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Abstracts



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**AMERICAN
SOCIETY OF GENE
& CELL THERAPY**

13th Annual Meeting
May 19 - May 22, 2010
Washington, DC

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Perry B. Hackett, PhD
Jakob Giehm Mikkelsen, PhD
Matthew H. Porteus, MD, PhD

**American Society of Gene & Cell Therapy
13th Annual Meeting**

May 19-May 22, 2010
Washington, DC

Wednesday, May 19, 2010

Scientific Symposium 100, 8:30 AM–1:30 AM

Cell Therapy BioProcessing Symposium

Co-Chairs: Boro Dropulic, PhD, Thomas Tillett

Speakers: David L. Urdal, PhD, Gary C. du Moulin, PhD, MPH, Jane S. Lebkowski, PhD, Madhusudan V. Peshwa, PhD, Mitchell Finer, PhD, Michelle Williams, PhD

Scientific Symposium 101, 8:30 AM–11:30 AM

A Global Gene Therapy Renaissance

Chair: John Rasko, MBBS, PhD

Speakers: De-Chao Yu, PhD, Yasutomo Nasu, MD, PhD, Chae-Ok Yun, PhD, Seppo Ylä-Herttuala, MD, PhD, FESC, Alessandro Aiuti, MD, PhD

Lunch Break, 11:30 AM–1:00 PM

Scientific Symposium 110, 1:00 PM–3:00 PM

Gene and Cell Therapy Translational Studies

Chair: J. Kevin Donahue, MD

Speakers: J. Kevin Donahue, MD, Douglas Losordo, MD, Barry J. Byrne, MD, PhD, Patrick Most, MD

Scientific Symposium 111, 1:00 PM–3:00 PM

Ethical Issues with Embryonic Stem Cells and Induced Pluripotent Stem Cells

Chair: Jonathan Kimmelman, PhD

*Speakers: Jonathan D. Moreno, PhD, Insoo Hyun, PhD, Jeremy Sugarman, MD, MPH
Panel Discussion: James Ellis, PhD, Roger H. Bertolotti, PhD*

Scientific Symposium 112, 1:00 PM–3:00 PM

Barriers to HSC Gene Therapy

Co-Chairs: Manuel Grez, PhD, Harry L. Malech, MD

Speakers: Mary C. Dinaver, MD, PhD, Luigi M. Naldini, MD, PhD, C. Anthony Blau, MD, Christopher Baum, MD

Scientific Symposium 113, 1:00 PM–3:00 PM

Delivery of Oligonucleotide Therapeutics

Speakers: Joseph DeSimone, PhD, Steven F. Dowdy, PhD, Joshua Mendell, MD, PhD

Break, 3:00 PM - 3:30 PM

Scientific Symposium 120, 3:30 PM–5:00 PM

Emerging Field Review: Genomic Basis of Human Disease

Chair: Paul B. McCray, Jr., MD

Speakers: Eric D. Green, MD, PhD, Leslie G. Biesecker, MD, William A. Gahl, MD, PhD

Education Session 121, 3:30 PM–5:00 PM

Emerging Field Review: Regulatory RNAs

Co-Chairs: Alfred Lewin, PhD, Bernhard Gentner, MD

Speakers: Brian D. Brown, PhD, Ryan L. Boudreau, PhD, Bernhard Gentner, MD

Education Session 122, 3:30 PM–5:00 PM

Topical Review: Cell Therapy

Chair: Edwin M. Horwitz, MD, PhD

Speakers: Edwin M. Horwitz, MD, PhD, Peter Johnston, MD, FACC, Dao Pan, PhD

Education Session 123, 3:30 PM–5:00 PM

Topical Review: Gene Therapy for Eye Diseases

Co-Chairs: Peter A. Campochiaro, MD, Tal Kafri, PhD

Speakers: Peter A. Campochiaro, MD, John G. Flannery, PhD, Bill Hauswirth, PhD

Education Session 124, 3:30 PM–5:00 PM

Topical Review: Stem Cell Basics

Chair: William F. Goins, PhD

Speakers: G. Ian Gallicano, PhD, Ming Zhan, PhD

Break, 5:00 PM–5:30 PM

Education Session 130, 5:30 PM–7:00 PM

Emerging Field Review: Progress Towards Using ES/iPS Cells for Regenerative Medicine

Chair: Matthew H. Porteus, MD, PhD

Speakers: Ronald D.G. McKay, PhD, Elias T. Zambidis, MD, PhD, Evan Y.

