CORDYCEPS

A 3-IN-1 MEDICAL REFERENCE

Medical Dictionary

Bibliography &

Annotated Research Guide

TO INTERNET REFERENCES

ICON Group International, Inc.

CORDYCEPS

A MEDICAL DICTIONARY, BIBLIOGRAPHY,
AND ANNOTATED RESEARCH GUIDE TO
INTERNET REFERENCES

JAMES N. PARKER, M.D.
AND PHILIP M. PARKER, PH.D., EDITORS

ICON Health Publications
ICON Group International, Inc.
4370 La Jolla Village Drive, 4th Floor
San Diego, CA 92122 USA

Printed in the United States of America.

Last digit indicates print number: 10 9 8 7 6 4 5 3 2 1

Publisher, Health Care: Philip Parker, Ph.D.
Editor(s): James Parker, M.D., Philip Parker, Ph.D.

Publisher's note: The ideas, procedures, and suggestions contained in this book are not intended for the diagnosis or treatment of a health problem. As new medical or scientific information becomes available from academic and clinical research, recommended treatments and drug therapies may undergo changes. The authors, editors, and publisher have attempted to make the information in this book up to date and accurate in accord with accepted standards at the time of publication. The authors, editors, and publisher are not responsible for errors or omissions or for consequences from application of the book, and make no warranty, expressed or implied, in regard to the contents of this book. Any practice described in this book should be applied by the reader in accordance with professional standards of care used in regard to the unique circumstances that may apply in each situation. The reader is advised to always check product information (package inserts) for changes and new information regarding dosage and contraindications before prescribing any drug or pharmacological product. Caution is especially urged when using new or infrequently ordered drugs, herbal remedies, vitamins and supplements, alternative therapies, complementary therapies and medicines, and integrative medical treatments.

Cataloging-in-Publication Data

Parker, James N., 1961-
Parker, Philip M., 1960-

Cordyceps: A Medical Dictionary, Bibliography, and Annotated Research Guide to Internet References / James N. Parker and Philip M. Parker, editors
p. cm.
Includes bibliographical references, glossary, and index.
ISBN: 0-497-00300-7
1. Cordyceps-Popular works. I. Title.

Disclaimer

This publication is not intended to be used for the diagnosis or treatment of a health problem. It is sold with the understanding that the publisher, editors, and authors are not engaging in the rendering of medical, psychological, financial, legal, or other professional services.

References to any entity, product, service, or source of information that may be contained in this publication should not be considered an endorsement, either direct or implied, by the publisher, editors, or authors. ICON Group International, Inc., the editors, and the authors are not responsible for the content of any Web pages or publications referenced in this publication.

Copyright Notice

Acknowledgements

The collective knowledge generated from academic and applied research summarized in various references has been critical in the creation of this book which is best viewed as a comprehensive compilation and collection of information prepared by various official agencies which produce publications on Cordyceps. Books in this series draw from various agencies and institutions associated with the United States Department of Health and Human Services, and in particular, the Office of the Secretary of Health and Human Services (OS), the Administration for Children and Families (ACF), the Administration on Aging (AOA), the Agency for Healthcare Research and Quality (AHRQ), the Agency for Toxic Substances and Disease Registry (ATSDR), the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), the Healthcare Financing Administration (HCFA), the Health Resources and Services Administration (HRSA), the Indian Health Service (IHS), the institutions of the National Institutes of Health (NIH), the Program Support Center (PSC), and the Substance Abuse and Mental Health Services Administration (SAMHSA). In addition to these sources, information gathered from the National Library of Medicine, the United States Patent Office, the European Union, and their related organizations has been invaluable in the creation of this book. Some of the work represented was financially supported by the Research and Development Committee at INSEAD. This support is gratefully acknowledged. Finally, special thanks are owed to Tiffany Freeman for her excellent editorial support.

About the Editors

James N. Parker, M.D.

Dr. James N. Parker received his Bachelor of Science degree in Psychobiology from the University of California, Riverside and his M.D. from the University of California, San Diego. In addition to authoring numerous research publications, he has lectured at various academic institutions. Dr. Parker is the medical editor for health books by ICON Health Publications.

Philip M. Parker, Ph.D.

Philip M. Parker is the Eli Lilly Chair Professor of Innovation, Business and Society at INSEAD (Fontainebleau, France and Singapore). Dr. Parker has also been Professor at the University of California, San Diego and has taught courses at Harvard University, the Hong Kong University of Science and Technology, the Massachusetts Institute of Technology, Stanford University, and UCLA. Dr. Parker is the associate editor for ICON Health Publications.

About ICON Health Publications

To discover more about ICON Health Publications, simply check with your preferred online booksellers, including Barnes&Noble.com and Amazon.com which currently carry all of our titles. Or, feel free to contact us directly for bulk purchases or institutional discounts:

ICON Group International, Inc.
4370 La Jolla Village Drive, Fourth Floor
San Diego, CA 92122 USA
Fax: 858-546-4341
Web site: **www.icongrouponline.com/health**

Table of Contents

FORWARD

In March 2001, the National Institutes of Health issued the following warning: "The number of Web sites offering health-related resources grows every day. Many sites provide valuable information, while others may have information that is unreliable or misleading."[1] Furthermore, because of the rapid increase in Internet-based information, many hours can be wasted searching, selecting, and printing. Since only the smallest fraction of information dealing with Cordyceps is indexed in search engines, such as **www.google.com** or others, a non-systematic approach to Internet research can be not only time consuming, but also incomplete. This book was created for medical professionals, students, and members of the general public who want to know as much as possible about Cordyceps, using the most advanced research tools available and spending the least amount of time doing so.

In addition to offering a structured and comprehensive bibliography, the pages that follow will tell you where and how to find reliable information covering virtually all topics related to Cordyceps, from the essentials to the most advanced areas of research. Public, academic, government, and peer-reviewed research studies are emphasized. Various abstracts are reproduced to give you some of the latest official information available to date on Cordyceps. Abundant guidance is given on how to obtain free-of-charge primary research results via the Internet. **While this book focuses on the field of medicine, when some sources provide access to non-medical information relating to Cordyceps, these are noted in the text.**

E-book and electronic versions of this book are fully interactive with each of the Internet sites mentioned (clicking on a hyperlink automatically opens your browser to the site indicated). If you are using the hard copy version of this book, you can access a cited Web site by typing the provided Web address directly into your Internet browser. You may find it useful to refer to synonyms or related terms when accessing these Internet databases. **NOTE:** At the time of publication, the Web addresses were functional. However, some links may fail due to URL address changes, which is a common occurrence on the Internet.

For readers unfamiliar with the Internet, detailed instructions are offered on how to access electronic resources. For readers unfamiliar with medical terminology, a comprehensive glossary is provided. For readers without access to Internet resources, a directory of medical libraries, that have or can locate references cited here, is given. We hope these resources will prove useful to the widest possible audience seeking information on Cordyceps.

The Editors

[1] From the NIH, National Cancer Institute (NCI): **http://www.cancer.gov/cancerinfo/ten-things-to-know**.

CHAPTER 1. STUDIES ON CORDYCEPS

Overview

In this chapter, we will show you how to locate peer-reviewed references and studies on Cordyceps.

Federally Funded Research on Cordyceps

The U.S. Government supports a variety of research studies relating to Cordyceps. These studies are tracked by the Office of Extramural Research at the National Institutes of Health.[2] CRISP (Computerized Retrieval of Information on Scientific Projects) is a searchable database of federally funded biomedical research projects conducted at universities, hospitals, and other institutions.

Search the CRISP Web site at **http://crisp.cit.nih.gov/crisp/crisp_query.generate_screen**. You will have the option to perform targeted searches by various criteria, including geography, date, and topics related to Cordyceps.

For most of the studies, the agencies reporting into CRISP provide summaries or abstracts. As opposed to clinical trial research using patients, many federally funded studies use animals or simulated models to explore Cordyceps. The following is typical of the type of information found when searching the CRISP database for Cordyceps:

- **Project Title: MOLECULAR MECHANISM OF CORDYCEPS ON GLUCOSE METABOLISM**

  Principal Investigator & Institution: Chiu, Ken C.; Professor; Medicine; University of California Los Angeles 10920 Wilshire Blvd., Suite 1200 Los Angeles, Ca 90024

  Timing: Fiscal Year 2004; Project Start 15-MAY-2004; Project End 30-APR-2006

[2] Healthcare projects are funded by the National Institutes of Health (NIH), Substance Abuse and Mental Health Services (SAMHSA), Health Resources and Services Administration (HRSA), Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDCP), Agency for Healthcare Research and Quality (AHRQ), and Office of Assistant Secretary of Health (OASH).

Summary: (provided by applicant): An epidemic of type 2 diabetes is present in most countries of the world. As the prevalence of type 2 diabetes increases drastically and it is associated with devastating long-term complications, there is a very strong demand for the search of dietary supplements and alternative treatments for this disease. **Cordyceps** sinensis (CS) is a tonic supplement and a Chinese herbal medicine, which helps the body build strength, endurance, and stamina. In addition, CS is famous for its use as an aphrodisiac for both men and women and is also used to treat various respiratory, heart, liver, and kidney diseases. This R21 application is to explore the role of CS as a dietary supplement in the treatment of type 2 diabetes and its underlying molecular mechanisms. Our preliminary data, along with results of other studies show that CS lowers blood glucose concentration in experimental diabetic animals without affecting insulin concentration. However, it is not clear through which tissue/organ CS affects glucose homeostasis and the underlying molecular mechanism remains unknown. In this exploratory R21 application, we will examine the effect of CS on glucose homeostasis in rodents by examining glucose tolerance, in vivo insulin sensitivity and insulin production in both ob/ob and control (C57BL/6J) mice to investigate the site of action for CS. In addition, we will also use isolated perfused organ techniques and microarray to explore how CS affects glucose metabolism. The primary objective of this exploratory project is to assess the feasibility of investigating the effect of CS as a dietary supplement in those with a hyperglycemic state, thereby generating preliminary results to serve as the basis of more definitive studies. This project will provide the mechanistic insights of how CS affects glucose metabolism. Our long-term goal is to establish CS as a new dietary supplement for diabetic patients. It could potentially identify a new treatment for type 2 diabetes.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

E-Journals: PubMed Central[3]

PubMed Central (PMC) is a digital archive of life sciences journal literature developed and managed by the National Center for Biotechnology Information (NCBI) at the U.S. National Library of Medicine (NLM).[4] Access to this growing archive of e-journals is free and unrestricted.[5] To search, go to **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Pmc**, and type "Cordyceps" (or synonyms) into the search box. This search gives you access to full-text articles. The following is a sample of items found for Cordyceps in the PubMed Central database:

- **Structures of the Mating-Type Loci of Cordyceps takaomontana.** by Yokoyama E, Yamagishi K, Hara A.; 2003 Aug;
  http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&artid=169095

[3] Adapted from the National Library of Medicine: **http://www.pubmedcentral.nih.gov/about/intro.html**.

[4] With PubMed Central, NCBI is taking the lead in preservation and maintenance of open access to electronic literature, just as NLM has done for decades with printed biomedical literature. PubMed Central aims to become a world-class library of the digital age.

[5] The value of PubMed Central, in addition to its role as an archive, lies in the availability of data from diverse sources stored in a common format in a single repository. Many journals already have online publishing operations, and there is a growing tendency to publish material online only, to the exclusion of print.

The National Library of Medicine: PubMed

One of the quickest and most comprehensive ways to find academic studies in both English and other languages is to use PubMed, maintained by the National Library of Medicine.[6] The advantage of PubMed over previously mentioned sources is that it covers a greater number of domestic and foreign references. It is also free to use. If the publisher has a Web site that offers full text of its journals, PubMed will provide links to that site, as well as to sites offering other related data. User registration, a subscription fee, or some other type of fee may be required to access the full text of articles in some journals.

To generate your own bibliography of studies dealing with Cordyceps, simply go to the PubMed Web site at **http://www.ncbi.nlm.nih.gov/pubmed**. Type "Cordyceps" (or synonyms) into the search box, and click "Go." The following is the type of output you can expect from PubMed for Cordyceps (hyperlinks lead to article summaries):

[6] PubMed was developed by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine (NLM) at the National Institutes of Health (NIH). The PubMed database was developed in conjunction with publishers of biomedical literature as a search tool for accessing literature citations and linking to full-text journal articles at Web sites of participating publishers. Publishers that participate in PubMed supply NLM with their citations electronically prior to or at the time of publication.

CHAPTER 2. NUTRITION AND CORDYCEPS

Overview

In this chapter, we will show you how to find studies dedicated specifically to nutrition and Cordyceps.

Finding Nutrition Studies on Cordyceps

The National Institutes of Health's Office of Dietary Supplements (ODS) offers a searchable bibliographic database called the IBIDS (International Bibliographic Information on Dietary Supplements; National Institutes of Health, Building 31, Room 1B29, 31 Center Drive, MSC 2086, Bethesda, Maryland 20892-2086, Tel: 301-435-2920, Fax: 301-480-1845, E-mail: ods@nih.gov). The IBIDS contains over 460,000 scientific citations and summaries about dietary supplements and nutrition as well as references to published international, scientific literature on dietary supplements such as vitamins, minerals, and botanicals.[7] The IBIDS includes references and citations to both human and animal research studies.

As a service of the ODS, access to the IBIDS database is available free of charge at the following Web address: **http://ods.od.nih.gov/databases/ibids.html**. After entering the search area, you have three choices: (1) IBIDS Consumer Database, (2) Full IBIDS Database, or (3) Peer Reviewed Citations Only.

Now that you have selected a database, click on the "Advanced" tab. An advanced search allows you to retrieve up to 100 fully explained references in a comprehensive format. Type "Cordyceps" (or synonyms) into the search box, and click "Go." To narrow the search, you can also select the "Title" field.

---

[7] Adapted from **http://ods.od.nih.gov**. IBIDS is produced by the Office of Dietary Supplements (ODS) at the National Institutes of Health to assist the public, healthcare providers, educators, and researchers in locating credible, scientific information on dietary supplements. IBIDS was developed and will be maintained through an interagency partnership with the Food and Nutrition Information Center of the National Agricultural Library, U.S. Department of Agriculture.

The following information is typical of that found when using the "Full IBIDS Database" to search for "Cordyceps" (or a synonym):

- **A fermentation product of Cordyceps sinensis increases whole-body insulin sensitivity in rats.**
  Author(s): Department of Diabetes, Endocrinology and Metabolism, Gonda Research Center, Beckman Research Institute of the City of Hope Medical Center, Duarte, CA, USA. tomwbalon@hotmail.com
  Source: Balon, T W Jasman, A P Zhu, J S J-Altern-Complement-Med. 2002 June; 8(3): 315-23 1075-5535

- **A minor, protein-containing galactomannan from a sodium carbonate extract of Cordyceps sinensis.**
  Source: Kiho, T. Tabata, H. Ukai, S. Hara, C. Carbohydr-Res. Amsterdam : Elsevier Science Publishers B.V. November 15, 1986. volume 156 page 189-197. 0008-6215

- **A new taxon in the genus Cordyceps from China.**
  Source: Zang, M. Yang, D.R. LIi, C.D. Mycotaxon. Ithaca, N.Y. : Mycotaxon, Ltd. Apr/June 1990. volume 37 page 57-62. ill. 0093-4666

- **Activation of in vivo Kupffer cell function by oral administration of Cordyceps sinensis in rats.**
  Author(s): Department of Pharmacology, Faculty of Pharmaceutical Sciences, Mukogawa Women's University, Nishinomiya, Japan.
  Source: Nakamura, K Yamaguchi, Y Kagota, S Shinozuka, K Kunitomo, M Jpn-J-Pharmacol. 1999 April; 79(4): 505-8 0021-5198

- **Antioxidant activity of the extracts from fruiting bodies of cultured Cordyceps sinensis.**
  Author(s): Department of Pharmacology, Faculty of Pharmaceutical Sciences, Mukogawa Women's University, Nishinomiya 663-8179, Japan.
  Source: Yamaguchi, Y Kagota, S Nakamura, K Shinozuka, K Kunitomo, M Phytother-Res. 2000 December; 14(8): 647-9 0951-418X

- **Antioxidant and immunostimulating activities of the fruiting bodies of Paecilomyces japonica, a new type of Cordyceps sp.**
  Author(s): Natural Products Research Institute, Seoul National University, Korea. khshin@plaza.snu.ac.kr
  Source: Shin, K H Lim, S S Lee, S H Lee, Y S Cho, S Y Ann-N-Y-Acad-Sci. 2001 April; 928: 261-73 0077-8923

- **Anti-oxidation activity of different types of natural Cordyceps sinensis and cultured Cordyceps mycelia.**
  Source: Li, S.P. Li, P. Dong, T.T.X. Tsim, K.W.K. Phytomedicine. Stuttgart; New York : G. Fischer, c1994-. May 2001. volume 8 (3) page 207-212. 0944-7113

- **Antitumor activity of an extract of Cordyceps sinensis (Berk.) Sacc. against murine tumor cell lines.**
  Author(s): Department of Pharmacology, Kanazawa Medical University, Ishikawa, Japan.
  Source: Yoshida, J Takamura, S Yamaguchi, N Ren, L J Chen, H Koshimura, S Suzuki, S Jpn-J-Exp-Med. 1989 August; 59(4): 157-61 0021-5031

- **Antitumor sterols from the mycelia of Cordyceps sinensis.**
  Author(s): Department of Botany, University of British Columbia, Vancouver, Canada.
  Source: Bok, J W Lermer, L Chilton, J Klingeman, H G Towers, G H Phytochemistry. 1999 August; 51(7): 891-8 0031-9422

- **Augmentation of various immune reactivities of tumor-bearing hosts with an extract of Cordyceps sinensis.**
  Author(s): Department of Serology, Kanazawa Medical University, Ishikawa, Japan.
  Source: Yamaguchi, N Yoshida, J Ren, L J Chen, H Miyazawa, Y Fujii, Y Huang, Y X Takamura, S Suzuki, S Koshimura, S et al. Biotherapy. 1990; 2(3): 199-205 0921-299X
- **Bioactive naphthoquinones from Cordyceps unilateralis.**
  Source: Kittakoop, P. Punya, J. Kongsaeree, P. Lertwerawat, Y. Jintasirikul, A. Tanticharoen, M. Thebtaranonth, Y. Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. October 1999. volume 52 (3) page 453-457. 0031-9422
- **Cordycepin: selective growth inhibitor derived from liquid culture of Cordyceps militaris against Clostridium spp.**
  Source: Ahn, Y.J. Park, S.J. Lee, S.G. Shin, S.C. Choi, D.H. J-agric-food-chem. Washington, D.C. : American Chemical Society. July 2000. volume 48 (7) page 2744-2748. 0021-8561
- **Differentiation of medicinal Cordyceps species by rDNA ITS sequence analysis.**
  Source: Chen, Y.Q. Wang, N. Zhou, H. Qu, L.H. Planta-med. Stuttgart : Georg Thieme Verlag,. July 2002. volume 68 (7) page 635-639. 0032-0943
- **Down-regulation of apoptotic and inflammatory genes by Cordyceps sinensis extract in rat kidney following ischemia/reperfusion.**
  Author(s): Division of Urology, Harbor-UCLA Medical Center, Torrance, California, USA.
  Source: Shahed, A R Kim, S I Shoskes, D A Transplant-Proc. 2001 September; 33(6): 2986-7 0041-1345
- **Effect of Cordyceps sinensis on the proliferation and differentiation of human leukemic U937 cells.**
  Author(s): Department of Medical Research, Veterans General Hospital-Taipei, Taiwan, Republic of China.
  Source: Chen, Y J Shiao, M S Lee, S S Wang, S Y Life-Sci. 1997; 60(25): 2349-59 0024-3205
- **Effects of a water-soluble extract of Cordyceps sinensis on steroidogenesis and capsular morphology of lipid droplets in cultured rat adrenocortical cells.**
  Author(s): Department of Anatomy, College of Medicine, National Taiwan University, Taipei, Republic of China.
  Source: Wang, S M Lee, L J Lin, W W Chang, C M J-Cell-Biochem. 1998 June 15; 69(4): 483-9 0730-2312
- **Effects of Cordyceps sinensis on murine T lymphocyte subsets.**
  Author(s): Institute of Combined Western and Traditional Chinese Medicine, Hunan Medical University, Changsha.
  Source: Chen, G Z Chen, G L Sun, T Hsieh, G C Henshall, J M Chin-Med-J-(Engl). 1991 January; 104(1): 4-8 0366-6999
- **Effects of extracted Cordyceps sinensis on steroidogenesis in MA-10 mouse Leydig tumor cells.**
  Author(s): Department of Medicine, College of Medicine, National Cheng Kong University, Tainan, Taiwan, ROC.
  Source: Huang, B M Chuang, Y M Chen, C F Leu, S F Biol-Pharm-Bull. 2000 December; 23(12): 1532-5 0918-6158
- **Effects of the mycelial extract of cultured Cordyceps sinensis on in vivo hepatic energy metabolism in the mouse.**
  Author(s): Department of Animal Science, Kyoto University, Japan.

Source: Manabe, N Sugimoto, M Azuma, Y Taketomo, N Yamashita, A Tsuboi, H Tsunoo, A Kinjo, N Nian Lai, H Miyamoto, H Jpn-J-Pharmacol. 1996 January; 70(1): 85-8 0021-5198

- **Efficacy of a pure compound H1-A extracted from Cordyceps sinensis on autoimmune disease of MRL lpr/lpr mice.**
  Author(s): Department of Pediatrics, Veterans General Hospital, Taipei, Taiwan, Republic of China.
  Source: Yang, L Y Chen, A Kuo, Y C Lin, C Y J-Lab-Clin-Med. 1999 November; 134(5): 492-500 0022-2143

- **H1-A extracted from Cordyceps sinensis suppresses the proliferation of human mesangial cells and promotes apoptosis, probably by inhibiting the tyrosine phosphorylation of Bcl-2 and Bcl-XL.**
  Author(s): Department of Pediatrics, Taipei Veterans General Hospital, Taiwan. ly_yang@vghtpe.gov.tw
  Source: Yang, L Y Huang, W J Hsieh, H G Lin, C Y J-Lab-Clin-Med. 2003 January; 141(1): 74-83 0022-2143

- **Inhibition of activated human mesangial cell proliferation by the natural product of Cordyceps sinensis (H1-A): an implication for treatment of IgA mesangial nephropathy.**
  Author(s): Department of Pediatrics and Medical Research, Veterans General Hospital-Taipei, Taiwan, Republic of China.
  Source: Lin, C Y Ku, F M Kuo, Y C Chen, C F Chen, W P Chen, A Shiao, M S J-Lab-Clin-Med. 1999 January; 133(1): 55-63 0022-2143

- **Inhibitory effect of Cordyceps sinensis on spontaneous liver metastasis of Lewis lung carcinoma and B16 melanoma cells in syngeneic mice.**
  Author(s): Department of Pharmacology, Faculty of Pharmaceutical Sciences, Mukogawa Women's University, Nishinomiya, Japan.
  Source: Nakamura, K Yamaguchi, Y Kagota, S Kwon, Y M Shinozuka, K Kunitomo, M Jpn-J-Pharmacol. 1999 March; 79(3): 335-41 0021-5198

- **Inhibitory effects of water extracts from fruiting bodies of cultured Cordyceps sinensis on raised serum lipid peroxide levels and aortic cholesterol deposition in atherosclerotic mice.**
  Author(s): Department of Pharmacology, Faculty of Pharmaceutical Sciences, Mukogawa Women's University, Nishinomiya 663-8179, Japan.
  Source: Yamaguchi, Y Kagota, S Nakamura, K Shinozuka, K Kunitomo, M Phytother-Res. 2000 December; 14(8): 650-2 0951-418X

- **Molecular evidence for the anamorph-teleomorph connection in Cordyceps sinensis.**
  Source: Liu, Z.Y. Yao, Y.J. Liang, Z.Q. Liu, A.Y. Pegler, D.N. Chase, M.W. Mycol-res. [Cambridge : Cambridge University Press], 1989-. July 2001. volume 105 (pt.7) page 827-832. 0953-7562

- **N6-(2-hydroxyethyl)adenosine, a biologically active compound from cultured mycelia of Cordyceps and Isaria species [Fungi, metabolites].**
  Source: Furuya, T. Hirotani, M. Matsuzawa, M. Phytochemistry. Oxford : Pergamon Press. 1983. volume 22 (11) page 2509-2512. ill. 0031-9422

- **Non-volatile taste components of Agaricus blazei, Antrodia camphorata and Cordyceps militaris mycelia.**
  Source: Chang, H.L. Chao, G.R. Chen, C.C. Mau, J.L. Food-chem. Oxford : Elsevier Science Limited. August 2001. volume 74 (2) page 203-207. 0308-8146

- **Optimization of submerged culture conditions for the mycelial growth and exo-biopolymer production by Cordyceps militaris.**
  Author(s): Department of Biotechnology, Taegu University, Kyungsan, Kyungbuk, Korea.
  Source: Park, J P Kim, S W Hwang, H J Yun, J W Lett-Appl-Microbiol. 2001 July; 33(1): 76-81 0266-8254

- **Polysaccharides in fungi. XXXII. Hypoglycemic activity and chemical properties of a polysaccharide from the cultural mycelium of Cordyceps sinensis.**
  Author(s): Gifu Pharmaceutical University, Japan.
  Source: Kiho, T Hui, J Yamane, A Ukai, S Biol-Pharm-Bull. 1993 December; 16(12): 1291-3 0918-6158

- **Protein constituent contributes to the hypotensive and vasorelaxant activities of Cordyceps sinensis.**
  Author(s): National Research Institute of Chinese Medicine, Taipei, Taiwan, ROC.
  Source: Chiou, W F Chang, P C Chou, C J Chen, C F Life-Sci. 2000 February 25; 66(14): 1369-76 0024-3205

- **Regulation of bronchoalveolar lavage fluids cell function by the immunomodulatory agents from Cordyceps sinensis.**
  Author(s): National Research Institute of Chinese Medicine, Taipei, Taiwan. kuo911@cma23.nricm.edu.tw
  Source: Kuo, Y C Tsai, W J Wang, J Y Chang, S C Lin, C Y Shiao, M S Life-Sci. 2001 January 19; 68(9): 1067-82 0024-3205

- **Structure and antitumor activity of an alkali-soluble polysaccharide from Cordyceps ophiolglossoides [Fungi].**
  Source: Yamada, H. Kawaguchi, N. Ohmori, T. Takeshita, Y. Taneya, S.I. Carbohydr-Res. Amsterdam : Elsevier Scientific Publishing Company. January 10, 1984. volume 125 (1) page 107-115. 0008-6215

- **Studies on pharmacological activities of cultivated Cordyceps sinensis.**
  Source: Yong Lu, L. Yin, L. June Wang, Y. Chang Xiao, L. PTR,-Phytother-res. Sussex : John Wiley & Sons. May 1997. volume 11 (3) page 237-239. 0951-418X

- **The determination of the partial 18 S ribosomal DNA sequences of Cordyceps species.**
  Author(s): Molecular Biology Department, National Institute of Bioscience and Human Technology, Ibaraki, Japan.
  Source: Ito, Y Hirano, T Lett-Appl-Microbiol. 1997 October; 25(4): 239-42 0266-8254

- **The fruiting body and its caterpillar host of Cordyceps sinensis show close resemblance in main constituents and anti-oxidation activity.**
  Author(s): Department of Biology and Biotechnology Research Institute, The Hong Kong University of Science and Technology, Hong Kong, China.
  Source: Li, S P Su, Z R Dong, T T Tsim, K W Phytomedicine. 2002 May; 9(4): 319-24 0944-7113

- **The scientific rediscovery of a precious ancient Chinese herbal regimen: Cordyceps sinensis: part II.**
  Author(s): Department of Pediatrics, Stanford University School of Medicine, California, USA.
  Source: Zhu, J S Halpern, G M Jones, K J-Altern-Complement-Med. 1998 Winter; 4(4): 429-57 1075-5535

- **Tochukaso (Semitake and others), Cordyceps species.**
  Source: Kiho, T. Ukai, S. Food-rev-int. Monticello, N.Y. : Marcel Dekker Inc. 1995. volume 11 (1) page 231-234. 8755-9129

Federal Resources on Nutrition

In addition to the IBIDS, the United States Department of Health and Human Services (HHS) and the United States Department of Agriculture (USDA) provide many sources of information on general nutrition and health. Recommended resources include:

- healthfinder®, HHS's gateway to health information, including diet and nutrition: **http://www.healthfinder.gov/scripts/SearchContext.asp?topic=238&page=0**
- The United States Department of Agriculture's Web site dedicated to nutrition information: **www.nutrition.gov**
- The Food and Drug Administration's Web site for federal food safety information: **www.foodsafety.gov**
- The National Action Plan on Overweight and Obesity sponsored by the United States Surgeon General: **http://www.surgeongeneral.gov/topics/obesity/**
- The Center for Food Safety and Applied Nutrition has an Internet site sponsored by the Food and Drug Administration and the Department of Health and Human Services: **http://vm.cfsan.fda.gov/**
- Center for Nutrition Policy and Promotion sponsored by the United States Department of Agriculture: **http://www.usda.gov/cnpp/**
- Food and Nutrition Information Center, National Agricultural Library sponsored by the United States Department of Agriculture: **http://www.nal.usda.gov/fnic/**
- Food and Nutrition Service sponsored by the United States Department of Agriculture: **http://www.fns.usda.gov/fns/**

Additional Web Resources

A number of additional Web sites offer encyclopedic information covering food and nutrition. The following is a representative sample:

- AOL: **http://search.aol.com/cat.adp?id=174&layer=&from=subcats**
- Family Village: **http://www.familyvillage.wisc.edu/med_nutrition.html**
- Google: **http://directory.google.com/Top/Health/Nutrition/**
- Healthnotes: **http://www.healthnotes.com/**
- Open Directory Project: **http://dmoz.org/Health/Nutrition/**
- Yahoo.com: **http://dir.yahoo.com/Health/Nutrition/**
- WebMD®Health: **http://my.webmd.com/nutrition**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,00.html**

CHAPTER 3. ALTERNATIVE MEDICINE AND CORDYCEPS

Overview

In this chapter, we will begin by introducing you to official information sources on complementary and alternative medicine (CAM) relating to Cordyceps. At the conclusion of this chapter, we will provide additional sources.

National Center for Complementary and Alternative Medicine

The National Center for Complementary and Alternative Medicine (NCCAM) of the National Institutes of Health (**http://nccam.nih.gov/**) has created a link to the National Library of Medicine's databases to facilitate research for articles that specifically relate to Cordyceps and complementary medicine. To search the database, go to the following Web site: **http://www.nlm.nih.gov/nccam/camonpubmed.html**. Select "CAM on PubMed." Enter "Cordyceps" (or synonyms) into the search box. Click "Go." The following references provide information on particular aspects of complementary and alternative medicine that are related to Cordyceps:

- **A fermentation product of Cordyceps sinensis increases whole-body insulin sensitivity in rats.**
  Author(s): Balon TW, Jasman AP, Zhu JS.
  Source: Journal of Alternative and Complementary Medicine (New York, N.Y.). 2002 June; 8(3): 315-23.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12165189

- **A new tropolone from the insect pathogenic fungus Cordyceps sp. BCC 1681.**
  Author(s): Seephonkai P, Isaka M, Kittakoop P, Trakulnaleamsai S, Rattanajak R, Tanticharoen M, Thebtaranonth Y.
  Source: J Antibiot (Tokyo). 2001 September; 54(9): 751-2. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11714233

- **A polysaccharide isolated from Cordyceps sinensis, a traditional Chinese medicine, protects PC12 cells against hydrogen peroxide-induced injury.**

Author(s): Li SP, Zhao KJ, Ji ZN, Song ZH, Dong TT, Lo CK, Cheung JK, Zhu SQ, Tsim KW.
Source: Life Sciences. 2003 September 26; 73(19): 2503-13.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12954458

- **Activation and proliferation signals in primary human T lymphocytes inhibited by ergosterol peroxide isolated from Cordyceps cicadae.**
  Author(s): Kuo YC, Weng SC, Chou CJ, Chang TT, Tsai WJ.
  Source: British Journal of Pharmacology. 2003 November; 140(5): 895-906. Epub 2003 September 22.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14504132

- **Activation of in vivo Kupffer cell function by oral administration of Cordyceps sinensis in rats.**
  Author(s): Nakamura K, Yamaguchi Y, Kagota S, Shinozuka K, Kunitomo M.
  Source: Japanese Journal of Pharmacology. 1999 April; 79(4): 505-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10361894

- **Activation of macrophages and the intestinal immune system by an orally administered decoction from cultured mycelia of Cordyceps sinensis.**
  Author(s): Koh JH, Yu KW, Suh HJ, Choi YM, Ahn TS.
  Source: Bioscience, Biotechnology, and Biochemistry. 2002 February; 66(2): 407-11.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11999417

- **Amelioration of cyclosporin nephrotoxicity by Cordyceps sinensis in kidney-transplanted recipients.**
  Author(s): Xu F, Huang JB, Jiang L, Xu J, Mi J.
  Source: Nephrology, Dialysis, Transplantation : Official Publication of the European Dialysis and Transplant Association - European Renal Association. 1995; 10(1): 142-3.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7724020

- **Antifatigue and antistress effect of the hot-water fraction from mycelia of Cordyceps sinensis.**
  Author(s): Koh JH, Kim KM, Kim JM, Song JC, Suh HJ.
  Source: Biological & Pharmaceutical Bulletin. 2003 May; 26(5): 691-4.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12736514

- **Antifibrotic effect of extracellular biopolymer from submerged mycelial cultures of Cordyceps militaris on liver fibrosis induced by bile duct ligation and scission in rats.**
  Author(s): Nan JX, Park EJ, Yang BK, Song CH, Ko G, Sohn DH.
  Source: Arch Pharm Res. 2001 August; 24(4): 327-32.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11534766

- **Antioxidant activity of the extracts from fruiting bodies of cultured Cordyceps sinensis.**
  Author(s): Yamaguchi Y, Kagota S, Nakamura K, Shinozuka K, Kunitomo M.
  Source: Phytotherapy Research : Ptr. 2000 December; 14(8): 647-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11114006

- **Antioxidant and immunostimulating activities of the fruiting bodies of Paecilomyces japonica, a new type of Cordyceps sp.**
  Author(s): Shin KH, Lim SS, Lee SH, Lee YS, Cho SY.
  Source: Annals of the New York Academy of Sciences. 2001 April; 928: 261-73.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11795517

- **Antioxidant and memory enhancing effects of purple sweet potato anthocyanin and Cordyceps mushroom extract.**
  Author(s): Cho J, Kang JS, Long PH, Jing J, Back Y, Chung KS.
  Source: Arch Pharm Res. 2003 October; 26(10): 821-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14609130

- **Anti-oxidation activity of different types of natural Cordyceps sinensis and cultured Cordyceps mycelia.**
  Author(s): Li SP, Li P, Dong TT, Tsim KW.
  Source: Phytomedicine : International Journal of Phytotherapy and Phytopharmacology. 2001 May; 8(3): 207-12.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11417914

- **Antitumor activity of an extract of Cordyceps sinensis (Berk.) Sacc. against murine tumor cell lines.**
  Author(s): Yoshida J, Takamura S, Yamaguchi N, Ren LJ, Chen H, Koshimura S, Suzuki S.
  Source: Jpn J Exp Med. 1989 August; 59(4): 157-61.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2601113

- **Antitumor activity of protein-bound polysaccharide from Cordyceps ophioglossoides in mice.**
  Author(s): Ohmori T, Tamura K, Tsuru S, Nomoto K.
  Source: Japanese Journal of Cancer Research : Gann. 1986 December; 77(12): 1256-63.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3102430

- **Antitumor sterols from the mycelia of Cordyceps sinensis.**
  Author(s): Bok JW, Lermer L, Chilton J, Klingeman HG, Towers GH.
  Source: Phytochemistry. 1999 August; 51(7): 891-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10423860

- **Anti-tumour and immuno-stimulating activities of the fruiting bodies of Paecilomyces japonica, a new type of Cordyceps spp.**
  Author(s): Shin KH, Lim SS, Lee S, Lee YS, Jung SH, Cho SY.
  Source: Phytotherapy Research : Ptr. 2003 August; 17(7): 830-3.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12916090

- **Application of statistically based experimental designs for the optimization of exo-polysaccharide production by Cordyceps militaris NG3.**
  Author(s): Xu CP, Kim SW, Hwang HJ, Yun JW.
  Source: Biotechnology and Applied Biochemistry. 2002 October; 36(Pt 2): 127-31.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12241554

- **Augmentation of various immune reactivities of tumor-bearing hosts with an extract of Cordyceps sinensis.**
  Author(s): Yamaguchi N, Yoshida J, Ren LJ, Chen H, Miyazawa Y, Fujii Y, Huang YX, Takamura S, Suzuki S, Koshimura S, et al.
  Source: Biotherapy (Dordrecht, Netherlands). 1990; 2(3): 199-205.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2206772

- **Biosynthesis of 3'-deoxyadenosine by Cordyceps militaris. Mechanism of reduction.**
  Author(s): Lennon MB, Suhadolnik RJ.
  Source: Biochimica Et Biophysica Acta. 1976 April 2; 425(4): 532-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1083247

- **Bioxanthracenes from the insect pathogenic fungus Cordyceps pseudomilitaris BCC 1620. II. Structure elucidation.**
  Author(s): Isaka M, Kongsaeree P, Thebtaranonth Y.
  Source: J Antibiot (Tokyo). 2001 January; 54(1): 36-43.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11269713

- **Bioxanthracenes from the insect pathogenic fungus. Cordyceps pseudomilitaris BCC 1620. I. Taxonomy, fermentation, isolation and antimalarial activity.**
  Author(s): Jaturapat A, Isaka M, Hywel-Jones NL, Lertwerawat Y, Kamchonwongpaisan S, Kirtikara K, Tanticharoen M, Thebtaranonth Y.
  Source: J Antibiot (Tokyo). 2001 January; 54(1): 29-35.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11269712

- **Combined effects of Cordyceps sinensis and methotrexate on hematogenic lung metastasis in mice.**
  Author(s): Nakamura K, Konoha K, Yamaguchi Y, Kagota S, Shinozuka K, Kunitomo M.
  Source: Receptors & Channels. 2003; 9(5): 329-34.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14527877

- **Comparison of balanol from Verticillium balanoides and ophiocordin from Cordyceps ophioglossoides.**
  Author(s): Boros C, Hamilton SM, Katz B, Kulanthaivel P.
  Source: J Antibiot (Tokyo). 1994 September; 47(9): 1010-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7928689

- **Component analysis of protein-bound polysaccharide (SN-C) from Cordyceps ophioglossoides and its effects on syngeneic murine tumors.**
  Author(s): Ohmori T, Tamura K, Takaoka H, Sawai T, Kawanishi G, Yanahira S, Tsuru S, Nomoto K.
  Source: Chemical & Pharmaceutical Bulletin. 1988 November; 36(11): 4505-11.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3246018

- **Cordycepin, a metabolic product isolated from cultures of Cordyceps militaris (Linn.) Link.**
  Author(s): CUNNINGHAM KG, MANSON W, SPRING FS, HUTCHINSON SA.
  Source: Nature. 1950 December 2; 166(4231): 949.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14796634

- **Cordycepin: selective growth inhibitor derived from liquid culture of Cordyceps militaris against Clostridium spp.**
  Author(s): Ahn YJ, Park SJ, Lee SG, Shin SC, Choi DH.
  Source: Journal of Agricultural and Food Chemistry. 2000 July; 48(7): 2744-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10898616

- **Cordyceps brittlebankisoides, a new pathogen of grubs and its anamorph, Metarhizium anisopliae var. majus.**
  Author(s): Yi Liu Z, Liang ZQ, Whalley AJ, Yao YJ, Liu AY.
  Source: Journal of Invertebrate Pathology. 2001 October; 78(3): 178-82.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11812122

- **Cordyceps Sinensis (CordyMax Cs-4) supplementation does not improve endurance exercise performance.**
  Author(s): Parcell AC, Smith JM, Schulthies SS, Myrer JW, Fellingham G.
  Source: International Journal of Sport Nutrition and Exercise Metabolism. 2004 April; 14(2): 236-42.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15118196

- **Cordyceps sinensis and its fractions stimulate MA-10 mouse Leydig tumor cell steroidogenesis.**
  Author(s): Huang BM, Ju SY, Wu CS, Chuang WJ, Sheu CC, