4		Antiviral, anti-HIV	Infection, HIV/AIDS
tiquizium	2H-Quinolizinium, 3-(di-2-thienylmethylene)octahydro-5-methyl-, [CAS]	71731-58-3	U.S. 4,205,074	Antispasmodic	
tirapazamine	1,2,4-Benzotriazin-3-amine, 1,4-dioxide- [CAS]	20028-80-2 27314-97-2 5424-06-6	DE 2204574	Radio/ chemosensitizer	Cancer, lung, non-small cell
Tiratricol		51-24-1			
tirilazad	Pregna-1,4,9(11)-triene-3,20-dione, 21-[4-(2,6-di-1-pyrrolidinyl-4-pyrimidinyl)-1-piperazinyl]-16-methyl-, (16Alpha)-, [CAS]	110101-65-0 110101-67-2 110101-66-1	WO 8701706	Neuroprotective	Haemorrhage, subarachnoid
tirofiban	L-Tyrosine, N-(butylsulfonyl)-O-[4-(4-piperidinyl)butyl]-, [CAS]	142373-60-2 144494-65-5	EP 478363	Antithrombotic	Infarction, myocardial
tiropramide	Benzenepropanamide, Alpha-(benzoylamino)-4-[2-(diethylamino)ethoxy]-N,N-dipropyl-, (+/−)-[CAS]	55837-29-1	DE 2503992	Antispasmodic	Muscle spasm, general
Titanium Sulfate		13825-74-6			
tixocortol	Pregn-4-ene-3,20-dione, 21-[(2,2-dimethyl-1-oxopropyl)thio]-11,17-dihydroxy-, (11β)- [CAS]	55560-96-8 61951-99-3	GB 1475795	Antiallergic, non-asthma, mucosal, topical	Rhinitis, allergic, general
tizanidine	2,1,3-Benzothiadiazol-4-amine, 5-chloro-N-(4,5-dihydro-1H-imidazol-2-yl)-[CAS]	51322-75-9	GB 1429926	Muscle relaxant	Spastic paralysis
TLK-199	Glycine, L-Gamma-glutamyl-S-(phenylmethyl)-L-cysteinyl-2-phenyl-, diethyl ester, (2R)-[CAS]	168682-53-9	U.S. 5,679,643	Immunostimulant, other	Myelo-dysplastic syndrome
TLK-286	Glycine, L-Gamma-glutamyl-3-[[2-([bis[bis(2-chloroethyl)amino]phosphinyl]oxy)ethyl]-sulfonyl]-L-alanyl-2-phenyl-, (2R)-[CAS]	158382-37-7	U.S. 5,545,621	Anticancer, other	Cancer, ovarian
TNF-β analogue			RU 2035185	Anticancer, immunological	Cancer, general
TNP-470		129298-91-5			
TO-186	Pregna-1,4-diene-3,20-dione, 9-fluoro-11β,17,21-trihydroxy-16beta.-methyl-, 17-butyrate 21-propionate [CAS]	5534-02-1		Antipruritic/inflamm, allergic	
tobramycin	O-3-amino-3-deoxy-Alpha-D-glucopyranosyl-(1,6)-O-(2,6-diamino-2,3,6-trideoxy-Alpha-D-ribo-hexopyranosyl-(1-4)-2-deoxy-[CAS]	32986-56-4		Formulation, inhalable, topical	Infection, respiratory tract, general
tocainide	Propanamide, 2-amino-N-(2,6-dimethylphenyl)-[CAS]	41708-72-9	U.S. 4,218,477	Antiarrhythmic	Fibrilation, ventricular
Tocamphyl		5634-42-4			
tocladesine	8-Chloroadenosine 3′5′-cyclic phosphate	41941-56-4		Anticancer, other	Cancer, colorectal
Tocoretinate		40516-48-1			
Todralazine		14679-73-3			

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Tofenacin		15301-93-6			
tofimilast	5H-Pyrazolo[3,4-c]-1,2,4-triazolo[4,3-a]pyridine,9-cyclopentyl-7-ethyl-6,9-dihydro-3-(2-thienyl)-	185954-27-2		Antiasthma	Asthma
tofisopam	5H-2,3-Benzodiazepine, 1-(3,4-dimethoxyphenyl)-5-ethyl-7,8-dimethoxy-4-methyl-[CAS]	22345-47-7	GB 1334271	Anxiolytic	Anxiety, general
Tolazamid		1156-19-0			
Tolazolin		59-98-3			
Tolbutamide		64-77-7			
tolcapone	Methanone, (3,4-dihydroxy-5-nitrophenyl)(4-methylphenyl)-[CAS]	134308-13-7	EP 237929	Antiparkinsonian	Parkinson's disease
tolciclate	Carbamothioic acid, methyl(3-methylphenyl)-, O-(1,2,3,4-tetrahydro-1,4-methanonaphthalen-6-yl) ester [CAS]	50838-36-3	GB 1364407	Antifungal	Infection, derma-tological
Tolcyclamide		664-95-9			
tolevamer	Benzenesulfonic acid, 4-ethenyl-, homopolymer.	28038-50-8		Antibacterial, other	Infection, Clostridium, general
tolfenamic acid	Benzoic acid, 2[(3-chloro-2-methylphenyl)amino]-[CAS]	13710-19-5	DE 1543295	Anti-inflammatory	Inflammation, general
Tolindate		27877-51-6			
Tolipralol		2933-94-0			
Tolmetin		26171-23-3			
Tolnaftate		2398-96-1			
Tolonidine		4201-22-3			
Tolonium		92-31-9			
toloxatone	2-Oxazolidinone, 5-(hydroxymethyl)-3-(3-methylphenyl)-[CAS]	29218-27-7	GB 1250538	Antidepressant	
Tolperisone		728-88-1			
Tolpropamine		5632-44-0			
Tolrestat		82964-04-3			
tolserine	Carbamic acid, (2-methylphenyl)-, (3aS,8aR)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl ester [CAS]	145209-30-9		Cognition enhancer	Alzheimer's disease
tolterodine	Phenol, 2-(3-(bis(1-methylethyl)amino)-1-phenylpropyl)-4-methyl-, (R)-[CAS]	124937-51-5	EP 325571	Urological	Incontinence
tolvaptan	Benzamide, N-[4-[(7-chloro-2,3,4,5-tetrahydro-5-hydroxy-1H-1-benzazepin-1-yl)carbonyl]-3-methylphenyl]-2-methyl-[CAS]	150683-30-0	EP 450097	Cardiovascular	Heart failure
Tolycaine		3686-58-6			
Topiramate	Beta-D-Fructopyranose, 2,3:4,5-bis-O-(1-methylethylidene)-, sulfamate [CAS]	97240-79-4	EP 533483	Antiepileptic	Epilepsy, generalized, tonic-clonic
topoisomerase inhibitors			U.S. 5,733,880	Anticancer, other	Cancer, general

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topotecan	1H-Pyrano[3',4':6,7]indolizino[1,2-b]quinoline-3,14(4H,12H)-dione, 9-[(dimethylamino)methyl]-4-ethyl-4,10-dihydroxy-, (S)-[CAS]	123948-87-8	EP 231122	Anticancer, other	Cancer, ovarian
torasemide	3-Pyridinesulfonamide, N-[[(1-methylethyl)amino]carbonyl]-4-[(3-methylphenyl)amino]-[CAS]	56211-40-6	U.S. 4,018,929	Antihypertensive, diuretic	Hypertension, general
torcetapib	ethyl (2R,4S)-4-[[3,5-bis(trifluoromethyl)benzyl](methoxycarbonyl)amino]-2-ethyl-6-(trifluoromethyl)-3,4-dihydroquinoline-1(2H)-carboxylate	262352-17-0		Hypolipaemic/ Antiatherosclerosis	Athero-sclerosis
torcitabine	β-L-2'Deoxycytidine			Antiviral, other	Infection, hepatitis-B virus
toremifene	Ethanamine, 2-[4-(4-chloro-1,2-diphenyl-1-butenyl)phenoxy]-N,N-dimethyl-, (Z)-[CAS]	89778-26-7	EP 95875	Anticancer, hormonal	Cancer, breast
Torsemide		89778-27-8 56211-40-6			
Tositumomab		208921-02-2			
tosufloxacin	1,8-Naphthyridine-3-carboxylic acid, 7-(3-amino-1-pyrrolidinyl)-1-(2,4-difluorophenyl)-6-fluoro-1,4-dihydro-4-oxo-, [CAS]	100490-36-6 115964-29-9	U.S. 4,704,459	Quinolone antibacterial	Infection, urinary tract
tramadol	Cyclohexanol, 2-[(dimethylamino)methyl]-1-(3-methoxyphenyl)-, cis-(+/-)-[CAS]	27203-92-5 36282-47-0		Analgesic, other	Pain, general
Tramazoline		1082-57-1			
trandolapril	1H-Indole-2-carboxylic acid, 1-[2-[(1-carboxy-3-phenylpropyl)amino]-1-oxopropyl]octahydro-, [2S-[1[R*(R*)],2Alpha,3aAlpha,7aβ]]-[CAS]	87679-71-8 87679-37-6 52-53-9	DE 3151690	Antihypertensive, renin system	Hypertension, general
tranexamic acid	Cyclohexanecarboxylic acid, 4-(aminomethyl)-, trans-[CAS]	1197-18-8	U.S. 3,950,405	Antifibrinolytic	Menstrual disorder, general
tranilast	Benzoic acid, 2-[[3-(3,4-dimethoxyphenyl)-1-oxo-2-propenyl]amino]-[CAS]	53902-12-8	U.S. 3,940,422	Vulnerary	Wound healing
trans-retinoic acid	Retinoic acid [CAS]	302-79-4		Anticancer, other	Cancer, general
Tranylcypromine		155-09-9			
trapidil	[1,2,4]Triazolo[1,5-a]pyrimidin-7-amine, N,N-diethyl-5-methyl-[CAS]	15421-84-8	DD 55956	Vasodilator, coronary	
Trastuzumab		180288-69-1			
travoprost	5-Heptenoic acid, 7-(3,5-dihydroxy-2-(3-hydroxy-4-(3-(trifluoromethyl)phenoxy)-1-butenyl)cyclopentyl)-, 1-methylethylester (1R(1Alpha(Z),2β(1E,3R*),3Alpha,5Alpha)) [CAS]	157283-68-6		Formulation, mucosal, topical	Glaucoma
Traxanox		58712-69-9			
traxoprodil	1-Piperidineethanol, 4-hydroxy-Alpha-(4-hydroxyphenyl)-β-methyl-4-phenyl-, (AlphaS,βS)-[CAS]	134234-12-1 188591-67-5		Analgesic, other	Pain, general

