

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LCY Biotechnology Holding, Inc.,
Petitioner

v.

RadiciChimica S.p.A,
Patent Owner

Case No. PGR2024-00044
Patent 11,781,148

DECLARATION OF SYLVIA D. HALL-ELLIS, PH.D.

I. INTRODUCTION

1. My name is Sylvia D. Hall-Ellis. I have been retained as an expert by Counsel for LCY Biotechnology Holding, Inc.

2. I have written this declaration at the request of LCY Biotechnology Holding, Inc. to provide my expert opinion regarding the authenticity and public availability of several publications. My declaration sets forth my opinions in detail and provides the basis for my opinions regarding the public availability of these publications.

3. I reserve the right to supplement or amend my opinions, and basis for them, in response any additional evidence, testimony, discovery, argument, and/or other additional information that may be provided to me after the date of this declaration.

4. I am being compensated for my time spent working on this matter at my normal consulting rate of \$400 per hour, plus reimbursement for any additional reasonable expenses. My compensation is not in any way tied to the content of this declaration, the substance of my opinions, or the outcome of this proceeding. I have no other interests in this proceeding or with any of the parties.

5. All of the materials that I considered are discussed explicitly in this declaration.

II. QUALIFICATIONS

6. I am currently an Adjunct Professor in the School of Information at San José State University. I obtained a Master of Library Science from the University of North Texas in 1972 and a Ph.D. in Library and Information Science from the University of Pittsburgh in 1985. Over the last fifty years, I have held various positions in the field of library and information resources. I was first employed as a librarian in 1966 and have been involved in the field of library sciences since, holding numerous positions.

7. I am a member of the American Library Association (“ALA”) and its Association for Library Collections & Technical Services (“ALCTS”) Division, and I served on the Committee on Cataloging: Resource and Description (which wrote the new cataloging rules) and as the chair of the Committee for Education and Training of Catalogers and the Competencies and Education for a Career in Cataloging Interest Group. I also served as the Chair of the ALCTS Division’s Task Force on Competencies and Education for a Career in Cataloging. Additionally, I served as the Chair for the ALA Office of Diversity’s Committee on Diversity, as a member of the REFORMA National Board of Directors, and as a member of the Editorial Board for the ALCTS premier cataloging journal, *Library Resources and Technical Services*, as a Co-Chair of the Membership Committee for the Library Research Round Table (LRRT) of the American Library

Association, and as a member of the LRRT Nominating Committee. Currently I serve as a member of the CORE Margaret Mann Citation Committee.

8. I have also given over one-hundred presentations in the field, including several on library cataloging systems and Machine-Readable Cataloging (“MARC”) standards. My current research interests include library cataloging systems, metadata, and organization of electronic resources.

9. I have been deposed thirty-six times: (1) *Symantec Corp. vs. Finjan, Inc.*, Petition for *Inter Partes Review* of U.S. Patent No. 7,613,926, May 26, 2016, on behalf of Symantec Corp.; (2) *Symantec Corp. vs. Finjan, Inc.*, Northern District of California, 14-cv-299-HSG, on behalf of Symantec Corp., September 14, 2017; (3) one deposition for ten matters: *Intellectual Ventures I LLC vs. AT&T Mobility LLC*; AT&T Mobility II LLC, New Cingular Wireless Services, Inc., SBC Internet Services, Inc., Wayport, Inc., and Cricket Wireless LLC, C.A. No. 12-193 (LPS); *Intellectual Ventures II LLC vs. AT&T Mobility LLC*; AT&T Mobility II LLC, New Cingular Wireless Services, Inc., SBC Internet Services, Inc., Wayport, Inc., and Cricket Wireless LLC, C.A. No. 13-1631 (LPS); *Intellectual Ventures I LLC vs. T-Mobile USA, Inc. and T-Mobile US, Inc.*, C.A. No. 13-1632 (LPS); *Intellectual Ventures II LLC vs. T-Mobile USA, Inc. and T-Mobile US, Inc.*, C.A. No. 13-1633 (LPS); *Intellectual Ventures I LLC, vs. Nextel Operations, Inc., Sprint Spectrum L.P., Boost Mobile, LLC and Virgin Mobile USA, L.P.*, C.A. No. 13-1634

(LPS); *Intellectual Ventures II LLC vs. Nextel Operations, Inc., Sprint Spectrum L.P., Boost Mobile, LLC and Virgin Mobile USA, L.P.*, C.A. No. 13-1635 (LPS); *Intellectual Ventures I LLC, vs. United States Cellular Corporation*, C.A. No. 13-1636 (LPS); *Intellectual Ventures I LLC vs. United States Cellular Corporation*, C.A. No. 13-1637 (LPS); *Intellectual Ventures II LLC vs. AT&T Mobility LLC, AT&T Mobility II LLC, New Cingular Wireless Services, Inc.*, C.A. No. 15-799 (LPS); *Intellectual Ventures I LLC vs. T-Mobile USA, Inc. and T-Mobile US, Inc.*, C.A. No. 15-800 (LPS), on behalf of AT&T Mobility LLC; AT&T Mobility II LLC, Boost Mobile, LLC Cricket Wireless LLC, Nextel Operations, Inc., New Cingular Wireless Services, Inc., SBC Internet Services, Inc., Sprint Spectrum L.P., T-Mobile USA, Inc., T-Mobile US, Inc., United States Cellular Corporation Virgin Mobile USA, L.P., and Wayport, Inc., November 15, 2016; (4) *Hitachi Maxell, LTD., v. Top Victory Electronics (Taiwan) Co. Ltd., et al.*, Eastern District of Texas, 2:14-cv-1121 JRG-RSP (E.D. Texas), on behalf of Top Victory Electronics (Taiwan) Co. LTD, *et. al.*, January 20, 2016; (5) *Sprint Spectrum, L.P. vs. General Access Solutions, Ltd.*, Petition for *Inter Partes* Review of U.S. Patent No. 7,173,916, on behalf of Sprint Spectrum L.P., July 13, 2018; (6) *Nichia Corporation vs. Vizio, Inc.*, Central District of California, 8:16-cv-00545; on behalf of Vizio, Inc., October 12, 2018; (7) *Intellectual Ventures I LLC, vs. T-Mobile USA, Inc., T-Mobile US, Inc., Ericsson Inc., and Telefonaktiebolaget LM Ericsson*,

Middle District of Florida, 2:17-cv-00557 (JRG), on behalf of T-Mobile USA, Inc., T-Mobile US, Inc., Ericsson Inc., and Telefonaktiebolaget LM Ericsson, October 19, 2018; (8) Pfizer, Inc. vs. Biogen, Inc., Petition for *Inter Partes Review* of U.S. Patent No. 8,821,873, on behalf of Pfizer, November 3, 2018; (9) *Finjan, Inc. vs. ESET, LLC and ESET SPOL. S.R.O.*, Southern District of California, 3:17-cv-00183-CAB-BGS, on behalf of ESET, January 15, 2019; (10) *Finjan, Inc. vs. Cisco Systems, Inc.*, Northern District of California, 5:17-cv-00072-BLF-SVK, on behalf of Cisco Systems, Inc., September 6, 2019; (11) *Facebook, Inc., Instagram, LLC and Whatsapp Inc. vs. Blackberry Limited*, Petition for *Inter Partes Review* of U.S. Patent No. 9,349,120 B2, on behalf of Facebook, Inc., Instagram, LLC and Whatsapp Inc. December 20, 2019; (12) *3Shape A/S and Shape Inc. v. Align Technology, Inc.*, Petition for *Inter Partes Review* of U.S. Patent No. 7,156,661, IPR2020-00222 and IPR2020-00223, August 10, 2020, on behalf of 3Shape A/S and 3Shape Inc.; (13) *Finjan Inc. v. Rapid7, Inc. and Rapid7 LLC*, District of Delaware, 1:18-cv-01519-MN, September 15, 2020; (14) *VLSI Technology LLC v. Intel Corporation*, Western District of Texas, 6:19-cv-00254, 6:19-cv-00255, 6:19-cv-00256, on behalf of Intel Corporation, September 23, 2020; (15) *Finjan Inc. v. Sonicwall, Inc.*, Northern District of California, 5:17-cv-04467-BLF-HRL, on behalf of Sonicwall, Inc., October 27, 2020; (16) *VLSI Technology, LLC v. Intel Corporation*, District of Delaware, 1:18-cv-00966-CFC-CJB, February 5, 2021, on

behalf of the Intel Corporation; (17) *Unified Patents, LLC v. Good Kaisha IP Bridge 1*, Petition for *Inter Partes* Review of U. S. Patent 7,817,868, February 11, 2021, on behalf of Unified Patents; (18) *Finjan, Inc. v. Qualsys, Inc.*, Northern District of California, 4:18-cv-07229-YGR, March 1, 2021, on behalf of Qualsys, Inc.; (19) *Qualcomm, Inc. v. Monterey Research LLC*, Petition for *Inter Partes* Review of U. S. Patent 6,534,805, May 6, 2021, on behalf of Qualcomm, Inc.; (20) *Hulu, LLC v. Sound View Innovations, LLC*, Petition for *Inter Partes* Review of U. S. Patent 5,806,062, May 14, 2021, on behalf of Hulu, LLC; (21) *VLSI Technology LLC v. Intel Corporation*, Western District of Texas, 6:19-cv-00254, 6:19-cv-00255 and 6:19-cv-00256, August 3, 2021, on behalf of Intel Corporation; (22) *Liquidia Technologies, Inc. v. United Therapeutics Corporation*, Petition for *Inter Partes* Review of U. S. Patent 10,716,793 B2, October 20, 2021, on behalf of Liquidia Technologies, Inc.; (23) *EcoFactor, Inc. v. Google, Inc.*, Western District of Texas, 6:20-cv-00075 (ADA), 6:20-0078-ADA, and 6:20-cv-00080 ADA, October 27, 2021, on behalf of Google, Inc.; (24) *Liquidia Technologies, Inc. v. United Therapeutics Corporation*, Petition for *Inter Partes* Review of U. S. Patent 10,716,793 B2, March 11, 2022, on behalf of Liquidia Technologies, Inc.; (25) *Juniper Networks, Inc. v. Swarm Technology LLC*, Petition for *Inter Partes* Review of U. S. Patent 9,852,004, May 5, 2022, on behalf of Juniper Networks, Inc.; (26) *ParkerVision, Inc. v. Intel Corporation*, Western District of Texas, 6:20-cv-108

(ADA), October 26, 2022, on behalf of the Intel Corporation; (27) *CommScope v. TQ Delta*, Petition for *Inter Partes Review* of U. S. Patents 9,094,348 and 10,833,809, February 16, 2023, on behalf of CommScope; (28) *WSOU Investments d/b/a Brazos v. Salesforce.com, Inc.* for Western District of Texas, 6:20-cv-01164-ADA and 6:20-cv-01170-ADA, April 18, 2023, on behalf of Salesforce; (29) *Regents of the University of Minnesota v. AT&T Mobility LLC*, District of Minnesota, 14:cv-4999-JRT-TNL & 14-cv-4669-JRT-TNL, May 18, 2023, on behalf of AT & T Mobility LLC; (30) *VLSI Technology LLC v. Intel Corporation*, Northern District of California, 5:17-cv-0571-BLF-NC, July 11, 2023, on behalf of Intel Corporation; (31) *Trustees of Purdue University v. ST Microelectronics*, Western District of Texas, 6:21-cv-00727-ADA, July 27, 2023, on behalf of ST Microelectronics; (32) *Advanced Micro Devices, Inc. v. Realtek Semiconductor Corp.*, Petition for *Inter Partes Review* of U. S. Patents 7,936,245 & 9,590,582, August 10, 2023, on behalf of Advanced Micro Devices, Inc.; (33) *Motif Foodworks, Inc. v. Impossible Foods, Inc.*, Petition for *Inter Partes Review* of U. S. Patent 9,943,096, August 24, 2023, on behalf of Motif Foodworks, Inc.; (34) *Network System Technologies, LLC v. Texas Instruments, Inc.*, Eastern District of Texas, 2:22-cv-00482-RWS, March 20, 2024, on behalf of Texas Instruments, Inc.; (35) *Network System Technologies, LLC v. Texas Instruments, Inc.*, Eastern District of Texas, 2:22-cv-00482, May 22, 2024, on behalf of Texas Instruments,

Inc.; and, (36) *Pardalis Technology Licensing, LLC v. International Business Machines, Corporation*, Eastern District of Texas, 2:22-cv-00452, May 23, 2024, on behalf of International Business Machines, Corporation. I have testified at trial three times: (1) *Advanced Micro Devices, Inc. v. Realtek Semiconductor Corp.*, U.S. Patents 7,936,245 & 9,590,582, October 20, 2023, International Trade Commission, Washington, DC, on behalf of Advanced Micro Devices, Inc.; (2) *Trustees of Purdue University v. ST Microelectronics*, Western District of Texas, 6:21-cv-00727-ADA, November 29, 2023, on behalf of ST Microelectronics; and, (3) *Certain Power Converter Modules and Computing Systems Containing the Same*, Investigation ITC-337-TA-1370, International Trade Commission, May 1, 2024, on behalf of Delta Electronics, Inc.

10. My full *curriculum vitae* is submitted herewith as Exhibit 1055.

III. PRELIMINARIES

11. *Scope of this declaration.* I am not an attorney and will not offer opinions on the law. I am, however, rendering my expert opinion on the authenticity of the documents referenced herein and on when and how each of these documents was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, could have located the documents.

12. I am informed by counsel that an item is considered authentic if there

is sufficient evidence to support a finding that the item is what it is claimed to be. I am also informed that authenticity can be established based on the contents of the documents themselves, such as the appearance, contents, substance, internal patterns, or other distinctive characteristics of the item, taken together with all of the circumstances. I am further informed that an item is considered authentic if it is at least 20 years old, in a condition that creates no suspicion of its authenticity, and in a place where, if authentic, it would likely be. Lastly, I have been informed that a document's authenticity can be established by comparison with an authentic specimen.

13. I am informed by counsel that a printed publication qualifies as publicly accessible as of the date it was disseminated or otherwise made available such that a person interested in and ordinarily skilled in the relevant subject matter could locate it through the exercise of ordinary diligence.

14. While I understand that the determination of public accessibility under the foregoing standard rests on a case-by-case analysis of the facts particular to an individual publication, I also understand that a printed publication is rendered "publicly accessible" if it is cataloged and indexed by a library such that a person interested in the relevant subject matter could locate it (*i.e.*, I understand that cataloging and indexing by a library is sufficient, though there are other ways that a printed publication may qualify as publicly accessible). One manner of sufficient

indexing is indexing according to subject matter category. I understand that the cataloging and indexing by a single library of a single instance of a particular printed publication is sufficient, even if the single library is in a foreign country. I understand that, even if access to a library is restricted, a printed publication that has been cataloged and indexed therein is publicly accessible so long as a presumption is raised that the portion of the public concerned with the relevant subject matter would know of the printed publication. I also understand that the cataloging and indexing of information that would guide a person interested in the relevant subject matter to the printed publication, such as the cataloging and indexing of an abstract for the printed publication, is sufficient to render the printed publication publicly accessible.

15. I understand that routine business practices, such as general library cataloging and indexing practices, can be used to establish an approximate date on which a printed publication became publicly accessible.

16. *Indexing.* A researcher may discover material relevant to his or her topic in a variety of ways. One common means of discovery is to search for relevant information in an index of periodical and other publications. Having found relevant material, the researcher will then normally obtain it online, look for it in libraries, or purchase it from a publisher, a bookstore, a document delivery service, or other provider. Sometimes, the date of a document's public

accessibility will involve both indexing and library date information. However, date information for indexing entries is often unavailable. This is especially true for online indices.

17. Indexing services use a wide variety of controlled vocabularies to provide subject access and other means of discovering the content of documents. The formats in which these access terms are presented vary from service to service.

18. Before the widespread development of online databases to index articles in journals, magazines, conference papers, and technical reports, libraries purchased printed volumes of indices. Graduate library school education mandated that students learn about the bibliographic control of disciplines, the prominent indexing volumes, and searching strategies required to use them effectively and efficiently. Half of the courses that I studied in library school were focused on bibliography and resources in academic disciplines.

19. Librarians consulted with information seekers to verify citations, check availability in union catalogs, printed books catalogs, and the OCLC database, and make formal requests for materials, *e.g.*, books, conference proceedings, journal articles. Requests were transmitted using Telex machines, rudimentary email systems, and the United States Postal Service. During my career, I have performed and supervised staff who handled these resource sharing tasks.

20. A major firm known for the breadth of subjects and comprehensive treatment in the preparation of index volumes, the H. W. Wilson Company offered these reference resources since the firm was founded in 1898. The *Reader's Guide to Periodical Literature* is one of the best-known titles available from H. W. Wilson. Each volume includes a comprehensive index for 300 of the most popular and important periodicals published in the United States and Canada. Information seekers have subject access expressed in plain language terminology, author access, and cross references to find the desired results from their searches. The family of index titles included *Science & Technology Index*, *Business Periodicals*, *Applied Science & Technology Index*, *Humanities Index*, *Biological & Agricultural Index*, and *Industrial Arts Index*. These printed indices have been superseded by digital database offerings available to information seekers through Ebsco.

21. Online indexing services commonly provide bibliographic information, abstracts, and full-text copies of the indexed publications, along with a list of the documents cited in the indexed publication. These services also often provide lists of publications that cite a given document. A citation of a document is evidence that the document was publicly available and in use no later than the publication date of the citing document.

22. *ResearchGate*.¹ A social networking site designed for scientists and researchers to share papers, ask and answer questions, and find collaborators, *ResearchGate* is the largest academic social network in terms of active users. As of September 2023, ResearchGate had more than 25 million users, with its largest user-bases coming from Europe and North America.²

23. Features available to *ResearchGate* members include following a research interest and the work of other individual participants, a blogging feature for users to write short reviews on peer-reviewed articles, private chat rooms for sharing data, editing documents, or discussing confidential topics, and a research-focused job board. *ResearchGate* indexes self-published information on user profiles and suggests members connect with others who have similar interests. Member questions are fielded to others who have identified relevant expertise on their profiles.

24. *ResearchGate* restricts its user accounts to people at recognized institutions and published researchers. Most of *ResearchGate's* users are involved in medicine, biology, engineering, computer science, agricultural sciences, and psychology. *ResearchGate* publishes a citation impact measurement in the form of an “RG Score,” which is reported to be correlated with existing citation impact

¹ www.researchgate.net

² <https://en.wikipedia.org/wiki/ResearchGate>

measures. *ResearchGate* does not charge fees for putting content on the site and does not require peer review.

25. *Semantic Scholar*.³ A project developed at the Allen Institute for Artificial Intelligence and publicly released in November 2015, *Semantic Scholar* is designed to be an AI-backed search engine for scientific journal articles which uses a combination of machine learning, natural language processing, and machine vision to add a layer of semantic analysis to the traditional methods of citation analysis, and to extract relevant figures, entities, and venues from papers. *Semantic Scholar* is designed to highlight important, influential papers, and to identify the connections between them.

26. As of January 2018, following a 2017 project that added biomedical papers and topic summaries, the *Semantic Scholar* corpus included more than 40 million papers from computer science and biomedicine. In March 2018, Doug Raymond, who developed machine learning initiatives for the Amazon Alexa platform, was hired to lead the *Semantic Scholar* project. As of August 2019, the number of included papers had grown to more than 173 million after the addition of the Microsoft Academic Graph records, already used by Lens.org.

³ <https://www.semanticscholar.org>

27. *Google Scholar*.⁴ Released in beta in November 2004, Google Scholar includes a significant number of peer-reviewed online academic journals, books, conference papers, selected theses and dissertations, preprints, abstracts, technical reports, and other scholarly literature. Google Scholar is a freely accessible web search engine that indexes the full text or metadata of scholarly literature across an array of publishing formats and disciplines. While Google does not publish the size of Google Scholar's database, scientometric researchers estimated it to contain roughly 389 million documents including articles, citations and patents making it the world's largest academic search engine in January 2018.

28. Because many of *Google Scholar*'s search results link to commercial journal articles, searchers will be able to access only an abstract and the citation details of an article and may have to pay a fee to access the entire article. The most relevant results for the searched keywords will be listed first, in order of the author's ranking, the number of references that are linked to it and their relevance to other scholarly literature, and the ranking of the publication that the journal appears in. Through its "cited by" feature, *Google Scholar* provides access to abstracts of articles that have cited the article being viewed. Through its "Related articles" feature, *Google Scholar* presents a list of closely related articles, ranked

⁴ <https://scholar.google.com>

primarily by how similar these articles are to the original result, but also taking into account the relevance of each paper.

29. *Scopus*.⁵ Researchers trust the information and data they discover with *Scopus* because the content comes from over 5,000 publishers that must be reviewed and selected by an independent Content Selection and Advisory Board (CSAB) to be, and continue to be, indexed on *Scopus*.

30. *Scopus* is the largest abstract and citation database of peer-reviewed literature: scientific journals, books, and conference proceedings. Delivering a comprehensive overview of the world's research output (more than 69 million items) in the fields of science, technology, medicine, social sciences, and arts and humanities, *Scopus* features smart tools to track, analyze and visualize research.

31. *Scopus* offers free features to non-subscribed users and is available through Scopus Preview. Researchers may use *Scopus* to assist with their research, such as searching authors, and learning more about content coverage and source metrics.

IV. LIBRARY CATALOGING PRACTICES

A. MARC RECORDS AND THE ONLINE LIBRARY CATALOG

32. I am fully familiar with the library cataloging standard known as the MARC standard, which is an industry-wide standard method of storing and

⁵ <https://www.elsevier.com/solutions/scopus>

organizing library catalog information.⁶ MARC was first developed in the 1960s by the Library of Congress. A MARC-compatible library is one that has a catalog consisting of individual MARC records for each of its items. Today, MARC is the primary communications protocol for the transfer and storage of bibliographic metadata in libraries.⁷

33. MARC is a framework into which descriptive bibliographic data are transcribed to interact with the software in online library catalogs to provide access to books, journals, and other resources in the collection. The bibliographic data provide points of access and can be searched by a person of ordinary skill in the art (“POSITA”) to identify and obtain resources in the library collection. An information seeker (or POSITA) can search a local online library catalog or the

⁶ The full text of the standard is available from the Library of Congress at <http://www.loc.gov/marc/bibliographic/>.

⁷ Almost every major library in the world is MARC-compatible. *See, e.g., MARC Frequently Asked Questions (FAQ)*, Library of Congress, <https://www.loc.gov/marc/faq.html> (last visited June 7, 2024) (“MARC is the acronym for MACHine-Readable Cataloging. It defines a data format that emerged from a Library of Congress-led initiative that began nearly forty years ago. It provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today.”). MARC is the ANSI/NISO Z39.2-1994 (reaffirmed 2016) standard for Information Interchange Format.

holdings of a group of libraries in a state or region or in the global catalog WorldCat.

34. MARC records are not designed for public viewing. Although a significant number of libraries provide access to the MARC version of a bibliographic record, the public display is designed to show information in a succinct manner that is quickly understood and useful to the information seeker. Libraries determine the default search for the online catalog to make the entry of search terms efficient and result in a successful search. Information seekers can enter a keyword, title, author, or standard number for the item. Libraries may also provide a search capability called “Summon” that allows the information seeker to enter known information about the item to conduct a search.

35. Since at least the early 1970s and continuing to the present day, MARC has been the primary communications protocol for the transfer and storage of bibliographic metadata in libraries.⁸ As explained by the Library of Congress:

You could devise your own method of organizing the bibliographic information, but you would be isolating your library,

⁸ A complete history of the development of MARC can be found in *MARC: Its History and Implications* by Henrietta D. Avram (Washington, DC: Library of Congress, 1975) and available online from the Hathi Trust (<https://babel.hathitrust.org/cgi/pt?id=mdp.39015034388556;view=1up;seq=1>; last visited June 7, 2024).

limiting its options, and creating much more work for yourself. Using the MARC standard prevents duplication of work and allows libraries to better share bibliographic resources. Choosing to use MARC enables libraries to acquire cataloging data that is predictable and reliable. If a library were to develop a “home-grown” system that did not use MARC records, it would not be taking advantage of an industry-wide standard whose primary purpose is to foster communication of information.

Using the MARC standard also enables libraries to make use of commercially available library automation systems to manage library operations. Many systems are available for libraries of all sizes and are designed to work with the MARC format. Systems are maintained and improved by the vendor so that libraries can benefit from the latest advances in computer technology. The MARC standard also allows libraries to replace one system with another with the assurance that their data will still be compatible.

Why Is a MARC Record Necessary? LIBRARY OF CONGRESS,
<http://www.loc.gov/marc/umb/um01to06.html#part2> (last visited June 7, 2024).

36. Examining the MARC records for a specific item reveals the comprehensive data transcribed about a particular item at the time that cataloging and classification occurred. In addition to the creator, title, subjects, and standard numbers, additional information may provide additional and relevant data depending on the type of resource. Understanding the full extent of bibliographic data for an item and the points of access associated with it provides essential

information that can be used to determine the indexing and public availability for documents described in this Declaration.

B. MARC RECORDS

37. A MARC record comprises several fields, each of which contains specific data about the work. Each field is identified by a standardized, unique, three-digit code corresponding to the type of data that follow. For example, a work's title is recorded in field 245, the primary author or creator of the work is recorded in field 100, an item's International Standard Book Number ("ISBN") is recorded in field 020, an item's International Standard Serial Number ("ISSN") is recorded in field 022, an item's Library of Congress call number is recorded in field 050, and the publication date is recorded in field 260 under the subfield "c." *Id.*⁹ If a work is a periodical, then its publication frequency is recorded in field 310, alternate publication frequency is recorded in field 321, and the publication dates (*e.g.*, the first and last publication) are recorded in field 362, which is also

⁹ In some MARC records, field 264 is used rather than field 260 to record publication information. See <http://www.loc.gov/marc/bibliographic/bd264.html> (last visited June 7, 2024) ("Information in field 264 is similar to information in field 260 (Publication, Distribution, etc. (Imprint)). Field 264 is useful for cases where the content standard or institutional policies make a distinction between functions").

referred to as the enumeration/chronology field. *See* <http://www.loc.gov/marc/bibliographic/bd3xx.html> (last visited June 7, 2024).

38. The library that created the record is recorded in Field 040 in subfield “a” with a unique library code. When viewing the MARC record online via Online Computer Library Center’s (“OCLC”) bibliographic database, hovering over this code with the mouse reveals the full name of the library. I used this method of “mousing over” the library codes in the OCLC database to identify the originating library for the MARC records discussed in this Declaration. Where this “mouse over” option was not available, I consulted the Directory of OCLC Libraries to identify the institution that created the MARC record.¹⁰

39. MARC records also include several fields that include subject matter classification information. An overview of MARC record fields is available through the Library of Congress at <http://www.loc.gov/marc/bibliographic/>. For example, 6XX fields are termed “Subject Access Fields.” *See* <http://www.loc.gov/marc/bibliographic/bd6xx.html>. Among these, for example, is the 650 field; this is the “Subject Added Entry – Topical Term” field. *See* <http://www.loc.gov/marc/bibliographic/bd650.html>. The 650 field is a “[s]ubject added entry in which the entry element is a topical term.” *Id.* These authenticated subject entries “are assigned to a bibliographic record to provide access according

¹⁰ <https://www.oclc.org/en/contacts/libraries.html>

to generally accepted thesaurus-building rules (*e.g.*, *Library of Congress Subject Headings* (LCSH), *Medical Subject Headings* (MeSH)).” *Id.*

40. Further, MARC records include call numbers, which themselves indicate a subject and physical location within the library collections. For example, the 050 field is the “Library of Congress Call Number.” See <http://www.loc.gov/marc/bibliographic/bd050.html> (last visited June 7, 2024). A defined portion of the Library of Congress Call Number is the classification number, and “source of the classification number is *Library of Congress Classification* and the *LC Classification-Additions and Changes*.” *Id.* Thus, included in the 050 field is a subject matter classification. Each item in a library has a single classification number. A library selects a classification scheme (*e.g.*, the Library of Congress Classification scheme just described or a similar scheme such as the Dewey Decimal Classification scheme or the National Library of Medicine Classification scheme) and uses it consistently. When the Library of Congress assigns the classification number, it appears as part of the 050 field. If a local library assigns the classification number, it appears in a 090 field. In either scenario, the MARC record includes a classification number that represents a subject matter classification.