Snyder, MD, PhD, FAAP

Education Session 131, 5:30 PM–7:00 PM

Emerging Field Review: Targeted Integration

Chair: Fulvio Mavilio, PhD

Speakers: J. Keith Joung, MD PhD, Andrew M. Scharenberg, MD, David W. Russell, MD, PhD

Education Session 132, 5:30 PM–7:00 PM

Topical Review: Gene Delivery to the Heart

Chair: Dongsheng Duan, PhD

Speakers: Dongsheng Duan, PhD, Roger J. Hajjar, MD, Charles R. Bridges, MD, ScD

Education Session 133, 5:30 PM–7:00 PM

Topical Review: Immunotherapy of Cancer

Chair: Chiara Bonini, MD

Speakers: Richard A. Morgan, PhD, Gianpietro Dotti, MD, Chiara Bonini, MD

Education Session 134, 5:30 PM–7:00 PM

Topical Review: Pre-existing Immunity to Gene Transfer Vectors

Chair: Roland W. Herzog, PhD

Speakers: Michael Cancro, PhD, Luk Vandenberghe, PhD, Katherine A. High, MD

Exhibit Hall Welcome Reception, 7:00 PM–9:00 PM

Physical Methods of Delivery

Coordinating Reviewer:

Nancy Smyth Templeton, PhD

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Michael A. Barry, PhD

Jeffrey Hughes, PharmD, PhD

Christian Plank, PhD

Chun Wang, PhD

Chemical and Molecular Conjugates

Coordinating Reviewer:

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Tatiana Segura, PhD

Millicent Sullivan, PhD

Genetic and Metabolic Diseases Gene & Cell Therapy

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Brendan Lee, MD, PhD

Jon A. Wolff, MD

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Roger J. Hajjar, MD

Cathryn S. Mah, PhD

Christina A. Pacak, PhD

Neurologic & Ophthalmic Gene & Cell Therapy

Coordinating Reviewer:

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Musculo-skeletal Gene & Cell Therapy

Coordinating Reviewer:
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Jeffrey Chamberlain, PhD
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Scott Q. Harper, PhD
Terri A. Zachos, DVM, PhD

Infectious Diseases and Vaccines

Coordinating Reviewer:
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Dorothee von Laer, MD

Cancer - Immunotherapy

Coordinating Reviewer:
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Jeffrey J. Molldrem, MD
James J. Mulé, PhD
David B. Weiner, PhD

Cancer – Oncolytic Viruses

Coordinating Reviewer:
Ronald Rodriguez, MD, PhD

Reviewers:

Winald Gerritsen, MD, PhD
Chinghai Kao, PhD
David H. Kirn, MD
Masato Yamamoto, MD, PhD

Thursday, May 20, 2010

George Stamatoyannopoulos Lecture 200, 8:00 AM–9:15 AM

Chair: Barrie J. Carter, PhD

Speaker: Hal E. Broxmeyer, PhD

Exhibit Hall Coffee Social, 9:15 AM–10:30 AM**Scientific Symposium 210, 10:30 AM–12:30 PM****Clinical Trials**

Chair: R. Jude Samulski, PhD

Speakers: Steven A. Rosenberg, MD, PhD, Ian MacLachlan, PhD, Bill Hauswirth, PhD, R. Jude Samulski, PhD

Scientific Symposium 211, 10:30 AM–12:30 PM**Tissue Specific Stem Cells**

Chair: Carolyn Lutzko, PhD

Speakers: Markus Grompe, MD, Carolyn Lutzko, PhD, Mervin C. Yoder, MD

Scientific Symposium 212, 10:30 AM–12:30 PM**Cell and Gene Therapy Approaches for Genetic Diseases: Progress and Challenges**

Chair: Charles P. Venditti, MD, PhD

Speakers: Nathalie Cartier-Lacave, MD, Alessandra Biffi, MD, Ronald D.G. McKay, PhD, Robert D. Steiner, MD

Scientific Symposium 213, 10:30 AM–12:30 PM**How Viruses Cause Disease: Implications for Vector and Vaccine Development**

Chair: Roberto Cattaneo, PhD

Speakers: Lynn W. Enquist, PhD, Jeffrey Bergelson, MD, Bernard Moss, MD, PhD, Roberto Cattaneo, PhD

Scientific Symposium 214, 10:30 AM–12:30 PM**Gene and Cell Therapeutic Approaches for Musculo-Skeletal Diseases**

Co-Chairs: Paula Clemens, MD, Alan J. Nixon, DVM, MS

Speakers: Edward M. Schwarz, PhD, Steven C. Ghivizzani, PhD, Joel R. Chamberlain, PhD, Carmen Berton, PhD

Scientific Symposium 215, 10:30 AM–12:30 PM**Novel Cell and Gene Therapy Interventions for the Lung**

Chair: Bruce Bunnell, PhD

Speakers: Daniel Weiss, MD, PhD, Paul B. McCray, Jr., MD, Peter I. Leikes, PhD, John F. Engelhardt, PhD

Scientific Symposium 216, 10:30 AM–12:30 PM**NIH Resources for Cell and Gene Therapy Investigators**

Speakers: Cheryl L. McDonald, MD, Daniel Rosenblum, MD, Catherine McKeon, PhD, David G. Badman, PhD, Roy S. Wu, PhD, Danilo A. Tagle, PhD, Traci Heath Mondoro, PhD, Sonia Skarlatos, PhD, Ying Huang, PhD

Lunch Break, 12:30 PM–2:00 PM

Individual speaker presentation titles will be included in the 13th Annual Final Program, which will be distributed at the meeting in Washington, DC. Please see the Final Program for comprehensive program information, including room assignments, speaker order and individual presentation titles.