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API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
trazodone	1,2,4-Triazolo[4,3-a]pyridin-3(2H)-one, 2-[3-[4-(3-chlorophenyl)-1-piperazinyl]propyl]-[CAS]	19794-93-5 25332-39-2	U.S. 4,215,104	Antidepressant	
Trenacamra		155576-45-7			
Trenbolone		10161-33-8			
Trengestone		5192-84-7			
treosulfan	1,2,3,4-Butanetetrol, 1,4-dimethanesulfonate, [S-(R*,R*)]-[CAS]	299-75-2	WO 8401506	Anticancer, alkylating	
trepibutone	Benzenebutanoic acid, 2,4,5-triethoxy-Gamma-oxo-[CAS]	41826-92-0	GB 1387733	Antispasmodic	
treprostinol	Prosta-5,13-dien-1-oic acid, 6,9-epoxy-11,15-dihydroxy-, [5Z,9Alpha,11Alpha,13E,15S]-[CAS]	35121-78-9 61849-14-7	U.S. 6,054,486	Formulation, parenteral, other	Hypertension, pulmonary
tretinoin	Retinoic acid [CAS]	302-79-4		Formulation, dermal, topical	Acne
tretoquinol	6,7-Isoquinolinediol, 1,2,3,4-tetrahydro-1-[(3,4,5-trimethoxyphenyl)methyl]-, (S)-[CAS]	18559-59-8 30418-38-3 21650-42-0 24305-27-9	ZA 6802416	Antiasthma	
TRH		226214-49-9			
TRI-50b	TRI 50b [CAS]			Antithrombotic	Thrombosis, general
Triacetin		102-76-1			
Triamcinolone Acetonide		76-25-5			
Triamcinolone Benetonide		31002-79-6			
Triamcinolone Hexacetonide		5611-51-8			
triamcinolone	Pregna-1,4-diene-3,20-dione, 9-fluoro-11,21-dihydroxy-16,17-[(1-methylethylidene)bis(oxy)]-, (11β,16Alpha)-[CAS]	76-25-5 124-94-7		Formulation, inhalable, topical	Asthma
Triamterene		396-01-0			
triapine	Triapine [CAS]	236392-56-5	U.S. 6,458,816	Anticancer, antimetabolite	Cancer, leukaemia, general
Triaziquone		68-76-8			
triazolam	8-chloro-6-(2-chlorophenyl)-1-methyl-4H-[1,2,4]-triazolo[4,3-a][1,4]benzodiazepine	28911-01-5	U.S. 3,980,790	Hypnotic/ Sedative	Insomnia
Tribenoside		10310-32-4			
Trichlorfon		52-68-6			
Trichlormethiazide		133-67-5			
Trichlormethine		555-77-1			
Trichloroethylene		79-01-6			
Triclobisonium		79-90-3			
Triclocarban		101-20-2			
Triclofenol Piperazine		5714-82-9			
Triclofos		306-52-5			
Triclosan		3380-34-5			
Tricromyl		85-90-5			

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Tridihexethyl Iodide		125-99-5			
trientine	1,2-Ethanediamine, N,N2-bis(2aminoethyl)-, [CAS]	38260-01-4		Metabolic and enzyme disorders	Wilson's disease
		112-24-3			
Triethanolamine		102-71-6			
Triethylenemelamine		51-18-3			
Triethylenephosphoramide		545-55-1			
Triethylenethiophosphoramide		52-24-4			
Trifluoperazine		117-89-5			
Trifluperidol		749-13-3			
Triflupromazine		146-54-3			
trifluridine	Thymidine, Alpha,Alpha,Alpha-trifluoro- [CAS]	70-00-8	U.S. 3,201,387	Antiviral, other	Infection, herpes virus, general
trifusal	Benzoic acid, 2-(acetyloxy)-4-(trifluoromethyl)-[CAS]	322-79-2	U.S. 4,096,252	Antithrombotic	Thrombosis, general
Trihexyphenidyl		52-49-3			
triolstane	Androst-2-ene-2-carbonitrile, 4,5-epoxy-3,17-dihydroxy-, (4Alpha,5Alpha,17β)- [CAS]	13647-35-3	U.S. 3,296,255	Anticancer, hormonal	Cancer, breast
Trimazosin		35795-16-5			
trimebutine	Benzoic acid, 3,4,5-trimethoxy-, 2-(dimethylamino)-2-phenylbutyl ester, (Z)-2-butenedioate (1:1) [CAS]	34140-59-5	DE 2151716	Antispasmodic	
		39133-31-8			
Trimecaine		616-68-2			
Trimeprazine		84-96-8			
Trimetazidine		5011-34-7			
Trimethadione		127-48-0			
Trimethaphan		68-91-7			
Trimethobenzamide		138-56-7			
Trimethoprim		738-70-5			
Trimetozine		635-41-6			
trimetrexate	2,4-Quinazolinediamine, 5-methyl-6-[[(3,4,5-trimethoxyphenyl)amino]methyl]- [CAS]	52128-35-5	U.S. 4,391,809	Antifungal	Infection, *Pneumocystis jiroveci*
		82952-64-5			
trimipramine	5H-Dibenz[b,f]azepine-5-propanamine, 10,11-dihydro-N,N,β-trimethyl-, (Z)-2-butenedioate (1:1) [CAS]	521-78-8		Antidepressant	
		739-71-9			
Trimoprostil		69900-72-7			
Trioxsalen		3902-71-4			
tripamide	Benzamide, 3-(aminosulfonyl)-4-chloro-N-(octahydro-4,7-methano-2H-isoindol-2-yl)-, (3aAlpha,4Alpha,7Alpha,7aAlpha)-[CAS]	73803-48-2	JP 7305585	Antihypertensive, diuretic	Hypertension, general
Triparanol		78-41-1			
Tripelennamine		91-81-6			
Triprolidine		486-12-4			
triptorelin	Luteinizing hormone-releasing factor (pig), 6-D-tryptophan-[CAS]	124508-66-3	U.S. 4,010,125	Releasing hormones	Cancer, prostate
		57773-63-4			

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tritiozine	Morpholine, 4-[thioxo(3,4,5-trimethoxyphenyl)methyl]-[CAS]	35619-65-9	U.S. 3,862,138	Antiulcer	
Tritoqualine		14504-73-5			
TRK-530	Phosphonic acid, [[[4-(methylthio)phenyl][thio]methylene]bis-, disodium salt [CAS]	151425-92-2	WO 9410181	Antiarthritic, other	Arthritis, rheumatoid
TRK-820	2-Propenamide, N-[(5Alpha,6β)-17-(cyclopropylmethyl)-4,5-epoxy-3,14-dihydroxymorphinan-6-yl]-3-(3-furanyl)-N-methyl-, monohydrochloride, (2E)-[CAS]	152658-17-8	WO 9315081	Antipruritic/ inflamm, non-allergic	Pruritus
Troclosene		2244-21-5			
trofosfamide	3-2-(chloroethyl)-2-[bis(2-chloroethyl)amino]tetrahydro-2H-1,3,2-oxazaphosphorin 2-oxide	22089-22-1	GB 1188159	Anticancer, alkylating	
Troglitazone		97322-87-7			
Troleandomycin		2751-9-9			
Trolnitrate		588-42-1			
tromantadine	N-(1-adamantyl)-2-(2-dimethylamine ethoxy)acetamide	53783-83-8	DE 1941218	Antiviral, other	Infection, herpes simplex virus
Tromethamine		77-86-1			
Tropacine		6878-98-4			
Tropesin		65189-78-8			
Tropicamide		1508-75-4			
tropine	1H-Indole-3-acetic acid, 1-(4-chlorobenzoyl)-5-methoxy-2-methyl-, 2-carboxy-2-phenylethyl ester, (+/−)-[CAS]	65189-78-8		Antiarthritic, other	
tropisetron	1H-Indole-3-carboxylic acid, 8-methyl-8-azabicyclo[3.2.1]oct-3-yl ester, endo-[CAS]	89565-68-4	GB 2125398	Antiemetic	Chemotherapy-induced nausea and vomiting
Trospectomycin		88669-04-9			
trospium	3Alpha-Hydroxyspiro[1AlphaH,5AlphaH-nortropane-8,1'-pyrrolidinium] benzilate	10405-02-4		Urological	Pollakisuria
trovafloxacin	1,8-Naphthyridine-3-carboxylic acid, 7-(6-amino-3-azabicyclo[3.1.0]hex-3-yl)-1-(2,4-difluorophenyl)-6-fluoro-1,4-dihydro-4-oxo-, (1Alpha,5Alpha,6Alpha)-, [CAS]	147059-72-1 147059-75-4	U.S. 5,164,402	Quinolone antibacterial	Infection, respiratory tract, general
troxacitabine	2(1H)-Pyrimidinone, 4-amino-1-(2-(hydroxymethyl)-1,3-dioxolan-4-yl)-, (2S-cis)-[CAS]	145918-75-8		Anticancer, other	Cancer, leukaemia, acute myelogenous
Troxerutin		7085-55-4			
troxipide	Benzamide, 3,4,5-trimethoxy-N-3-piperidinyl-, (+/−)-[CAS]	30751-05-4 99777-81-8	U.S. 3,647,805	Antiulcer	Ulcer, gastric
Trypan Red		574-64-1			
Tryparsamide		554-72-3			
Tryptophan		73-22-3			
TSH		9002-71-5			

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TSN-09	6,14-Ethenomorphinan-7-methanol, 17-(cyclopropylmethyl)-Alpha-(1,1-dimethylethyl)-, 5-epoxy-18,19-dihydro-3-hydroxy-6-methoxy-Alpha-methyl-, [5Alpha,7Alpha,(S)]-[CAS]	52485-79-7		Formulation, transdermal, patch	Pain, cancer
TU-2100	Nonanedioic acid, bis[2-(ethoxycarbonyl)phenyl] ester		U.S. 6,180,669	Antiacne	Acne
Tuaminoheptane		123-82-0			
Tubercidin		69-33-0			
Tubocurarine Chloride		57-94-3			
tulobuterol	Benzeneethanol, 2-chloro-Alpha-[[(1,1-dimethylethyl)amino]methyl]-[CAS]	41570-61-0	DE 2244737	Antiasthma	Asthma
TV-3326	N-(Propargyl-(3R)aminoindan-5-yl)-ethyl methyl carbamate			Cognition enhancer	Alzheimer's disease
TY-11223	Acetic acid, [2-[2,3,3a,6,7,7a-hexahydro-2-hydroxy-1-(3-hydroxy-4,4-dimethyl-1,6-nonadiynyl)-1H-inden-5-yl]ethoxy]-, [1S-[1Alpha(R*),2β,3aAlpha,7aAlpha]]-[CAS]	140694-43-5	U.S. 4,837,342	Antithrombotic	Unspecified
TY-12533	6,7,8,9-Tetrahydro-2-methyl-5H-cyclohepta[b]pyridine-3-carbonylguanidine maleate		U.S. 6,258,829	Antiarrhythmic	Unspecified
TYB-3215	D-Glucitol, 1,4:3,6-dianhydro-, dinitrate [CAS]	87-33-2		Formulation, modified-release, other	Angina, general
Tybamate		4268-36-4			
tyloxapol	4-(1,1,3,3-Tetramethylbutyl)phenol polymer with formaldehyde and oxirane [CAS]	25301-02-4		Formulation, inhalable, topical	Cystic fibrosis
Tymazoline		24243-97-8			
Tyramine		51-67-2			
Tyropanoate		7246-21-1			
Ubenimex		58970-76-6			
ufenamate	Benzoic acid, 2-[[3-(trifluoromethyl)phenyl]amino]-, butyl ester [CAS]	67330-25-0	BE 861852	Antipruritic/inflamm, non-allergic	
Undecylenic Acid		112-38-9			
Unoprostone		12037-36-6			
UR-8880	4-[4-Chloro-5-(3-fluoro-4-methoxyphenyl)imidazol-1-imidazol-1-yl]benzenesulfonamide-[CAS]			Anti-inflammatory	Inflammation, general
Uracil Mustard		66-75-1			
Uralyt-U	1,2,3-Propanetricarboxylic acid, 2-hydroxy-, potassium sodium salt (5:6:6), hydrate [CAS]	55049-48-4	U.S. 4,400,535	Urological	
urapidil	2,4(1H,3H)-Pyrimidinedione, 6-[[3-[4-(2-methoxyphenyl)-1-piperazinyl]propyl]amino]-1,3-dimethyl-[CAS]	34661-75-1	GB 1309324	Antihypertensive, adreergic	Hypertension, general
urea	Urea [CAS]	57-13-6			
Uredepa		302-49-8		Antipsoriasis	

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Urethan		51-79-6			
Uridine 5'-Triphosphate		63-39-8			
Urinastatin		80449-31-6			
ursodeoxycholic acid	3.Alpha.,7.β.-dihydroxy-5.β.-cholan-24-oic acid [CAS]	128-13-2		Formulation, other, Cirrhosis, primary biliary, hepatic dysfunction, biliary calculus	Cirrhosis, primary biliary
Ursodiol		128-13-2			
Ushercell			U.S. 6,063,773	Formulation, mucosal, topical	Contraceptive, female
Uzarin		20231-81-6			
valaciclovir	L-Valine, 2-[(2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy]ethyl ester [CAS]	124832-26-4	EP 308065	Antiviral, other	Infection, herpes simplex virus
Valacyclovir		124832-26-4			
valdecoxib	Benzenesulfonamide, 4-(5-methyl-3-phenyl-4-isoxazolyl)-[CAS]	181695-72-7	U.S. 5,859,257	Antiarthritic, other	Arthritis, rheumatoid
Valdetamide		512-48-1			
Valethamate		90-22-2			
valganciclovir	L-Valine, 2-((2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy)-3-hydroxypropyl ester [CAS]	175865-59-5 175865-60-8	EP 694547	Antiviral, other	Infection, cytomegalo-virus
Valnoctamide		4171-13-5			
valomaciclovir	L-Valine (3R)-3-((2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methyl)-4-((1-oxooctadecyl)oxy)butyl ester [CAS]	195156-77-5		Antiviral, other	Infection, herpes simplex virus
valproate	Pentanoic acid, 2-propyl-, [CAS]	76584-70-8 1069-66-5	U.S. 4,988,731	Antiepileptic	Epilepsy, generalized, tonic-clonic
Valproic Acid		99-66-1			
Valpromide		2430-27-5			
valrocemide	Pentanamide, N-(2-amino-2-oxoethyl)-2-propyl-[CAS]	92262-58-3	U.S. 5,585,358	Antiepileptic	Epilepsy, general
valrubicin	Pentanoic acid, 2-(1,2,3,4,6,11-hexahydro-2,5,12-trihydroxy-7-methoxy-6,11-dioxo-4-((2,3,6-trideoxy-3-((trifluoroacetyl)amino)-Alpha-L-lyxo-hexopyranosyl)oxy)-2-naphthacenyl)-2-oxoethyl ester (2S-cis)-[CAS]	56124-62-0	U.S. 4,035,566	Anticancer, antibiotic	Cancer, bladder
valsartan	L-Valine, N-(1-oxopentyl)-N-[[2'-(1H-tetrazol-5-yl)[1,1'-biphenyl]-4-yl]methyl]-[CAS]	137862-53-4	EP 443983	Antihypertensive, renin system	Hypertension, general
Valspodar		121584-18-7			
vardenafil	Piperazine, 1-(3-(1,4-dihydro-5-methyl-(4-oxo-7-propylimidazo(5,1-f)(1,2,4)-triazin-2-yl)-4-ethoxyphenyl)sulfonyl)-4-ethyl-[CAS]	224785-90-4		Male sexual dysfunction	Sexual dysfunction, male, general