41. Each item in a library has a single classification number. A library selects a classification scheme (*e.g.*, the Library of Congress Classification scheme

just described or a similar scheme such as the Dewey Decimal Classification scheme) and uses it consistently. When the Library of Congress assigns the classification number, it appears as part of the 050 field, as discussed above. For MARC records created by libraries other than the Library of Congress (e.g., a university library or a local public library), the classification number may appear in a 09X (e.g., 090) field. See <http://www.loc.gov/marc/bibliographic/bd09x.html> (last visited June 7, 2024).

C. OCLC

42. The OCLC was created “to establish, maintain and operate a computerized library network and to promote the evolution of library use, of libraries themselves, and of librarianship, and to provide processes and products for the benefit of library users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing the rate of rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information.”¹¹ Among other services, OCLC and its members are responsible for maintaining the WorldCat database

¹¹ Third Article, Amended Articles of Incorporation of OCLC Online Computer Library Center, Incorporated (available at <https://www.oclc.org/content/dam/oclc/membership/articles-of-incorporation.pdf>).

(<http://www.worldcat.org/>), used by independent and institutional libraries throughout the world.

43. OCLC also provides its members online access to MARC records through its OCLC bibliographic database. When an OCLC member institution acquires a work, it creates a MARC record for this work in its computer catalog system in the ordinary course of its business. MARC records created at the Library of Congress were initially tape-loaded into the OCLC database through a subscription to MARC Distribution Services daily or weekly. Once the MARC record is created by a cataloger at an OCLC member institution or is tape-loaded from the Library of Congress, the MARC record is then made available to any other OCLC members online, and therefore made available to the public. Accordingly, once the MARC record is created by a cataloger at an OCLC member institution or is tape-loaded from the Library of Congress or another library anywhere in the world, any publication corresponding to the MARC record has been cataloged and indexed according to its subject matter such that a person interested in that subject matter could, with reasonable diligence, locate and access the publication through any library with access to the OCLC bibliographic database or through the Library of Congress.

44. When an OCLC member institution creates a new MARC record, OCLC automatically supplies the date of creation for that record. The date of

creation for the MARC record appears in the fixed field (008), characters 00 through 05. The MARC record creation date reflects the date on which the item was first acquired or cataloged. Initially, field 005 of the MARC record is automatically populated with the date the MARC record was created in year, month, day format (YYYYMMDD) (some of the newer library catalog systems also include hour, minute, second (HHMMSS)). Thereafter, the library's computer system may automatically update the date in field 005 every time the library updates the MARC record (*e.g.*, to reflect that an item has been moved to a different shelving location within the library). Field 005 is visible when viewing a MARC record via an appropriate computerized interface. The initial field 005 date (*i.e.*, the date the MARC record was created) does appear. The date upon which the most recent update to field 005 occurred also appears in field 005. Thus, when an item's MARC record has been printed to hardcopy—as is the case with the exhibits to this report—the date reflected next to field 008 is necessarily on or after the date the library first cataloged and indexed the underlying item.

45. Once one library has cataloged and indexed a publication by creating a MARC record for that publication, other libraries that receive the publication do not create additional MARC records—the other libraries instead rely on the original MARC record. They may update or revise the MARC record to ensure accuracy, but they do not replace or duplicate it. This practice does more than save

libraries from duplicating labor, it also enhances the accuracy of MARC records. It also allows librarians around the world to know that a particular MARC record is authoritative. In contrast, a hypothetical system wherein duplicative records were created would result in confusion as to which record is authoritative.

46. The date of creation of the MARC record by a cataloger at an OCLC member institution reflects when the underlying item is accessible to the public. Upwards of two-thirds to three-quarters of book sales to libraries come from a jobber or wholesaler for online and print resources. These resellers make it their business to provide books to their customers as fast as possible, often providing turnaround times of only a single day after publication. Libraries purchase a significant portion of the balance of their books directly from publishers themselves, which provide delivery on a similarly expedited schedule. In general, libraries make these purchases throughout the year as the books are published and shelve the books as soon thereafter as possible in order to make the books available to their patrons. Thus, books are generally available at libraries across the country within just a few days of publication.

D. JOURNALS

47. Catalogers can create MARC records for all types of print, online, and digital resources. For example, MARC records cover serial publications, including both serially-published monographs and journals. OCLC hosts MARC records for

more than 320 million serial publications. Serial publications are those publications that have the same collective title but are intended to be continued indefinitely with enumeration such as a volume or issue number, *e.g.*, magazines and journals. In the OCLC bibliographic database, the first issue of the serial publication is typically cataloged, but the date is left open-ended with the use of a punctuation mark such as a dash. Individual issues are not cataloged according to the current national cataloging rules outlined in *RDA: Resource and Access*. Instead, MARC records for serial publication in OCLC represent the entire run of the serial title. With knowledge of the first issue published, future issues can be predicted. In my extensive professional experience, is it highly unusual for a library to stop collecting and shelving a serial publication prior to the end of its publication run. If a subscription to a serial publication ends its run or is cancelled before the end of its run, the library will denote that it has stopped receiving new volumes by filling in the end date in the local MARC record.

48. The handling of printed journal subscriptions is shown on the covers of individual issues. As was the best practice among libraries, issues arrived at a central facility and were immediately received, verified as part of a subscription, checked in, and stamped with the institution's name and date. Determining that the issue was part of the library subscription ensured that the entire set of publications for the year had been received so that they could be professionally bound and

retained. This process also verified that all of the published issues arrived so that the library staff did not have to request or claim an issue that did not arrive as expected. In large public libraries with branches and multi-campus libraries within academic institutions, the journals were sorted and delivered to the subscribing unit. The issues were frequently stamped again to acknowledge receipt. The new issue was placed in the public area; the older issue was stored so that it remained available.

49. The foregoing process has been standard library practice longer than I have been working in the profession. I first learned the steps in the process in the late 1970s and later supervised it. Although the checking in process has become automated and now links electronically to holdings records for the MARC record for each serial title, the manual stamping and placing the issue in a public area has not changed for 50 years. Unless I note otherwise below in reference to a specific serial publication, it is my expert opinion that this standard protocol was followed for each of the publications discussed below.

V. PUBLICATIONS

A. Weaver, Robert. *Molecular Biology*. 5th ed. New York: McGraw Hill, 2011. (“Weaver 2012”) [Hall-Ellis Exhibit 1007]

50. Attached hereto as Hall-Ellis Exhibit 1007 is an excerpt from a book titled *Molecular Biology*, 5th edition, by Robert Weaver (hereafter “Weaver 2012”) and issued by McGraw Hill with a 2012 copyright date. Hall-Ellis Exhibit 1007 is

a true and correct copy of the cover, title page, copyright page, table of contents, and Chapter 2, “The Molecular Nature of Genes” (pages 12-29) as held by the Library of Congress. I obtained Hall-Ellis Exhibit 1007 from the Library of Congress. The text of Hall-Ellis Exhibit 1007 is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. Hall-Ellis Exhibit 1007 is a true and correct copy in a condition that creates no suspicion about its authenticity.

51. Attached hereto as Attachment 1A is a true and correct copy of the MARC record for this book from the Library of Congress online catalog. Library ownership is indicated by the presence of the library’s name at the top of the screen printout. The library code for the Library of Congress (“DLC”) appears in field 040, which means that the MARC record for this book was created at the Library of Congress as part of the Cataloging in Publication (CIP) Program.¹² A cataloger prepares basic information about the forthcoming book which is included on the verso of the title page (also called the copyright page). The information is provided to save time needed for the cataloging process at the library after the book is purchased. The CIP data includes the author (field 100), title and subtitle (field 245), ISBN (field 022), suggested subject headings (field 650), classification

¹² <https://www.loc.gov/publish/cip/>.

numbers for the Library of Congress classification number (field 050), and the Dewey Decimal classification number (field 082). These data elements are included in the MARC record that the Library of Congress contributes to the OCLC bibliographic database. As can be seen in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 664665930 on December 29, 2010, as shown in field 008 (“20101229”) , which is the date on which, or shortly after which, a work was first acquired and catalogued by the library that created the original MARC record. Accordingly, Hall-Ellis Exhibit 1007 was publicly available to a person of ordinary skill in the art at the Library of Congress as of, or shortly after, December 29, 2010. The library continues to update and enhance this MARC record to meet current cataloging rules. The most recent enhancement to the MARC record occurred on August 31, 2017, as shown in field 005 (“20170831”). MARC and OCLC resources have been continuously operational and available since at least 1992, and in my over thirty years of experience, I have consistently found the information contained within these resources (e.g., fields 005 and 008) to be complete and reliable, including as to the key dates, indexing fields, and status of the underlying reference that such fields represent. I personally identified and retrieved the library catalog record which is Attachment 1A.

52. The International Standard Book Number (ISBN) on Hall-Ellis

Exhibit 1007 (0-0735-2532-4) matches the ISBN in the second field 020 of Attachment 1A. Therefore, Hall-Ellis Exhibit 1007 is the same book as the one that the cataloger at the Library of Congress used to create the MARC record that is Attachment 1A. Field 955 is Local Tracking Information, which is a record of internal steps in the cataloging process followed by the Library of Congress and provides an indicator of the public accessibility of works held at libraries. Field 955 in Attachment 1A indicates that the book titled *Molecular Biology*, 5th edition, (Hall-Ellis Exhibit 1007) was present and cataloged in the Library of Congress on June 18, 2011 (“2011-06-18”) and exited the BCCD (Binding and Collections Care Division) on June 23, 2011 (“2011-06-23”). Accordingly, a person of ordinary skill would have been able to locate *Molecular Biology* using the library catalog system as of June 23, 2011, and it was thus publicly accessible as of this date

53. Attached hereto as Attachment 1B is a true and correct copy of the MARC record for the book titled *Molecular Biology*, 5th edition, obtained from the OCLC bibliographic database. I personally identified and retrieved the MARC record that is Attachment 1B. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 1B, that library code is “DLC,” which means that the MARC record for this book was created at the Library of Congress. As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record

number 664665930 on December 29, 2010 (“101229”). The library community continues to update and enhance this MARC record to meet current cataloging rules. I personally identified and retrieved the MARC record that is Attachment 1B.

54. Attachment 1B further includes an entry in field 050 (“QH506 \$b .W43 2021”)—as described above, this includes a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“QH 506”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“572.8”), a subject matter consistent with the Dewey Decimal classification system. Attachment 1B further includes a descriptor term reading “Molecular biology” (see Attachment 1C, Library of Congress subject heading sh85086577) in the 650 field. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 1B was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entry (e.g., searching for the “Molecular biology” of field 650). As of June 23, 2011, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1007. Further, as of December 29,

2010, the MARC record attached hereto as Attachment 1B was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that added this book to its collection, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this book to its collection. I personally identified and retrieved the Library of Congress record which is Attachment 1C, and Attachment 1C is a true and correct copy of the Library of Congress record.

55. Further supporting my opinion that Hall-Ellis Exhibit 1007 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that the book titled *Molecular Biology*, 5th edition, was registered with the U. S. Copyright Office as item TX0007654775 on December 14, 2012, and indicated a publication date of February 11, 2011 (see Attachment 1D, U. S. Copyright Office Public Catalog). The U.S. Copyright Office Public Catalog, found at <https://www.copyright.gov/public-records/>, provides keyword searching capabilities and other tools for locating books. Accordingly, such registration of *Molecular Biology*, 5th edition, with the U.S. Copyright Office would have provided a person of ordinary skill in the art with keyword searching capabilities and other tools to locate this book at least as of its registration date. I personally identified and retrieved the U.S. Copyright Office Public Catalog record which is

Attachment 1D, and Attachment 1D is a true and correct copy of the U.S. Copyright Office Public Catalog record that I retrieved.

56. As yet another example supporting my opinion that Hall-Ellis Exhibit 1007 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the Weaver 2012 book as cataloged at the Library of Congress is currently available from 653 libraries.¹³

57. In view of the above, the Weaver 2012 monograph was publicly available and accessible at least by June 23, 2011, at least because by that date it had been received, cataloged, and indexed at the Library of Congress and made part of the OCLC bibliographic database. For these reasons, it is my opinion that Hall-Ellis Exhibit 1007 was published and accessible to the public on or before June 23, 2011.

B. Alberts, Bruce, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, and Peter Walter. *Molecular Biology of the Cell*. 5th ed. New York: Garland Science, 2014. (“Alberts 2008”) [Hall-Ellis Exhibit 1008]

58. Attached hereto as Hall-Ellis Exhibit 1008 is an excerpt from a book titled *Molecular Biology of the Cell*, 5th edition, by Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, and Peter Walter (hereafter “Alberts 2008”) and issued by Garland Science with a 2008

¹³ <https://search.worldcat.org/title/664665930>

copyright date. Hall-Ellis Exhibit 1008 is a true and correct copy of the cover, title page, copyright page, table of contents, and several excerpts. The excerpt include Chapter 3, “Proteins” (pp. 125-193); Chapter 6, “How Cells Read the Genome: From DNA to Protein” (pp. 329-410); p. 415; Chapter 8, “Manipulating Proteins, DNA, and RNA” (pp. 501-578); and an excerpt from Chapter 12, “Intracellular Compartments and Protein Sorting” (pp. 739-742) as held by the Steenbock Library at the University of Wisconsin – Madison. I obtained Hall-Ellis Exhibit 1008 from the Steenbock Library at the University of Wisconsin – Madison. The text of Hall-Ellis Exhibit 1008 is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. Hall-Ellis Exhibit 1008 is a true and correct copy in a condition that creates no suspicion about its authenticity.

59. Attached hereto as Attachment 2A is a true and correct copy of the MARC record for this book from the Steenbock Library at the University of Wisconsin – Madison online catalog. Library ownership is indicated by the presence of the library’s code (“GZM”) in field 049. The library code for the Library of Congress (“DLC”) appears in field 040, which means that the MARC record for this book was created at the Library of Congress as part of the

Cataloging in Publication (CIP) Program.¹⁴ A cataloger prepares basic information about the forthcoming book which is included on the verso of the title page (also called the copyright page). The information is provided to save time needed for the cataloging process at the library after the book is purchased. The CIP data includes the author (field 100), title and subtitle (field 245), ISBN (field 022), suggested subject headings (field 650), classification numbers for the Library of Congress classification number (field 050), and the Dewey Decimal classification number (field 082). These data elements are included in the MARC record that the Library of Congress contributes to the OCLC bibliographic database. As can be seen in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 82473851 on February 7, 2007, as shown in field 008 (“070207”) , which is the date on which, or shortly after which, a work was first acquired and catalogued by the library that created the original MARC record. Accordingly, Hall-Ellis Exhibit 1008 was publicly available to a person of ordinary skill in the art at the Library of Congress as of, or shortly after, February 7, 2007. The library continues to update and enhance this MARC record to meet current cataloging rules. The most recent enhancement to the MARC record occurred on June 27, 2019, as shown in field 005 (“20190627”). MARC and OCLC resources have been continuously operational and available since at least 1992, and in my

¹⁴ <https://www.loc.gov/publish/cip/>.

over thirty years of experience, I have consistently found the information contained within these resources (e.g., fields 005 and 008) to be complete and reliable, including as to the key dates, indexing fields, and status of the underlying reference that such fields represent.

60. I personally identified and retrieved the library catalog record which is Attachment 2A.

61. The International Standard Book Number (ISBN) on Hall-Ellis Exhibit 1008 (0-8153-4105-9) matches the ISBN in the second field 020 of Attachment 2A. Therefore, Hall-Ellis Exhibit 1008 is the same book as the one that the cataloger at the Library of Congress used to create the MARC record that is Attachment 2A. Field 949 indicates that the book titled *Molecular Biology of the Cell*, 5th edition, (Hall-Ellis Exhibit 1008) was present and cataloged in the Steenbock Library at the University of Wisconsin – Madison on March 18, 2010 (“20100318”). Accordingly, a person of ordinary skill would have been able to locate *Molecular Biology* using the library catalog system as of June 23, 2011, and it was thus publicly accessible as of this date.

62. Attached hereto as Attachment 2B is a true and correct copy of the MARC record for the book titled *Molecular Biology of the Cell*, 5th edition, obtained from the OCLC bibliographic database. I personally identified and retrieved the MARC record that is Attachment 2B. As previously noted, the

library that created the record is recorded in field 040 with a unique library code. For Attachment 2B, that library code is “DLC,” which means that the MARC record for this book was created at the Library of Congress. As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 82473851 on February 7, 2007 (“07007”). I personally identified and retrieved the MARC record that is Attachment 2B.

63. Attachment 2B further includes an entry in field 050 (“QH581.2 \$b .M64 2008”)—as described above, this includes a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“QU 300 \$b M7178 2008”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“572.8”), a subject matter consistent with the Dewey Decimal classification system. Attachment 2B further includes seven descriptor terms reading “Cytology” (see Attachment 2C, Library of Congress subject heading sh85035240), “Molecular biology” (see Attachment 1C, Library of Congress subject heading sh85086577), “Cells” (see Attachment 2D, Library of Congress subject heading sh85021678), “Biochemical genetics” (see Attachment 2E, Library of Congress subject heading sh85014121), “Amino acids” (see Attachment 2F, Library of Congress subject heading sh85004486), “Cell

interaction” (see Attachment 2G, Library of Congress subject heading sh85021649), and “DNA” (see Attachment 2H, Library of Congress subject heading sh85037008) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 2B was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entries (e.g., searching for the “Molecular biology” of field 650). As of June 23, 2011, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1008. Further, as of February 7, 2007, the MARC record attached hereto as Attachment 2B was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that added this book to its collection, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this book to its collection. I personally identified and retrieved the records that are Attachments 2C, 2D, 2E, 2F, 2G, and 2H, and these attachments are true and correct copies of the Library of Congress records that I retrieved.

64. Further supporting my opinion that Hall-Ellis Exhibit 1008 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that the book titled *Molecular Biology of the Cell*, 5th edition, was registered

with the U. S. Copyright Office as item TX0006966634 on January 26, 2009, and indicated a publication date of December 1, 2007 (see Attachment 2I, U. S. Copyright Office Public Catalog). The U.S. Copyright Office Public Catalog, found at <https://www.copyright.gov/public-records/>, provides keyword searching capabilities and other tools for locating books. As noted above, such registration of *Molecular Biology of the Cell*, 5th edition, would have provided a person of ordinary skill in the art with keyword searching capabilities and other tools to locate this book at least as of its registration date. I personally identified and retrieved the record that is Attachment 2I, and Attachment 2I is a true and correct copy of the U.S. Copyright Office Public Catalog record.

65. As yet another example supporting my opinion that Hall-Ellis Exhibit 1008 was publicly available and accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the Alberts 2008 book as cataloged at the Library of Congress is currently available from 2,099 libraries.¹⁵

66. In view of the above, the Alberts 2008 monograph was publicly available and accessible at least by December 1, 2007, at least because by that date it had been received, cataloged, and indexed at the Library of Congress and made part of the OCLC bibliographic database. For these reasons, it is my opinion that

¹⁵ <https://search.worldcat.org/title/82473851>

Hall-Ellis Exhibit 1008 was published and accessible to the public on or before December 1, 2007.

C. Maimone, Thomas J., and Phil S. Baran. “Modern Synthetic Efforts Toward Biologically Active Terpenes.” *Nature Chemical Biology*, vol. 3, no. 7 (July 2007): 396-407. (“Maimone 2007”) [Hall-Ellis Exhibit 1009]

67. Attached hereto as Hall-Ellis Exhibit 1009 is a copy of the journal article titled “Modern Synthetic Efforts Toward Biologically Active Terpenes” by Thomas J. Maimone and Phil S. Baran (hereafter “Maimone 2007”). I found the Maimone 2007 article in the Library of Congress, and it was published in Volume 3, Number 7 of the journal *Nature Chemical Biology*. The Maimone 2007 article appears beginning on page 396 of this issue dated July 2007. Hall-Ellis Exhibit 1009 is a true and correct copy of the Maimone 2007 article I found (pages 396-407). Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. Hall-Ellis Exhibit 1009 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1009 is a true and correct copy in a condition that creates no suspicion about its authenticity. The Maimone 2007 article is also available from the publisher, Springer Nature¹⁶ and in the digital repositories

¹⁶ <https://www.nature.com/articles/nchembio.2007.1>

*ResearchGate*¹⁷ and *Semantic Scholar*.¹⁸ The publisher's website indicates that the Maimone 2007 article was published on June 18, 2007.

68. Attached hereto as Attachment 3A is a true and correct copy of the MARC record for the journal *Nature Chemical Biology*, which contained the article Maimone 2007 in its July 2007 issue, from the Library of Congress online catalog. I personally identified and retrieved the MARC record that is Attachment 3A.

69. Based on finding a print copy of Hall-Ellis Exhibit 1009 in the Library of Congress and its MARC record in the Library of Congress online library catalog attached as Attachment 3A, it is my opinion that the Maimone 2007 article published in the journal *Nature Chemical Biology* was publicly available on or shortly after June 18, 2007, which is also the date shown on the publisher's website. Attachment 3A also shows that Hall-Ellis Exhibit 1009 was catalogued with a descriptor term reading "Biochemistry \$v Periodicals" (see Attachment 3B, Library of Congress subject heading sh2007101985) in the 650 field and thus a

¹⁷

https://www.researchgate.net/publication/6261553_Modern_Synthetic_Efforts_Toward_Biologically_Active_Terpenes

¹⁸ <https://www.semanticscholar.org/paper/Modern-synthetic-efforts-toward-biologically-active-Maimone-Baran/6454e5a705d53aa536cbe76cb98efee9d7dd13e7>

person of ordinary skill in the art could have searched for Maimone 2007 using these indices and accessed Maimone on or shortly after June 18, 2007. I personally identified and retrieved the record which is Attachment 3B, and Attachment 3B is a true and correct copy of the record that I retrieved.

70. As noted in the holdings information (362 field), the Library of Congress has received the journal *Nature Chemical Biology* since June 2005 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1009, the Maimone 2007 article was publicly available on June 18, 2007, because the serial title had been received, cataloged, and indexed in the Library of Congress and made part of its online catalog database beginning in June 2005 and continuing for each issue thereafter, including the July 2007 issue containing Maimone 2007.

71. Attached hereto as Attachment 3C is a true and correct copy of the MARC record for the journal *Nature Chemical Biology* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 3C, that library code is “NSD,” which means that the MARC record for this serial was cataloged as part of the National Serials Data Program at the Library of Congress. As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 56478549 on September 10, 2004, as

shown in field 008 (“040910”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 3C occurred on February 5, 2020, as shown in field 005 (“20200205”). I personally identified and retrieved the MARC record that is Attachment 3C. The “BLvl” entry in Attachment 3C is “s,” which indicates that the journal *Nature Chemical Biology* is a serial publication. Field 310 of Attachment 3C reads “Monthly.” Accordingly, the MARC record for Hall-Ellis Exhibit 1009 corresponds to the journal *Nature Chemical Biology* from the time the serial title began publication and includes the date of the Maimone 2007 article.

72. Attachment 3C includes an entry in field 050 (“QD415.A1 \$b N385”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system) and an entry in field 060 (“W1 \$b NA8115G”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system). Attachment 3C further includes a descriptor term reading “Biochemistry \$v Periodicals” (see Attachment 3B, Library of Congress subject heading sh2007101985) in the 650 field. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 3C was indexed according to its subject matter by

virtue of at least three independently sufficient classifications: the field 050 entry, the field 060 entry, and the field 650 entries (e.g., searching for the “Biochemistry” and/or “Periodicals” of field 650). As of or shortly after June 18, 2007, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1009. As of September 10, 2004, the MARC record attached hereto as Attachment 3C was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

73. As yet another example supporting my opinion that Hall-Ellis Exhibit 1009 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the journal *Nature Chemical Biology* as cataloged at the Library of Congress is currently available from 1,385 libraries.¹⁹ In view of the above, this July 2007 issue of the journal *Nature Chemical Biology* was publicly available and accessible at least by or shortly after June 18, 2007, at least because by that date it had been received, cataloged, and indexed at the Library of Congress and made part of the OCLC bibliographic database. For these

¹⁹ <https://search.worldcat.org/title/56478549>

reasons, it is my opinion that Hall-Ellis Exhibit 1009 was published and accessible to the public on or shortly after June 18, 2007.

D. Zwenger, Sam, and Chhandak Basu. “Plant Terpenoids: Applications and Future Potentials.” *Biotechnology and Molecular Biology Reviews*, vol. 3, issue 1 (February 2008): 001-007. (“Zwenger 2008”) [Hall-Ellis Exhibit 1010]

74. Attached hereto as Hall-Ellis Exhibit 1010 is a copy of the journal article titled “Plant Terpenoids: Applications and Future Potentials” by Sam Zwenger and Chhandak Basu (hereafter “Zwenger 2008”). I found the Zwenger 2008 article in the National Library of Medicine (Beltsville, Maryland), and it was published in Volume 3, Issue 1 of the digital journal *Biotechnology and Molecular Biology Reviews*. The Zwenger 2008 article appears beginning on page 001 of this issue dated February 2008. Hall-Ellis Exhibit 1010 is a true and correct copy of the Zwenger 2008 article I found (pages 001-007). Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. Hall-Ellis Exhibit 1010 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1010 is a true and correct copy in a condition that creates no suspicion about its authenticity. The Zwenger 2008 article is also available from the publisher, the

Academic Journals²⁰ and the digital repositories *ResearchGate*²¹ and *Semantic Scholar*.²²

75. Attached hereto as Attachment 4A is a true and correct copy of the MARC record for the digital journal *Biotechnology and Molecular Biology Reviews*, which contained the article Zwenger 2008 in its February 2008 issue, from the National Library of Medicine online catalog. I personally identified and retrieved the MARC record that is Attachment 4A.

76. Based on finding a copy of Hall-Ellis Exhibit 1010 in the National Library of Medicine and its MARC record in the National Library of Medicine online library catalog attached as Attachment 4A, it is my opinion that the Zwenger 2008 article published in the digital journal *Biotechnology and Molecular Biology Reviews* was publicly available on or shortly after February 28, 2008, which is also the date shown on the publisher's website. Attachment 4A also shows that Hall-Ellis Exhibit 1010 was catalogued with three descriptor terms reading "Biotechnology \$v periodical" (see Attachment 4B, National Library of

²⁰ <https://academicjournals.org/journal/BMBR/article-abstract/7A875A540218>

²¹

https://www.researchgate.net/publication/228346620_Plant_terpenoids_Applications_and_future_potentials

²² <https://www.semanticscholar.org/paper/Plant-terpenoids%3A-applications-and-future-Zwenger-Basu/b4a761c39d6689ea135f4bfb4d00b21a245349ca>

Medicine subject heading D001709), “Biochemical Phenomena \$v periodical” (see Attachment 4C, National Library of Medicine subject heading D001669), and “Molecular Biology \$v periodical” (see Attachment 4D, National Library of Medicine subject heading D008967) in the 650 fields, and thus a person of ordinary skill in the art could have searched for Zwenger 2008 using these indices and accessed Zwenger 2008 on or shortly after February 28, 2008. I personally identified and retrieved the records which are Attachments 4B, 4C, and 4D, and those records found at Attachments 4B, 4C, and 4D are true and correct copies of the records that I retrieved.