Meet-the-Investigator 220, 12:30 PM–1:45 PM

Musculo-Skeletal

Speakers: Jeffrey Chamberlain, PhD, Paula Clemens, MD

Meet the Investigator Session 221, 12:30 PM–2:00 PM

Cancer Stem Cells

Speakers: Timothy P. Cripe, MD, PhD, Samuel D. Rabkin, PhD

Oral Abstract Session 230, 2:00 PM–4:00 PM

AAV Vectors: Vector Trafficking.....p.S1

Co-Chairs: David W. Schaffer, Xiao Xiao

1 2:00 PM	5 3:00 PM
2 2:15 PM	6 3:15 PM
3 2:30 PM	7 3:30 PM
4 2:45 PM	8 3:45 PM

Oral Abstract Session 231, 2:00 PM–4:00 PM

DNA Vectorology & Gene Targeting.....p.S4

Co-Chairs: Perry Hackett, Matthew Porteus

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12 2:45 PM	16 3:45 PM

Oral Abstract Session 232, 2:00 PM–4:00 PM

Neurologic & Ophthalmic Gene & Cell Therapy.....p.S7

Co-Chairs: Michael Kaplitt, Deborah J. Watson

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18 2:15 PM	22 3:15 PM
19 2:30 PM	23 3:30 PM
20 2:45 PM	24 3:45 PM

Oral Abstract Session 233, 2:00 PM–4:00 PM

Cancer – Immunotherapy T Cell Studies.....p.S11

Co-Chairs: Dean Lee, Chiara Bonini

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27 2:30 PM	31 3:30 PM
28 2:45 PM	32 3:45 PM

Oral Abstract Session 234, 2:00 PM–4:00 PM

Cancer-Oncolytic Viruses I.....p.S14

Co-Chairs: David H. Kirn, Winald Gerritsen

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Oral Abstract Session 235, 2:00 PM–4:00 PM

Immunologic & Host Responses in Gene & Cell Therapy.....p.S17

Co-Chairs: Evanthia Galanis, Maciej Lesniak

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Oral Abstract Session 236, 2:00 PM–4:00 PM

Oligonucleotide & RNAi Therapeutics I.....p.S20

Co-Chairs: Dieter Gruenert, Faye Rogers

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Cancer - Targeted Gene & Cell Therapy

Coordinating Reviewer:
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Special thanks to the abstract reviewers for their time and expertise.

Outstanding New Investigator Symposium 240, 4:30 PM–6:15 PM

Exhibit Hall Networking Reception, 6:15 PM–8:15 PM

Poster Session I, 6:15 PM–8:15 PM

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Adenovirus and Other DNA Virus Vectors I p.S29
(Abstracts 73 through 86)

Targeting Gene Modification and Integration p.S34
(Abstracts 87 through 99)

Physical Methods of Delivery p.S38
(Abstracts 100 through 116)

Chemical and Molecular Conjugates I p.S44
(Abstracts 117 through 132)

Genetic and Metabolic Diseases Gene & Cell Therapy I p.S50
(Abstracts 133 through 147)

Musculo-skeletal Gene & Cell Therapy I p.S57
(Abstracts 148 through 160)

Infectious Diseases and Vaccines: Vaccine Related Gene Transfer Research p.S62
(Abstracts 161 through 174)

Cancer – Immunotherapy I p.S67
(Abstracts 175 through 190)

Cancer-Oncolytic Viruses I p.S73
(Abstracts 191 through 204)

Cancer-Targeted Gene & Cell Therapy I p.S78
(Abstracts 205 through 219)

Hematologic and Immunologic Gene & Cell Therapy I p.S84
(Abstracts 220 through 233 and Abstract 869 which has
been moved from Poster Session III)

Gene Regulation p.S89
(Abstracts 234 through 244)

Oligonucleotide & RNAi Therapeutics I p.S93
(Abstracts 245 through 259)

Stem Cell Biology p.S99
(Abstracts 260 through 273)

Cell Processing and Vector Production I p.S104
(Abstracts 274 through 282)

Foundation Symposium 250, 7:00 PM–10:00 PM

Expanding Frontiers in Spinal Muscular Atrophy Gene Therapy

Chair: Christian L. Lorson, PhD

Speakers: Christian L. Lorson, PhD, C. Frank Bennett, PhD, Marco Passini, PhD, Brian K. Kaspar, PhD, Petra Kaufman, MD