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varespladib	Acetic acid, ((3-(aminooxoacetyl)-2-ethyl-1-(phenylmethyl)-1H-indol-4-yl)oxy)-[CAS]	172732-68-2 172733-42-5	EP	675110	Septic shock treatment	Sepsis
Varicella Virus Vaccine						
vatanidipine	3,5-Pyridinedicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-, 2-[4-[4-(diphenylmethyl)-1-piperazinyl]phenyl]ethyl methyl ester, [CAS]	116308-55-5 133743-71-2	EP	257616	Neuroprotective	Hypertension, general
VEA			U.S.	6,007,817	Radio/ chemosensitizer	Cancer, general
vecuronium	Piperidinium, 1-[(2β,3Alpha,5Alpha,16β,17β)-3,17-bis(acetyloxy)-2-(1-piperidinyl)androstan-16-yl]-1-methyl-, [CAS]	50700-72-6	U.S.	4,237,126	Muscle relaxant	Anaesthesia, adjunct
Velnacrine		104675-29-8				
venlafaxine	Cyclohexanol, 1-[2-(dimethylamino)-1-(4-methoxyphenyl)ethyl]-, [CAS]	93413-69-5 99300-78-4 66644-81-3	GB	2227743	Antidepressant	Depression, general
Veralipride						
verapamil	Benzeneacetonitrile, Alpha-[3-[[2-(3,4-dimethoxyphenyl)ethyl]methylamino]propyl]-3,4-dimethoxy-Alpha-(1-methylethyl)-[CAS]	52-53-9			Formulation, modified-release, other	Hypertension, general
verteporfin	23H,25H-Benzo[b]porphine-9,13-dipropanoic acid, 18-ethenyl-4,4a-dihydro-3,4-bis(methoxycarbonyl)-4a,8,14,19-tetramethyl-, monomethyl ester, trans-[CAS]	129497-78-5	U.S.	5,238,940	Ophthalmological	Macular degeneration
vesnarinone	Piperazine, 1-(3,4-dimethoxybenzoyl)-4-(1,2,3,4-tetrahydro-2-oxo-6-quinolinyl)-[CAS]	81840-15-5	GB	2086896	Cardiostimulant	Heart failure
Vetrabutine		3735-45-3				
VF-233	Benzene carboximidamide, N,3,4,5-tetrahydroxy-[CAS]	95933-74-7	U.S.	4,623,659	Cardiovascular	Reperfusion, injury
VI-0134			U.S.	6,403,597	Male sexual dysfunction	Premature ejaculation
vidarabine	9H-Purin-6-amine, 9-β-D-arabinofuranosyl-[CAS]	24356-66-9 5536-17-4	GB	1159290	Antiviral, other	Infection, herpes virus, general
vigabatrin	5-Hexenoic acid, 4-amino-[CAS]	68506-86-5 60643-86-9	GB	1472525	Antiepileptic	Epilepsy, partial (focal, local)
vilazodone	2-Benzofurancarboxamide, 5-[4-[4-(5-cyano-1H-indol-3-yl)butyl]-1-piperazinyl]-[CAS]	163521-12-8	EP	648767	Antidepressant	Depression, general
Viloxazine		46817-91-8				
Viminol		21363-18-8				
Vinbarbital		125-44-0				
Vinblastine		865-21-4				
vinburnine	Eburnamenin-14(15H)-one, (3Alpha,16Alpha)-[CAS]	474-00-0 4880-88-0	DE	1932245	Cognition enhancer	

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Vincamine		1617-90-9			
Vinconate		70704-03-9			
vincristine	Vincaleukoblastine, 22-oxo-, sulfate (1:1) (salt)[CAS]	2068-78-2	EP 207831	Formulation, parenteral, other	Cancer, general
		57-22-7			
vindesine	Vincaleukoblastine, 3-(aminocarbonyl)-O4-deacetyl-3-de(methoxycarbonyl)-[CAS]	53643-48-4	GB 1463575	Anticancer, other	Cancer, leulaemia, acute lymphocytic
		59917-39-4			
vinflunine	Aspidospermidine-3-carboxylic acid, 4-(acetyloxy)-6,7-didehydro-15-[(2R,4R,6S,8S)-4-(1,1-difluoroethyl)-1,3,4,5,6,7,8,9-octahydro-8-(methoxycarbonyl)-2,6-methano-2H-azecino[4,3-b]indol-8-yl]-3-hydroxy-16-methoxy-1-methyl-, methyl ester, (2β,3β,4β,5Alpha,12β,19Alpha)-[CAS]	162652-95-1	FR 2707988	Anticancer, other	Cancer, general
vinorelbine	C'-Norvincaleukoblastine, 3',4'-didehydro-4'-deoxy-[CAS]	71486-22-1	EP 10458	Anticancer, other	Cancer, lung, non-small cell
vinpocetine	Eburnamenine-14-carboxylic acid, ethyl ester, (3Alpha,16Alpha)-[CAS]	42971-09-5	GB 1405127	Cognition enhancer	Cognitive disorder, general
Vinyl Ether		109-93-3			
Vinylbital		2430-49-1			
Viquidil		84-55-9			
Viridin		3306-52-3			
Visnadine		477-32-7			
Vitamin A		68-26-8			
vitamin B12	Vitamin B12 [CAS]	68-19-9		Formulation, transmucosal, nasal	Anaemia, general
vitamin C	L-Ascorbic acid [CAS]	50-81-7		Formulation, modified-release, <=24 hr	Nutrition
Vitamin D_2		50-14-6			
Vitamin D_3		67-97-0			
Vitamin K_5		83-70-5			
Vitamins, Prenatal					
VLA-4 antagonists	((R,S)-4-(4-(Amino-imino-methyl)-pheny)-3-((4-biphenylyl)-methyl)-4-methyl-2,5-dioxoimidazolidin-1-yl)-acetyl-L-N-methyl-aspartyl-L-phenylglycine		EP 842943	Antiasthma	Asthma
VNP-4010M	1,2-Bis(methylsulfonyl)-1-(2-chloroethyl)-2-(methylamino)carbonylhydrazine		U.S. 6,040,338	Anticancer, alkylating	Cancer, general
voglibose	D-epi-Inositol, 3,4-dideoxy-4-[[2-hydroxy-1-(hydroxymethyl)ethyl]amino]-2-C-(hydroxymethyl)-[CAS]	83480-29-9	EP 56194	Antidiabetic	Diabetes, Type II
voriconazole	4-Pyrimidineethanol, Alpha-(2,4-difluorophenyl)-5-fluoro-β-methyl-Alpha-(1H-1,2,4-triazol-1-ylmethyl)-, (R-(R*,S*))-[CAS]	137234-62-9	EP 440372	Antifungal	Infection, fungal, general

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Vorozole		129731-10-8			
VUF-K-8788	7-[3-[4-(2-Quinolinylmethyl)-1-piperazinyl]propoxy]-3,4-dihydro-2H-1,4-benzothiazine-3-one			Antiasthma	Asthma
Warfarin		81-81-2			
WF-10	Tetrachlorodecaoxide [CAS]	92047-76-2		Radio/ chemoprotective	Chemotherapy-induced injury, bone marrow, general
WMC-79	2-(3-[4-[3-(6-oxo-6H-2, 10b-diaza-aceanthrenylen-5-ylamino)propyl]-piperazin-1-yl]propyl)-5-nitro-2-aza-phenalene-1,3-dione			Anticancer, other	Cancer, colorectal
wound healing matrix			U.S. 5,897,880	Formulation, transdermal, patch	Ulcer, diabetic
WP-170			U.S. 6,531,121	Cytokine	Unspecified
xaliproden	Pyridine, 1,2,3,6-tetrahydro-1-[2-(2-naphthalenyl)ethyl]-4-[3-(trifluoromethyl)phenyl]-, [CAS]	90494-79-4 135354-020-8	EP 101381	Neuroprotective	Amyotrophic lateral sclerosis
xanoterol	4-Morpholinecarboxamide, N-[2-[[2-hydroxy-3-(4-hydroxyphenoxy)propyl]amino]ethyl]-, (+/−)- [CAS]	73210-73-8 81801-12-9	GB 2002748	Cardiostimulant	Heart failure
Xanomeline		131986-45-3			
Xanthinol Niacinate		437-74-1			
Xemilofiban		149820-74-6			
Xenbucin		959-10-4			
Xibenolol		81584-06-7			
xibornol	Phenol, 4,5-dimethyl-2-(1,7,7-trimethylbicyclo[2.2.1]hept-2-yl)-, exo- [CAS]	13741-18-9	GB 1206774	Antibacterial, other	Infection, general
ximelagatran	Glycine, N-((R)-cyclohexyl-2-((2S)-2-((((4-(hydroxyamino)iminomethyl)phenyl)methyl)-amino)carbonyl)-1-azetidinyl)2-oxoethyl ethyl ester [CAS]	192939-46-1		Antithrombotic	Thrombosis, venous
Ximoprofen		56187-89-4			
xipamide	Benzamide, 5-(aminosulfonyl)-4-chloro-N-(2,6-dimethylphenyl)-2-hydroxy-[CAS]	14293-44-8	U.S. 3,567,777	Antihypertensive, diuretic	
xorphanol	Morphinan-3-ol, 17-(cyclobutylmethyl)-8-methyl-6-methylene-, (8β)-[CAS]	77287-89-9		Analgesic, other	Pain, cancer
XR-5118	2,5-Piperazinedione, 3-[[5-[[2-(dimethylamino)ethyl]thio]-2-thienyl]methylene]-6-(phenylmethylene)-, monohydrochloride, (3Z,6Z)-[CAS]	174766-49-5	WO 9532190	Anticancer, other	Cancer, general
XR-5944	N,N'-(1,2-Ethanediyl)bis(imino-2,1-ethanediyl)bis(9-methylphenazine-1-carboxamide)		EP 934278	Anticancer, other	Cancer, general
Xylometazoline		526-36-3			
Xylose		58-86-6			