77. As noted in the holdings information (362 field), the National Library of Medicine has received the digital journal *Biotechnology and Molecular Biology Reviews* since April 2006 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1010, the Zwenger 2008 article was publicly available on February 28, 2008, because the serial title had been received, cataloged, and indexed in the National Library of Medicine and made part of its online catalog database beginning in April 2006 and continuing for each issue thereafter, including the February 2008 issue containing Zwenger 2008.

78. Attached hereto as Attachment 4E is a true and correct copy of the MARC record for the digital journal *Biotechnology and Molecular Biology Reviews* I obtained from the OCLC bibliographic database. As previously noted,

the library that created the record is recorded in field 040 with a unique library code. For Attachment 4E, that library code is “FQM,” which means that the MARC record for this serial was cataloged in the Louis Calder Memorial Library at the University of Miami School of Medicine (Miami, Florida). As can be seen in field 008 in the MARC record for this exhibit, a cataloger in the Louis Calder Memorial Library at the University of Miami School of Medicine created OCLC record number 174144047 on October 15, 2007, as shown in field 008 (“071015”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 4E occurred on January 15, 2024, as shown in field 005 (“20240115”). I personally identified and retrieved the MARC record that is Attachment 4E. The “BLvl” entry in Attachment 4E is “s,” which indicates that the digital journal *Biotechnology and Molecular Biology Reviews* is a serial publication. Accordingly, the MARC record for Hall-Ellis Exhibit 1010 corresponds to the digital journal *Biotechnology and Molecular Biology Reviews* from the time the serial title began publication and includes the date of the Zwenger 2008 article.

79. Attachment 4E includes an entry in field 060 (“W1”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system). Attachment 4E further includes two descriptor terms reading “Biotechnology \$v Periodicals” (see Attachment 4F,

Library of Congress subject heading sh2007101988) and “Molecular biology \$v Periodicals” (see Attachment 4G, Library of Congress subject heading sh2008107896) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 4E was indexed according to its subject matter by virtue of at least two independently sufficient classifications: the field 060 entry and the field 650 entries (e.g., searching for the “Molecular biology” and/or “Periodicals” of field 650). As of or shortly after February 28, 2008, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1010. As of October 15, 2007, the MARC record attached hereto as Attachment 4E was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

80. As yet another example supporting my opinion that Hall-Ellis Exhibit 1010 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the digital journal *Biotechnology and Molecular Biology Reviews* as cataloged in the Louis Calder Memorial Library at the University of Miami School of Medicine is currently available from 225

libraries.²³ In view of the above, this February 2008 issue of the digital journal *Biotechnology and Molecular Biology Reviews* was publicly available and accessible at least by or shortly after February 28, 2008, at least because by that date it had been cataloged and indexed in the Louis Calder Memorial Library at the University of Miami School of Medicine, made part of the OCLC bibliographic database, and received at the National Library of Medicine. For these reasons, it is my opinion that Hall-Ellis Exhibit 1010 was published and accessible to the public on or shortly after February 28, 2008.

E. Blazeck, John, and Hal S. Alper. “Promoter Engineering: Recent Advances in Controlling Transcription at the Most Fundamental Level.” *Biotechnology Journal*, vol. 8, no. 1 (January 2013): 46-58. (“Blazeck 2013”) [Hall-Ellis Exhibit 1011]

81. Attached hereto as Hall-Ellis Exhibit 1011 is a copy of the journal article titled “Promoter Engineering: Recent Advances in Controlling Transcription at the Most Fundamental Level” by John Blazeck and Hal S. Alper (hereafter “Blazeck 2013”). I found the Blazeck 2013 article in the National Library of Medicine (Bethesda, Maryland) was published in Volume 8, Number 1 of the *Biotechnology Journal*.. The Blazeck 2013 article appears beginning on page 46 of this issue dated January 2013. Hall-Ellis Exhibit 1011 is a true and correct copy of the Blazeck 2013 article containing the cover page, the copyright page, the table

²³ <https://search.worldcat.org/title/174144047>

of contents, and article I found contained on pages 46-58. Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. Hall-Ellis Exhibit 1011 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1011 is a true and correct copy in a condition that creates no suspicion about its authenticity. The Blazeck 2013 article is also available from the publisher, Wiley,²⁴ through the National Library of Medicine,²⁵ and the digital repository *ResearchGate*.²⁶

82. Attached hereto as Attachment 5A is a true and correct copy of the MARC record for the *Biotechnology Journal*, which contained Blazeck 2013 in its January 2013 issue, from the National Library of Medicine online catalog. I personally identified and retrieved the MARC record that is Attachment 5A.

83. Based on finding a print copy of Hall-Ellis Exhibit 1011 in the

²⁴

<https://analyticalsciencejournals.onlinelibrary.wiley.com/doi/10.1002/biot.201200120>

²⁵ <https://pubmed.ncbi.nlm.nih.gov/22890821/>

²⁶

https://www.researchgate.net/publication/230666315_Promoter_engineering_Recent_advances_in_controlling_transcription_at_the_most_fundamental_level

National Library of Medicine and its MARC record in the National Library of Medicine online library catalog attached as Attachment 5A, it is my opinion that the Blazeck 2013 article published in the *Biotechnology Journal* was publicly available on or shortly after February 5, 2013, which is also the date shown by the library's label on the cover. In common practice these labels are applied at or around the time the volume is entered into the library's collection and the volume is made available to library patrons within a short time thereafter. Attachment 5A also shows that Hall-Ellis Exhibit 1011 was catalogued with a descriptor term reading "Biotechnology \$v periodical" (see Attachment 4B, National Library of Medicine subject heading D001709) in the 650 field, and thus a person of ordinary skill in the art could have searched for Blazeck 2013 using these indices and accessed Blazeck 2013 on or shortly after February 5, 2013. I personally identified and retrieved the National Library of Medicine record which is Attachment 4B, and Attachment 4B is a true and correct copy of the National Library of Medicine record that I retrieved.

84. As noted in the holdings information (362 field), the National Library of Medicine has received the *Biotechnology Journal* since January 2006 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1011, the Blazeck 2013 article was publicly available on February 5, 2013, because the serial title had been received, cataloged, and indexed

in the National Library of Medicine and made part of its online catalog database, beginning in January 2006 and continuing for each issue thereafter, including the January 2013 issue containing Blazeck 2013.

85. Attached hereto as Attachment 5B is a true and correct copy of the MARC record for the *Biotechnology Journal* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 5B, that library code is “DLC,” which means that the MARC record for this serial was cataloged at the Library of Congress. As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 65430629 on April 3, 2006, as shown in field 008 (“060403”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 5B occurred on March 17, 2016, as shown in field 005 (“20160317”). I personally identified and retrieved the MARC record that is Attachment 5B. The “BLvl” entry in Attachment 5B is “s,” which indicates that the *Biotechnology Journal* is a serial publication. Field 310 of Attachment 5B reads “Monthly.” Accordingly, the MARC record for Hall-Ellis Exhibit 1011 corresponds to the *Biotechnology Journal* from the time the serial title began publication and includes the date of the Blazeck 2013 article.

86. Attachment 5B includes an entry in field 050 (“TP248.13 \$b B577”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system) and an entry in field 060 (“W1 \$b BI918QK”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system). Attachment 5B further includes two descriptor terms reading “Biotechnology \$v Periodicals” (see Attachment 4F, Library of Congress subject heading sh2007101988) and “Biotechnology \$v periodical” (see Attachment 4B, National Library of Medicine subject heading D001709) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 5B was indexed according to its subject matter by virtue of at least three independently sufficient classifications: the field 050 entry, the field 060 entry, and the field 650 entries (e.g., searching for the “Biotechnology” and/or “Periodicals” of field 650. As of or shortly after February 5, 2013, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1011. As of April 3, 2006, the MARC record attached hereto as Attachment 5B was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date

through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

87. As yet another example supporting my opinion that Hall-Ellis Exhibit 1011 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that Attachment 5B indicates that the *Biotechnology Journal* as cataloged at the Library of Congress is currently available from 590 libraries.²⁷ In view of the above, this January 2013 issue of the *Biotechnology Journal* was publicly available and accessible at least by or shortly after February 5, 2013, at least because by that date it had been received, cataloged, and indexed at the Library of Congress and made part of the OCLC bibliographic database. For these reasons, it is my opinion that Hall-Ellis Exhibit 1011 was published and accessible to the public on or shortly after February 5, 2013.

F. Weake, Vikki M., and Jerry L. Workman. “Inducible Gene Expression: Diverse Regulatory Mechanisms.” *Nature Reviews Genetics*, vol. 11, no. 6 (June 2010): 426-437. (“Weake 2010”) [Hall-Ellis Exhibit 1012]

88. Attached hereto as Hall-Ellis Exhibit 1012 is a copy of the journal article titled “Inducible Gene Expression: Diverse Regulatory Mechanisms” by Vikki M. Weake and Jerry L. Workman (hereafter “Weake 2010”). I found the Weake 2010 article in the Library of Congress, and it was published in Volume 11,

²⁷ <https://search.worldcat.org/title/65430629>

Number 6 of the journal *Nature Reviews Genetics*. The Weake 2010 article appears beginning on page 426 of this issue dated June 2010. Hall-Ellis Exhibit 1012 is a true and correct copy of the Weake 2010 article I found, including the cover page, the table of contents, a letter from the editors, and the article itself on pages 426-437. Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. Hall-Ellis Exhibit 1012 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1012 is a true and correct copy in a condition that creates no suspicion about its authenticity. The Weake 2010 article is also available from the publisher, the Nature Publishing Group,²⁸ through the National Library of Medicine,²⁹ and the digital repository *ResearchGate*.³⁰ The publisher's website indicates that the Weake 2010 article was published on April 27, 2010.

89. Attached hereto as Attachment 6A is a true and correct copy of the MARC record for the journal *Nature Reviews Genetics*, which contained the article

²⁸ <https://www.nature.com/articles/nrg2781>

²⁹ <https://pubmed.ncbi.nlm.nih.gov/20421872/>

³⁰

https://www.researchgate.net/publication/43346069_Inducible_gene_expression_Diverse_regulatory_mechanisms

Weake 2010 in its June 2010 issue, from the Library of Congress online catalog. I personally identified and retrieved the MARC record that is Attachment 6A.

90. Based on finding a print copy of Hall-Ellis Exhibit 1012 in the Library of Congress and its MARC record in the Library of Congress online library catalog attached as Attachment 6A, it is my opinion that the Weake 2010 article published in the journal *Nature Reviews Genetics* was publicly available on or shortly after April 27, 2010, which is also the date indicated on the publisher's website. Attachment 6A also shows that Hall-Ellis Exhibit 1012 was catalogued with two descriptor terms reading "Genetics \$v Periodicals" (see Attachment 6B, Library of Congress subject heading sh2008105128) and "Genetics \$v periodical" (see Attachment 6C, National Library of Medicine subject heading D005823) in the 650 fields and thus a person of ordinary skill in the art could have searched for Weake 2010 using these indices and accessed Weake 2010 on or shortly after April 27, 2010. I personally identified and retrieved the U.S. Library of Congress records at Attachments 6B and 6C, and Attachments 6B and 6C are true and correct copies of the Library of Congress records that I retrieved.

91. As noted in the holdings information (362 field), the Library of Congress has received the journal *Nature Reviews Genetics* since October 2000 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1012, the Weake 2010 article was publicly available

on April 27, 2010, because the serial title had been received, cataloged, and indexed in the Library of Congress and made part of its online catalog database beginning October 2000 and continuing for each issue thereafter, including the June 2010 issue containing Weake 2010.

92. Attached hereto as Attachment 6D is a true and correct copy of the MARC record for the journal *Nature Reviews Genetics* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 6D, that library code is “OUN,” which means that the MARC record for this serial was cataloged at the Ohio University Library (Athens, Ohio). As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Ohio University Library created OCLC record number 45426000 on November 27, 2000, as shown in field 008 (“001127”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 6D occurred on August 9, 2022, as shown in field 005 (“20220809”). I personally identified and retrieved the MARC record that is Attachment 6D. The “BLvl” entry in Attachment 6D is “s,” which indicates that the journal *Nature Reviews Genetics* is a serial publication. Field 310 of Attachment 6D reads “Monthly.” Accordingly, the MARC record for Hall-Ellis Exhibit 1012 corresponds to the journal *Nature Reviews Genetics* from the time the

serial title began publication and includes the date of the Weake 2010 article.

93. Attachment 6D includes an entry in field 050 (“QH426 \$b .N38”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system) and an entry in field 060 (“W1 \$b NA839H”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system). Attachment 6D further includes two descriptor terms reading “Genetics \$v Periodicals” (see Attachment 6B, Library of Congress subject heading sh2008105128) and “Genetics \$v periodical” (see Attachment 6C, National Library of Medicine subject heading D005823) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 6D was indexed according to its subject matter by virtue of at least three independently sufficient classifications: the field 050 entry, the field 060 entry, and the field 650 entries (e.g., searching for the “Genetics” and/or “periodicals” of field 650). As of or shortly after April 27, 2010, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1012. As of November 27, 2000, the MARC record attached hereto as Attachment 6D was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was

publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library, that added this periodical to its collection.

94. As yet another example supporting my opinion that Hall-Ellis Exhibit 1012 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that Attachment 6D indicates that the journal *Nature Reviews Genetics* as cataloged at the Ohio University Library is currently available from 1,699 libraries.³¹ In view of the above, this June 2010 issue of the journal *Nature Reviews Genetics* was publicly available and accessible at least by or shortly after April 27, 2010, at least because by that date it had been cataloged and indexed at the Ohio University Library, made part of the OCLC bibliographic database, and received at the Library of Congress. For these reasons, it is my opinion that Hall-Ellis Exhibit 1012 was published and accessible to the public on or shortly after April 27, 2010.

G. Weinhandl, Katrin, Margit Winkler, Anton Glieder, and Andrea Camattari. “Carbon Source Dependent Promoters in Yeasts.” *Microbial Cell Factories*, vol. 13, no. 5 (2014): 17 pages. (“Weinhandl 2014”) [Hall-Ellis Exhibit 1013]

95. Attached hereto as Hall-Ellis Exhibit 1013 is a copy of the journal article titled “Carbon Source Dependent Promoters in Yeasts” by Katrin

³¹ <https://search.worldcat.org/title/45426000>

Weinhandl, Margit Winkler, Anton Glieder, and Andrea Camattari (hereafter “Weinhandl 2014”). I found the Weinhandl 2014 article in the National Library of Medicine (Bethesda, Maryland), and it was published in Volume 13, Number 5 of the digital journal *Microbial Cell Factories*. The Weinhandl 2014 article is 17 pages long in this issue dated 2014. Hall-Ellis Exhibit 1013 is a true and correct copy of the Weinhandl 2014 article I found (pages 1-17). Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The Weinhandl 2014 article is also available from the publisher, Springer Nature,³² through the National Library of Medicine,³³ and in the digital repository *ResearchGate*.³⁴ Hall-Ellis Exhibit 1013 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1013 is a true and correct copy in a condition that creates no suspicion about its authenticity.

96. Attached hereto as Attachment 7A is a true and correct copy of the

³² <https://microbialcellfactories.biomedcentral.com/articles/10.1186/1475-2859-13-5#citeas>

³³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3897899/>

³⁴

https://www.researchgate.net/publication/259629371_Carbon_source_dependent_promoters_in_yeasts

MARC record for the digital journal *Microbial Cell Factories* from the National Library of Medicine online catalog, which contained the article Weinhandl 2014 in its Volume 13, Number 5 issue. I personally identified and retrieved the MARC record that is Attachment 7A.

97. Based on finding a copy of Hall-Ellis Exhibit 1013 in the National Library of Medicine and its MARC record in the Library of Medicine online library catalog attached as Attachment 7A, it is my opinion that the Weinhandl 2014 article published in the digital journal *Microbial Cell Factories* was publicly available on or shortly after January 9, 2014, which is also the date shown on the publisher's website. Attachment 7A also shows that Hall-Ellis Exhibit 1013 was catalogued with five descriptor terms reading "Cells \$x microbiology" (see Attachment 7B, National Library of Medicine subject heading D002477), "Biotechnology" (see Attachment 4B, National Library of Medicine subject heading D001709), "Cell Culture Techniques \$x statistics & numerical data" (see Attachment 7C, National Library of Medicine subject heading D018929), "Genetics, Microbial" (see Attachment 7D, National Library of Medicine subject heading D005827), and "Recombinant Proteins" (see Attachment 7E, National Library of Medicine subject heading D011994) in the 650 fields and thus a person of ordinary skill in the art could have searched for Weinhandl 2014 using these indices and accessed Weinhandl 2014 on or shortly after 2014.

98. As noted in the holdings information (362 field), the National Library of Medicine has received the digital journal *Microbial Cell Factories* since 2002 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1013, the Weinhandl 2014 article was publicly available on January 9, 2014, because the serial title had been received, cataloged, and indexed in the National Library of Medicine and made part of its online catalog database, beginning in 2002 and continuing for each issue thereafter, including the 2014 issue containing Weinhandl 2014.

99. Attached hereto as Attachment 7F is a true and correct copy of the MARC record for the digital journal *Microbial Cell Factories* obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 7F, that library code is “VAM,” which means that the MARC record for this serial was cataloged in the Moore Health Science Library at the University of Virginia (Charlottesville, Virginia). As can be seen in field 008 in the MARC record for this exhibit, a cataloger in the Moore Health Science Library at the University of Virginia created OCLC record number 49659655 on April 24, 2002, as shown in field 008 (“020424”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 7F occurred on February 15, 2023, as shown in

field 005 (“20230215”). I personally identified and retrieved the MARC record that is Attachment 7F. The “BLvl” entry in Attachment 7F is “s,” which indicates that the digital journal *Microbial Cell Factories* is a serial publication. Field 310 of Attachment 7F reads “Annual.” Accordingly, the MARC record for Hall-Ellis Exhibit 1013 corresponds to the digital journal *Microbial Cell Factories* from the time the serial title began and includes the date of the Weinhandl 2014 article.

100. Attachment 7F includes an entry in field 050 (“TP248.27 [\$b] M53”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system) and an entry in field 060 (“W1”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system). Attachment 7F further includes seven descriptor terms reading “Microbial biotechnology \$v Periodicals” (see Attachment 7G, Library of Congress subject heading sh89001096 and Attachment 7H, Library of Congress subject heading sh85099890), “Recombinant proteins \$x Synthesis \$v Periodicals” (see Attachment 7I, Library of Congress subject heading sh90005744 and Attachment 7H, Library of Congress subject heading sh85099890), “Cells \$x microbiology” (see Attachment 7B, National Library of Medicine subject heading D00477), “Recombinant Proteins” (see Attachment 7E, National Library of Medicine subject heading D011994), “Culture Techniques \$x

statistics & numerical data” (see Attachment 7J, National Library of Medicine subject heading D046508), “Genetics, Microbial” (see Attachment 7D, National Library of Medicine subject heading D005827), and “Biotechnology” (see Attachment 4B, National Library of Medicine subject heading D001709) in the field 650. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 7E was indexed according to its subject matter by virtue of at least three independently sufficient classifications: the field 050 entry, the field 060 entry, and the field 650 entries (e.g., searching for the “Biochemistry” and/or “Periodicals” of field 650. As of or shortly after January 9, 2014, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1013. As of April 24, 2002, the MARC record attached hereto as Attachment 7E was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

101. As yet another example supporting my opinion that Hall-Ellis Exhibit 1013 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the digital journal *Microbial Cell*

Factories as cataloged in the Moore Health Science Library at the University of Virginia is currently available from 1,385 libraries.³⁵ In view of the above, this January 2014 issue of the digital journal *Microbial Cell Factories* was publicly available and accessible at least by or shortly after January 9, 2014, at least because by that date it had been cataloged and indexed in the Moore Health Science Library at the University of Virginia, made part of the OCLC bibliographic database, and received at the National Library of Medicine. For these reasons, it is my opinion that Hall-Ellis Exhibit 1013 was published and accessible to the public on or shortly after January 9, 2014.

H. Kanai, Tamotsu, Akihiro Hara, Naoki Kanayama, Mitsuyoshi Ueda, and Atsuo Tanaka. “An n-Alkane-Responsive Promoter Element Found in the Gene Encoding the Peroxisomal Protein of Candida Tropicalis Does Not Contain a C6 Zinc Cluster DNA-Binding Motif.” *Journal of Bacteriology*, vol. 182, no. 9 (May 2000): 2492-2497. (“Kanai 2000”) [Hall-Ellis Exhibit 1014]

102. Attached hereto as Hall-Ellis Exhibit 1014 is a copy of the journal article titled “An n-Alkane-Responsive Promoter Element Found in the Gene Encoding the Peroxisomal Protein of Candida Tropicalis Does Not Contain a C6 Zinc Cluster DNA-Binding Motif” by Tamotsu Kanai, Akihiro Hara, Naoki Kanayama, Mitsuyoshi Ueda, and Atsuo Tanaka (hereafter “Kanai 2000”). I found the Kanai 2000 article the Steenbock Library at the University of Wisconsin –

³⁵ <https://search.worldcat.org/title/49659655>

Madison, and it was published in Volume 182, Number 9 of the *Journal of Bacteriology*. The Kanai 2000 article appears beginning on page 2492 of this issue dated May 2000. Hall-Ellis Exhibit 1014 is a true and correct copy of the Kanai 2000 article I found including the journal cover page, editorial page, table of contents, and the article itself on pages 2492-2497. Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The Kanai 2000 article is also available from the publisher, the American Society for Microbiology,³⁶ through the National Library of Medicine,³⁷ and the digital repository *Semantic Scholar*.³⁸ Hall-Ellis Exhibit 1014 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1014 is a true and correct copy in a condition that creates no suspicion about its authenticity.

103. Attached hereto as Attachment 8A is a true and correct copy of the MARC record for the *Journal of Bacteriology*, which contained the article Kanai 2000 in its May 2000 issue, from the Steenbock Library at the University of

³⁶ <https://journals.asm.org/doi/10.1128/jb.182.9.2492-2497.2000>

³⁷ <https://pubmed.ncbi.nlm.nih.gov/10762250/>

³⁸ <https://www.semanticscholar.org/paper/An-n-Alkane-Responsive-Promoter-Element-Found-in-of-Kanai-Hara/de639bc9799e0addbc9c5ac8aab32efac6ff2e>

Wisconsin – Madison online catalog. The library continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 8A occurred on April 20, 2015, as shown in field 005 (“20150420”). I personally identified and retrieved the MARC record that is Attachment 8A.

104. Based on finding a copy of Hall-Ellis Exhibit 1014 in the Steenbock Library at the University of Wisconsin – Madison and its MARC record in the Steenbock Library online library catalog attached as Attachment 8A, it is my opinion that the Kanai 2000 article published in the *Journal of Bacteriology* was publicly available on or shortly thereafter April 24, 2000, which is also the date shown by the library’s stamp on the cover. In common practice these stamps are applied at or around the time the volume is entered into the library’s collection and the volume is made available to library patrons within a short time thereafter. Attachment 8A also shows that Hall-Ellis Exhibit 1014 was catalogued with a descriptor term reading “Bacteriology \$v Periodicals” (see Attachment 8B, Library of Congress subject heading sh2009116578) in the 650 field and thus a person of ordinary skill in the art could have searched for Kanai 2000 using these indices and accessed Kanai 2000 on or shortly after April 24, 2000. I personally identified and retrieved the Steenbock Library records which are Attachments 8A and 8B and those Steenbock Library records found at Attachments 8A and 8B are true and

correct copies of the records that I retrieved.

105. As noted in the holdings information (362 field), the Steenbock Library at the University of Wisconsin – Madison has received the *Journal of Bacteriology* since 1916 and continues to receive the publication. In view of the MARC record for Hall-Ellis Exhibit 1014, the Kanai 2000 article was publicly available on April 24, 2000, because the serial title had been received, cataloged, and indexed in the Steenbock Library at the University of Wisconsin – Madison and made part of its online catalog database beginning in 1916 and continuing for each issue thereafter, including the May 2000 issue containing Kanai 2000.

106. Attached hereto as Attachment 8C is a true and correct copy of the MARC record for the *Journal of Bacteriology* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 8C that library code is “U. S. Armed Forces Military Library,” which is now part of the National Library of Medicine (Bethesda, Maryland).³⁹ As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the National Library of Medicine created OCLC record number 1800435 on December 24, 1974, as shown in field 008 (“741224”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent

³⁹ https://en.wikipedia.org/wiki/Army_Medical_Museum_and_Library

enhancement to Attachment 8C occurred on February 29, 2024, as shown in field 005 (“20240229”). I personally identified and retrieved the MARC record that is Attachment 8C. The “BLvl” entry in Attachment 8C is “s,” which indicates that the *Journal of Bacteriology* is a serial publication. Field 310 of Attachment 8C reads “Semimonthly, \$b Jan. 1991-.” Accordingly, the MARC record for Hall-Ellis Exhibit 1014 corresponds to the *Journal of Bacteriology* from the time the serial title began publication and includes the date of the Kanai 2000 article.

107. Attachment 8C includes an entry in field 050 (“QR1 \$b .J6”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1 \$b JO55”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“589”), a subject matter consistent with the Dewey Decimal classification system. Attachment 8C further includes two descriptor terms reading “Bacteriology \$v Periodicals” (see Attachment 8B, Library of Congress subject heading sh2009116578) and “Bacteriology” (see Attachment 8D, National Library of Medicine subject heading D001432) in the field 650. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 8C was indexed according to its subject matter by virtue of at least four independently sufficient classifications:

the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entries (e.g., searching for the “Biochemistry” and/or “Periodicals” of field 650. As of or shortly after April 24, 2000, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1014. As of December 24, 1974, the MARC record attached hereto as Attachment 8C was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library.

108. As yet another example supporting my opinion that Hall-Ellis Exhibit 1014 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the *Journal of Bacteriology* as cataloged at the National Library of Medicine is currently available from 1,603 libraries.⁴⁰ In view of the above, this April 2000 issue of the *Journal of Bacteriology* was publicly available and accessible at least by or shortly after April 24, 2000, at least because by that date it had been cataloged and indexed at the National Library of Medicine, made part of the OCLC bibliographic database, and received in the Steenbock Library at the University of Wisconsin – Madison. For

⁴⁰ <https://search.worldcat.org/title/1800435>

these reasons, it is my opinion that Hall-Ellis Exhibit 1014 was published and accessible to the public on or shortly after April 24, 2000.

- I. Kanai, Tamotsu, Akihiro Hara, Naoki Kanayama, Mitsuyoshi Ueda, and Atsuo Tanaka. “An n-Alkane-Responsive Promoter Element Found in the Gene Encoding the Peroxisomal Protein of Candida Tropicalis Does Not Contain a C6 Zinc Cluster DNA-Binding Motif – Figure 3.” *Journal of Bacteriology*, vol. 182, no. 9 (May 2000): 2496. (“Kanai Fig. 3”) [Hall-Ellis Exhibit 1015]**

109. Attached hereto as Hall-Ellis Exhibit 1015 is a copy of Figure 3 from the journal article titled “An n-Alkane-Responsive Promoter Element Found in the Gene Encoding the Peroxisomal Protein of Candida Tropicalis Does Not Contain a C6 Zinc Cluster DNA-Binding Motif” by Tamotsu Kanai, Akihiro Hara, Naoki Kanayama, Mitsuyoshi Ueda, and Atsuo Tanaka (hereafter “Kanai Fig. 3”). I found the Kanai Fig. 3 in the Steenbock Library at the University of Wisconsin – Madison, and it was published in Volume 182, Number 9 of the *Journal of Bacteriology*. The Kanai Fig. 3 article appears on page 2496 of this issue dated May 2000. Hall-Ellis Exhibit 1015 is a true and correct copy of the Kanai Fig. 3 I found including the journal cover page, editorial page, table of contents, and Fig. 3 on page 2496. Specifically, the text of the figure is complete; no pages are missing; further, there are no visible alterations to the document. The Kanai Fig. 3 is also available from the publisher, the American Society for Microbiology,⁴¹ through the

⁴¹ <https://journals.asm.org/doi/10.1128/jb.182.9.2492-2497.2000>

National Library of Medicine,⁴² and the digital repository *Semantic Scholar*.⁴³ Hall-Ellis Exhibit 1015 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1015 is a true and correct copy in a condition that creates no suspicion about its authenticity.

110. Attached hereto as Attachment 9A is a true and correct copy of the MARC record for the *Journal of Bacteriology*, which contained the figure Kanai Fig. 3, in its May 2000 issue, from the Steenbock Library at the University of Wisconsin – Madison online catalog. The library continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 9A occurred on April 20, 2015, as shown in field 005 (“20150420”). I personally identified and retrieved the MARC record that is Attachment 9A.

111. Based on finding a copy of Hall-Ellis Exhibit 1015 in the Steenbock Library at the University of Wisconsin – Madison and its MARC record in the Steenbock Library in its online library catalog attached as Attachment 9A, it is my opinion that the Kanai Fig. 3 published in the *Journal of Bacteriology* was publicly available on or shortly after April 24, 2000, which is also the date shown by the

⁴² <https://pubmed.ncbi.nlm.nih.gov/10762250/>

⁴³ <https://www.semanticscholar.org/paper/An-n-Alkane-Responsive-Promoter-Element-Found-in-of-Kanai-Hara/de639bc9799e0addbc9c5ac8aab32efac6ff2e>

library's stamp on the cover. In common practice these stamps are applied at or around the time the volume is entered into the library's collection and the volume is made available to library patrons within a short time thereafter. Attachment 9A also shows that Hall-Ellis Exhibit 1015 was catalogued with a descriptor term reading "Bacteriology \$v Periodicals" (see Attachment 8B, Library of Congress subject heading sh2009116578) in the 650 field and thus a person of ordinary skill in the art could have searched for Kanai Fig. 3 using these indices and accessed Kanai Fig. 3 on or shortly after April 24, 2000. I personally identified and retrieved the Steenbock Library record which is Attachment 9A and the Steenbock Library record found at Attachment 9A is a true and correct copy of the record that I retrieved.

112. As noted in the holdings information (362 field), the Steenbock Library at the University of Wisconsin – Madison has received the *Journal of Bacteriology* since 1916 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1015, the Kanai Fig. 3 was publicly available on April 24, 2000, because the serial title had been received, cataloged, and indexed in the Steenbock Library at the University of Wisconsin – Madison and made part of its online catalog database beginning in 1916 and continuing for each issue thereafter, including the May 2000 issue containing Kanai 2000.

113. Attached hereto as Attachment 9B is a true and correct copy of the MARC record for the *Journal of Bacteriology* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 9B that library code is “U. S. Armed Forces Military Library,” which is now part of the National Library of Medicine (Bethesda, Maryland).⁴⁴ As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the National Library of Medicine created OCLC record number 1800435 on December 24, 1974, as shown in field 008 (“741224”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 9B occurred on February 29, 2024, as shown in field 005 (“20240229”). I personally identified and retrieved the MARC record that is Attachment 9B. The “BLvl” entry in Attachment 9B is “s,” which indicates that the *Journal of Bacteriology* is a serial publication. Field 310 of Attachment 9B reads “Semimonthly, \$b Jan. 1991-.” Accordingly, the MARC record for Hall-Ellis Exhibit 1015 corresponds to the *Journal of Bacteriology* from the time the serial title began publication and includes the date of the Kanai Fig. 3.

114. Attachment 9B includes an entry in field 050 (“QR1 \$b .J6”)—as described above, a subject matter classification number consistent with the Library

⁴⁴ https://en.wikipedia.org/wiki/Army_Medical_Museum_and_Library

of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1 \$b JO55”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“589”), a subject matter consistent with the Dewey Decimal classification system. Attachment 9B further includes two descriptor terms reading “Bacteriology \$v Periodicals” (see Attachment 8B, Library of Congress subject heading sh2009116578) and “Bacteriology” (see Attachment 8D, National Library of Medicine subject heading D001432) in the field 650. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 9B was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entries (e.g., searching for the “Bacteriology” and/or “Periodicals” of field 650. As of or shortly after April 24, 2000, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1015. As of December 24, 1974, the MARC record attached hereto as Attachment 9B was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an

individual library that added this periodical to its collection.

115. As yet another example supporting my opinion that Hall-Ellis Exhibit 1015 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the *Journal of Bacteriology* as cataloged at the National Library of Medicine is currently available from 1,603 libraries.⁴⁵ In view of the above, this May 2000 issue of the *Journal of Bacteriology* was publicly available and accessible at least by or shortly after April 24, 2000, at least because by that date it had been cataloged and indexed at the National Library of Medicine, made part of the OCLC bibliographic database, and received in the Steenbock Library at the University of Wisconsin – Madison. For these reasons, it is my opinion that Hall-Ellis Exhibit 1015 was published and accessible to the public on or shortly after April 24, 2000.

J. Masuda, Yutaka, Sun Mee Park, Akinori Ohta, and Masamichi Takagi. “Cloning and Characterization of the POX2 Gene in *Candida Maltosa*.” *Gene*, vol. 167, issue 1-2 (29 December 1995): 157-161. (“Masuda 1995”) [Hall-Ellis Exhibit 1016]

116. Attached hereto as Hall-Ellis Exhibit 1016 is a copy of the journal article titled “Cloning and Characterization of the POX2 Gene in *Candida Maltosa*” by Yutaka Masuda, Sun Mee Park, Akinori Ohta, and Masamichi Takagi (hereafter “Masuda 1995”). I found the Masuda 1995 article Linda Hall Library of

⁴⁵ <https://search.worldcat.org/title/1800435>

Science, Engineering & Technology (Kansas City, Missouri), and it was published in Volume 167, Numbers 1-2 of the journal *Gene*. The Masuda 1995 article appears beginning on page 157 of this issue dated December 29, 1995. Hall-Ellis Exhibit 1016 is a true and correct copy of the Masuda 1995 article I found including the cover page, the copyright page, the editorial page, the author index, and the article on pages 157-161. Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The Masuda 1995 article is also available from the publisher, Elsevier,⁴⁶ and through the National Library of Medicine.⁴⁷ Hall-Ellis Exhibit 1016 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1016 is a true and correct copy in a condition that creates no suspicion about its authenticity.

117. Attached hereto as Attachment 10A is a true and correct copy of the MARC record for the journal *Gene*, which contained the article Masuda 1995 in its December 1995 issue, from the Linda Hall Library of Science, Engineering & Technology online catalog. I personally identified and retrieved the MARC record that is Attachment 10A.

⁴⁶ <https://www.sciencedirect.com/science/article/abs/pii/0378111995006559>

⁴⁷ <https://pubmed.ncbi.nlm.nih.gov/8566769/>

118. Based on finding a copy of Hall-Ellis Exhibit 1016 in the Linda Hall Library of Science, Engineering & Technology and its MARC record in the Linda Hall Library of Science, Engineering & Technology online library catalog attached as Attachment 10A, it is my opinion that the Masuda 1995 article published in the journal *Gene* was publicly available by or shortly after March 1, 1999, which is also the date shown on the publisher's website. Attachment 10A also shows that Hall-Ellis Exhibit 1016 was catalogued with three descriptor terms reading "Genetic engineering \$v Periodicals" (see Attachment 10B, Library of Congress subject heading sh2008117864), "Molecular cloning \$v Periodicals" (see Attachment 10C, Library of Congress subject heading sh85086580 and Attachment 7H, Library of Congress subject heading sh85099890), and "Recombinant DNA \$v Periodicals" (see Attachment 10D, Library of Congress subject heading sh85111851 and Attachment 7H, Library of Congress subject heading sh85099890) in the 650 fields and thus a person of ordinary skill in the art could have searched for Masuda 1995 using these indices and accessed Masuda 1995 on or shortly after March 1, 1999. I personally identified and retrieved the Linda Hall Library of Science, Engineering & Technology records found at attachments 10A-10D, and Attachments 10A-10D are true and correct copies of the Linda Hall Library record that I retrieved.

119. As noted in the holdings information (362 field), the Linda Hall

Library of Science, Engineering & Technology has received the journal *Gene* since 1976 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1016, the Masuda 1995 article was publicly available by March 1, 1999, because the serial title had been received, cataloged, and indexed in the Linda Hall Library of Science, Engineering & Technology and made part of its online catalog database, beginning in 1976 and continuing for each issue thereafter, including the December 1995 issue containing Masuda 1995.

120. Attached hereto as Attachment 10E is a true and correct copy of the MARC record for the journal *Gene* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 10E, that library code is “DLC,” which means that the MARC record for this serial was cataloged at the Library of Congress. As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 3424642 on November 16, 1977, as shown in field 008 (“1771116”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 10E occurred on August 9, 2022, as shown in field 005 (“20220809”). I personally identified and retrieved the MARC record that is Attachment 10E. The “BLvl” entry in Attachment 10E is “s,” which indicates that the journal *Gene*

is a serial publication. Field 310 of Attachment 10E reads “Biweekly, \$b <15 July 1992-.” Accordingly, the MARC record for Hall-Ellis Exhibit 1016 corresponds to the journal *Gene* from the time the serial title began publication and includes the date of the Masuda 1995 article.

121. Attachment 10E includes an entry in field 050 (“QH442 \$b .G43”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1 \$b GE184M”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“575.1”), a subject matter consistent with the Dewey Decimal classification system. Attachment 10E further includes four descriptor terms reading “Genetic engineering \$v Periodicals” (see Attachment 10B, Library of Congress subject heading sh2008117864), “Molecular cloning \$v Periodicals” (see Attachment 10C, Library of Congress subject heading sh85086580 and Attachment 7H, Library of Congress subject heading sh85099890), “Recombinant DNA \$v Periodicals” (see Attachment 10D, Library of Congress subject heading sh85111851 and Attachment 7H, Library of Congress subject heading sh85099890), and “Genetic recombination” (see Attachment 10F, Library of Congress subject heading sh85053867) in the field 650. Thus, as of its cataloging, the publication

corresponding to the MARC record attached hereto as Attachment 10E was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entries (e.g., searching for the “Recombinant DNA” and/or “Periodicals” of field 650. As of or shortly after March 1999, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1016. As of November 16, 1977, the MARC record attached hereto as Attachment 10E was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

122. As yet another example supporting my opinion that Hall-Ellis Exhibit 1016 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the journal *Gene* as cataloged at the Library of Congress is currently available from 555 libraries.⁴⁸ In view of the above, this December 1995 issue of the journal *Gene* was publicly available and accessible at least by or shortly after March 1, 1999, at least because by that date it had been cataloged and indexed at the Library of Congress, made part of the

⁴⁸ <https://search.worldcat.org/title/3424642>

OCLC bibliographic database, and received in the Linda Hall Library of Science, Engineering & Technology. For these reasons, it is my opinion that Hall-Ellis Exhibit 1016 was published and accessible to the public on or shortly after March 1, 1999.

K. Masuda, Yutaka, Sun Mee Park, Akinori Ohta, and Masamichi Takagi. “Cloning and Characterization of the POX2 Gene in *Candida Maltosa* – Figure 2.” *Gene*, vol. 167, issue 1-2 (29 December 1995): 159. (“Masuda Fig. 2”) [Hall-Ellis Exhibit 1017]

123. Attached hereto as Hall-Ellis Exhibit 1017 is a figure from a copy of the journal article titled “Cloning and Characterization of the POX2 Gene in *Candida Maltosa*” by Yutaka Masuda, Sun Mee Park, Akinori Ohta, and Masamichi Takagi (hereafter “Masuda Fig. 2”). I found the Masuda Fig. 2 in the Linda Hall Library of Science, Engineering & Technology (Kansas City, Missouri), and it was published in Volume 167, Numbers 1-2 of the journal *Gene*. The Masuda Fig. 2 appears on page 159 of this issue dated December 29, 1995. Hall-Ellis Exhibit 1017 is a true and correct copy of the Masuda Fig. 2 including the cover page, the copyright page, the editorial page, the author index, and Fig. 2 on page 159. Specifically, the text of the figure is complete; further, there are no visible alterations to the document. The Masuda fig. 2 is also available from the publisher, Elsevier,⁴⁹ and through the National Library of Medicine.⁵⁰ Hall-Ellis

⁴⁹ <https://www.sciencedirect.com/science/article/abs/pii/0378111995006559>

Exhibit 1017 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1017 is a true and correct copy in a condition that creates no suspicion about its authenticity.

124. Attached hereto as Attachment 11A is a true and correct copy of the MARC record for the journal *Gene*, which contained the figure Masuda Fig. 2 in its December 1995 issue, from the Linda Hall Library of Science, Engineering & Technology online catalog. I personally identified and retrieved the MARC record that is Attachment 11A.

125. Based on finding a copy of Hall-Ellis Exhibit 1017 in the Linda Hall Library of Science, Engineering & Technology and its MARC record in the Linda Hall Library of Science, Engineering & Technology online library catalog attached as Attachment 11A, it is my opinion that the Masuda Fig. 2 published in the journal *Gene* was publicly available by or shortly after March 1, 1999, which is also the date indicated on the publisher’s website. Attachment 11A also shows that Hall-Ellis Exhibit 1017 was catalogued with three descriptor terms reading “Genetic engineering \$v Periodicals” (see Attachment 10B, Library of Congress subject heading sh2008117864), “Molecular cloning \$v Periodicals” (see Attachment 10C, Library of Congress subject heading sh85086580 and Attachment 7H, Library of Congress subject heading sh85099890), and “Recombinant DNA \$v

⁵⁰ <https://pubmed.ncbi.nlm.nih.gov/8566769/>

Periodicals” (see Attachment 10D, Library of Congress subject heading sh85111851 and Attachment 7H, Library of Congress subject heading sh85099890) in the 650 fields and thus a person of ordinary skill in the art could have searched for Masuda Fig. 2 using these indices and accessed Masuda Fig. 2 on or shortly after March 1, 1999. I personally identified and retrieved the Linda Hall Library of Science, Engineering & Technology records found at attachments 10A-10D, and Attachments 10A-10D are true and correct copies of the Linda Hall Library records that I retrieved.

126. As noted in the holdings information (362 field), the Linda Hall Library of Science, Engineering & Technology has received the journal *Gene* since 1976 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1017, the Masuda Fig. 2 was publicly available by March 1, 1999, because the serial title had been received, cataloged, and indexed in the Linda Hall Library of Science, Engineering & Technology and made part of its online catalog database beginning in 1976 and continuing for each issue thereafter, including the December 1995 issue containing Masuda Fig. 2.

127. Attached hereto as Attachment 11B is a true and correct copy of the MARC record for the journal *Gene*, I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 11B, that library code is

“DLC,” which means that the MARC record for this serial was cataloged at the Library of Congress. As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 3424642 on November 16, 1977, as shown in field 008 (“1771116”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 11B occurred on August 9, 2022, as shown in field 005 (“20220809”). I personally identified and retrieved the MARC record that is Attachment 11B. The “BLvl” entry in Attachment 11B is “s,” which indicates that the journal *Gene* is a serial publication. Field 310 of Attachment 11B reads “Biweekly, \$b <15 July 1992-.” Accordingly, the MARC record for Hall-Ellis Exhibit 1017 corresponds to the journal *Gene* from the time the serial title began publication and includes the date of the Masuda Fig. 2.

128. Attachment 11B includes an entry in field 050 (“QH442 \$b .G43”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1 \$b GE184M”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“575.1”), a subject matter consistent with the Dewey Decimal classification system.

Attachment 11B further includes four descriptor terms reading “Genetic engineering \$v Periodicals” (see Attachment 10B, Library of Congress subject heading sh2008117864), “Molecular cloning \$v Periodicals” (see Attachment 10C, Library of Congress subject heading sh85086580 and Attachment 7H, Library of Congress subject heading sh85099890), “Recombinant DNA \$v Periodicals” (see Attachment 10D, Library of Congress subject heading sh85111851 and Attachment 7H, Library of Congress subject heading sh85099890), and “Genetic recombination” (see Attachment 10F, Library of Congress subject heading sh85053867) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 11B was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entries (e.g., searching for the “Recombinant DNA” and/or “Periodicals” of field 650. As of or shortly after March 1, 1999, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1017. As of November 16, 1977, the MARC record attached hereto as Attachment 11B was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC

bibliographic database or through an individual library that added this periodical to its collection.

129. As yet another example supporting my opinion that Hall-Ellis Exhibit 1017 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the journal *Gene* as cataloged at the Library of Congress is currently available from 555 libraries.⁵¹ In view of the above, this December 1995 issue of the journal *Gene* was publicly available and accessible at least by or shortly after by March 1, 1999, at least because by that date it had been cataloged and indexed at the Library of Congress, made part of the OCLC bibliographic database, and received in the Linda Hall Library of Science, Engineering & Technology. For these reasons, it is my opinion that Hall-Ellis Exhibit 1017 was published and accessible to the public on or shortly after March 1, 1999.

- L. Lee, Michael E., William C. DeLoache, Bernardo Cervantes, and John E. Dueber. “A Highly Characterized Yeast Toolkit for Modular, Multipart Assembly.” *ACS Synthetic Biology*, vol. 4, issue 9 (2015): 975-986. (“Lee 2015”) [Hall-Ellis Exhibit 1018]**

130. Attached hereto as Hall-Ellis Exhibit 1018 is a copy of the journal article titled “A Highly Characterized Yeast Toolkit for Modular, Multipart Assembly” by Michael E. Lee, William C. DeLoache, Bernardo Cervantes, and

⁵¹ <https://search.worldcat.org/title/3424642>

John E. Dueber (hereafter “Lee 2015”). I found the Lee 2015 article at the National Library of Medicine (Bethesda, Maryland), and it was published in Volume 4, Issue 9 of the open access journal *ACS Synthetic Biology*. The Lee 2015 article appears beginning on page 975 of this issue dated 2015. Hall-Ellis Exhibit 1018 is a true and correct copy of the Lee 2015 article I found (pages 975-986). Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. Hall-Ellis Exhibit 1018 article is also available from the publisher, the American Chemical Society,⁵² through the National Library of Medicine,⁵³ and the digital repositories *ResearchGate*⁵⁴ and *Semantic Scholar*.⁵⁵ Hall-Ellis Exhibit 1018 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1018 is a true and correct copy in a condition that creates no suspicion about its authenticity.

⁵² <https://pubs.acs.org/doi/10.1021/sb500366v>

⁵³ <https://pubmed.ncbi.nlm.nih.gov/25871405/>

⁵⁴

https://www.researchgate.net/publication/274964535_A_Highly_Characterized_Yeast_Toolkit_for_Modular_Multipart_Assembly

⁵⁵ <https://www.semanticscholar.org/paper/A-Highly-Characterized-Yeast-Toolkit-for-Modular%2C-Lee-Deloache/0198dac70004da88cddc17de6a233504cb0d1cfe>

131. Attached hereto as Attachment 12A is a true and correct copy of the MARC record for the open access journal *ACS Synthetic Biology*, which contained the article Lee 2015 in its 2015 issue, from the National Library of Medicine online catalog. I personally identified and retrieved the MARC record that is Attachment 12A.

132. Based on finding a copy of Hall-Ellis Exhibit 1018 in the National Library of Medicine and its MARC record in the National Library of Medicine online library catalog attached as Attachment 12A, it is my opinion that the Lee 2015 article published in the open access journal *ACS Synthetic Biology* was publicly available on or shortly after April 14, 2015, which is also the date shown on the publisher's website. Attachment 12A also shows that Hall-Ellis Exhibit 1018 was catalogued with two descriptor terms reading "Synthetic Biology \$v periodical" (see Attachment 12B, National Library of Medicine subject heading D058615) and "Genetic Engineering \$v periodical" (see Attachment 12C, National Library of Medicine subject heading D005818) in the 650 fields and thus a person of ordinary skill in the art could have searched for Lee 2015 using these indices and accessed Lee 2015 on or shortly after April 14, 2015. I personally identified and retrieved the National Library of Medicine records found at attachments 12A-12C, and Attachments 12A-12C are true and correct copies of the National Library of Medicine records that I retrieved.

133. As noted in the holdings information (362 field), the National Library of Medicine has received the open access journal *ACS Synthetic Biology* since January 2012 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1018, the Lee 2015 article was publicly available on April 14, 2015, because the serial title had been received, cataloged, and indexed in the National Library of Medicine and made part of its online catalog database, beginning in January 2012 and continuing for each issue thereafter, including the 2015 issue containing Lee 2015.

134. Attached hereto as Attachment 12D is a true and correct copy of the MARC record for the open access journal *ACS Synthetic Biology* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 12D, that library code is “DLC,” which means that the MARC record for this serial was cataloged at the Library of Congress. As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 725876736 on May 19, 2011, as shown in field 008 (“110519”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 12D occurred on February 18, 2022, as shown in field 005 (“20220218”). I personally identified and retrieved the MARC record that is

Attachment 12D. The “BLvl” entry in Attachment 12D is “s,” which indicates that the open access journal *ACS Synthetic Biology* is a serial publication. Field 310 of Attachment 12D reads “Monthly.” Accordingly, the MARC record for Hall-Ellis Exhibit 1018 corresponds to the open access journal *ACS Synthetic Biology* from the time the serial title began publication and includes the date of the Lee 2015 article.

135. Attachment 12D includes an entry in field 050 (“TA164”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“660.6”), a subject matter consistent with the Dewey Decimal classification system. Attachment 12D further includes two descriptor terms reading “Synthetic biology \$v Periodicals” (see Attachment 12E, Library of Congress subject heading sh2010006918) and “Genetic engineering \$v Periodicals” (see Attachment 10B, Library of Congress subject heading sh2008117864) in the field 650. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 12D was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082

entry, and the field 650 entries (e.g., searching for the “Synthetic biology” and/or “Periodicals” of field 650. As of or shortly after April 14, 2015, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1018. As of May 19, 2011, the MARC record attached hereto as Attachment 12D was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

136. As yet another example supporting my opinion that Hall-Ellis Exhibit 1018 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the open access journal *ACS Synthetic Biology* as cataloged at the Library of Congress is currently available from 468 libraries.⁵⁶ In view of the above, this 2015 issue of the open access journal *ACS Synthetic Biology* was publicly available and accessible at least by or shortly after April 14, 2015, at least because by that date it had been cataloged and indexed at the Library of Congress, made part of the OCLC bibliographic database, and received in the National Library of Medicine. For these reasons, it is my opinion that Hall-Ellis Exhibit 1018 was published and accessible to the public on or

⁵⁶ <https://search.worldcat.org/title/725876736>

shortly after April 14, 2015.

M. van der Walt, J. P., and J. A. von Arx. “The Yeast Genus *Yarrowia* gen. nov.” *Antonie van Leeuwenhoek*, vol. 46, no. 6 (1980): 517-521. (“van der Walt 1980”) [Hall-Ellis Exhibit 1019]

137. Attached hereto as Hall-Ellis Exhibit 1019 is a copy of the journal article titled “The Yeast Genus *Yarrowia* gen. nov.” by J. P. van der Walt and J. A. von Arx (hereafter “van der Walt 1980”). I found the van der Walt 1980 article in the Linda Hall Library (Kansas City, Missouri), and it was published in Volume 46, Number 6 of the journal *Antonie van Leeuwenhoek*.⁵⁷ The van der Walt 1980 article appears beginning on page 517 of this issue dated 1980. Hall-Ellis Exhibit 1019 is a true and correct copy of the van der Walt 1980 article including the journal cover page, editorial page, table of contents, and article I found on pages 517-521. Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The van der Walt 1980 article is also available from the publisher, Springer,⁵⁸ through the National Library of Medicine,⁵⁹ and the digital repository *Semantic Scholar*.⁶⁰ Hall-Ellis Exhibit 1019

⁵⁷ The organization is now known as the Linda Hall Library of Science, Engineering & Technology.

⁵⁸ <https://link.springer.com/article/10.1007/BF00394008>

⁵⁹ <https://pubmed.ncbi.nlm.nih.gov/7195185/>

was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1019 is a true and correct copy in a condition that creates no suspicion about its authenticity.

138. Attached hereto as Attachment 13A is a true and correct copy of the MARC record for the journal *Antonie van Leeuwenhoek*, which contained the article van der Walt 1980 in its 1980 issue, from the Linda Hall Library online catalog. I personally identified and retrieved the MARC record that is Attachment 13A.

139. Based on finding a print copy of Hall-Ellis Exhibit 1019 in the Linda Hall Library and its MARC record in the Linda Hall Library in its online library catalog attached as Attachment 13A, it is my opinion that the van der Walk 1980 article published in the journal *Antonie van Leeuwenhoek* was publicly available on or shortly after March 8, 1980, which is also the date shown by the library's stamp on the cover. In common practice these stamps are applied at or around the time the volume is entered into the library's collection and the volume is made available to library patrons within a short time thereafter. Attachment 13A also shows that Hall-Ellis Exhibit 1019 was catalogued with a descriptor term reading "Bacteriology \$v Periodicals" (see Attachment 13B, Library of Congress subject

⁶⁰ <https://www.semanticscholar.org/paper/The-yeast-genus-Yarrowia-gen.-nov.-Walt-Arx/7f6e83634f157cb2c3c130a4e3d871b5077eb39e>

heading sh2009116578) in the 650 field and thus a person of ordinary skill in the art could have searched for van der Walt 1980 using these indices and accessed van der Walt 1980 on or shortly after March 8, 1980. I personally identified and retrieved the Linda Hall Library of Science, Engineering & Technology records found at attachments 13A-13B, and Attachments 13A-13B are true and correct copies of the Linda Hall Library of Science, Engineering & Technology records that I retrieved.

140. As noted in the holdings information (362 field), the Linda Hall Library has received the journal *Antonie van Leeuwenhoek* since 1934 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1019, the van der Walt 1980 article was publicly available on March 8, 1980, because the serial title had been received, cataloged, and indexed in the Linda Hall Library and made part of its online catalog database, beginning in 1934 and continuing for each issue thereafter, including the 1980 issue containing van der Walt 1980.

141. Attached hereto as Attachment 13C is a true and correct copy of the MARC record for the journal *Antonie van Leeuwenhoek* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 13C, that library code is “MUL,” which means that the MARC record for this serial was cataloged

as part of the Minnesota Union List of Serials at the University of Minnesota Libraries (Minneapolis, Minnesota). As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the University of Minnesota Libraries created OCLC record number 1481634 on July 27, 1975, as shown in field 008 (“750727”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 13C occurred on February 27, 2024, as shown in field 005 (“20240227”). I personally identified and retrieved the MARC record that is Attachment 13C. The “BLvl” entry in Attachment 13C is “s,” which indicates that the journal *Antonie van Leeuwenhoek* is a serial publication. Field 310 of Attachment 13C reads “Six no. a year.” Accordingly, the MARC record for Hall-Ellis Exhibit 1019 corresponds to the journal *Antonie van Leeuwenhoek* from the time the serial title began publication and includes the date of the van der Walt 1980 article.

142. Attachment 13C includes an entry in field 050 (“QR1 \$b .A55”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1 \$b AN897R”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“576.05”), a subject

matter consistent with the Dewey Decimal classification system. Attachment 13C further includes a descriptor term reading “Bacteriology \$v Periodicals” (see Attachment 13B, Library of Congress subject heading sh2009116578) in the field 650. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 13C was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entries (e.g., searching for the “Bacteriology” and/or “Periodicals” of field 650. As of or shortly after March 8, 1980, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1019. As of July 27, 1975, the MARC record attached hereto as Attachment 13C was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

143. As yet another example supporting my opinion that Hall-Ellis Exhibit 1019 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the journal *Antonie van Leeuwenhoek* as cataloged at the University of Minnesota Libraries is currently available from

1,248 libraries.⁶¹ In view of the above, this 1980 issue of the journal *Antonie van Leeuwenhoek* was publicly available and accessible at least by or shortly after March 8, 1980, at least because by that date it had been cataloged and indexed at the University of Minnesota Libraries, made part of the OCLC bibliographic database, and received at the Linda Hall Library. For these reasons, it is my opinion that Hall-Ellis Exhibit 1019 was published and accessible to the public on or shortly after March 8, 1980.

N. Van der Walt, J. P., M. T. Smith, and Y. Yamada. “Arxula gen. nov. (Candidaceae), a New Anamorphic, Arthroconidial Yeast Genus.” *Antonie van Leeuwenhoek*, vol. 57, no. 1 (January 1990): 59-61. (“van der Walt 1990”) [Hall-Ellis Exhibit 1020]

144. Attached hereto as Hall-Ellis Exhibit 1020 is a copy of the journal article titled “Arxula gen. nov. (Candidaceae), a New Anamorphic, Arthroconidial Yeast Genus” by J. P. van der Walt, M. T. Smith, and Y. Yamada (hereafter “van der Walt 1990”). I found the van der Walt 1990 article in the Linda Hall Library (Kansas City, Missouri), and it was published in Volume 57, Number 1 of the journal *Antonie van Leeuwenhoek*.⁶² The van der Walt 1990 article appears beginning on page 59 of this issue dated January 1990. Hall-Ellis Exhibit 1020 is a true and correct copy of the van der Walt 1990 article including the journal cover

⁶¹ <https://search.worldcat.org/title/1481634>

⁶² The organization is now known as the Linda Hall Library of Science, Engineering & Technology.

page, editorial page, table of contents, and article I found(pages 59-61). Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The van der Walt 1990 article is also available from the publisher, Springer,⁶³ through the National Library of Medicine,⁶⁴ and the digital repository *Semantic Scholar*.⁶⁵ Hall-Ellis Exhibit 1020 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1020 is a true and correct copy in a condition that creates no suspicion about its authenticity.

145. Attached hereto as Attachment 14A is a true and correct copy of the MARC record for the journal *Antonie van Leeuwenhoek*, which contained the article van der Walt 1990 in its January 1990 issue, from the Linda Hall Library online catalog. I personally identified and retrieved the MARC record that is Attachment 14A.

146. Based on finding a print copy of Hall-Ellis Exhibit 1020 in the Linda Hall Library and its MARC record in the Linda Hall Library online library catalog

⁶³ <https://link.springer.com/article/10.1007/BF00400338>

⁶⁴ <https://pubmed.ncbi.nlm.nih.gov/2372213/>

⁶⁵ [https://www.semanticscholar.org/paper/Arxula-gen.-nov.-\(Candidaceae\)%2C-a-new-anamorphic%2C-Walt-Smith/c00490a5b60ef38c600fc2378f498b039181446a](https://www.semanticscholar.org/paper/Arxula-gen.-nov.-(Candidaceae)%2C-a-new-anamorphic%2C-Walt-Smith/c00490a5b60ef38c600fc2378f498b039181446a)

attached as Attachment 14A, it is my opinion that the van der Walt 1990 article published in the journal *Antonie van Leeuwenhoek* was publicly available by January 31, 1990, as indicated on the publisher's website. Attachment 14A also shows that Hall-Ellis Exhibit 1020 was catalogued with a descriptor term reading "Bacteriology \$v Periodicals" (see Attachment 13B, Library of Congress subject heading sh2009116578) in the 650 field and thus a person of ordinary skill in the art could have searched for van der Walt 1990 using these indices and accessed van der Walt 1990 on or shortly after January 31, 1990.

147. As noted in the holdings information (362 field), the Linda Hall Library has received the journal *Antonie van Leeuwenhoek* since 1934 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1020, the van der Walt 1990 article was publicly available by January 31, 1990, because the serial title had been received, cataloged, and indexed in the Linda Hall Library and made part of its online catalog database beginning in 1934 and continuing for each issue thereafter, including the January 1990 issue containing van der Walt 1990.

148. Attached hereto as Attachment 14B is a true and correct copy of the MARC record for the journal *Antonie van Leeuwenhoek* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 14B, that library

code is “MUL,” which means that the MARC record for this serial was cataloged as part of the Minnesota Union List of Serials at the University of Minnesota Libraries (Minneapolis, Minnesota). As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the University of Minnesota Libraries created OCLC record number 1481634 on July 27, 1975, as shown in field 008 (“750727”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 14B occurred on February 27, 2024, as shown in field 005 (“20240227”). I personally identified and retrieved the MARC record that is Attachment 4B. The “BLvl” entry in Attachment 14B is “s,” which indicates that the journal *Antonie van Leeuwenhoek* is a serial publication. Field 310 of Attachment 14B reads “Six no. a year.” Accordingly, the MARC record for Hall-Ellis Exhibit 1020 corresponds to the journal *Antonie van Leeuwenhoek* from the time the serial title began publication and includes the date of the van der Walt 1990 article.

149. Attachment 14B includes an entry in field 050 (“QR1 \$b .A55”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1 \$b AN897R”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey

Decimal classification system), and an entry in field 082 (“576.05”), a subject matter consistent with the Dewey Decimal classification system. Attachment 14B further includes a descriptor term reading “Bacteriology \$v Periodicals” (see Attachment 13B, Library of Congress subject heading sh2009116578) in the field 650. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 14B was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entry. (e.g., searching for the “Bacteriology” and/or “Periodicals” of field 650. As of or shortly after January 31, 1990, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1020. As of July 27, 1975, the MARC record attached hereto as Attachment 14B was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

150. As yet another example supporting my opinion that Hall-Ellis Exhibit 1020 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the journal *Antonie van Leeuwenhoek*

as cataloged at the University of Minnesota Libraries is currently available from 1,248 libraries.⁶⁶ In view of the above, this January 1990 issue of the journal *Antonie van Leeuwenhoek* was publicly available and accessible at least by or shortly after January 31, 1990, at least because by that date it had been cataloged and indexed at the University of Minnesota Libraries, made part of the OCLC bibliographic database, and received at the Linda Hall Library. For these reasons, it is my opinion that Hall-Ellis Exhibit 1020 was published and accessible to the public on or shortly after January 31, 1990.

- O. Craft, David L., Krishna M. Madduri, Mark Eshoo, and C. Ron Wilson. “Identification and Characterization of the CYP52 Family of *Candida tropicalis* ATCC 20336, Important for the Conversion of Fatty Acids and Alkanes to α , ω -Dicarboxylic Acids.” *Applied and Environmental Microbiology*, vol. 69, no. 10 (October 2003): 5983-5991. (“Craft 2003”) [Hall-Ellis Exhibit 1021]**

151. Attached hereto as Hall-Ellis Exhibit 1021 is a copy of the journal article titled “Identification and Characterization of the CYP52 Family of *Candida tropicalis* ATCC 20336, Important for the Conversion of Fatty Acids and Alkanes to α , ω -Dicarboxylic Acids” by David L. Craft, Krishna M. Madduri, Mark Eshoo, and C. Ron Wilson (hereafter “Craft 2003”). I found the Craft 2003 article in the Steenbock Library at the University of Wisconsin – Madison, and it was published in Volume 69, Number 10 of the journal *Applied and Environmental Microbiology*.

⁶⁶ <https://search.worldcat.org/title/1481634>

The Craft 2003 article appears beginning on page 5983 of this issue dated October 2003. Hall-Ellis Exhibit 1021 is a true and correct copy of the Craft 2003 article including the journal cover page, editorial page, table of contents, and article I found (pages 5983-5991). Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The Craft 2003 article is also available from the publisher, the American Society for Microbiology,⁶⁷ through the National Library of Medicine,⁶⁸ and the digital repositories *ResearchGate*⁶⁹ and *Semantic Scholar*.⁷⁰ Hall-Ellis Exhibit 1021 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1021 is a true and correct copy in a condition that creates no suspicion about its authenticity.

152. Attached hereto as Attachment 15A is a true and correct copy of the

⁶⁷ <https://journals.asm.org/doi/full/10.1128/aem.69.10.5983-5991.2003>

⁶⁸ <https://pubmed.ncbi.nlm.nih.gov/14532053/>

⁶⁹

https://www.researchgate.net/publication/9060951_Identification_and_characterization_of_the_CYP52_family_of_Candida_tropicalis_ATCC_20336_important_for_the_conversion_of_fatty_acids_and_alkanes_to_alphaomega-dicarboxylic_acids

⁷⁰ <https://www.semanticscholar.org/paper/Identification-and-Characterization-of-the-CYP52-of-Craft-Madduri/fd0799cbd4b1cea88065baecf23bce43150c985f>

MARC record for the journal *Applied and Environmental Microbiology*, which contained the article Craft 2003 in its October 2003 issue, from the Steenbock Library at the University of Wisconsin – Madison online catalog. I personally identified and retrieved the MARC record that is Attachment 15A.

153. Based on finding a print copy of Hall-Ellis Exhibit 1021 in the Steenbock Library at the University of Wisconsin – Madison and its MARC record in the Steenbock Library online library catalog attached as Attachment 15A, it is my opinion that the Craft 2003 article published in the journal *Applied and Environmental Microbiology* was publicly available on or shortly after October 17, 2003, which is also the date shown by the library’s stamp on the cover. In common practice these stamps are applied at or around the time the volume is entered into the library’s collection and the volume is made available to library patrons within a short time thereafter. Attachment 15A also shows that Hall-Ellis Exhibit 1021 was catalogued with two descriptor terms reading “Microbial ecology \$v Periodicals” (see Attachment 15B, Library of Congress subject heading sh85084757 and Attachment 7H, Library of Congress subject heading sh85099890) and “Microbiology \$v Periodicals” (see Attachment 15C, Library of Congress subject heading sh2008107742) in the 650 fields and thus a person of ordinary skill in the art could have searched for Craft 2003 using these indices and accessed Craft 2003 on or shortly after October 17, 2003.

154. As noted in the holdings information (362 field), the Steenbock Library at the University of Wisconsin – Madison has received the journal *Applied and Environmental Microbiology* since 1976 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1021, the Craft 2003 article was publicly available on October 17, 2003, because the serial title had been received, cataloged, and indexed in the Steenbock Library at the University of Wisconsin – Madison and made part of its online catalog database, beginning in 1976 and continuing for each issue thereafter, including the October 2003 issue containing Craft 2003.

155. Attached hereto as Attachment 15D is a true and correct copy of the MARC record for the journal *Applied and Environmental Microbiology* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 15D, that library code is “NSD,” which means that the MARC record for this serial was cataloged as part of the National Serials Data Program at the Library of Congress. As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 1712042 on October 17, 1975, as shown in field 008 (“751017”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to

Attachment 15D occurred on June 8, 2023, as shown in field 005 (“20230608”). I personally identified and retrieved the MARC record that is Attachment 15D. The “BLvl” entry in Attachment 15D is “s,” which indicates that the journal *Applied and Environmental Microbiology* is a serial publication. Field 310 of Attachment 15D reads “Semimonthly \$b <2007->.” Accordingly, the MARC record for Hall-Ellis Exhibit 1021 corresponds to the journal *Applied and Environmental Microbiology* from the time the serial title adopted the current title and includes the date of the Craft 2003 article.

156. Attachment 15D includes an entry in field 050 (“QR1 \$b .A6”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1 \$b AP498”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“576/.05”), a subject matter consistent with the Dewey Decimal classification system. Attachment 15D further includes two descriptor terms reading “Microbial ecology \$v Periodicals” (see Attachment 15B, Library of Congress subject heading sh85084757 and Attachment 7H, Library of Congress subject heading sh85099890) and “Microbiology \$v Periodicals” (see Attachment 15C, Library of Congress subject heading sh2008107742) in the field 650. Thus, as of its cataloging, the publication

corresponding to the MARC record attached hereto as Attachment 15D was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entries (e.g., searching for the “Microbiology” and/or “Periodicals” of field 650. As of or shortly after October 17, 2003, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1021. As of October 17, 1975, the MARC record attached hereto as Attachment 15D was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

157. As yet another example supporting my opinion that Hall-Ellis Exhibit 1021 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the journal *Applied and Environmental Microbiology* as cataloged at the Library of Congress is currently available from 1,525 libraries.⁷¹ In view of the above, this October 2003 issue of the journal *Applied and Environmental Microbiology* was publicly available and accessible at

⁷¹ <https://search.worldcat.org/title/1712042>

least by or shortly after October 17, 2003, at least because by that date it had been cataloged and indexed at the Library of Congress, made part of the OCLC bibliographic database, and received in the Steenbock Library at the University of Wisconsin – Madison. For these reasons, it is my opinion that Hall-Ellis Exhibit 1021 was published and accessible to the public on or shortly after October 17, 2003.

P. National Collection of Yeast Cultures. “NCYC 825: *Yarrowia lipolytica*.” Norwich, UK: NCYC, 1975. (“NCYC 825”) [Hall-Ellis Exhibit 1022]

158. Attached hereto as Hall-Ellis Exhibit 1022 is a printout of the website, *Yarrowia lipolytica* (NCYC 825), prepared by the National Collection of Yeast Cultures (NCYC) (hereafter “NCYC 825”). I personally downloaded Hall-Ellis Exhibit 1022 from the NCYC website.⁷² From the web browser, I entered the terms “NCYC 825” and the web page that is Hall-Ellis Exhibit 1022 appeared. Specifically, the text of Hall-Ellis Exhibit 1022 is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. Hall-Ellis Exhibit 1022 was found within the custody of a digital repository for scientists, a place where an authentic copy of this document would likely be. The website indicates that the NCYC 825 document was published by December 31, 1975.

⁷² <https://www.ncyc.co.uk/catalogue/yarrowia-lipolytica-825>

Q. Kunze, Gotthard, Claude Gaillardin, Małgorzata Czernicka, Pascal Durrens, Tiphaine Martin, Erik Böer, Toni Gabaldón, Jose A Cruz, Emmanuel Talla, Christian Marck, André Goffeau, Valérie Barbe, Philippe Baret, Keith Baronian, Sebastian Beier, Claudine Bleykasten, Rüdiger Bode, Serge Casaregola, Laurence Despons, Cécile Fairhead, Martin Giersberg, Przemysław Piotr Gierski, Urs Hähnel, Anja Hartmann, Dagmara Jankowska, Claire Jubin, Paul Jung, Ingrid Lafontaine, Véronique Leh-Louis, Marc Lemaire, Marina Marcet-Houben, Martin Mascher, Guillaume Morel, Guy-Franck Richard, Jan Riechen, Christine Sacerdot, Anasua Sarkar, Guilhem Savel, Joseph Schacherer, David J Sherman, Nils Stein, Marie-Laure Straub, Agnès Thierry, Anke Trautwein-Schult, Benoit Vacherie, Eric Westhof, Sebastian Worch, Bernard Dujon, Jean-Luc Souciet, Patrick Wincker, Uwe Scholz, and Cécile Neuvéglise. “The Complete Genome of *Blastobotrys (Arxula) Adeninivorans* LS3 - a Yeast of Biotechnological Interest.” *Biotechnology for Biofuels*, vol. 7, article 66 (24 April 2014): 15 pages. (“Kunze 2014”) [Hall-Ellis Exhibit 1023]

159. Attached hereto as Hall-Ellis Exhibit 1023 is a copy of the journal article titled “The Complete Genome of *Blastobotrys (Arxula) Adeninivorans* LS3 - a Yeast of Biotechnological Interest” and Supplemental File 7 titled “Phylogeny and Synteny of *A. Adeninivorans* and Other Yeasts” by Gotthard Kunze, Claude Gaillardin, Małgorzata Czernicka, Pascal Durrens, Tiphaine Martin, Erik Böer, Toni Gabaldón, Jose A Cruz, Emmanuel Talla, Christian Marck, André Goffeau, Valérie Barbe, Philippe Baret, Keith Baronian, Sebastian Beier, Claudine Bleykasten, Rüdiger Bode, Serge Casaregola, Laurence Despons, Cécile Fairhead, Martin Giersberg, Przemysław Piotr Gierski, Urs Hähnel, Anja Hartmann, Dagmara Jankowska, Claire Jubin, Paul Jung, Ingrid Lafontaine, Véronique Leh-

Louis, Marc Lemaire, Marina Marcet-Houben, Martin Mascher, Guillaume Morel, Guy-Franck Richard, Jan Riechen, Christine Sacerdot, Anasua Sarkar, Guilhem Savel, Joseph Schacherer, David J Sherman, Nils Stein, Marie-Laure Straub, Agnès Thierry, Anke Trautwein-Schult, Benoit Vacherie, Eric Westhof, Sebastian Worch, Bernard Dujon, Jean-Luc Souciet, Patrick Wincker, Uwe Scholz, and Cécile Neuvéglise (hereafter “Kunze 2014”). I found the Kunze 2014 article in the National Library of Medicine (Bethesda, Maryland), and it was published in Volume 7 as article 66 in the open access digital journal *Biotechnology for Biofuels*. The Kunze 2014 article appears on 15 pages in this issue dated April 2014. Hall-Ellis Exhibit 1023 is a true and correct copy of the Kunze 2014 article I found. Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The Kunze 2014 article is also available from the publisher, Springer,⁷³ through the National Library of Medicine,⁷⁴ and the digital repositories *ResearchGate*⁷⁵ and *Semantic Scholar*.⁷⁶ Hall-Ellis Exhibit

⁷³ <http://www.biotechnologyforbiofuels.com/content/7/1/66>

⁷⁴ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4022394/>

⁷⁵

https://www.researchgate.net/publication/262383235_The_complete_genome_of_Blastobotrys_Arxula_adenivorans_LS3_-_A_yeast_of_biotechnological_interest

1023 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1023 is a true and correct copy in a condition that creates no suspicion about its authenticity.

160. Attached hereto as Attachment 17A is a true and correct copy of the MARC record for the open access digital journal *Biotechnology for Biofuels*, which contained the article Kunze 2014 in its April 2014 issue, from the National Library of Medicine online catalog. I personally identified and retrieved the MARC record that is Attachment 17A.

161. Based on finding a print copy of Hall-Ellis Exhibit 1023 in the National Library of Medicine and its MARC record in the National Library of Medicine online library catalog attached as Attachment 17A, it is my opinion that the Kunze 2014 article published in the open access digital journal *Biotechnology for Biofuels* was publicly available on or shortly after April 24, 2014, which is also the date shown on the publisher’s website. Attachment 17A also shows that Hall-Ellis Exhibit 1023 was catalogued with two descriptor terms reading “Biotechnology \$v periodical” (see Attachment 4B, National Library of Medicine subject heading D001709) and “Energy-Generating Resources \$v periodical” (see Attachment 17B, National Library of Medicine subject heading D004736) in the

⁷⁶ [https://www.semanticscholar.org/paper/The-complete-genome-of-Blastobotrys-\(Arxula\)-LS3-a-Kunze-Gaillardin/0fbf316e160aa62d3eacdf0f11a8e11171813dff](https://www.semanticscholar.org/paper/The-complete-genome-of-Blastobotrys-(Arxula)-LS3-a-Kunze-Gaillardin/0fbf316e160aa62d3eacdf0f11a8e11171813dff)

650 fields and thus a person of ordinary skill in the art could have searched for Kunze 2014 using these indices and accessed Kunze 2014 on or shortly after April 24, 2014.

162. As noted in the holdings information (362 field), the National Library of Medicine has received the open access digital journal *Biotechnology for Biofuels* since 2008 and continued to receive each issue of the publication until it ceased operations in 2021. In view of the MARC record for Hall-Ellis Exhibit 1023, the Kunze 2014 article was publicly available on April 24, 2014, because the serial title had been received, cataloged, and indexed in the National Library of Medicine and made part of its online catalog database beginning in 2008 and continuing for each issue thereafter, including the April 2014 issue containing Kunze 2014.

163. Attached hereto as Attachment 17C is a true and correct copy of the MARC record for the open access digital journal *Biotechnology for Biofuels* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 17C, that library code is “OH1,” which means that the MARC record for this serial was cataloged at the OhioLink Consortium (Columbus, Ohio). As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the consortium OhioLink created OCLC record number 227003653 on May 5, 2008, as shown in field 008 (“080505”). The library community continues to update this

MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 17C occurred on January 31, 2023, as shown in field 005 (“20230131”). I personally identified and retrieved the MARC record that is Attachment 17C. The “BLvl” entry in Attachment 17C is “s,” which indicates that the open access digital journal *Biotechnology for Biofuels* is a serial publication. Field 310 of Attachment 17C reads “Irregular.” Accordingly, the MARC record for Hall-Ellis Exhibit 1023 corresponds to the open access digital journal *Biotechnology for Biofuels* during the time of publication and includes the date of the Kunze 2014 article.

164. Attachment 17C includes an entry in field 050 (“TP248.13”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system) and an entry in field 060 (“W1”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system). Attachment 17C further includes two descriptor terms reading “Biotechnology \$v Periodicals” (see Attachment 4F, Library of Congress subject heading sh2007101988) and “Biomass energy \$v Periodicals” (see Attachment 17D, Library of Congress subject heading sh85014231 and Attachment 7H, Library of Congress subject heading sh85099890) in the field 650. Thus, as of its cataloging, the publication corresponding to the MARC record

attached hereto as Attachment 17C was indexed according to its subject matter by virtue of at least three independently sufficient classifications: the field 050 entry, the field 060 entry, and the field 650 entries. (e.g., searching for the “Biotechnology” and/or “Periodicals” of field 650. As of or shortly after April 14, 2014, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1023. As of May 5, 2008, the MARC record attached hereto as Attachment 17C was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

165. As yet another example supporting my opinion that Hall-Ellis Exhibit 1023 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the open access digital journal *Biotechnology for Biofuels* as cataloged at the consortium OhioLink is currently available from 1,271 libraries.⁷⁷ In view of the above, this April 2014 issue of the journal *Biotechnology for Biofuels* was publicly available and accessible at least by or shortly after April 24, 2014, at least because by that date it had been cataloged

⁷⁷ <https://search.worldcat.org/title/227003653>

and indexed at the consortium OhioLink, made part of the OCLC bibliographic database, and received in the National Library of Medicine. For these reasons, it is my opinion that Hall-Ellis Exhibit 1023 was published and accessible to the public on or shortly after April 24, 2014.

R. Middelhoven, W. J., M. C. Hoogkamer-Te Niet, and N. J. Kreger-Van Rij. “*Trichosporon adeninovorans* sp. nov., a Yeast Species Utilizing Adenine, Xanthine, Uric Acid, Putrescine and Primary *n*-alkylamines as the Sole Source of Carbon, Nitrogen and Energy.” *Antonie van Leeuwenhoek*, vol. 50 (July 1984): 369-378. (“Middelhoven 1984”) [Hall-Ellis Exhibit 1024]

166. Attached hereto as Hall-Ellis Exhibit 1024 is a copy of the journal article titled “*Trichosporon adeninovorans* sp. nov., a Yeast Species Utilizing Adenine, Xanthine, Uric Acid, Putrescine and Primary *n*-alkylamines as the Sole Source of Carbon, Nitrogen and Energy” by W. J. Middelhoven, M. C. Hoogkamer-Te Niet, and N. J. Kreger-Van Rij (hereafter “Middelhoven 1984”). I found the Middelhoven 1984 article in the Linda Hall Library (Kansas City, Missouri), and it was published in Volume 50, Number 4 of the journal *Antonie van Leeuwenhoek*.⁷⁸ The Middelhoven 1984 article appears beginning on page 369 of this issue dated 1984. Hall-Ellis Exhibit 1024 is a true and correct copy of the Middelhoven 1984 article including the journal cover page, editorial page, table of

⁷⁸ The organization is now known as the Linda Hall Library of Science, Engineering & Technology.

contents, and article I found (pages 369-378). Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The Middelhoven 1984 article is also available from the publisher, Springer⁷⁹ and through the National Library of Medicine.⁸⁰ Hall-Ellis Exhibit 1024 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1024 is a true and correct copy in a condition that creates no suspicion about its authenticity.

167. Attached hereto as Attachment 18A is a true and correct copy of the MARC record for the journal *Antonie van Leeuwenhoek*, which contained the article Middelhoven 1984 in its July 1984 issue, from the Linda Hall Library online catalog. I personally identified and retrieved the MARC record that is Attachment 18A.

168. Based on finding a print copy of Hall-Ellis Exhibit 1024 in the Linda Hall Library and its MARC record in the Linda Hall Library online library catalog attached as Attachment 18A, it is my opinion that the Middelhoven 1984 article published in the journal *Antonie van Leeuwenhoek* was publicly available on or shortly thereafter February 21, 1985, which is also the date shown by the library's

⁷⁹ <https://link.springer.com/article/10.1007/BF00394651>

⁸⁰ <https://pubmed.ncbi.nlm.nih.gov/6543110/>

stamp on the cover. In common practice these stamps are applied at or around the time the volume is entered into the library's collection and the volume is made available to library patrons within a short time thereafter. Attachment 18A also shows that Hall-Ellis Exhibit 1024 was catalogued with a descriptor term reading "Bacteriology \$v Periodicals" (see Attachment 13B, Library of Congress subject heading sh2009116578) in the 650 field and thus a person of ordinary skill in the art could have searched for Middelhoven 1984 using these indices and accessed Middelhoven 1984 on or shortly after February 21, 1985.

169. As noted in the holdings information (362 field), the Linda Hall Library has received the journal *Antonie van Leeuwenhoek* since 1934 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1024, the Middelhoven 1984 article was publicly available on February 21, 1985, because the serial title had been received, cataloged, and indexed in the Linda Hall Library and made part of its online catalog database.

170. Attached hereto as Attachment 18B is a true and correct copy of the MARC record for the journal *Antonie van Leeuwenhoek* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 18B, that library code is "MUL," which means that the MARC record for this serial was cataloged as part of the Minnesota Union List of Serials at the University of Minnesota

Libraries (Minneapolis, Minnesota). As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the University of Minnesota Libraries created OCLC record number 1481634 on July 27, 1975, as shown in field 008 (“750727”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 18B occurred on February 27, 2024, as shown in field 005 (“20240227”). I personally identified and retrieved the MARC record that is Attachment 18B. The “BLvl” entry in Attachment 18B is “s,” which indicates that the journal *Antonie van Leeuwenhoek* is a serial publication. Field 310 of Attachment 18B reads “Six no. a year.” Accordingly, the MARC record for Hall-Ellis Exhibit 1024 corresponds to the journal *Antonie van Leeuwenhoek* from the time the serial title began publication and includes the date of the Middelhoven 1984 article.

171. Attachment 18B includes an entry in field 050 (“QR1 \$b .A55”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1 \$b AN897R”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“576.05”), a subject matter consistent with the Dewey Decimal classification system. Attachment 18B

further includes a descriptor term reading “Bacteriology \$v Periodicals” (see Attachment 13B, Library of Congress subject heading sh2009116578) in the field 650. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 18B was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entry (e.g., searching for the “Bacteriology” and/or “Periodicals” of field 650. As of or shortly after February 21, 1985, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1024. As of July 27, 1975, the MARC record attached hereto as Attachment 18B was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library that added this periodical to its collection.

172. As yet another example supporting my opinion that Hall-Ellis Exhibit 1024 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the journal *Antonie van Leeuwenhoek* as cataloged at the University of Minnesota Libraries is currently available from

1,248 libraries.⁸¹ In view of the above, this July 1984 issue of the journal *Antonie van Leeuwenhoek* was publicly available and accessible at least by or shortly after February 21, 1985, at least because by that date it had been cataloged and indexed at the University of Minnesota Libraries, made part of the OCLC bibliographic database, and received at the Linda Hall Library. For these reasons, it is my opinion that Hall-Ellis Exhibit 1024 was published and accessible to the public on or shortly after February 21, 1985.

- S. **Kurtzman, Cletus P., and Christie J. Robnett. “Multigene Phylogenetic Analysis of the *Trichomonascus*, *Wickerhamiella* and *Zygoascus* Yeast Clades, and the Proposal of *Sugiyamaella* gen. nov. and 14 New Species Combinations.” *FEMS Yeast Research*, vol. 7, issue 1 (January 2007): 141-151. (“Kurtzman 2007”) [Hall-Ellis Exhibit 1025]**

173. Attached hereto as Hall-Ellis Exhibit 1025 is a copy of the journal article titled “Multigene Phylogenetic Analysis of the *Trichomonascus*, *Wickerhamiella* and *Zygoascus* Yeast Clades, and the Proposal of *Sugiyamaella* gen. nov. and 14 New Species Combinations” by Cletus P. Kurtzman and Christie J. Robnett (hereafter “Kurtzman 2007”). I found the Kurtzman 2007 article in the Linda Hall Library (Kansas City, Missouri), and it was published in Volume 7,

⁸¹ <https://search.worldcat.org/title/1481634>

Issue 1 of the journal *FEM Yeast Research*.⁸² The Kurtzman 2007 article appears beginning on page 141 of this issue dated January 2007. Hall-Ellis Exhibit 1025 is a true and correct copy of the Kurtzman 2007 article including the journal cover page, editorial page, table of contents, and article I found (pages 141-151). Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The Kurtzman 2007 article is also available from the publisher, Oxford Academic Press⁸³ and through the National Library of Medicine.⁸⁴ Hall-Ellis Exhibit 1025 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Hall-Ellis Exhibit 1025 is a true and correct copy in a condition that creates no suspicion about its authenticity.

174. Attached hereto as Attachment 19A is a true and correct copy of the MARC record for the journal *FEM Yeast Research*, which contained the article Kurtzman 2007 in its January 2007 issue, from the Linda Hall Library online catalog. I personally identified and retrieved the MARC record that is Attachment

⁸² The organization is now known as the Linda Hall Library of Science, Engineering & Technology.

⁸³ <https://academic.oup.com/femsyr/article/7/1/141/492833>

⁸⁴ <https://pubmed.ncbi.nlm.nih.gov/17311592/>

19A.

175. Based on finding a print copy of Hall-Ellis Exhibit 1025 in the Linda Hall Library and its MARC record in the Linda Hall Library online library catalog attached as Attachment 19A, it is my opinion that the Kurtzman 2007 article published in the journal *FEM Yeast Research* was publicly available on or shortly thereafter February 13, 2007, which is also the date shown by the library's stamp on the cover. In common practice these stamps are applied at or around the time the volume is entered into the library's collection and the volume is made available to library patrons within a short time thereafter. Attachment 19A also shows that Hall-Ellis Exhibit 1025 was catalogued with a descriptor term reading "Yeast \$v Periodicals" (see Attachment 19B, Library of Congress subject heading sh85149060 and Attachment 7H, Library of Congress subject heading sh85099890) in the 650 field and thus a person of ordinary skill in the art could have searched for Kurtzman 2007 using these indices and accessed Kurtzman 2007 on or shortly after February 13, 2007.

176. As noted in the holdings information (362 field), the Linda Hall Library has received the journal *FEM Yeast Research* since 2001 and continues to receive each issue of the publication. In view of the MARC record for Hall-Ellis Exhibit 1025, the Kurtzman 2007 article was publicly available on February 13, 2007, because the serial title had been received, cataloged, and indexed in the

Linda Hall Library and made part of its online catalog database.

177. Attached hereto as Attachment 19C is a true and correct copy of the MARC record for the journal *FEM Yeast Research* I obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 19C, that library code is “JNA,” which means that the MARC record for this serial was cataloged at the Northern Illinois University Library (DeKalb, Illinois). As can be seen in field 008 in the MARC record for this exhibit, a cataloger at the Northern Illinois University Library created OCLC record number 47108630 on June 12, 2001, as shown in field 008 (“010612”). The library community continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 19C occurred on March 8, 2024, as shown in field 005 (“20240308”). I personally identified and retrieved the MARC record that is Attachment 19C. The “BLvl” entry in Attachment 19C is “s,” which indicates that the journal *FEM Yeast Research* is a serial publication. Field 310 of Attachment 19C reads “Bimonthly, \$b <Oct. 2003-.” Accordingly, the MARC record for Hall-Ellis Exhibit 1025 corresponds to the journal *FEM Yeast Research* from the time the serial title began publication and includes the date of the Kurtzman 2007 article.

178. Attachment 19C includes an entry in field 050 (“QR151 \$b .F445”)—

as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system), an entry in field 060 (“W1 \$b FE549G”), a subject matter consistent with the National Library of Medicine classification system (analogous to the Dewey Decimal classification system), and an entry in field 082 (“579”), a subject matter consistent with the Dewey Decimal classification system. Attachment 19C further includes a descriptor term reading “Yeast \$v Periodicals” (see Attachment 19B, Library of Congress subject heading sh85149060 and Attachment 7H, Library of Congress subject heading sh85099890) in the field 650. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 19C was indexed according to its subject matter by virtue of at least four independently sufficient classifications: the field 050 entry, the field 060 entry, the field 082 entry, and the field 650 entries (e.g., searching for the “Yeast” and/or “Periodicals” of field 650. As of or shortly after February 13, 2007, a person of ordinary skill in the art could have used these indices to search a library and find Hall-Ellis Exhibit 1025. As of June 12, 2001, the MARC record attached hereto as Attachment 19C was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to

the OCLC bibliographic database or through an individual library that added this periodical to its collection.

179. As yet another example supporting my opinion that Hall-Ellis Exhibit 1025 was publicly accessible to ordinarily skilled and interested researchers in the field is the fact that WorldCat indicates that the journal *FEM Yeast Research* as cataloged at the Northern Illinois University Library is currently available from 1,404 libraries.⁸⁵ In view of the above, this January 2007 issue of the journal *FEM Yeast Research* was publicly available and accessible at least by or shortly after on February 13, 2007, at least because by that date it had been cataloged and indexed at the Northern Illinois University Library, made part of the OCLC bibliographic database, and received at the Linda Hall Library. For these reasons, it is my opinion that Hall-Ellis Exhibit 1025 was published and accessible to the public on or shortly after February 13, 2007.

VI. SUMMARY OF OPINIONS

180. In view of the foregoing, it is my opinion that the publications described above were publicly available no later than the corresponding date listed in the table below:

⁸⁵ <https://search.worldcat.org/title/47108630>

Hall-Ellis Exhibit	Publication	Publicly Available On or After
1007	Weaver, Robert. <i>Molecular Biology</i> . 5th ed. New York: McGraw Hill, c2012.	June 23, 2011
1008	Alberts, Bruce, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, and Peter Walter. <i>Molecular Biology of the Cell</i> . 5th ed. New York: Garland Science, 2008.	December 1, 2007
1009	Maimone, Thomas J., and Phil S. Baran. "Modern Synthetic Efforts Toward Biologically Active Terpenes." <i>Nature Chemical Biology</i> , vol. 3, no. 7 (July 2007): 396-407.	June 18, 2007
1010	Zwenger, Sam, and Chhandak Basu. "Plant Terpenoids: Applications and Future Potentials." <i>Biotechnology and Molecular Biology Reviews</i> , vol. 3, issue 1 (February 2008): 001-007.	February 28, 2008
1011	Blazeck, John, and Hal S. Alper. "Promoter Engineering: Recent Advances in Controlling Transcription at the Most Fundamental Level." <i>Biotechnology Journal</i> , vol. 8, no. 1 (January 2013): 46-58.	February 5, 2013
1012	Weake, Vikki M., and Jerry L. Workman. "Inducible Gene Expression: Diverse Regulatory Mechanisms." <i>Nature Reviews Genetics</i> , vol. 11, no. 6 (June 2010): 426-437.	April 27, 2010
1013	Weinhandl, Katrin, Margit Winkler, Anton Glieder, and Andrea Camattari. "Carbon Source Dependent Promoters in Yeasts." <i>Microbial Cell Factories</i> , vol. 13, no. 5 (2014): 17 pages	January 9, 2014
1014	Kanai, Tamotsu, Akihiro Hara, Naoki Kanayama, Mitsuyoshi Ueda, and Atsuo Tanaka. "An n-Alkane-Responsive Promoter Element Found in the Gene Encoding the Peroxisomal Protein of <i>Candida tropicalis</i> Does Not Contain a C6 Zinc Cluster DNA-Binding Motif" <i>Journal of Bacteriology</i> , vol. 182, no. 9 (May 2000): 2492-2497.	April 24, 2000

Hall-Ellis Exhibit	Publication	Publicly Available On or After
1015	Kanai, Tamotsu, Akihiro Hara, Naoki Kanayama, Mitsuyoshi Ueda, and Atsuo Tanaka. "An n-Alkane-Responsive Promoter Element Found in the Gene Encoding the Peroxisomal Protein of <i>Candida tropicalis</i> Does Not Contain a C6 Zinc Cluster DNA-Binding Motif -- Figure 3." <i>Journal of Bacteriology</i> , vol. 182, no. 9 (May 2000): 2496.	April 24, 2000
1016	Masuda, Yutaka, Sun Mee Park, Akinori Ohta, and Masamichi Takagi. "Cloning and Characterization of the POX2 Gene in <i>Candida maltosa</i> ." <i>Gene</i> , vol. 167, issue 1-2 (29 December 1995): 157-161.	March 1, 1999
1017	Masuda, Yutaka, Sun Mee Park, Akinori Ohta, and Masamichi Takagi. "Cloning and Characterization of the POX2 Gene in <i>Candida maltosa</i> -- Figure 2." <i>Gene</i> , vol. 167, issue 1-2 (29 December 1995): 159.	March 1, 1999
1018	Lee, Michael E., William C. DeLoache, Bernardo Cervantes, and John E. Dueber. "A Highly Characterized Yeast Toolkit for Modular, Multipart Assembly." <i>ACS Synthetic Biology</i> , vol. 4, issue 9 (2015): 975-986.	April 14, 2015
1019	Van der Walt, J. P., and J. A. von Arx. "The Yeast Genus <i>Yarrowia</i> gen. nov." <i>Antonie van Leeuwenhoek</i> , vol. 46, no. 6 (1980): 517-521.	March 8, 1980
1020	Van der Walt, J.P., M. T. Smith, and Y. Yamada. "Arxula gen. nov. (Candidaceae), a new anamorphic, arthroconidial yeast genus." <i>Antonie van Leeuwenhoek</i> , vol. 57, no. 1 (January 1990): 59-61.	January 31, 1990

Hall-Ellis Exhibit	Publication	Publicly Available On or After
1021	Craft, David L., Krishna M. Madduri, Mark Eshoo, and C. Ron Wilson. "Identification and Characterization of the CYP52 Family of <i>Candida tropicalis</i> ATCC 20336, Important for the Conversion of Fatty Acids and Alkanes to α , ω -Dicarboxylic Acids." <i>Applied and Environmental Microbiology</i> , vol. 69, no. 10 (October 2003): 5983-5991.	October 17, 2003
1022	National Collection of Yeast Cultures. "NCYC 825: <i>Yarrowia lipolytica</i> ." Norwich, UK: NCYC, 1975.	December 31, 1975
1023	Kunze, Gotthard, Claude Gaillardin, Małgorzata Czernicka, Pascal Durrens, Tiphaine Martin, Erik Böer, Toni Gabaldón, Jose A Cruz, Emmanuel Talla, Christian Marck, André Goffeau, Valérie Barbe, Philippe Baret, Keith Baronian, Sebastian Beier, Claudine Bleykasten, Rüdiger Bode, Serge Casaregola, Laurence Despons, Cécile Fairhead, Martin Giersberg, Przemysław Piotr Gierski, Urs Hähnel, Anja Hartmann, Dagmara Jankowska, Claire Jubin, Paul Jung, Ingrid Lafontaine, Véronique Leh-Louis, Marc Lemaire, Marina Marcet-Houben, Martin Mascher, Guillaume Morel, Guy-Franck Richard, Jan Riechen, Christine Sacerdot, Anasua Sarkar, Guilhem Savel, Joseph Schacherer, David J Sherman, Nils Stein, Marie-Laure Straub, Agnès Thierry, Anke Trautwein-Schult, Benoit Vacherie, Eric Westhof, Sebastian Worch, Bernard Dujon, Jean-Luc Souciet, Patrick Wincker, Uwe Scholz, and Cécile Neuveglise. "The Complete Genome of <i>Blastobotrys (Arxula) adeninivorans</i> LS3 - a Yeast of Biotechnological Interest." <i>Biotechnology for Biofuels</i> , vol. 7, article 66 (24 April 2014): 20 pages.	April 24, 2014

Hall-Ellis Exhibit	Publication	Publicly Available On or After
1024	Middelhoven, W. J., M. C. Hoogkamer-Te Niet, and N. J. Kreger-Van Rij. "Trichosporon adeninovorans sp. nov., a yeast species utilizing adenine, xanthine, uric acid, putrescine and primary n-alkylamines as the sole source of carbon, nitrogen and energy." <i>Antonie van Leeuwenhoek</i> , vol. 50, no. 4 (July 1984): 369-378.	February 21, 1985
1025	Kurtzman, Cletus P., and Christie J. Robnett. "Multigene Phylogenetic Analysis of the <i>Trichomonascus</i> , <i>Wickerhamiella</i> and <i>Zygoascus</i> Yeast Clades, and the Proposal of <i>Sugiyamaella</i> gen. nov. and 14 New Species Combinations." <i>FEMS Yeast Research</i> , vol. 7, issue 1 (January 2007): 141-151.	February 13, 2007

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245	10	a Molecular biology / c Robert F. Weaver.
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260	—	a New York : b McGraw-Hill, c c2012.
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- 505 0 Tables: The genetic code, amino acids.
- 538 System requirements for accompanying DVD-ROM: Macintosh OS X.
- 538 System requirements for accompanying DVD-ROM: Windows.
- 520 8 This fifth edition of 'Molecular Biology of the Cell' contains basic, core knowledge about how cells work. It has a proven track record in providing students with a conceptual and accessible grounding in cell biology. The text and figures have been prepared to be easy-to-follow, accurate and engaging for the introductory student.
- 650 0 Cytology.
- 650 0 Molecular biology.
- 650 0 Biochemical genetics.
- 650 0 Cells.
- 650 0 Amino acids.
- 650 0 Cell interaction.
- 650 0 DNA.
- 650 1 Cell Biology.
- 650 1 2 Cells
- 650 2 2 Molecular Biology
- 650 2 2 Amino Acids
- 650 2 2 Cell Communication
- 650 2 2 DNA
- 650 2 2 Neoplasms
- 650 2 Cell Biology
- 650 2 Cytology
- 650 6 Cytologie.
- 650 6 Génétique biochimique.
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 650 7 Cytology. **\$2** nli
 650 7 Molecular biology. **\$2** nli
 700 1 Alberts, Bruce.
 700 1 Wilson, John.
 700 1 Hunt, Tim.
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 776 0 8 **\$i** Online version: **\$t** Molecular biology of the cell. **\$b** 5th ed. **\$d** New York : Garland Science, ©2008 **\$w** (OCoLC)1288021074
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360 __ |i subdivision |a Cytology |i under names of animals and plants, and under organs and regions of the body, e.g. |a Fishes--Cytology; Corn--Cytology; Heart--Cytology; Foot--Cytology

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550 __ |a Cells

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035 __ |a (DLC)6924385

035 __ |a (DLC)sp 85021678

035 __ |a (DLC)346297

040 __ |a DLC |c DLC |d DLC

053 _0 |a QH573 |6 QH671

150 __ |a Cells

550 __ |w g |a Organisms

550 __ |a Cytology

9u0 __ |a Penguin dict. of biol. |6 (cell: mass of protoplasm made discrete by an enveloping plasma membrane.)

9u0 __ |a Oxford dict. of biol. |6 (cell: the structural and functional unit of most living organisms)

v09 __ |t 0635 |b te04 |7 0

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3b0 __ |i subdivision |a Metabolism--Genetic aspects |i under individual chemicals and groups of chemicals, e.g. |a Copper--Metabolism--Genetic aspects

450 __ |a Chemical genetics

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550 __ |6 g |a Molecular genetics

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035 __ |a (DLC)7314968

035 __ |a (DLC)sp 85004486

035 __ |a (DLC)367274

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053 _0 |a QD431 |6 QD431.7 |c Organic chemistry

053 _0 |a QP561 |6 QP562 |c Biochemistry

150 __ |a Amino acids

550 __ |w g |a Amino compounds

550 __ |w g |a Organic acids

550 __ |a Peptides

9u0 __ |a Oxford dict. of biochemistry and molecular biology, 2006 |6 (amino acid: any organic acid containing one or more amino constituents)

9u0 __ |a MeSH browser, Oct. 4, 2007 |6 (Amino Acids. Scope note: Organic compounds that generally contain an amino (-NH₂) and a carboxyl (-COOH) group. Twenty alpha-amino acids are the subunits which are polymerized to form proteins.)

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053 _0 |a QR96.5 |c Microbiology

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450 __ |a Cell communication

450 __ |a Cellular communication (Biology)

450 __ |a Cellular interaction

450 __ |a Intercellular communication

550 __ |6 g |a Cellular control mechanisms

w90 __ |a Bukauskas, F. Intercellular communication, 1991.

w90 __ |a Cellular communication in plants, c1993.

w90 __ |a LC database, March 4, 1993 |u (cellular communication)

v0w __ |t 9832 |b te03 |7 1

v53 __ |a xx00 |u ta27

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450 __ |a Desoxyribonucleic acid

450 __ |a Thymonucleic acid

450 __ |a TNA (Nucleic acid)

550 __ |w g |a Deoxyribose

550 __ |w g |a Nucleic acids

550 __ |a Genes

670 __ |a Work cat.: Wilcox, F.H. DNA : the thread of life, 1988.

670 __ |a Web. 3.

670 __ |a MESH.

670 __ |a Dorland's med. dict.

670 __ |a Sears.

670 __ |a Hennepin |b (D N A)

906 __ |t 9108 |u fk04 |v 0

952 __ |a 167 bib. record(s) to be changed

952 __ |a LC pattern: Recombinant DNA

953 __ |a xx00 |b td13

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Registration Number / Date: TX0006966634 / 2009-01-26

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Title: Molecular Biology of the Cell, fifth edition.

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Date of Creation: 2007

Date of Publication: 2007-12-01

Nation of First Publication: United States

Authorship on Application: Bruce Alberts; Domicile: United States; Citizenship: United States. Authorship: text, artwork.

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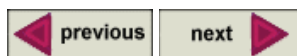
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300	— a volumes : b illustrations ; c 28 cm
310	— a Monthly

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338 ___ |a volume |b nc |2 rdacarrier
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530 ___ |a Also issued online.
588 ___ |a Latest issue consulted: Vol. 2, no. 3 (Mar. 2006).
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776 1_ |t Nature chemical biology (Online) |x 1552-4469 |w (DLC) 2004215506 |
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029 1 UKMGB **\$b** 013290399

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 040 ##\$aFQM\$beng \$cFQM \$dOCLCQ
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 338 ##\$aonline resource \$bcr \$2rdacarrier
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 588 ##\$aLatest issue consulted: Vol. 6, no. 6 (July 2011) (viewed Aug. 26, 2011).
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 650 22\$aBiochemical Phenomena
 650 22\$aMolecular Biology
 655 #2\$aPeriodical
 856 4#\$uhttp://www.academicjournals.org/bmbr/index.htm
 911 ##\$aElectronic only
 935 ##\$a(DNLM)1135736-nlmdb
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 999 ##\$aAUTH
 035 ##\$a(OCOLC)174144047

ATTACHMENT 4B

Biotechnology MeSH Descriptor Data 2024

[Details](#)[Qualifiers](#)[MeSH Tree Structures](#)[Concepts](#)

MeSH Heading

Biotechnology

Tree Number(s)

H01.158.550

J01.897.120

Unique ID

D001709

RDF Unique Identifier

<http://id.nlm.nih.gov/mesh/D001709>

Scope Note

Body of knowledge related to the use of organisms, cells or cell-derived constituents for the purpose of developing products which are technically, scientifically and clinically useful. Alteration of biologic function at the molecular level (i.e., GENETIC ENGINEERING) is a central focus; laboratory methods used include TRANSFECTION and CLONING technologies, sequence and structure analysis algorithms, computer databases, and gene and protein structure function analysis and prediction.

Entry Version

BIOTECHNOL

See Also

Genetic Engineering

Recombinant Proteins

Public MeSH Note

87

History Note

87

Date Established

1987/01/01

Date of Entry

1986/03/27

Revision Date

2009/07/10

page delivered in 0.165s

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NLM | NIH | HHS | USA.gov

LCY Biotechnology Holding, Inc.

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ATTACHMENT 4C

Biochemical Phenomena MeSH Descriptor Data 2024

[Details](#)[Qualifiers](#)[MeSH Tree Structures](#)[Concepts](#)**MeSH Heading**

Biochemical Phenomena

Tree Number(s)

G02.111

Unique ID

D001669

RDF Unique Identifier

<http://id.nlm.nih.gov/mesh/D001669>

Annotation

general or unspecified; prefer specifics

Scope Note

The chemical processes, enzymatic activities, and pathways of living things and related temporal, dimensional, qualitative, and quantitative concepts.

Entry Version

BIOCHEM PHENOMENA

Entry Term(s)

Biochemical Concepts
Biochemical Phenomenon
Biochemical Process
Biochemical Processes
Phenomena, Biochemical

Previous Indexing

Biochemistry (1966-1997)

Public MeSH Note

1998; for BIOCHEMICAL PROCESSES see BIOCHEMICAL PROCESSES 2009-2016

History Note

1998; use explode 1970-1997

Date Established

1998/01/01

Date of Entry

1999/01/01

Revision Date

2016/01/15

page delivered in 0.169s

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ATTACHMENT 4D

Molecular Biology MeSH Descriptor Data 2024

Details	Qualifiers	MeSH Tree Structures	Concepts
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MeSH Heading
Molecular Biology
Tree Number(s)
H01.158.201.636
H01.158.273.343.595
H01.181.122.650
Unique ID
D008967
RDF Unique Identifier
http://id.nlm.nih.gov/mesh/D008967
Annotation
use for the discipline only (education, history, etc)
Scope Note
A discipline concerned with studying biological phenomena in terms of the chemical and physical interactions of molecules.
Entry Version
MOL BIOL
Entry Term(s)
Biochemical Genetics
Biology, Molecular
Genetics, Biochemical
Genetics, Molecular
Molecular Genetics
Previous Indexing
Biology (1966-1967)
See Also
Biochemical Phenomena
Genetic Phenomena
Genetic Structures
Public MeSH Note
70
History Note
70(68)
Date Established
1970/01/01
Date of Entry
1999/01/01
Revision Date
2016/06/17

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ATTACHMENT 4E

Bibliographic Record - OCLC Number: 174144047

LDR Record Status 'c' - Corrected or revised
 Type of Record 'a' - Language material
 Bibliographic Level 's' - Serial
 Type of Control ' ' - No specified type of control
 Encoding Level ' ' - Full level
 Descriptive Cataloging Form 'a' - AACR2
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 005 20240115191501.6
 008 Date Entered on File '071015'
 Type of Date/Publication Status 'c' - Continuing resource currently published
 Date1/Beginning Date of Publication '2006'
 Date2/Ending Date of Publication '9999'
 Place of Publication, Production, or Execution Code 'xxu' - United States
 Frequency 'u' - Unknown
 Regularity 'u' - Unknown
 Type of Continuing Resource 'p' - Periodical
 Form of Original Item ' ' - None of the following
 Form of Item 'o' - Online
 Nature of Entire Work ' ' - No specified nature of entire work
 Nature of Contents ' '
 Government Publication ' ' - Not a government publication
 Conference Publication '0' - Not a conference publication
 Original Alphabet or Script of Title 'a' - Basic Roman
 Entry Convention '0' - Successive entry
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 022 1538-2273
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 060 1 0 W1
 210 1 Biotechnol mol biol rev

222 0 Biotechnology and molecular biology reviews **\$b** (Online).
 245 0 0 Biotechnology and molecular biology reviews.
 246 3 BMBR
 260 [Place of publication not identified] : **\$b** Academic Journals, **\$c** 2006-
 336 text **\$b** txt **\$2** rdacontent
 337 computer **\$b** c **\$2** rdamedia
 338 online resource **\$b** cr **\$2** rdacarrier
 362 0 Vol. 1, no. 1 (Apr. 2006)-
 588 Latest issue consulted: Vol. 6, no. 6 (July 2011) (viewed Aug. 26, 2011).
 650 0 Biotechnology **\$v** Periodicals.
 650 0 Molecular biology **\$v** Periodicals.
 650 1 2 Biotechnology.
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 650 2 2 Biochemical Phenomena.
 650 7 Biotechnology. **\$2** fast **\$0** (OCoLC)fst00832729
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ATTACHMENT 4F

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LCCN Permalink: <https://lcn.loc.gov/sh2007101988>

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MARC Display**Labelled Display****LC control no.:** sh2008107896**LCCN Permalink:** <https://lcn.loc.gov/sh2008107896>**HEADING:** Molecular biology Periodicals

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[Help](#) - [Search](#) - [Search History](#) - [Headings List](#) - [Start Over](#)**Library of Congress**URL: <https://www.loc.gov/>**Mailing Address:**101 Independence Ave,
S.E.
Washington, DC 20540**Library of Congress Authorities**URL: <http://authorities.loc.gov/>**Library of Congress Online Catalog**URL: <https://catalog.loc.gov/>**Questions, comments, error reports:** [Contact Us](#)

ATTACHMENT 5A

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 856 4#\$uhttp://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1860-7314
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ATTACHMENT 5B

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 Place of Publication, Production, or Execution Code 'gw' - Germany
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 Conference Publication '0' - Not a conference publication
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029 1 NZ1 \$b 10746885
029 1 NZ1 \$b 11155266

ATTACHMENT 6A

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Nature reviews. Genetics

[Full Record](#)[MARC Tags](#)

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246	30	a Genetics
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336	—	a text b txt 2 rdacontent
337	—	a unmediated b n 2 rdamedia
338	—	a volume b nc 2 rdacarrier
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500	—	a Title from cover.
510	0_	a Chemical abstracts x 0009-2258
515	—	a Volume 1 complete in 3 issues.
530	—	a Also issued via the World Wide Web by subscription through the Nature Reviews website.
588	—	a Latest issue consulted: Vol. 21, no. 2 (Feb. 2020) (Nature website, viewed Jan. 27, 2020).
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650	_7	a Genetics. 2 fast 0 (OCoLC)fst00940117
655	_2	a Periodicals.
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776	1_	t Nature reviews. Genetics (Online) w (DLC) 2001227038 w (OCoLC)45495502
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850	—	a DLC a DNLM
859	41	u http://www.nature.com/nrg/
853	20	8 1 a v. b no. u 12 v r i (year) j (month) w m x 01
863	41	8 1.1 a 2 b 1 i 2001 j 01
906	—	a 7 b cbc c serials d 2 e ncip f 20 g n-oclcserc
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955	—	a to SRD/CAT a dd00 2004-02-19 to SERCAT3 i dd77 2004-03-01 to Shelflisting e dd95 2004-03-04 g dd96 2004-03-05 to SER a Barcode 00200798508 returned from bindery 2009-11-20
985	—	e eserial 200406

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Supplements	2007:Oct., 2007:Nov.

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Status	Not Charged
Older receipts	v.1:no.1-v.2:no.2 (2000:Oct.-2001:Feb.), v.9:no.7-v.9:no.10 (2008:July-2008:Oct.)
Supplements	2008:Oct.

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v. 19, no. 5 (2018 May)
v. 14, no. 9 (2013 Sept.)
v. 6, no. 12 (2005 Dec.)

CALL NUMBER [QH426 .N38](#)
Copy 2
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MARC Display

Labelled Display

LC control no.: sh2008105128

LCCN Permalink: <https://lcn.loc.gov/sh2008105128>

HEADING: Genetics Periodicals

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005 20110729160341.0

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150 __ |a Genetics |6 Periodicals

ww9 __ |a Record generated for validation purposes.

w90 __ |a Work cat.: Genetics and breeding, [1997]-

u0w __ |t 8888 |v te00 |6 0

u53 __ |a te00

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ATTACHMENT 6C

Genetics MeSH Descriptor Data 2024

Details

Qualifiers

MeSH Tree Structures

Concepts

MeSH Heading

Genetics

Tree Number(s)

H01.158.273.343

Unique ID

D005823

RDF Unique Identifier

<http://id.nlm.nih.gov/mesh/D005823>

Annotation

the discipline (education, history, etc) only; use GENETIC PHENOMENA or specifics treed under it for genetic processes and properties of organisms, or the qualifier / genet with specific anatomical terms, organisms, diseases, etc.

Scope Note

The branch of science concerned with the means and consequences of transmission and generation of the components of biological inheritance. (Stedman, 26th ed)

Entry Version

GENET

See Also

Genetic Structures

Histocompatibility Testing

Entry Combination

methods:Genetic Techniques

Date Established

1966/01/01

Date of Entry

1999/01/01

Revision Date

2016/06/17

page delivered in 0.158s

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ATTACHMENT 6D

Bibliographic Record - OCLC Number: 45426000

LDR Record Status 'c' - Corrected or revised
 Type of Record 'a' - Language material
 Bibliographic Level 's' - Serial
 Type of Control ' ' - No specified type of control
 Encoding Level ' ' - Full level
 Descriptive Cataloging Form 'a' - AACR2

001 45426000
 005 20220809171004.9
 008 Date Entered on File '001127'
 Type of Date/Publication Status 'c' - Continuing resource currently published
 Date1/Beginning Date of Publication '2000'
 Date2/Ending Date of Publication '9999'
 Place of Publication, Production, or Execution Code 'enk' - England
 Frequency 'm' - Monthly
 Regularity 'r' - Regular
 Type of Continuing Resource 'p' - Periodical
 Form of Original Item ' ' - None of the following
 Form of Item ' ' - None of the following
 Nature of Entire Work ' ' - No specified nature of entire work
 Nature of Contents ' '
 Government Publication ' ' - Not a government publication
 Conference Publication '0' - Not a conference publication
 Original Alphabet or Script of Title 'a' - Basic Roman
 Entry Convention '0' - Successive entry
 Language Code 'eng' - English
 Modified Record ' ' - Record is not modified
 Cataloging Source Code 'c' - Cooperative cataloging program

010 2001229989
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 030 NRGAAAM
 037 \$b Nature Publishing Group, Porters South, 4-6 Crinan Street, London N19XW, UK

042 pcc
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 060 0 0 W1 \$b NA839H
 210 1 0 Nat Rev Genet \$2 dnln
 245 0 0 Nature reviews. \$p Genetics.
 246 3 0 Genetics
 260 London, UK : \$b Nature Pub. Group, \$c [2000]-
 300 volumes : \$b illustrations ; \$c 28 cm
 310 Monthly
 336 text \$b txt \$2 rdacontent
 337 unmediated \$b n \$2 rdamedia
 338 volume \$b nc \$2 rdacarrier
 362 0 Vol. 1, no. 1 (Oct. 2000)-
 500 Title from cover.
 510 0 Chemical abstracts \$x 0009-2258
 515 Volume 1 complete in 3 issues.
 530 Also issued via the World Wide Web by subscription through the Nature Reviews website.
 588 Latest issue consulted: Vol. 21, no. 2 (Feb. 2020) (Nature website, viewed Jan. 27, 2020).
 650 0 Genetics \$v Periodicals.
 650 1 2 Genetics.
 650 7 Genetics. \$2 fast \$0 (OCoLC)fst00940117
 655 2 Periodicals.
 655 7 Periodicals. \$2 fast \$0 (OCoLC)fst01411641
 655 7 Periodicals. \$2 lcgft \$0 <http://id.loc.gov/authorities/genreForms/gf2014026139> \$0 (uri) <http://id.loc.gov/authorities/genreForms/gf2014026139>
 776 1 \$t Nature reviews. Genetics (Online) \$w (DLC) 2001227038 \$w (OCoLC)45495502
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 856 4 1 \$u <http://www.nature.com/nrg/>
 891 2 0 \$9 853 \$8 1 \$a v. \$b no. \$u 12 \$v r \$i (year) \$j (month) \$w m \$x 01
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ATTACHMENT 7A

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 044 ##\$9England
 060 10\$aW1
 210 10\$aMicrob Cell Fact \$2DNLM
 245 00\$aMicrobial cell factories.
 260 ##\$aLondon : \$bBioMed Central, \$c[2002-
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 338 ##\$aonline resource \$bcr \$2rdacarrier
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 500 ##\$aTitle from BioMed Central archive volume screen (viewed Aug. 16, 2002).
 510 1#\$91 \$aMEDLINE \$bv8n1, 2009-
 510 0#\$91 \$aPubMed \$bv1n1,2002-
 510 0#\$aPMC
 515 ##\$aArticles are added consecutively to the current annual volume.
 516 ##\$aText (electronic journal) available in HTML and PDF formats.
 538 ##\$aSystem requirements: Adobe Acrobat Reader.
 538 ##\$aMode of access: Internet.
 650 12\$aCells \$xmicrobiology
 650 22\$aBiotechnology
 650 22\$aCell Culture Techniques \$xstatistics & numerical data
 650 22\$aGenetics, Microbial
 650 22\$aRecombinant Proteins
 856 40\$uhttps://microbialcellfactories.biomedcentral.com/
 856 40\$uhttps://www.ncbi.nlm.nih.gov/pmc/journals/100/
 911 ##\$aElectronic only
 914 ##\$aPortico \$bCurrent to 2024 as of 20240208 \$cISSN_14752859
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 999 ##\$aAUTH
 035 ##\$a(OCOLC)49659655

ATTACHMENT 7B

Cells MeSH Descriptor Data 2024

Details	Qualifiers	MeSH Tree Structures	Concepts
---------	------------	----------------------	----------

MeSH Heading

Cells

Tree Number(s)

A11

Unique ID

D002477

RDF Unique Identifier

<http://id.nlm.nih.gov/mesh/D002477>

Annotation

general; prefer specific cell or specific anatomical term or organism with /cytol; cell stages = CELL CYCLE

Scope Note

The fundamental, structural, and functional units or subunits of living organisms. They are composed of CYTOPLASM containing various ORGANELLES and a CELL MEMBRANE boundary.

Previous Indexing

Cytology (1966-1971)

Public MeSH Note

1972; was see under CYTOLOGY 1963-71

History Note

1972; was see under CYTOLOGY 1963-71

Entry Combination

physiology:Cell Physiological Phenomena

transplantation:Cell Transplantation

Date Established

1972/01/01

Date of Entry

1999/01/01

Revision Date

2018/02/28

page delivered in 0.203s

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ATTACHMENT 7C

Cell Culture Techniques MeSH Descriptor Data 2024

Details	Qualifiers	MeSH Tree Structures	Concepts
---------	------------	----------------------	----------

MeSH Heading
Cell Culture Techniques

Tree Number(s)
E01.370.225.500.223
E05.200.500.265
E05.242.223
E05.481.500.249

Unique ID
D018929

RDF Unique Identifier
<http://id.nlm.nih.gov/mesh/D018929>

Annotation
note category: do not confuse with CELLS, CULTURED

Scope Note
Methods for maintaining or growing CELLS in vitro.

Entry Term(s)
Cell Culture

NLM Classification #
QS 525

Previous Indexing
Tissue Culture (1966-1995)

See Also
Cells, Cultured

Public MeSH Note
2005; see CELL CULTURE 1996-2004

History Note
2005 (1996)

Date Established
1996/01/01

Date of Entry
1995/01/06

Revision Date
2015/07/06

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ATTACHMENT 7D

Genetics, Microbial MeSH Descriptor Data 2024

[Details](#)[Qualifiers](#)[MeSH Tree Structures](#)[Concepts](#)**MeSH Heading**

Genetics, Microbial

Tree Number(s)

H01.158.273.343.330

H01.158.273.540.367

Unique ID

D005827

RDF Unique Identifier

<http://id.nlm.nih.gov/mesh/D005827>

Annotation

specialty; general and unspecified only: prefer /genet with specific microbes

Scope Note

A subdiscipline of genetics which deals with the genetic mechanisms and processes of microorganisms.

Entry Version

GENET MICROBIAL

Entry Term(s)

Microbial Genetics

NLM Classification #

QW 46

Previous Indexing

Genetics (1966-1967)

See Also

Chromosomes, Bacterial

Chromosomes, Fungal

Genome, Microbial

Public MeSH Note

68

History Note

68

Date Established

1968/01/01

Date of Entry

1999/01/01

Revision Date

2019/05/24

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ATTACHMENT 7E

Recombinant Proteins MeSH Descriptor Data 2024

Details	Qualifiers	MeSH Tree Structures	Concepts
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MeSH Heading

Recombinant Proteins

Tree Number(s)

D12.776.828

Unique ID

D011994

RDF Unique Identifier

<http://id.nlm.nih.gov/mesh/D011994>

Annotation

IM general only; coordinate NIM with specific protein

Scope Note

Proteins prepared by recombinant DNA technology.

Entry Term(s)

Biosynthetic Protein

Biosynthetic Proteins

DNA Recombinant Proteins

Proteins, Biosynthetic

Proteins, Recombinant DNA

Recombinant Protein

NLM Classification #

QU 55

Previous Indexing

DNA, Recombinant (1977-1985)

Proteins or specific protein (1966-1985)

Public MeSH Note

86

History Note

86

Date Established

1986/01/01

Date of Entry

1985/03/08

Revision Date

2020/05/27

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ATTACHMENT 7F

Bibliographic Record - OCLC Number: 49659655

LDR	Record Status	'c' - Corrected or revised
	Type of Record	'a' - Language material
	Bibliographic Level	's' - Serial
	Type of Control	' ' - No specified type of control
	Encoding Level	' ' - Full level
	Descriptive Cataloging Form 'a' - AACR2	
001	49659655	
005	20230215144123.2	
008	Date Entered on File	'020424'
	Type of Date/Publication Status	'c' - Continuing resource currently published
	Date1/Beginning Date of Publication	'2002'
	Date2/Ending Date of Publication	'9999'
	Place of Publication, Production, or Execution Code	'enk' - England
	Frequency	'a' - Annual
	Regularity	'r' - Regular
	Type of Continuing Resource	'p' - Periodical
	Form of Original Item	's' - Electronic
	Form of Item	'o' - Online
	Nature of Entire Work	' ' - No specified nature of entire work
	Nature of Contents	' '
	Government Publication	' ' - Not a government publication
	Conference Publication	'0' - Not a conference publication
	Original Alphabet or Script of Title	' ' - No alphabet or script given/no key title
	Entry Convention	'0' - Successive entry
	Language Code	'eng' - English
	Modified Record	' ' - Record is not modified
	Cataloging Source Code	'c' - Cooperative cataloging program
006	Form of Material	'm' - Computer file
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	Dimensions (c)	'n' - Not applicable
	Sound (c)	'u' - Unknown
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Reformatting Quality (c) '|' - No attempt to code

010 2002252927

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022 1475-2859 \$l 1475-2859

042 pcc

050 0 0 TP248.27.M53

060 1 0 W1

210 1 0 Microb Cell Fact \$2 dnln

245 0 0 Microbial cell factories.

260 London : \$b BioMed Central, \$c 2002-

310 Annual

336 text \$b txt \$2 rdacontent

337 computer \$b c \$2 rdamedia

338 online resource \$b cr \$2 rdacarrier

362 0 Vol. 1 (2002)-

500 Title from BioMed Central archive volume screen (viewed Aug. 15, 2002).

515 Articles are added consecutively to the current annual volume.

538 Mode of access: World Wide Web.

588 1 Vol. 20, issue 1 (Dec. 2020) (SpringerLink, viewed February 24, 2021)

650 0 Microbial biotechnology \$v Periodicals.

650 0 Recombinant proteins \$x Synthesis \$v Periodicals.

650 1 2 Cells \$x microbiology.

650 2 2 Recombinant Proteins.

650 2 2 Culture Techniques \$x statistics & numerical data.

650 2 2 Genetics, Microbial.

650 2 2 Biotechnology.

650 7 Histology. \$2 ebps

650 7 Microbiology. \$2 ebps

650 7 Microbial biotechnology. \$2 fast \$0 (OCoLC)fst01019471

650 7 Recombinant proteins \$x Synthesis. \$2 fast \$0 (OCoLC)fst01091506

653 Bioengineering

655 2 Periodical.

655 4 Fulltext.

655 4 Internet Resources.

655 4 Periodicals.

655 7 Periodicals. \$2 fast \$0 (OCoLC)fst01411641
655 7 Periodicals. \$2 lcgft
850 DLC
856 4 0 \$u <https://link.springer.com/journal/volumesAndIssues/12934>
856 4 0 \$u <http://bibpurl.oclc.org/web/7386> \$u <http://www.microbialcellfactories.com/> \$7 0
856 4 0 \$u <http://www.biomedcentral.com/1475-2859> \$7 0
856 4 0 \$u <http://bibpurl.oclc.org/web/8433> \$u <https://www.ncbi.nlm.nih.gov/pmc/journals/100/>
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029 1 OCLCS \$b OP-15637
029 1 UKMGB \$b 005489805

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LC control no.: sh 89001096

LCCN Permalink: <https://lcn.loc.gov/sh89001096>

HEADING: Microbial biotechnology

000 00787cz a2200241n 450

001 4824193

005 20120329075154.0

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010 __ |a sh 89001096

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035 __ |a (DLC)170878

040 __ |a DLC |c DLC |d DLC

053 _0 |a TP248.27.M53

150 __ |a Microbial biotechnology

450 __ |a Microorganisms |x Biotechnology

550 __ |w g |a Biotechnology

550 __ |w g |a Industrial microbiology

550 __ |a Biotechnological microorganisms

670 __ |a Work cat.: Soyremennye problemy biotekhnologii mikroorganizmov : tezisy dokladov konferentsii molodykh uchenykh, 1987.

906 __ |t 8925 |u fk05 |v 1

952 __ |a 22 bib. record(s) to be changed

952 __ |a LC pattern: Animal cell biotechnology

953 __ |a ff01 |b fj25

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LC control no.: sh 85099890

LCCN Permalink: <https://lcn.loc.gov/sh85099890>

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005 20120717060125.0

008 860211 | anannbabn |b ana

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035 __ |a (DLC)6226910

035 __ |a (DLC)sp 85099890

035 __ |a (DLC)314952

040 __ |a DLC |c DLC |d DLC

053 _0 |a AP |c General periodicals

053 _0 |a PN4700 |6 PN5650 |c History

150 __ |a Periodicals

3w0 __ |i subdivision |a Periodicals |i under specific subjects, e.g. |a Engineering--Periodicals; United States--History--Periodicals

450 __ |a Journals (Periodicals)

450 __ |a Magazines

550 __ |9 g |a Library materials

550 __ |9 g |a Mass media

550 __ |9 g |a Serial publications

550 __ |a Newspapers

550 __ |a Press

wu0 __ |a UMI business vocab. |6 (Journals)

v80 __ |i Here are entered works on the periodicals of the world and, with appropriate subdivisions, works on special aspects or sections of periodicals. Works on periodicals in a specific language, or in a specific country or larger area, are entered under the adjectival form of the language or area, e.g. |a Arabic periodicals; Canadian periodicals.

v0w __ |t 0420 |b tc03 |7 0

v10 __ |a Proposal saved by tc03 on 05/14/2012 at 17:15:30

v53 __ |a xx00 |6 td14

v0w __ |t 1206 |7 0

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LC control no.: sh 90005744

LCCN Permalink: <https://lcn.loc.gov/sh90005744>

HEADING: Recombinant proteins

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001 4834962

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008 901121|| anannbabn |a ana

010 __ |a sh 90005744

035 __ |a (DLC)sh 90005744

035 __ |a (DLC)181647

040 __ |a DLC |c DLC

053 _0 |a TP248.65.P76

150 __ |a Recombinant proteins

450 __ |a Genetically engineered proteins

450 __ |a Proteins |x Genetic engineering

550 __ |w g |a Proteins

550 __ |w g |a Recombinant molecules

670 __ |a Work cat.: Purification and analysis of recombinant proteins, c1991.

670 __ |a MESH.

670 __ |a MEDLARS.

906 __ |t 9051 |u fk04 |v 1

952 __ |a 0 bib. record(s) to be changed

953 __ |a ff01

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ATTACHMENT 7J

Culture Techniques MeSH Descriptor Data 2024

Details

Qualifiers

MeSH Tree Structures

Concepts

MeSH Heading

Culture Techniques

Tree Number(s)

E05.481.500

Unique ID

D046508

RDF Unique Identifier

<http://id.nlm.nih.gov/mesh/D046508>

Annotation

general or unspecified; prefer specifics; NIM; Manual 18.7.2-.3, 22.26.1, 26.23+

Scope Note

Methods of maintaining or growing biological materials in controlled laboratory conditions. These include the cultures of CELLS; TISSUES; organs; or embryo in vitro. Both animal and plant tissues may be cultured by a variety of methods. Cultures may derive from normal or abnormal tissues, and consist of a single cell type or mixed cell types.

Previous Indexing

Tissue Culture (1966-2004)

See Also

Cell Line

Cells, Cultured

Cells, Immobilized

Clone Cells

Diffusion Chambers, Culture

Tumor Cells, Cultured

Virus Cultivation

Public MeSH Note

2005

History Note

2005

Date Established

2005/01/01

Date of Entry

2004/07/07

Revision Date

2015/06/23

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LEADER 02176mas a2200589 4500

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005 20150420145755.0

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035 \$a(OCOLC)ocm01800435

035 \$a(OCOLC)ocm38751488

035 \$9AAT6203UW

035 \$a169939

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035 \$a(EXLNZ-01UWI_NETWORK)999483147302121

040 \$aU.S. Armed Forces Medical
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050 00 \$aQR1\$b.J6

060 0_ \$aw1 J055

069 1_ \$aJ13840000

070 0_ \$a448.3\$bJ82

072 _0 \$aX300

082 10 \$a589\$212

210 0_ \$aJ. bacteriol.\$b(Print)

222 _0 \$aJournal of bacteriology\$b(Print)

245 00 \$aJournal of bacteriology.

260 \$a[Washington, D.C., etc.] :\$bAmerican Society for Microbiology [etc.]

300 \$avolumes :\$billustrations, portraits ;\$c23-27 cm

310 \$aSemimonthly,\$b<Feb. 1991->

321 \$aBimonthly,\$b1916-25

321 \$aMonthly,\$b1926-19

336 \$atext\$btxt\$2rdacontent

337 \$aunmediated\$bn\$2rdamedia

338 \$avolume\$bnc\$2rdacarrier

362 0_ \$av. 1- 1916-

500 \$aEditors: 1916-June 1944, E. C. A. Winslow.--July 1944-June 1951, J. M. Sherman.--July 1951- J. R. Porter and others.

530 \$aAlso available on the Internet.

555 \$aVols. 1-30, 1916-35. 1 v.; Vols. 31-64, 1936-52. 1 v.; Vols. 65-80, 1953-60. 1 v..

550 \$aOfficial organ of the Society of American Bacteriologists.

580 \$aCumulated annually on CD-ROM with same title; also available as part of ASM journals on CD.

650 _0 \$aBacteriology\$vPeriodicals.

650 _2 \$aBacteriology\$vperiodicals.

710 2_ \$aAmerican Society for Microbiology.

710 2_ \$aSociety of American Bacteriologists.

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260 \$a[Washington, DC] :\$bAmerican Society for Microbiology

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362 1_ \$aPrint began with vol. 1 (1916).

500 \$aRefereed/Peer-reviewed

538 \$aMode of access: World Wide Web.

588 \$aDescription based on: Vol. 177, issue 1 (Jan. 1995); title from issue table of contents screen (publisher's Web site, viewed Nov. 25, 2003).

588 \$aLatest issue consulted: Vol. 185, issue 23 (Dec. 2003) (viewed Nov. 25, 2003).

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ATTACHMENT 8B

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ATTACHMENT 8C

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 510 2 Chemical abstracts **\$x** 0009-2258
 550 Official organ of the Society of American Bacteriologists, 1961-
 555 Vols. 1-30, 1916-1935. 1 v.; Vols. 31-64, 1936-1952. 1 v.; Vols. 65-80, 1953-1960. 1 v.
 580 Cumulated annually on CD-ROM; also issued as part of: ASM journals on CD.
 580 Vols. 11-54 contain the 27th-47th Abstracts of papers presented at the ... General Meeting, Society of American Bacteriologists, later published separately.
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710 2 Society of American Bacteriologists, **\$e** issuing body.

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785 0 1 Society of American Bacteriologists. General Meeting. **\$t** Abstracts of papers presented at the ... General Meeting **\$g** 1947-1949 **\$x** 2691-6959 **\$w** (DLC) 99103069 **\$w** (OCoLC)4786925

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ATTACHMENT 8D

Bacteriology MeSH Descriptor Data 2024

[Details](#)[Qualifiers](#)[MeSH Tree Structures](#)[Concepts](#)**MeSH Heading**

Bacteriology

Tree Number(s)

H01.158.273.540.177

Unique ID

D001432

RDF Unique Identifier

<http://id.nlm.nih.gov/mesh/D001432>

Annotation

the discipline (education, history, etc) only; use BACTERIAL PHYSIOLOGICAL PHENOMENA or specifics treed under it for biological processes and properties of bacteria

Scope Note

The study of the structure, growth, function, genetics, and reproduction of bacteria, and BACTERIAL INFECTIONS.

Entry Version

BACTERIOL

NLM Classification #

QW 21

See Also

Infectious Disease Medicine

Entry Combination

methods:Bacteriological Techniques

Date Established

1966/01/01

Date of Entry

1999/01/01

Revision Date

2009/07/06

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ATTACHMENT 9A

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222 _0 \$aJournal of bacteriology\$b(Print)

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530 \$aAlso available on the Internet.

555 \$aVols. 1-30, 1916-35. 1 v.; Vols. 31-64, 1936-52. 1 v.; Vols. 65-80, 1953-60. 1 v..

550 \$aOfficial organ of the Society of American Bacteriologists.

580 \$aCumulated annually on CD-ROM with same title; also available as part of ASM journals on CD.

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362 1_ \$aPrint began with vol. 1 (1916).

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538 \$aMode of access: World Wide Web.

588 \$aDescription based on: Vol. 177, issue 1 (Jan. 1995); title from issue table of contents screen (publisher's Web site, viewed Nov. 25, 2003).

588 \$aLatest issue consulted: Vol. 185, issue 23 (Dec. 2003) (viewed Nov. 25, 2003).

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710 2_ \$aAmerican Society for Microbiology.

906 \$aJOURNAL

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 Conference Publication '0' - Not a conference publication
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 Entry Convention '0' - Successive entry
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 321 Monthly, **\$b** 1926-
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700 1 Porter, J. R. \$q (John Roger), \$d 1909-1979, \$e editor. \$1 <https://id.oclc.org/worldcat/entity/E39PBjyhGgTd6K3xJfkGRGJXd>

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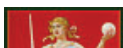
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ATTACHMENT 10E

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222 0 Gene **\$b** (Amsterdam)

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260 Amsterdam : **\$b** Elsevier/North-Holland, **\$c** 1976-

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310 Biweekly, **\$b** <15 July 1992->

321 Bimonthly, **\$b** 1976-

321 Monthly, **\$b** <Jan. 1979->

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362 0 v. 1-

500 "An international journal focusing on gene cloning and gene structure and function."

510 2 Chemical abstracts **\$x** 0009-2258

530 Also issued via World Wide Web by subscription through ScienceDirect (Online service).

580 Vols. for 1996- includes separately paged section called: Gene-combis which is printed version of articles published electronically in Gene-combis on the World-Wide Web.

580 Online version has open access mirror journal: Gene X (Online), published 2019-2020.

588 1 Vol. 295, no. 1 (July 24, 2002).

650 0 Genetic engineering **\$v** Periodicals.

650 0 Molecular cloning **\$v** Periodicals.

650 0 Recombinant DNA **\$v** Periodicals.

650 0 Genetic recombination.

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650 2 Recombination, Genetic

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936 ##\$a15 July 1992

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 Date2/Ending Date of Publication '9999'
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 Conference Publication '0' - Not a conference publication
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246 3 Gene-combis

260 Amsterdam : **\$b** Elsevier/North-Holland, **\$c** 1976-

300 volumes **\$b** illustrations **\$c** 24 cm

310 Biweekly, **\$b** <15 July 1992->

321 Bimonthly, **\$b** 1976-

321 Monthly, **\$b** <Jan. 1979->

336 text **\$b** txt **\$2** rdacontent

337 unmediated **\$b** n **\$2** rdamedia

338 volume **\$b** nc **\$2** rdacarrier

362 0 v. 1-

500 "An international journal focusing on gene cloning and gene structure and function."

510 2 Chemical abstracts **\$x** 0009-2258

530 Also issued via World Wide Web by subscription through ScienceDirect (Online service).

580 Vols. for 1996- includes separately paged section called: Gene-combis which is printed version of articles published electronically in Gene-combis on the World-Wide Web.

580 Online version has open access mirror journal: Gene X (Online), published 2019-2020.

588 1 Vol. 295, no. 1 (July 24, 2002).

650 0 Genetic engineering **\$v** Periodicals.

650 0 Molecular cloning **\$v** Periodicals.

650 0 Recombinant DNA **\$v** Periodicals.

650 0 Genetic recombination.

650 2 Molecular Biology

650 2 Recombination, Genetic

650 6 Génie génétique **\$v** Périodiques.

650 6 Clonage moléculaire **\$v** Périodiques.

650 6 ADN recombinant **\$v** Périodiques.

650 6 Recombinaison génétique.

650 7 Genetic recombination. **\$2** fast **\$0** (OCoLC)fst00940079

650 7 Genetic engineering. **\$2** fast **\$0** (OCoLC)fst00940027

650 7 Molecular cloning. **\$2** fast **\$0** (OCoLC)fst01024762

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650 1 7 Genetica. **\$2** gtt

650 1 7 Moléculaire genetika. **\$2** gtt

653 GENETICS

653 CLONING

653 RECOMBINANT DNA
653 RECOMBINATION
655 2 Periodical
655 4 Fulltext.
655 4 Periodicals.
655 4 Internet Resources.
655 7 Periodicals. \$2 fast \$0 (OCOLC)fst01411641
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856 4 1 \$u <http://www.sciencedirect.com/science/journal/03781119>
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 245 00\$aACS synthetic biology.
 246 1#\$aAmerican Chemical Society synthetic biology
 246 1#\$aACS synth. biol.
 260 ##\$aWashington, D.C. : \$bAmerican Chemical Society, \$cc2012-
 310 ##\$aMonthly
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 338 ##\$aonline resource \$bcr \$2rdacarrier
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 510 0#\$91 \$aPubMed \$bv1n1, Jan. 2012-
 588 ##\$aDescription based on: Vol. 1, issue 1 (Jan. 20, 2012); title from journal home page (ACS Publications, viewed Jan. 20, 2012).
 588 ##\$aLatest issue consulted: 2 (2013) (viewed Mar. 21, 2013).
 650 12\$aSynthetic Biology
 650 22\$aGenetic Engineering
 655 #2\$aPeriodical
 856 40\$uhttp://pubs.acs.org/journal/asbcd6
 911 ##\$aElectronic only
 914 ##\$aPortico \$bCurrent to 2023 as of 20240208 \$cISSN_21615063
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 993 ##\$aYMG \$b20130321
 994 ##\$aCDN \$b20130325
 995 ##\$aAUTH \$b20130325 \$cREV \$d20240209
 996 ##\$aCONSER \$b20000101

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999 ##\$aAUTH
035 ##\$a(OCOLC)725876736

ATTACHMENT 12B

Synthetic Biology MeSH Descriptor Data 2024

Details	Qualifiers	MeSH Tree Structures	Concepts
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MeSH Heading
Synthetic Biology
Tree Number(s)
H01.158.273.904
J01.293.069.500
Unique ID
D058615
RDF Unique Identifier
http://id.nlm.nih.gov/mesh/D058615
Annotation
IM for the discipline (education, history, etc); NIM as a coordinate for studies involving specific synthetic biology concepts and applications
Scope Note
A field of biological research combining engineering in the formulation, design, and building (synthesis) of novel biological structures, functions, and systems.
NLM Classification #
QT 36
Public MeSH Note
2011
History Note
2011
Date Established
2011/01/01
Date of Entry
2010/06/25
Revision Date
1955/01/01

page delivered in 0.16s

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	8600 Rockville Pike	FOIA
	Bethesda, MD 20894	HHS Vulnerability Disclosure
NLM Support Center		
Accessibility		
Careers		

ATTACHMENT 12C

Genetic Engineering MeSH Descriptor Data 2024

Details

Qualifiers

MeSH Tree Structures

Concepts

MeSH Heading

Genetic Engineering

Tree Number(s)

E05.393.420

Unique ID

D005818

RDF Unique Identifier

<http://id.nlm.nih.gov/mesh/D005818>

Scope Note

Directed modification of the gene complement of a living organism by such techniques as altering the DNA, substituting genetic material by means of a virus, transplanting whole nuclei, transplanting cell hybrids, etc.

Entry Version

GENET ENGINEERING

Entry Term(s)

Engineering, Genetic

Genetic Intervention

Intervention, Genetic

Previous Indexing

Eugenics (1966-1972)

Genetics, Medical (1966-1972)

See Also

Animals, Genetically Modified

DNA, Recombinant

Fertilization in Vitro

Mice, Knockout

Mice, Transgenic

Organisms, Genetically Modified

Plants, Genetically Modified

Protein Engineering

Public MeSH Note

89; was GENETIC INTERVENTION 1973-88; was in Cat E & G 1973-79

Online Note

use GENETIC ENGINEERING to search GENETIC INTERVENTION 1973-88

History Note

89; was GENETIC INTERVENTION 1973-88; was in Cat E & G 1973-79

Date Established

1973/01/01

Date of Entry

1999/01/01

Revision Date

2001/07/25

page delivered in 0.194s

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[Accessibility](#)
[Careers](#)

[NLM](#) | [NIH](#) | [HHS](#) | [USA.gov](#)

ATTACHMENT 12D

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	Encoding Level	' ' - Full level
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005	20220218204217.0	
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	Date1/Beginning Date of Publication	'2012'
	Date2/Ending Date of Publication	'9999'
	Place of Publication, Production, or Execution Code	'dcu' - District of Columbia
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022 0 2161-5063 \$2 1

037 \$b American Chemical Society, P.O. Box 3337, Columbus, OH 43210

042 pcc \$a nsdp

050 0 0 TA164

060 1 0 W1

070 0 TA164 \$b .A27

082 1 0 660.6 \$2 14

210 1 0 ACS Synth Biol \$2 dnln

210 0 ACS synth. biol.

222 0 ACS synthetic biology

245 0 0 ACS synthetic biology.

246 1 American Chemical Society synthetic biology

246 1 Synthetic biology

260 Washington, D.C. : \$b American Chemical Society, \$c ©2012-

310 Monthly

336 text \$b txt \$2 rdacontent

337 computer \$b c \$2 rdamedia

338 online resource \$b cr \$2 rdacarrier

362 1 Began with: Vol. 1, issue 1 (Jan. 20, 2012).

588 Description based on: Vol. 1, issue 1 (Jan. 20, 2012); title from journal home page (ACS Publications, viewed Jan. 20, 2012).

588 Latest issue consulted: Volume 10, issue 11 (November 19, 2021) (ACS Publications, viewed Nov. 23, 2021).

650 0 Synthetic biology \$v Periodicals.

650 0 Genetic engineering \$v Periodicals.

650 1 2 Synthetic Biology

650 2 2 Genetic Engineering

650 7 Genetic engineering. \$2 fast \$0 (OCoLC)fst00940027

650 7 Synthetic biology. \$2 fast \$0 (OCoLC)fst01762461

655 0 Electronic journals.

655 2 Periodical

655 7 Periodicals. \$2 fast \$0 (OCoLC)fst01411641

710 2 American Chemical Society, \$e issuing body.

850 DLC

856 4 0 **\$u** <https://pubs.acs.org/journal/asbcd6>
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 525 ##\$aFor Suppl. to v35 SEE: QR151.S83 1969.
 546 ##\$aArticles in English, German and French.
 550 ##\$aIssued by the foundation Stichting Antonie van Leeuwenhoek in which the Netherlands Society of Microbiology (Nederlandsche Vereeniging voor Microbiologie) is represented.
 650 #0\$aBacteriology \$vPeriodicals
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780 02\$tNederlandsch tijdschrift voor hygiëne, microbiologie en serologie \$x0369-3821
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948 ##\$aLTI 09/01/2008

ATTACHMENT 13B

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ATTACHMENT 13C

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 264 3 1 **\$3** <2018-> : **\$a** Cham, Switzerland : **\$b** Springer
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 510 2 Chemical abstracts **\$x** 0009-2258
 520 "Journal of microbiology and serology."
 546 In English, German, and French.
 550 Issued by the foundation Stichting Antonie van Leeuwenhoek in which the Netherlands Society of Microbiology (Nederlandsche Vereeniging voor Microbiologie) is represented.
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 650 1 2 Microbiology
 650 2 2 Serology
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 655 7 Periodicals **\$2** fast
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 525 ##\$aFor Suppl. to v35 SEE: QR151.S83 1969.
 546 ##\$aArticles in English, German and French.
 550 ##\$aIssued by the foundation Stichting Antonie van Leeuwenhoek in which the Netherlands Society of Microbiology (Nederlandsche Vereeniging voor Microbiologie) is represented.
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 008 Date Entered on File '750727'
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 Date1/Beginning Date of Publication '1934'
 Date2/Ending Date of Publication '9999'
 Place of Publication, Production, or Execution Code 'sz ' - Switzerland
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 Regularity 'x' - Completely irregular
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 Form of Item ' ' - None of the following
 Nature of Entire Work ' ' - No specified nature of entire work
 Nature of Contents ' '
 Government Publication ' ' - Not a government publication
 Conference Publication '0' - Not a conference publication
 Original Alphabet or Script of Title 'a' - Basic Roman
 Entry Convention '0' - Successive entry
 Language Code 'eng' - English
 Modified Record ' ' - Record is not modified
 Cataloging Source Code 'c' - Cooperative cataloging program

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050 0 0 QR1 \$b .A55
 060 0 0 W1 \$b AN897R
 082 0 4 576.05 \$b A635
 210 0 Antonie van Leeuwenhoek
 222 0 Antonie van Leeuwenhoek \$b (Gedrukt)
 245 0 0 Antonie van Leeuwenhoek.
 260 Dordrecht : \$b Kluwer Academic Publishers
 264 3 1 \$3 <2018-> : \$a Cham, Switzerland : \$b Springer
 300 volumes \$b illustrations \$c 25 cm
 310 Six no. a year
 321 Quarterly
 336 text \$b txt \$2 rdacontent
 337 unmediated \$b n \$2 rdamedia
 338 volume \$b nc \$2 rdacarrier
 362 0 v. 1- 1934-
 510 2 Chemical abstracts \$x 0009-2258
 520 "Journal of microbiology and serology."
 546 In English, German, and French.
 550 Issued by the foundation Stichting Antonie van Leeuwenhoek in which the Netherlands Society of Microbiology (Nederlandsche Vereeniging voor Microbiologie) is represented.
 650 0 Bacteriology \$v Periodicals.
 650 1 2 Microbiology
 650 2 2 Serology
 650 7 Bacteriology \$2 fast
 650 1 7 Microbiologie. \$2 gtt
 655 2 Periodical
 655 7 Periodicals \$2 fast
 655 7 Periodicals. \$2 lcgft
 655 7 Periodicals. \$2 rbgenr
 710 2 Nederlandse Vereniging voor Microbiologie.
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245 00 \$aApplied and environmental microbiology.

246 1_ \$aApplied & environmental microbiology

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337 \$aunmediated\$bn\$2rdamedia

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362 1_ \$aPrint began with vol. 31 (1976).

500 \$aRefereed/Peer-reviewed

588 0_ \$aVol. 61, issue 1 (Jan. 1995); title from contents screen (publisher's Web site, viewed Oct. 7, 2003).

588 1_ \$aVol. 86, no. 10 (May 2020) (aem.asm.org, viewed May 7, 2020).

650 _0 \$aMicrobiology\$vPeriodicals.

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650 _6 \$aÉcologie microbienne\$vPériodiques.

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650 _7 \$aMicrobial ecology.\$2fast\$0(OCOLC)fst01019484

650 _7 \$aMicrobiology.\$2fast\$0(OCOLC)fst01019576

655 _7 \$aPeriodicals.\$2fast\$0(OCOLC)fst01411641

776 \$x0099-2240

710 2_ \$aAmerican Society for Microbiology.

780 00 \$tApplied microbiology\$w(CKB)954927519600

906 \$aJOURNAL

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[Help](#) - [Search](#) - [Search History](#) - [Headings List](#) - [Start Over](#)**Library of Congress**URL: <https://www.loc.gov/>**Mailing Address:**101 Independence Ave,
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Washington, DC 20540**Library of Congress Authorities**URL: <http://authorities.loc.gov/>**Library of Congress Online Catalog**URL: <https://catalog.loc.gov/>**Questions, comments, error reports:** [Contact Us](#)

ATTACHMENT 15D

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	Date1/Beginning Date of Publication	'1976'
	Date2/Ending Date of Publication	'9999'
	Place of Publication, Production, or Execution Code	'dcu' - District of Columbia
	Frequency	's' - Semimonthly
	Regularity	'r' - Regular
	Type of Continuing Resource	'p' - Periodical
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	Government Publication	' ' - Not a government publication
	Conference Publication	'0' - Not a conference publication
	Original Alphabet or Script of Title	'a' - Basic Roman
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210 0 Appl. environ. microbiol. \$b (Print)

222 0 Applied and environmental microbiology \$b (Print)

245 0 0 Applied and environmental microbiology.

260 [Washington] : \$b American Society for Microbiology.

300 volumes : \$b illustrations ; \$c 26 cm

310 Semimonthly, \$b <2007>-

321 Monthly

336 text \$b txt \$2 rdacontent

337 unmediated \$b n \$2 rdamedia

338 volume \$b nc \$2 rdacarrier

362 0 Vol. 31 (Jan. 1976)-

510 2 Chemical abstracts \$x 0009-2258

530 Also issued online.

580 Cumulated annually on CD-ROM with same title; also available as part of ASM journals on CD.

588 Latest issue consulted: Vol. 73, no. 2 (Jan. 2007).

650 0 Microbiology \$v Periodicals.

650 0 Microbial ecology \$v Periodicals.

650 2 Ecology.

650 2 Environment.

650 2 Microbiology.

650 6 Microbiologie \$v Périodiques.

650 6 Écologie microbienne \$v Périodiques.

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 338 ##\$aonline resource \$bcr \$2rdacarrier
 362 1#\$aBegan with Volume 1, issue 1 (2008); ceased with Volume 14 (2021).
 500 ##\$aDescription based on first issue; title from journal information screen (OhioLINK, viewed May 5, 2008).
 500 ##\$aLatest issue consulted: 2:2 (Jan. 2009) (viewed Jan. 23, 2009).
 510 0#\$94 \$aPubMed \$bv1, 2008-v14, 2021
 510 0#\$aPMC
 650 12\$aBiotechnology
 650 22\$aEnergy-Generating Resources
 655 #2\$aPeriodical
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 911 ##\$aElectronic only
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Energy-Generating Resources MeSH Descriptor Data

2024

Details	Qualifiers	MeSH Tree Structures	Concepts
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Energy-Generating Resources

Tree Number(s)
N06.230.132

Unique ID
D004736

RDF Unique Identifier
<http://id.nlm.nih.gov/mesh/D004736>

Scope Note
Materials or phenomena which can provide energy directly or via conversion.

Entry Term(s)
Primary Energy Resource
Primary Energy Resources
Secondary Energy Resources

See Also
Electric Power Supplies
Power Plants

Public MeSH Note
82

History Note
82

Date Established
1982/01/01

Date of Entry
1981/05/19

Revision Date
2011/06/24

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ATTACHMENT 17C

Bibliographic Record - OCLC Number: 227003653

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	Bibliographic Level	's' - Serial
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	Encoding Level	' ' - Full level
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008	Date Entered on File	'080505'
	Type of Date/Publication Status	'd' - Continuing resource ceased publication
	Date1/Beginning Date of Publication	'2008'
	Date2/Ending Date of Publication	'2021'
	Place of Publication, Production, or Execution Code	'enk' - England
	Frequency	' ' - No determinable frequency (irregular)
	Regularity	'x' - Completely irregular
	Type of Continuing Resource	'p' - Periodical
	Form of Original Item	's' - Electronic
	Form of Item	'o' - Online
	Nature of Entire Work	' ' - No specified nature of entire work
	Nature of Contents	' '
	Government Publication	' ' - Not a government publication
	Conference Publication	'0' - Not a conference publication
	Original Alphabet or Script of Title	' ' - No alphabet or script given/no key title
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022 1754-6834 \$l 1754-6834

042 pcc

050 0 0 TP248.13

060 1 0 W1

210 1 0 Biotechnol Biofuels \$2 dnln

245 0 0 Biotechnology for biofuels.

260 [London] : \$b BioMed Central, \$c 2008-2021.

300 1 online resource

310 Irregular

336 text \$b txt \$2 rdacontent

337 computer \$b c \$2 rdamedia

338 online resource \$b cr \$2 rdacarrier

362 1 Began with vol. 1, issue 1 (Dec. 2008); ceased with Volume 14 (2021)..

515 Articles are added consecutively to the current annual volume.

588 0 Vol. 1, issue 1 (Dec. 2008); title from journal information screen (OhioLINK, viewed May 5, 2008).

588 1 Vol. 11, issue 1 (Dec. 2008) (Springer Link website, viewed May 18, 2018).

650 0 Biotechnology \$v Periodicals.

650 0 Biomass energy \$v Periodicals.

650 1 2 Biotechnology.

650 2 2 Energy-Generating Resources.

650 7 Biotechnology. \$2 ebps

650 7 Biofuels. \$2 ebps

650 7 Biomass energy. \$2 fast \$0 (OCoLC)fst00832532

650 7 Biotechnology. \$2 fast \$0 (OCoLC)fst00832729

655 2 Periodical.

655 7 Periodicals. \$2 fast \$0 (OCoLC)fst01411641

710 2 BioMed Central Ltd., \$e issuing body.

785 0 0 \$t Biotechnology for biofuels and bioproducts \$x 2731-3654

850 DLC

856 4 0 \$u <https://www.ncbi.nlm.nih.gov/pmc/journals/605/>

856 4 0 \$u <https://link.springer.com/journal/volumesAndIssues/13068>

856 4 0 \$u <http://bibpurl.oclc.org/web/50620> \$u <http://www.biotechnologyforbiofuels.com/> \$7 0

029 1 AU@ \$b 000043249354
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ATTACHMENT 17D

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LCCN Permalink: <https://lccn.loc.gov/sh85014231>

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150 __ |a Biomass energy

450 __ |a Bio-energy (Biomass energy)

450 __ |a Bioenergy (Biomass energy)

450 __ |a Biofuels

450 __ |a Biological fuels

450 __ |a Biomass as fuel

450 __ |a Energy, Biomass

450 __ |a Renewable fuels

550 __ |w g |a Fuel

550 __ |w g |a Renewable energy sources

550 __ |a Microbial fuel cells

670 __ |a Solar energy conversion. Biofuels, 1980.

- 670 __ |a McGraw-Hill encyc. sci. tech. |b (Biomass)
670 __ |a Inspec |b (Bioenergy conversion)
670 __ |a LC database, April 7, 1989 |b (Biofuels, biological fuels, bioenergy); viewed October 19, 2022 (65 records with "renewable fuel?" in the title proper)
670 __ |a Coastal Bio-Energy Forum (2006 : Olympic Natural Resources Center). Coastal Bio-Energy Forum, 2006.
670 __ |a American heritage dictionary of the English language, 2016, via WWW, viewed July 27, 2021 |b (biomass, n. 1. The total mass of living matter within a given unit of environmental area. 2. Plant or animal material, such as forestry byproducts or agricultural waste, that is used as a fuel or energy source)
670 __ |a Merriam-Webster unabridged, via WWW, viewed July 27, 2021 |b (biomass, noun: 1 : the amount of living matter in the form of one or more kinds of organisms present in a particular habitat usually expressed as weight of organisms per unit area of habitat or as volume or weight of organisms per unit volume of habitat; 2 : plant materials and animal waste used as a source of fuel)
670 __ |a Work cat: Kant, Rajni. Renewable fuels, 2023: |b ECIP preface (renewable fuels, which are plant-based fuels; the regrowth of plants to the original extent absorbs an equivalent amount of [carbon]; clean energy for all; renewable energy can reduce the negative impact of fossil fuels on the environment) |w (DLC)2022033133
675 __ |a Web. 3
680 __ |i Here are entered works on energy from fuels produced from plant or animal sources, such as forestry byproducts or agricultural waste, or on the fuels themselves. Works on the total mass of living matter within a given unit of environmental area are entered under |a Biomass.
681 __ |i Note under |a Biomass
910 __ |a Proposal saved by js12 on 10/27/2022 at 09:50:43
95u __ |a Pattern: Refuse as fuel; Solar energy; Wind power
906 __ |t 0837 |v te04 |2 0
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Ma i l / <https://catalog.loc.gov/>

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ATTACHMENT 18A

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 210 0#\$aAntonie van Leeuwenhoek
 222 #0\$aAntonie van Leeuwenhoek
 245 00\$aAntonie van Leeuwenhoek.
 260 ##\$aDordrecht [etc.] \$bKluwer Academic Publishers [etc.]
 300 ##\$av. \$bill. \$c25 cm.
 310 ##\$aSix no. a year
 321 ##\$aQuarterly
 362 0#\$av. 1- 1934-
 500 ##\$a"Journal of microbiology and serology."
 510 1#\$aIndex medicus, \$x0019-3879
 510 2#\$aBiological abstracts, \$x0006-3169
 510 2#\$aChemical abstracts, \$x0009-2258
 510 2#\$aEnergy information abstracts, \$x0147-6521
 510 2#\$aEnvironment abstracts, \$x0093-3287
 510 2#\$aExcerpta medica,
 510 2#\$aInternational aerospace abstracts, \$x0020-5842
 510 2#\$aLife sciences collection,
 510 2#\$aPESTDOC,
 510 2#\$aRINGDOC,
 510 2#\$aVETDOC,
 525 ##\$aInclude supplements.
 525 ##\$aFor Suppl. to v35 SEE: QR151.S83 1969.
 546 ##\$aArticles in English, German and French.
 550 ##\$aIssued by the foundation Stichting Antonie van Leeuwenhoek in which the Netherlands Society of Microbiology (Nederlandsche Vereeniging voor Microbiologie) is represented.
 650 #0\$aBacteriology \$vPeriodicals
 710 2#\$aNederlandse Vereniging voor Microbiologie

780 02\$tNederlandsch tijdschrift voor hygiëne, microbiologie en serologie \$x0369-3821
850 ##\$aCU-RivA \$aNcRS \$aNjR
936 ##\$aunknown \$av. 54, no. 5
948 ##\$aLTI 09/01/2008

ATTACHMENT 18B

Bibliographic Record - OCLC Number: 1481634

LDR Record Status 'c' - Corrected or revised
 Type of Record 'a' - Language material
 Bibliographic Level 's' - Serial
 Type of Control ' ' - No specified type of control
 Encoding Level ' ' - Full level
 Descriptive Cataloging Form ' ' - Non-ISBD

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 005 20240227121344.3
 008 Date Entered on File '750727'
 Type of Date/Publication Status 'c' - Continuing resource currently published
 Date1/Beginning Date of Publication '1934'
 Date2/Ending Date of Publication '9999'
 Place of Publication, Production, or Execution Code 'sz ' - Switzerland
 Frequency 'b' - Bimonthly
 Regularity 'x' - Completely irregular
 Type of Continuing Resource 'p' - Periodical
 Form of Original Item ' ' - None of the following
 Form of Item ' ' - None of the following
 Nature of Entire Work ' ' - No specified nature of entire work
 Nature of Contents ' '
 Government Publication ' ' - Not a government publication
 Conference Publication '0' - Not a conference publication
 Original Alphabet or Script of Title 'a' - Basic Roman
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 Language Code 'eng' - English
 Modified Record ' ' - Record is not modified
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 210 0 Antonie van Leeuwenhoek
 222 0 Antonie van Leeuwenhoek **\$b** (Gedrukt)
 245 0 0 Antonie van Leeuwenhoek.
 260 Dordrecht : **\$b** Kluwer Academic Publishers
 264 3 1 **\$3** <2018-> : **\$a** Cham, Switzerland : **\$b** Springer
 300 volumes **\$b** illustrations **\$c** 25 cm
 310 Six no. a year
 321 Quarterly
 336 text **\$b** txt **\$2** rdacontent
 337 unmediated **\$b** n **\$2** rdamedia
 338 volume **\$b** nc **\$2** rdacarrier
 362 0 v. 1- 1934-
 510 2 Chemical abstracts **\$x** 0009-2258
 520 "Journal of microbiology and serology."
 546 In English, German, and French.
 550 Issued by the foundation Stichting Antonie van Leeuwenhoek in which the Netherlands Society of Microbiology (Nederlandsche Vereeniging voor Microbiologie) is represented.
 650 0 Bacteriology **\$v** Periodicals.
 650 1 2 Microbiology
 650 2 2 Serology
 650 7 Bacteriology **\$2** fast
 650 1 7 Microbiologie. **\$2** gtt
 655 2 Periodical
 655 7 Periodicals **\$2** fast
 655 7 Periodicals. **\$2** lcgft
 655 7 Periodicals. **\$2** rbgenr
 710 2 Nederlandse Vereniging voor Microbiologie.
 776 0 8 **\$i** Online version: **\$t** Antonie van Leeuwenhoek (Online) **\$x** 1572-9699 **\$w** (DLC) 2004233139 **\$w** (OCoLC)38266464
 776 0 8 **\$i** Online version: **\$t** Antonie van Leeuwenhoek **\$w** (OCoLC)795037464
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 856 4 1 **\$u** <http://firstsearch.oclc.org> **\$z** Address for accessing the journal using authorization number and password through OCLC FirstSearch Electronic Collections Online. Subscription to online journal required for access to abstracts and full text
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029 1 NZ1 **\$b** 4980534

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 245 00\$aFEMS yeast research.
 246 30\$aYeast research
 260 ##\$aAmsterdam ; \$aNew York : \$bElsevier Science B.V. on behalf of the Federation of
 European Microbiological Societies, \$c2001-
 300 ##\$av. : \$bill. ; \$c28 cm.
 362 0#\$aVol. 1/1 (Apr. 2001)-
 500 ##\$aPublisher varies: 2006- , Blackwell Publishing.
 530 ##\$aAlso available online.
 650 #0\$aYeast \$vPeriodicals.
 710 2#\$aFederation of European Microbiological Societies
 945 ##\$aF.E.M.S. yeast research.
 948 ##\$aLTI 09/01/2008
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450 __ |a Yeasts

550 __ |6 g |a Edible fungi

550 __ |6 g |a Leavening agents

550 __ |a Yeast-free diet

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90w __ |t 9506 |u te04 |v 0

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ATTACHMENT 19C

Bibliographic Record - OCLC Number: 47108630

LDR Record Status 'c' - Corrected or revised
 Type of Record 'a' - Language material
 Bibliographic Level 's' - Serial
 Type of Control ' ' - No specified type of control
 Encoding Level ' ' - Full level
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 005 20240308114952.2
 008 Date Entered on File '010612'
 Type of Date/Publication Status 'c' - Continuing resource currently published
 Date1/Beginning Date of Publication '2001'
 Date2/Ending Date of Publication '9999'
 Place of Publication, Production, or Execution Code 'enk' - England
 Frequency 'b' - Bimonthly
 Regularity 'x' - Completely irregular
 Type of Continuing Resource 'p' - Periodical
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 Nature of Contents ' '
 Government Publication ' ' - Not a government publication
 Conference Publication '0' - Not a conference publication
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210 0 FEMS yeast res.
 222 0 FEMS yeast research
 245 0 0 FEMS yeast research.
 246 3 0 Yeast research
 246 3 Federation of European Microbiological Societies yeast research
 260 \$3 2001- : \$a Amsterdam ; \$a New York : \$b Published by Elsevier Science B.V. on behalf of the F
 ederation of European Microbiological Societies, \$c [2001]-
 260 2 \$3 <2006-> : \$a Oxford : \$b Blackwell
 264 3 1 \$3 2015- : \$a Oxford : \$b Oxford University Press
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 310 Bimonthly, \$b <Oct. 2003-
 321 Quarterly
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 338 volume \$b nc \$2 rdacarrier
 362 0 Vol. 1/1 (Apr. 2001)-
 588 Latest issue consulted: Vol. 6, no. 4 (June 2006).
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 650 1 2 Yeasts.
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