Friday, May 21, 2010

Top Abstracts Plenary Session 300, 8:00 AM–10:00 AM

Plenary Abstract Session.....p.S107

Co-Chairs: Stanton L. Gerson, John J. Rossi

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284 8:25 AM 287 9:25 AM

285 8:45 AM 288 9:45 AM

Break, 10:00 AM–10:30 AM

Scientific Symposium 310, 10:30 AM–12:30 PM

Personalized Cell and Gene Therapy

Chair: John J. Nemunaitis, MD

Speakers: John J. Nemunaitis, MD, Lilia Bi, PhD, Carl H. June, MD, Jeffrey Schlom, PhD

Scientific Symposium 311, 10:30 AM–12:30 PM

Stem Cells and Malignancy

Chair: Evan Y. Snyder, MD, PhD, FAAP

Speakers: Inder Verma, PhD, Roger J. Packer, MD, Evan Y. Snyder, MD, PhD, FAAP, Carl Bart Rountree, MD

Scientific Symposium 312, 10:30 AM–12:30 PM

Current Status of Genetic Vaccines

Chair: Stephen Gottschalk, MD

Speakers: Si-Yi Chen, MD, PhD, Jerald C. Sadoff, MD, Sattva S. Neelapu, MD, Stephen Gottschalk, MD

Scientific Symposium 313, 10:30 AM–12:30 PM

Precise Genetic and Post-transcriptional Modification of Stem Cells

Chair: Matthew H. Porteus, MD, PhD

Speakers: Linzhao Cheng, PhD, Dieter C. Gruenert, PhD, Robert Blueloch, MD, PhD

Scientific Symposium 314, 10:30 AM–12:30 PM

New Physical Gene Delivery System and Vectorology

Chair: Shulin Li, PhD

Speakers: Christian Plank, PhD, Declan M. Soden, PhD, Kate E. Broderick, PhD, Laurence JN Cooper, MD, PhD

Scientific Symposium 315, 10:30 AM–12:30 PM

Genetic Modification of Stem Cells for Therapeutic Applications

Chair: Frederic D. Bushman, PhD

Speakers: Christof von Kalle, MD, Matthew H. Porteus, MD, PhD, Frederic D. Bushman, PhD, Ko Mitani, PhD

Lunch Break, 12:30 PM–2:00 PM

Oral Abstract Session 320, 2:00 PM–4:00 PM

Clinical Gene & Cell Therapy Oral Abstract Session.....p.S110

Co-Chairs: Guangping Gao, Matthew Porteus

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RNA Virus Vectors.....p.S113

Co-Chairs: Fabio Candotti, Robert G. Hawley

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Co-Chairs: Douglas M. McCarty, Matthew D. Weitzman

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Gene Therapy for Lysosomal Storage Diseases and Other Genetic Disorders.....p.S120

Co-Chairs: Cary Harding, Chester B. Whitely

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Oral Abstract Session 324, 2:00 PM–4:00 PM

Physical Methods of Delivery.....p.S123

Co-Chairs: Nancy S. Templeton, Jeffery Hughes

321 2:00 PM 325 3:00 PM

322 2:15 PM 326 3:15 PM

323 2:30 PM 327 3:30 PM

324 2:45 PM 328 3:45 PM

Oral Abstract Session 325, 2:00 PM–4:00 PM

Cancer-Targeted Gene & Cell Therapy.....p.S127

Co-Chairs: David Dingli, Frank Marini

329 2:00 PM 333 3:00 PM

330 2:15 PM 334 3:15 PM

331 2:30 PM 335 3:30 PM

332 2:45 PM 336 3:45 PM

Oral Abstract Session 326, 2:00 PM–4:00 PM

Hematologic/Immunologic: Basic.....p.S130

Co-Chairs: David W. Emery, David Klatzmann

337 2:00 PM 341 3:00 PM

338 2:15 PM 342 3:15 PM

339 2:30 PM 343 3:30 PM

340 2:45 PM 344 3:45 PM

Break, 4:00 PM–4:30 PM**Presidential Symposium 330, 4:30 PM–6:30 PM***Chair: Kenneth Cornetta, MD**Speakers: Katherine A. High, MD, Jean Bennett, MD, PhD, David A. Williams, MD***Exhibit Hall Networking Reception, 6:30 PM–8:30 PM**