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YH-1885	2-Pyrimidinamine, 4-(3,4-dihydro-1-methyl-2(1H)-isoquinolinyl)-N-(4-fluorophenyl)-5,6-dimethyl-, monohydrochloride [CAS]	178307-42-1	WO	9605177	Antiulcer	Ulcer, GI, general
YM-511	Benzonitrile, 4-[[(4-bromophenyl)methyl]-4H-1,2,4-triazol-4-ylamino]- [CAS]	148869-05-0	WO	9305027	Anticancer, hormonal	Cancer, breast
YM-598	potassium(E)-N-[6-methoxy-5-(2-methoxyphenoxy)-2-(pyrimidin-2-yl)pyrimidin-4-yl]-2-phenylethenesulfonamidate				Anticancer, other	Cancer, prostate
Yohimbine		146-48-5				
YT-146	Adenosine, 2-(1-octynyl)- [CAS]	90596-75-1	U.S.	5,270,304	Anti-inflammatory	Inflammation, general
Z-321	Thiazolidine, 3-((2,3-dihydro-1H-inden-2-yl)acetyl)-4-(1-pyrrolidinylcarbonyl)-, (R)- [CAS]	130849-58-0	EP	372484	Cognition enhancer	Dementia, senile, general
Z-335	(1H-Indene-5-acetic acid, 2[[[(4-chlorophenyl)sulfonyl]amino]methyl]-2,3-dihydro, monosodium salt) [CAS]	146731-14-8	JP	92506077	Antithrombotic	Peripheral vascular disease
zafirlukast	Carbamin acid, [3-[[2-methoxy-4-[[[(2-methylphenyl)sulfonyl]amino]carbonyl]-phenyl]methyl]-1-methyl-1H-indol-5-yl]-, cyclopentyl ester [CAS]	107753-78-6	EP	199543	Antiasthma	Asthma
zalcitabine	Cytidine, 2',3'-dideoxy-[CAS]	7481-89-2	U.S.	4,879,277	Antiviral, anti-HIV	Infection, HIV/AIDS
Zaldaride		109826-26-8				
zaleplon	Acetamide, N-[3-(3-cyanopyrazolo[1,5-a]pyrimidin-7-yl)phenyl]-N-ethyl- [CAS]	151319-34-5	EP	776898	Hypnotic/ Sedative	Insomnia
zaltoprofen	Dibenzo[b,f]thiepin-2-acetic acid, 10,11-dihydro-Alpha-methyl-10-oxo- [CAS]	74711-43-6	JP	55053282	Anti-inflammatory	
zanamivir	5-Acetamido-2,6-anhydro-3,4,5-trideoxy-4-guanidino-D-glycero-D-galacto-non-2-enonic acid [CAS]	139110-80-8	WO	9116320	Antiviral, other	Infection, influenza virus
zanapezil	1-Propanone, 3-(1-(phenylmethyl)-4-piperidinyl)-1-(2,3,4,5-tetrahydro-1H-1-benzazepin-8-yl)- [CAS]	142852-50-4	EP	487071	Cognition enhancer	Alzheimer's disease
Zatebradine		85175-67-3				
ZD-0473	Platinum, amminedichloro(2-methylpyridine)-(SP-4-3)- [CAS]	181630-15-9	EP	727430	Anticancer, alkylating	Cancer, ovarian
ZD-0947			WO	9528388	Urological	Overactive bladder
ZD-6126	N-acetylcolchinol-O-phosphate				Anticancer, other	Cancer, general
ZD-9331	1H-Tetrazole-5-butanoic acid, Alpha-((4-(((1,4-dihydro-2,7-dimethyl-4-oxo-6-quinazolinyl)methyl)-2-propynylamino)-2-fluorobenzoyl)amino) (S)- [CAS]	153537-73-6	GB	2264946	Anticancer, antimetabolite	Cancer, pancreatic
zebularine	2(1H)-Pyrimidinone, 1-β-D-ribofuranosyl- [CAS]	3690-10-6			Anticancer, other	Cancer, general

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zelandopam	7,8-Isoquinolinediol, 4-(3,4-dihydroxyphenyl)-1,2,3,4-tetrahydro-, [CAS]	138086-00-7	JP 03190818	Vasodilator, renal	Hypertension, general
Zenarestat		112733-06-9			
Ziconotide		107452-89-1			
zidovudine	Thymidine, 3'-azido-3'-deoxy-[CAS]	30516-87-1	U.S. 4,724,232	Antiviral, anti-HIV	Infection, HIV/AIDS
zileuton	Urea, N-(1-benzo[b]thien-2-ylethyl)-N-hydroxy-[CAS]	111406-87-2	EP 279263	Antiasthma	Asthma
Zimeldine		56775-88-3			
zinc acetate	hexakis(\m-acetato)-\m4-oxotetrazinc	12129-82-7		Antiviral, other	Infection, herpes simplex virus prophylaxis
zinc acexamate	Hexanoic acid, 6-(acetylamino)-, zinc salt (2:1)-[CAS]	70020-71-2	EP 369088	Antiulcer	Ulcer, duodenal
zinc ibuprofenate		78416-80-5		Anti-inflammatory, topical	Inflammation, dermal
Zinc p-Phenolsulfonate		127-82-2			
Zinc Salicylate		16283-36-6			
Zinostatin		9014-2-2			
zinostatin stimalamer		123760-07-6	EP 136791	Anticancer, antibiotic	Cancer, liver
Zipeprol		34758-83-3			
ziprasidone	2H-Indol-2-one, 5-(2-(4-(1,2-benzisothiazol-3-yl)-1-piperaziny1)ethyl)-6-chloro-1,3-dihydro-[CAS]	122883-93-6 146939-27-7	EP 281309	Neuroleptic	Schizophrenia
zofenopril	L-Proline, 1-[3-(benzoylthio)-2-methyl-1-oxopropyl]-4-(phenylthio)-, [1(R*),2Alpha,4Alpha]-[CAS]	75176-37-3 81872-10-8 81972-10-8 81938-43-4	GB 2028327	Antihypertensive, renin system	Hypertension, general
zofenpril + HCTZ	L-Proline, 1-[3-(benzoylthio)-2-methyl-1-oxopropyl]-4-(phenylthio)-, [1(R*),2Alpha,4Alpha]- + 6-Chloro-3,4-dihydro-2H-1,2,4-benzothiazide-7-sulfonamide 1,1-dioxide [CAS]			Formulation, fixed-dose combinations	Hypertension, general
zoledronic acid	Phosphonic acid, [1-hydroxy-2-(1H-imidazol-1-yl)ethylidene]bis-[CAS]	118072-93-8 165800-06-6	EP 531253	Osteoporosis treatment	Hyper-calcaemia of malignancy
zolimidine	2-(p-methylsulfonylphenyl)imidazo[1,2-a]pyridine	1222-57-7	U.S. 3,318,880	Antiulcer	Gastritis
zolmitriptan	2-Oxazokidinone, 4-((3-(2-(dimethylamino)ethyl)-1H-indol-5-yl)methyl)-, (S)-[CAS]	139264-17-8	WO 9118897	Antimigraine	Migraine
zolpidem	Imidazo[1,2-a]pyridine-3-acetamide, N,N,6-trimethyl-2-(4-methylphenyl)-(R-(R* R*))-2,3-dihydroxybutanedioate (2:1) [CAS]	99294-93-6 82626-48-0	EP 50563	Hypnotic/ Sedative	Insomnia

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TABLE IV-continued

API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Zonepirac		33369-31-2			
zonampanel	1(2H)-Quinoxalineacetic acid, 3,4-dihydro-7-(1H-imidazol-1-yl)-6-nitro-2,3-dioxo- [CAS]	210245-80-0		Neuroprotective	Ischaemia, cerebral
zoniporide	1H-pyrazole-4-carboxamide,N-(aminoiminio methyl)-5-cyclopropyl-1-(5-quinolinyl)-,	249296-45-5		Cardiovascular	Unspecified
zonisamide	1,2-Benzisoxazole-3-methanesulfonamide [CAS]	68291-97-4 68291-98-5	GB 2025931	Antiepileptic	Epilepsy, generalized, tonic-clonic
zopiclone	1-Piperazinecarboxylic acid, 4-methyl-, 6-(5-chloro-2-pyridinyl)-6,7-dihydro-7-oxo-5H-pyrrolo[3,4-b]pyrazin-5-yl ester [CAS]	43200-80-2	GB 1358680	Hypnotic/ Sedative	Insomnia
Zopolrestat		110703-94-1			
Zorubicin		54083-22-6			
zosuquidar	1-Piperazineethanol, 4-(1,1-difluoro-1,1a,6,10b-tetrahydrodibenzo[a,e]cyclopropa[c]cyclo-hepten-6-yl)-Alpha-[(5-quinolinyloxy)methyl]-, [6(R)-(1aAlpha,6Alpha,10bAlpha)]-[CAS]	167465-36-3		Radio/ chemosensitizer	Cancer, leukaemia, acute myelogenous
zotepine	Ethanamine, 2-[(8-chlorodibenzo[b,f]thiepin-10-yl)oxy]-N,N-dimethyl-[CAS]	26615-21-4	GB 1247067	Neuroleptic	Schizophrenia
ZP-123			WO 0162775	Antiarrhythmic	Arrhythmia, general
Z-tamoxifen	Ethanamine, 2-[4-(1,2-diphenyl-1-butenyl)phenoxy]-N,N-dimethyl-, (Z)- [CAS]	10540-29-1		Anticancer, hormonal	Cancer, colorectal
zuclopenthixol	1-Piperazineethanol, 4-[3-(2-chloro-9H-thioxanthen-9-ylidene)propyl]-, (Z)-[CAS]	53772-83-1 982-24-1 85721-05-7 64053-00-5	EP 27082	Neuroleptic	Psychosis, general

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The invention claimed is:

1. A co-crystal comprising an API and a co-crystal former selected from:

(a) carbamazepine and saccharin;
(b) carbamazepine and nicotinamide;
(c) carbamazepine and trimesic acid;
(d) celecoxib and nicotinamide;
(e) celecoxib and 18-crown-6;
(f) 5-fluorouracil and urea;
(g) acetaminophen and 4,4'-bipyridine;
(h) phenytoin and pyridone;
(i) aspirin and 4,4'-bipyridine;
(j) ibuprofen and 4,4'-bipyridine;
(k) flurbiprofen and 4,4'-bipyridine;
(l) flurbiprofen and trans-1,2-bis(4-pyridyl) ethylene;
(m) carbamazepine and p-phthalaldehyde;
(n) carbamazepine and 2,6-pyridinecarboxylic acid;
(o) carbamazepine and 5-nitroisoplithalic acid;
(p) carbamazepine and 1,3,5,7-adamantane tetracarboxylic acid; or
(q) carbamazepine and benzoquinone, wherein the API and co-crystal former are hydrogen bonded to each other.

2. The co-crystal according to claim **1**, wherein said co-crystal comprises carbamazepine and saccharin.

3. The co-crystal according to claim **1**, wherein said co-crystal comprises carbamazepine and nicotinamide.

4. The co-crystal according to claim **1**, wherein said co-crystal comprises carbamazepine and trimesic acid.

5. The co-crystal according to claim **1**, wherein said co-crystal comprises celecoxib and nicotinamide.

6. The co-crystal according to claim **1**, wherein said co-crystal comprises celecoxib and 18-crown-6.

7. The co-crystal according to claim **1**, wherein said co-crystal comprises 5-fluorouracil and urea.

8. The co-crystal according to claim **1**, wherein said co-crystal comprises acetaminophen and 4,4'-bipyridine.

9. The co-crystal according to claim **1**, wherein said co-crystal comprises phenytoin and pyridine.

10. The co-crystal according to claim **1**, wherein said co-crystal comprises aspirin and 4,4'-bipyridine.

11. The co-crystal according to claim **1**, wherein said co-crystal comprises ibuprofen and 4,4'-bipyridine.

12. The co-crystal according to claim **1**, wherein said co-crystal comprises flurbiprofen and 4,4'-bipyridine.

13. The co-crystal according to claim **1**, wherein said co-crystal comprises flurbiprofen and trans-1,2-bis(4-pyridyl) ethylene.

14. The co-crystal according to claim **1**, wherein said co-crystal comprises carbamazepine and p-phthalaldehyde.

15. The co-crystal according to claim **1**, wherein said co-crystal comprises carbamazepine and 2,6-pyridinecarboxylic acid.

16. The co-crystal according to claim **1**, wherein said co-crystal comprises carbamazepine and 5-nitroisophthalic acid.

17. The co-crystal according to claim **1**, wherein said co-crystal comprises carbamazepine and 1,3,5,7-adamantane tetracarboxylic acid.

18. The co-crystal according to claim **1**, wherein said co-crystal comprises carbamazepine and benzoquinone.

19. A pharmaceutical composition comprising a pharmaceutically acceptable diluent, excipient, or carrier and a co-crystal comprising an API and a co-crystal former selected from:

(a) carbamazepine and saccharin;
(b) carbamazepine and nicotinamide;
(c) carbamazepine and trimesic acid;
(d) celecoxib and nicotinamide;
(e) celecoxib and 18-crown-6;
(f) 5-fluorouracil and urea;
(g) acetaminophen and 4,4'-bipyridine;
(h) phenytoin and pyridone;
(i) aspirin and 4,4'-bipyridine;
(j) ibuprofen and 4,4'-bipyridine;
(k) flurbiprofen and 4,4'-bipyridine;
(l) flurbiprofen and trans-1,2-bis(4-pyridyl)ethylene;
(m) carbamazepine and p-phthalaldehyde;
(n) carbamazepine and 2,6-pyridinecarboxylic acid;
(o) carbamazepine and 5-nitroisophthalic acid;
(p) carbamazepine and 1,3,5,7-adamantane tetracarboxylic acid; or
(q) carbamazepine and benzoquinone, wherein the API and co-crystal former hydrogen bonded to each other.

20. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises carbamazepine and saccharin.

21. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises carbamazepine and nicotinamide.

22. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises carbamazepine and trimesic acid.

23. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises celecoxib and nicotinamide.

24. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises celecoxib and 18-crown-6.

25. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises 5-fluorouracil and urea.

26. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises acetaminophen and 4,4'-bipyridine.

27. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises phenytoin and pyridine.

28. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises aspirin and 4,4'-bipyridine.

29. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises ibuprofen and 4,4'-bipyridine.

30. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises flurbiprofen and 4,4'-bipyridine.

31. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises flurbiprofen and trans-1,2-bis(4-pyridyl)ethylene.

32. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises carbamazepine and p-phthalaldehyde.

33. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises carbamazepine and 2,6-pyridinecarboxylic acid.

34. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises carbamazepine and 5-nitroisophthalic acid.

35. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises carbamazepine and 1,3,5,7-adamantane tetracarboxylic acid.

36. The pharmaceutical composition according to claim **19**, wherein said co-crystal comprises carbamazepine and benzoquinone.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,927,613 B2
APPLICATION NO. : 10/660202
DATED : April 19, 2011
INVENTOR(S) : Orn Almarsson et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 6,
Lines 18-19, "Pure phenyloin and a co-crystal with phenyloin" should read
--Pure phenytoin and a co-crystal with phenytoin--.

Column 12,
Line 32, "200 150 100," should read --200, 150, 100,--.
Line 34, "200 150, 100 90," should read --200, 150, 100, 90,--.

Column 14,
Line 33, "Cmax" should read --C_{max}--.

Column 20,
Line 23, "$AgF_{3\,CSO3}$" should read --AgF_3CSO_3--.

Column 30,
Line 6, "+/- 10 degrees" should read --+/- 1.0 degrees--.
Line 11, "(82001 TA" should read --(^{8}2001 TA--.

Column 37,
Line 7, "β80.291(2)," should read --β=80.291(2),--.
Line 16, "by π-υ" should read --by π- π--.
Line 27, "Phenyloin:" should read --Phenytoin:--.
Line 28, "phenyloin and" should read --phenytoin and--.
Line 31, "phenyloin/" should read --phenytoin/--.
Line 46, "phenyloin-phenyloin" should read --phenytoin-phenytoin--.
Lines 56-57, "(phenyloin" should read --(phenytoin--.
Line 66, "0.02= 2θ" should read --0.02° 2θ--.

Signed and Sealed this
Twenty-second Day of May, 2012

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

Column 38,
Lines 59-60, "λ=200 (2) K" should read --T=200 (2) K--.