Poster Session II, 6:30 PM–8:30 PM

RNA Virus Vectors I.....	p.S134
(Abstracts 345 through 361)	
AAV Vectors II	p.S140
(Abstracts 362 through 377)	
Adenovirus and Other DNA Virus Vectors II	p.S147
(Abstracts 378 through 391)	
Chemical and Molecular Conjugates II	p.S151
(Abstracts 392 through 407)	
Genetic and Metabolic Diseases Gene & Cell Therapy II	p.S157
(Abstracts 408 through 422 and Abstract 764 which has been moved from Poster Session III)	
Cardiovascular Gene & Cell Therapy	p.S164
(Abstracts 423 through 440)	
Ophthalmic Disorders and Technological Advances	p.S171
(Abstracts 441 through 453)	
Musculo-skeletal Gene & Cell Therapy II	p.S176
(Abstracts 454 through 468)	
Cancer – Immunotherapy II	p.S181
(Abstracts 469 through 487)	
Cancer-Oncolytic Viruses II	p.S189
(Abstracts 488 through 506)	
Cancer-Targeted Gene & Cell Therapy II	p.S196
(Abstracts 507 through 520; Abstract 519 withdrawn)	
Hematologic and Immunologic Gene & Cell Therapy II	p.S201
(Abstracts 521 through 534)	
Immunologic & Host Responses in Gene & Cell Therapy	p.S206
(Abstracts 535 through 554)	
Oligonucleotide & RNAi Therapeutics II	p.S214
(Abstracts 555 through 569)	
Cell Processing and Vector Production II	p.S220
(Abstracts 570 through 579)	

Foundation Symposium 340, 7:00 PM–10:00 PM

Progress and Prospects for Gene Therapy for CGD and Other Primary Immunodeficiencies

Chair: Fabio Candotti, MD

Speakers: Mary C. Dinan, MD, PhD, Alessandro Aiuti, MD, PhD, Harry Malech, MD, Manual Grez, PhD, Adrian Thrasher, MD, PhD, Toni Cathomen, PhD, Linzhao Cheng, PhD

Individual speaker presentation titles will be included in the 13th Annual Final Program, which will be distributed at the meeting in Washington, DC. Please see the Final Program for comprehensive program information, including room assignments, speaker order and individual presentation titles.

Saturday, May 22, 2010

**ASGCT Business Meeting (with continental breakfast),
8:00 AM–8:30 AM**

Scientific Symposium 400, 8:30 AM–10:30 AM

Late Stage Industry Clinical Trials

Co-Chairs: Douglas J. Jolly, PhD, Thomas Tillett

Speakers: Robert Sims, MD, Ryuichi Morishita, MD, PhD, Sander van Deventer, MD, PhD

Scientific Symposium 401, 8:30 AM–10:30 AM

Local Delivery of Chemical Gene Therapy - Mechanisms, Quantitative Understanding and Applications of Biodegradable Carriers

Chair: Ernst Wagner, PhD

Speakers: Lonnie D. Shea, PhD, Aliasger K. Salem, PhD, David M. Lynn, PhD, Daniel G. Anderson, PhD

Scientific Symposium 402, 8:30 AM–10:30 AM

Engineered T Cells in the Clinic: Emerging Clinical and Regulatory Issues

Chair: Jacqueline Corrigan-Curay, MD, JD

Speakers: Daniel M. Takefman, PhD, Joy Cavagnaro, PhD, DABT, RAC, Carl H. June, MD

Panel Discussion: Helen E. Heslop, MD, Michel Sadelain, MD, PhD, Steven A. Rosenberg, MD, PhD

Scientific Symposium 403, 8:30 AM–10:30 AM

Mechanisms of Innate Immunity Influencing Gene Therapy

Chair: David B. Weiner, PhD

Speakers: Valder Arruda, MD, PhD, Yiping Yang, MD, PhD, David B. Weiner, PhD, Michael T. Lotze, MD

Scientific Symposium 404, 8:30 AM–10:30 AM

MicroRNA and siRNA Roles in Disease Progression and Development of Novel

Chair: Maria G. Castro, PhD

Speakers: Anna M. Krichevsky, PhD, M. Maral Mouradian, MD, Sean E. Lawler, PhD, Al Charest, PhD

Scientific Symposium 405, 8:30 AM–10:30 AM

Special Considerations with Using Viral Vectors for Gene Modification of Stem Cells

Chair: Philip D. Gregory, PhD

Speakers: Matthew Hirsch, PhD, Philip D. Gregory, PhD, Frederic Paques, PhD, Andrew M. Scharenberg, MD

Break, 10:30 AM–11:00 AM

Oral Abstract Session 410, 11:00 AM–1:00 PM

Musculo-skeletal Gene & Cell Therapy.....p.S224

Co-Chairs: Jeffrey Chamberlain, Paula Clemens

580 11:00 AM 584 12:00 PM

581 11:15 AM 585 12:15 PM

582 11:30 AM 586 12:30 PM

583 11:45 AM 587 12:45 PM

Oral Abstract Session 411, 11:00 AM–1:00 PM

Chemical and Molecular Conjugates.....p.S228

Co-Chairs: Hideyoshi Harashima, Millicent Sullivan

588 11:00 AM 592 12:00 PM

589 11:15 AM 593 12:15 PM

590 11:30 AM 594 12:30 PM

591 11:45 AM 595 12:45 PM

Oral Abstract Session 412, 11:00 AM–1:00 PM

Cardiovascular Gene & Cell Therapy p.S231

Co-Chairs: Roger J. Hajjar, Xiao Xiao

596 11:00 AM 600 12:00 PM

597 11:15 AM 601 12:15 PM

598 11:30 AM 602 12:30 PM

599 11:45 AM 603 12:45 PM

Oral Abstract Session 413, 11:00 AM–1:00 PM

Cancer-Oncolytic Viruses II.....p.S234

Co-Chairs: Ronald Rodriguez, Masato Yamamoto

604 11:00 AM 608 12:00 PM

605 11:15 AM 609 12:15 PM

606 11:30 AM 610 12:30 PM

607 11:45 AM 611 12:45 PM

Oral Abstract Session 414, 11:00 AM–1:00 PM

Hematologic/Immunologic: Clinical, Preclinical and Safety p.S238

Co-Chairs: Gay Crooks, Adrian J. Thrasher

612 11:00 AM 616 12:00 PM

613 11:15 AM 617 12:15 PM

614 11:30 AM 618 12:30 PM

615 11:45 AM 619 12:45 PM

Oral Abstract Session 415, 11:00 AM–12:00 PM

Lung and Respiratory Disease Gene & Cell Therapy p.S241

Co-Chairs: Terence R. Flotte, Maria Limberis

620 11:00 AM

621 11:15 AM

622 11:30 AM

623 11:45 AM

Oral Abstract Session 416, 12:15 PM–1:15 PM

Gene Regulation.....p.S242

Co-Chairs: Olivier Danos, Giuliana Ferrari

624 12:15 PM

625 12:30 PM

626 12:45 PM

627 1:00 PM

Oral Abstract Session 417, 11:00 AM–1:00 PM

Stem Cell Therapies.....p.S244

Co-Chairs: Carolyn Lutzko, Alice F. Tarantal

628 11:00 AM 632 12:00 PM

629 11:15 AM 633 12:15 PM

630 11:30 AM 634 12:30 PM

631 11:45 AM 635 12:45 PM

Lunch Break, 1:00 PM–3:00 PM

Meet-the-Investigator 420, 1:00 PM–2:15 PM

Stem Cells

Speakers: James Ellis, PhD, Carolyn Lutzko, PhD

Meet-the-Investigator 421, 1:00 PM–2:15 PM**Roles of miRNA's**

Speakers: Mark A. Kay, MD, PhD, Luigi M. Naldini, MD, PhD

Oral Abstract Session 430, 3:00 PM–5:00 PM

Adenovirus and Other DNA Virus Vectors p.S247

Co-Chairs: Anja Ehrhardt, Florian Kreppel

636 3:00 PM	640 4:00 PM
637 3:15 PM	641 4:15 PM
638 3:30 PM	642 4:30 PM
639 3:45 PM	643 4:45 PM

Oral Abstract Session 431, 3:00 PM–5:00 PM

Infectious Diseases and Vaccines p.S250

Co-Chairs: Ann Leen, Bruce E. Torbett

644 3:00 PM	648 4:00 PM
645 3:15 PM	649 4:15 PM
646 3:30 PM	650 4:30 PM
647 3:45 PM	651 4:45 PM

Oral Abstract Session 432, 3:00 PM–5:00 PM

Cancer – Immunotherapy II p.S254

Co-Chairs: Jeff Mouldrem, Ronnie Alvarez

652 3:00 PM	656 4:00 PM
653 3:15 PM	657 4:15 PM
654 3:30 PM	658 4:30 PM
655 3:45 PM	659 4:45 PM

Oral Abstract Session 433, 3:00 PM–5:00 PM

Oligonucleotide & RNAi Therapeutics II p.S257

Co-Chairs: Peter M. Glazer, Paloma Giangrande

660 3:00 PM	664 4:00 PM
661 3:15 PM	665 4:15 PM
662 3:30 PM	666 4:30 PM
663 3:45 PM	667 4:45 PM

Oral Abstract Session 434, 3:00 PM–5:00 PM

Cell Processing and Vector Production p.S261

Co-Chairs: Fraser J Wright, Stephen Kaminsky

668 3:00 PM	672 4:00 PM
669 3:15 PM	673 4:15 PM
670 3:30 PM	674 4:30 PM
671 3:45 PM	675 4:45 PM

Oral Abstract Session 435, 3:00 PM–5:00 PM

Gene Therapy for Inborn Errors of Metabolism p.S264

Co-Chairs: Dwight Koeberl, Brendan Lee

676 3:00 PM	680 4:00 PM
677 3:15 PM	681 4:15 PM
678 3:30 PM	682 4:30 PM
679 3:45 PM	683 4:45 PM

Oral Abstract Session 436, 3:00 PM–5:00 PM

Late Breaking Science

Co-Chairs: Guangping Gao, Stanton L. Gerson

Poster Hall Social in Atrium, 5:00 PM–6:00 PM

Poster Session III, 6:00 PM–8:00 PM

RNA Virus Vectors II p.S267 (Abstracts 684 through 696)	
AAV Vectors III p.S272 (Abstracts 697 through 711)	
Adenovirus and Other DNA Virus Vectors III p.S278 (Abstracts 712 through 725)	
DNA Vectorology & Gene Targeting p.S283 (Abstracts 726 through 741)	