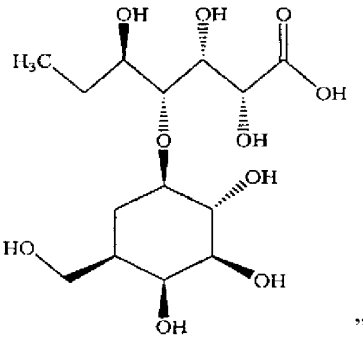
Column 40,
Line 23, "I>2θ (I)," should read --I>2σ (I),--.

Column 41,
Line 52, "$2\theta_{max}$ = 56.600°," should read --$2\theta_{max}$ = 56.60°--.

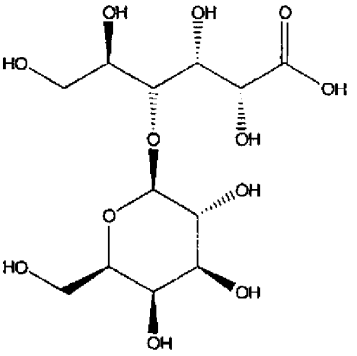
Column 42,
Line 17, "(22.)" should read --(22.0)--.
Line 26, "cocrystal" should read --co-crystal--.

Column 51, Table 1,
Column "MP", Row "Adenine"
"200 (sub.)" should read --220 (sub.)--.

Column 58, Table 1,
Column "Molecular Structure", Row "Lactobionic acid"

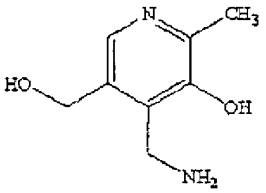


" should read --

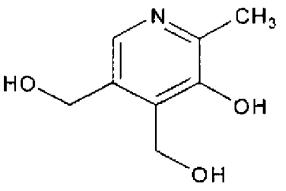


--.

Column 62, Table 1,
Column "Molecular Structure", Row "Pyridoxine"



" should read --



--.

Column 104, Table III, Column "Functional Group":
"pyridine thiol n-heterocyclic ring thionedisulfide pyrrolidindione iodine hydrazone thiocyanate *bromine aromatic"

should read:
--pyridine *chlorine alkyne thiol n-heterocyclic ring thionedisulfide pyrrolidindione iodine hydrazone--.

Column 105, Table III,
Column "Functional Group"
"thio ster" should read --thioester--.

Column 107, Table III,
Column "Functional Group"
"nitrate est r alcohol ether acetate" should read
--nitrate ester bromine alcohol ether acetate--.

Column 108, Table III,
Column "Functional Group"
"nitrat ester" should read --nitrate ester--.
"st r-O" should read --ester-O--.

Column 110, Table III,
Column "Functional Group"
"Amin t rtiary" should read --Amine tertiary--.

Column 119, Table IV,
Column "API Chemical Name", Row "(R)-salbutamol"
"1,3-Benzenedimethanol, Alpha1-(((1,1-dimethylethyl)amino)methyl)-4-hydroxy-[CAS]"
should read
--1,3-Benzenedimethanol, Alpha1-(((1,1-dimithylethyl)amino)methyl)-4-hydroxy-[CAS]--.

Column 125, Table IV,
Column "API Chemical Name", Row "aceglutamide"
"Aluminum, pentakis(N2-acetyl-L-glutaminoato)tetrahydroxytri- [CAS]"
should read
--Aluminum, pentakis(N2-acetyl-L-glutaminato)tetrahydroxytri- [CAS]--.

Column 127, Table IV,
Column "CAS No.", Row "ACTH"
"900-60-2" should read --9002-60-2--.

Column 130, Table IV,
Column "API Chemical Name", Row "albaconazole"
"4(3H)-Quinazolinone, 7-chloro-3-[(1R,2R)-2-(2,4-difluorophenyl)-2-hydroxy-1-methyl-3-(1H01,2,4-triazol-1-yl)propyl]- [CAS]"
should read

--4(3H)-Quinazolinone, 7-chloro-3-[(1R,2R)-2-(2,4-difluorophenyl)-2-hydroxy-1-methyl-3-(1H-1,2,4-triazol-1-yl)propyl]- [CAS]--.

Column 134, Table IV,
Column "API Chemical Name", Row "alsactide"
"Alpha1-17-Carticotropin, 1-β-alanine-17-[N-(4-aminobutyl)-L-lysinamide]-[CAS]"
should read
--Alpha1-17-Corticotropin, l-β-alanine-17-[N-(4-aminobutyl)-L-lysinamide]-[CAS]--.
Column "API Generic Name"
"Althiazid" should read --Althiazide--.

Column 136, Table IV,
Column "API Generic Name"
"Ambazon" should read --Ambazone--.
"Ambusid" should read --Ambuside--.

Column 141, Table IV,
Column "API Generic Name"
"amrinose" should read --amrinone--.
Column "Example of Indication", Row "amtolmetin guacil"
"rheumatiod" should read --rheumatoid--.

Column 144, Table IV,
Column "Patent Reference Row", Row "Antiprogestin"
"19703061" should read --19706061--.

Column 148, Table IV,
Column "API Generic Name"
"Aesthinol" should read --Arsthinol--.

Column 149, Table IV,
Column "CAS No.", Row "asoprisnil"
"199396-76-1" should read --199396-76-4--.

Column 151, Table IV,
Column "CAS No.", Row "atomoxetine"
"83015-36-3" should read --83015-26-3--.

Column 153, Table IV,
Column "API Generic Name"
"azasertron" should read --azasetron--.
"azathipprine" should read --azathioprine--.

Column 162, Table IV,
Column "API Chemical Name", Row "bexarotene"
"Benzoic acid, 4-(1-(5,6,7,8-tetrahydro-3,5,5,8,8-pentamethyl-2-naphthalenyl)-[CAS]" should read
--Benzoic acid, 4-(1-(5,6,7,8-tetrahydro-3,5,5,8,8-pentamethyl-2-naphthalenyl)ethenyl)- [CAS]--.

Column 164, Table IV,
Column "API Generic Name"
"birlcodar" should read --biricodar--.

Column 166, Table IV,
Column "API Generic Name"
"Bitoscanat" should read --Bitoscanate--.

Column 168, Table IV,
Column "API Generic Name"
"Brozuridine" should read --Broxuridine--.

Column 176, Table IV,
Column "CAS No.", Row "calcium polycarbophil"
"9003-97-9" should read --9003-97-8--.

Column 180, Table IV,
Column "API Chemical Name", Row "carboplatin"
"Platinum, diammine[1,1-cyclobutanedicarboxylate(2-)]-, (SP-4-2)- [CAS]" should read
--Platinum, diammine[1,1-cyclobutanedicarboxylato(2-)]-, (SP-4-2)- [CAS]--.

Column 187, Table IV,
Column "API Generic Name"
"cefotazime" should read --cefotaxime--.

Column 189, Table IV.
Column "API Chemical Name", Row "cefprozil"
"5-Thio-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[amino(4-hydroxyphenyl)acetyl]amino]-8-oxo-3-(1-propenyl)-, [6R-[6Alpha,7β(R*)]]-[CAS"
should read
--5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[amino(4-hydroxyphenyl)acetyl]amino]-8-oxo-3-(1-propenyl)-, [6R-[6Alpha,7β(R*)]]-[CAS--.

Column 189, Table IV,
Column "CAS No.", Row "cefprozil"
"92665-29-7" should read --92665-29-7
121123-17-9--.
Column "Patent Reference", Row "cefsulodin"
"GB" should read --GB 1387656--.

Column 190, Table IV,
Column "Patent Reference", Row "ceftibuten"
"EP" should read --EP 136721--.

Column 191, Table IV,
Row "Cefuzonam"

"**Patent Reference**	**Example of Therapeutic Use**	**Example of Indication**
U.S. 5,760,068	Antiarthritic, other	Arthritis rheumatoid"

should read

--Patent Reference	**Example of Therapeutic Use**	**Example of Indication--.**

Column 191, Table IV,
Row "celecoxib"

"**Patent Reference**	**Example of Therapeutic Use**	**Example of Indication**"

should read

--Patent Reference	**Example of Therapeutic Use**	**Example of Indication**
U.S. 5,760,068	Antiarthritic, other	Arthritis Rheumatoid--.

Row "Cellulose Ethyl Hydroxyethyl Ether"

"**API Generic Name**	**API Chemical Name**	**CAS No.**
Cellulose Ethyl Hydroxyethyl Ether"		

should read

--API Generic Name	**API Chemical Name**	**CAS No.**
Cellulose Ethyl Hydroxyethyl Ether--.		9004-58-4

Column 191, Table IV,

"API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Cellulose Ethyl Hydroxyethyl Ether					
CEP-1347	9,12-Epoxy-1H-diindolo[1,2,3-fg:3',2',1'-	156177-65-0	WO 9731002	Antiparkinsonian	Parkinson's disease"

should read

--API Generic Name	API Chemical Name	CAS No.	Patent Reference	Example of Therapeutic Use	Example of Indication
Cellulose Ethyl Hydroxyethyl Ether		9004-58-4			
Centchroman		31477-60-8			
CEP-1347	9,12-Epoxy-1H-diindolo[1,2,3-fg:3',2',1'-	156177-65-0	WO 9731002	Antiparkinsonian	Parkinson's disease--.

Column 193, Table IV,

Column "API Chemical Name", Row "cethromycin"

"2H-Oxacyclotetradecino(4,3-d)oxazole-2,6,8,14(1H,7H,9H)-tetrone 4-ethyloctahydro-3a,7,9,11,13,15-hexamethyl-11-((3-(3-quinolinyl)-2-propenyl)oxy)-10-((33.4.6-trideoxy-3-(dimethylamino)-β-D-xylo-hexapyranosyl)oxy)-,(3aS,4R,7R,9R,10R,11R,13R,15R,15aR)- [CAS]"

should read

--2H-Oxacyclotetradecino(4,3-d)oxazole-2,6,8,14(1H,7H,9H)-tetrone 4-ethyloctahydro-3a,7,9,11,13,15-hexamethyl-11-((3-(3-quinolinyl)-2-propenyl)oxy)-10-((3,4,6-trideoxy-3-(dimethylamino)-β-D-xylo-hexapyranosyl)oxy)-,(3aS,4R,7R,9R,10R,11R,13R,15R,15aR)- [CAS]--.

Column 195, Table IV,

Column "API Generic Name",

"Chloriazepoxide" should read --Chlordiazepoxide--.

Column 197, Table IV,

Column "API Generic Name",

"Chlorthenoxazine(e)" should read --Chlorthenoxazin(e)--.

Column 203, Table IV,

Column "API Generic Name",

"Clemizol" should read --Clemizole--.

Column 205, Table IV,
Column "API Generic Name",
"Clofibrat" should read --Clofibrate--.

Column 207, Table IV,
Column "Patent Reference", Row "cloxazolam"
"3,442,371" should read --3,772,371--.

Column 214, Table IV,
Column "API Generic Name",
"Cycloniumelodide" should read --Cyclonium Iodide--.

Column 218, Table IV,
Column "API Generic Name",
"DAX<SciClone" should read --DAX, SciClone--.
"d-Camphocarboxylic" should read --d-Camphocarboxylic Acid--.

Column 221, Table IV,
Column CAS No.", Row "Deoxycorticosterone"
"64-85-7" should read --64-58-7
56-47-3--.
Column 236, Table IV,
Column CAS No.", Row "doxylamine"
"469-21-4" should read --469-21-6--.

Column 239, Table IV,
Column "API Generic Name",
"Dyphyllin" should read --Dyphylline--.

Column 248, Table IV,
Column "API Generic Name",
"eoinephrine" should read --epinephrine--.

Column 253, Table IV,
Column "API Generic Name",
"Ethadion" should read --Ethadione--.

Column 263, Table IV,
Column "CAS No.", Row "fepradinol"
"36981-91-6
67704-50-1
63075-57-8" should read --36981-91-6
67704-50-1
63075-47-8--.

Column "Patent Reference", Row "fexofenadine"
"5,345,693" should read --5,375,693--.

Column 268, Table IV,
Column "API Generic Name",
"Fluroxen" should read --Fluroxene--.

Column 273, Table IV,
Column "API Generic Name",
"Gadobenat
Dimeglumine" should read --Gadobenate
Dimeglumine--.

Column 279, Table IV,
Column "API Generic Name",
"Gold Sodium
Thiemalat" should read --Gold Sodium
Thiomalate--.

Column 291, Table IV,
Column "API Generic Name",
"Indecainid" should read --Indecainide--.

Column 292, Table IV,
Column "API Generic Name",
"Induclem" should read --Inducterm--.

Column 295, Table IV,
Column "API Generic Name",
"Iproclozid" should read --Iproclozide--.

Column 295, Table IV,
Column "API Generic Name",
"Ipsapiron" should read --Ipsapirone--.

Column 297, Table IV,
Column "API Generic Name",
"Asocarboxazid" should read --Isocarboxazid--.

Column 299, Table IV,
Column "CAS No.", Row "itraconazole"
"84625-61-8" should read --84625-61-6--.

Column 303, Table IV,
Column "Patent Reference", Row "KNI-272"
"5,466,028" should read --5,644,028--.

Column 304, Table IV,
Column "Example of Therapeutic Use", Row "L-758298"
"Antimetic" should read --Antiemetic--.

Column 312, Table IV,
Column "CAS No.", Row "LH"
"902-67-9" should read --9002-67-9--.
Column "CAS No.", Row "LH-RH"
"934-40-6" should read --9034-40-6--.

Column 312, Table IV,
Column "API Generic Name",
"liarozote" should read --liarozole--.
"Lindan" should read --Lindane--.

Column 313, Table IV,
Column "API Generic Name",
"Lipo-dexamethasone" should read --Lipo-dexamethasone palmitate--.
"Lisofyllin" should read --Lisofylline--.

Column 325, Table IV,
Column "API Generic Name",
"Meglumin" should read --Meglumine--.

Column 328, Table IV,
Column "Patent Reference", Row "merimepodib"
"5,807,878" should read --5,807,876--.

Column 331, Table IV,
Column "API Generic Name"
"Methylhexaneamide" should read --Methylhexaneamine--.

Column 336, Table IV,
Column "API Generic Name"
",iltefosine" should read --miltefosine--.

Column 342, Table IV,
Column "API Generic Name",
"Muscarin" should read --Muscarine--.

Column 360, Table IV,
Column "API Generic Name",
"loanzapine" should read --olanzapine--.

Column 366, Table IV,
Column "API Generic Name",
"Oxetoron" should read --Oxetorone--.
"Oxolamin" should read --Oxolamine--.
"Oxolinix Acid" should read --Oxolinic Acid--.

Column 368, Table IV,
Column "API Generic Name",
"pactitaxel" should read --paclitaxel--.

Column 369, Table IV,
Column "API Generic Name"
"pamicogral" should read --pamicogrel--.

Column 374, Table IV,
Column "API Generic Name"
"Pentam thonium" should read --Pentamethonium--.

Column 407, Table IV,
Column "Patent Reference", Row "ribavirin"
"4,122,771" should read --4,211,771--.

Column 410, Table IV,
Column "Cas No.", Row "Risedronic Acid"
"105492-24-6" should read --105462-24-6--.

Column 413, Table IV,
Column "API Generic Name",
"Roxindol" should read --Roxindole--.

Column 415, Table IV,
Column "API Chemical Name", Row "RWJ-54428"
"5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2Z)-(2-amino-5-chloro-4-thiazolyl)(hydroxyimino)acetyl]amino]-3-[(3-[[(2-aminoethyl)thio]methyl]-4-pyridinyl]thio]-methyl]-4-pyridinyl]thio]-8-oxo-, (6R,7R)-[CAS]"
should read
--5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[(2Z)-(2-amino-5-chloro-4-thiazolyl)(hydroxyimino)acetyl]amino]-3-[(3-[[(2-aminoethyl)thio]methyl]-4-pyridinyl]thio]-8-oxo-, (6R,7R)- [CAS]--.

Column "Patent Reference", Row "RWJ-54428"
"3,713,772" should read --9,713,772--.

Column 418, Table IV,
Column "API Generic Name"
"Salicylsilfuric Acid" should read --Salicylsulfuric Acid--.

Column 435, Table IV,
Column "API Generic Name",
"stepronim" should read --stepronin--.

Column 439, Table IV,
Column "API Generic Name",
"silprostone" should read --sulprostone--.

Column 451, Table IV,
Column "Cas No.", Row "terbinafine"
"91191-71-6" should read --91161-71-6--.

Column 455, Table IV,
Column "API Generic Name",
"Thioimrag" should read --Thioimreg--.
Column "API Chemical Name", Row "Thioimrag"
"L-Thiolyrosinyl-glycinyl-glycine" should read
--L-Thiotyrosinyl-glycinyl-glycine--.

Column 461, Table IV,
Column "API Generic Name",
"Tolazamid" should read --Tolazamide--.

Column 461, Table IV,
Column "API Generic Name"
"Tolazolin" should read --Tolazoline--.

Column 463, Table IV,
Column "Patent Reference", Row "topotecan"
"231122" should read --321122--.

Column 465, Table IV,
Column "Cas No.", Row "tretoquinol"
"18559-59-8" should read --18559-59-6--.

Column 466, Table IV,
Column "Cas No.", Row "triapine"
"236392-56-5" should read --236392-56-6--.

Column 484, Table IV,
Column "Cas No.", Row "zofenopril"
"75176-37-3
81872-10-8
81972-10-8
81938-43-4"
should read
--75176-37-3
81872-10-8
81938-43-4--.

Column 486, Table IV,
Column "Patent Reference", Row "zuclopenthixol"
"27082" should read --270282--.