Chemical and Molecular Conjugates III p.S289 (Abstracts 742 through 757)	
Genetic and Metabolic Diseases Gene & Cell Therapy III p.S295 (Abstracts 758 through 772; Abstract 764 has been moved to Poster Session II after Abstract 422)	
Neurodegenerative Disorders, Spinal Cord and Trauma p.S301 (Abstracts 773 through 783)	
Musculo-skeletal Gene & Cell Therapy III p.S305 (Abstracts 784 through 796)	
Infectious Diseases and Vaccines: Non-Vaccine Related Gene Transfer Research p.S308 (Abstracts 797 through 808)	
Cancer – Immunotherapy III p.S312 (Abstracts 809 through 827)	
Cancer-Oncolytic Viruses III p.S319 (Abstracts 828 through 842; Abstract 838 withdrawn)	
Cancer-Targeted Gene & Cell Therapy III p.S325 (Abstracts 843 through 856)	
Hematologic and Immunologic Gene & Cell Therapy III p.S331 (Abstracts 857 through 871; Abstract 869 has been moved to Poster Session I after Abstract 233)	
Lung and Respiratory Disease Gene & Cell Therapy p.S336 (Abstracts 872 through 881)	
Oligonucleotide & RNAi Therapeutics III p.S340 (Abstracts 882 through 897)	
Stem Cell Therapies p.S346 (Abstracts 898 through 913)	

**Annual Meeting Concludes
8:00 PM**

476. TCR Engineered and In Vitro Expanded T Lymphocytes Recapitulate the Properties of Central Memory T Cells

Shicheng Yang,¹ Zhili Zheng,¹ Ling Zhang,¹ Steven A. Rosenberg,¹ Richard A. Morgan.¹

¹*Surgery Branch, Center for Cancer Research, National Cancer Institute, National Institutes of Health, Bethesda, MD.*

The T lymphocyte pool can be sub-divided into a naïve population (T_n) of antigen inexperienced cells, and following antigen encounter: effector memory (T_{em}), and central memory (T_{cm}) T cells. The memory T cells mount a fast and potent recall immune response following antigen recognition and T_{cm} cells are believed to contain T memory stem cells, which display the capacity for long-term self-renewal. Based on the differentiation marker L-selectin/CD62L and the release of the cytokine IL-2, central memory T cells can be distinguished from effector memory T cells. In this study, we developed methodologies to generate short-term cultured anti-tumor T lymphocytes by combining anti-CD3 activation and lentiviral transduction with an anti-tumor antigen TCR vector. PBMC derived from melanoma patients by leukopheresis were activated by anti-CD3/CD28 beads or plate-bound anti-CD3 antibody followed by one round of lentiviral vector transduction. Within two weeks of in vitro culture, we could expand T lymphocytes up to 1000-fold and majority of these cells showed a central memory-like phenotype illustrated by a high percentage of CD62L. Most importantly, the transduced cells expressed high levels of the anti-tumor TCR (up to 91%) and exhibited strong effector functions including lytic activity and cytokine release. Interestingly, distinct populations were observed when T lymphocytes were analyzed by the differentiation markers CD62L and CD45RO. For example, CD28 and CD27 were preferentially expressed on CD62L^{high} populations while CD70 showed the opposite distribution. Moreover, when the transduced cells were sorted into populations of CD45RO⁺/CD62L⁻ (T_{em}), CD45RO⁺/CD62L⁺ (T_{cm}) and CD45RO^{low}/CD62L⁺ (T_n) and then co-cultured with antigen-matched melanoma lines, cytokine release from these populations mimicked the types of immune cell responses observed in vivo. For example, T_{em} sorted cells secrete high levels of IFN- γ and low amounts IL-2 while T_{cm} cells showed the opposite reactivity (high IL-2 and low IFN- γ). In addition to cytokine production, T_{cm} and T_{em} actively lysed tumor cell lines while the T_n populations exhibited much reduced tumor cell lysis. In summary, T lymphocytes can be efficiently engineered with a lentiviral vector expressing an anti-tumor TCR and within two weeks of ex vivo culture yield large numbers of T lymphocytes mimicking a T_{cm} phenotype that may promote long-lived memory and anti-tumor efficacy in vivo.

by using electroporation. However, no prior study has combined all these optimization strategies into a human study. We developed VGX-3100 as a two plasmid combination vaccine targeting the E6/E7 gene products of HPV-16 and 18 as an immunotherapy for cervical cancer. This phase I study is designed to evaluate three dose levels of VGX-3100 delivered via electroporation (EP) using the CELLECTRA® constant current device. Data from the lowest dose cohort of patients studied (0.3 mg/each construct) are reported here. Six patients with a history of CIN 2/3 who had been treated by LEEP procedure were immunized three times at week 0, 4 and 12. Serum and PBMC samples were collected at multiple time points post immunization. The DNA vaccines and electroporation procedures were generally well tolerated with no serious adverse events or study related grade 3 or 4 adverse events reported. Significantly, administration of VGX-3100 induced both cellular and humoral responses. HPV 16 and 18 E6 and E7-specific cellular responses were observed in 3 out of 5 subjects (one subject excluded due to high Elispot background). The numbers of spot forming units (SFU) per million cells were higher than those reported previously in HPV immunization studies of poxviral vector systems or prior DNA vaccines. High titer HPV16 and 18 E7-specific antibody responses that were not present at baseline were also observed following vaccination in five of six patients. Both the anti-HPV 16 E7 and anti-HPV18 E7 IgG titers in some patients reached 1:104 or higher illustrating the immune potency of this candidate vaccine and the combined optimization approach in humans. Western Blot analysis confirmed reactivity of immunized patient sera against E7 antigens. Sera from five out of six patients recognized both HPV16 and 18 E7 antigens after the third immunization, while the prebleed sera was negative to either E7 antigen. Immune analysis of E6-specific humoral responses is in progress. In summary, vaccination of humans with highly optimized HPV constructs delivered by CELLECTRA® EP device induces both cellular and humoral responses at the lowest DNA dose. The CTL responses encourage further investigation in cervical cancer cohorts and the antibodies measured in this low dose cohort are encouraging for the further development of antibody dependent DNA vaccine strategies. Further study of this immune therapeutic vaccine at higher doses is in progress.

478. Improving Adoptive T Cell Therapy by Transduction of TIL with a Vector That Mediates the Inducible Expression of IL-12 in the Tumor Microenvironment

Ling Zhang, Sid P. Kerkard, Shicheng Yang, Zhili Zheng, Zhiya Yu, Nicholas P. Restifo, Steven A. Rosenberg, Richard A. Morgan.

Surgery Branch, NCI/NIH, Bethesda, MD.

Interleukin 12(IL-12) is a heterodimeric cytokine naturally produced by dendritic cells in response to antigenic stimulation. It is involved in the differentiation of naïve T cells into Th1 cells, and enhances the cytotoxic activity of NK cells and CD8 T lymphocytes by, among other mechanisms, stimulating interferon- γ (IFN- γ) production. Recombinant IL-12 has shown anti-tumor activities in animal models, suggesting it is a promising agent for use in cancer gene therapy. However, in early clinical trials unexpected patient toxicity necessitate the development of methods to reduce systemic toxicity such as engineering IL-12 to be produced locally at the tumor site. A promising approach for cancer therapy is the adoptive transfer of tumor infiltrating lymphocytes (TIL), which have been shown to mediate tumor regression in patients with metastatic melanoma. Here, we sought to enhance the therapeutic efficacy of TILs using the immunostimulatory properties of IL-12. We have developed a retroviral vector that mediates the inducible expression of a human single chain IL-12 protein (MSGV1-NFAT-hIL12-PA2). This vector used a composite expression cassette containing the minimal IL2 gene promoter linked to six-repeats of the Nuclear Factor of Activated T

477. Phase I Safety and Immunogenicity of HPV 16 and 18 DNA Vaccines Delivered Via Electroporation

Jian Yan,¹ Panyupa Pankhong,¹ Xuefei Shen,² Mary Giffear,² Jessica Lee,² Drea Harris,¹ Deanna Diaz,¹ Amir Khan,² Mark Bagarazzi,² Jean Boyer,¹ David B. Weiner,¹ Niranjana Y. Sardesai.²

¹*Pathology and Laboratory Medicine, University of Pennsylvania, Philadelphia, PA;* ²*Inovio Biomedical Corporation, Blue Bell, PA.*

DNA vaccines have potential advantages as a cancer immune therapy platform, due to their safety, stability, ease of production and engineering, and lack of immune interference for boosting. Despite examples of DNA vaccine-induced immunity in murine and non-human primate models, the immunogenicity induced by DNA vaccines in humans has been poor. Many strategies have been applied to enhance the potency of DNA vaccines, such as codon/RNA optimization, the addition of high efficiency immunoglobulin leader sequences, as well as improvement of DNA vaccine delivery methods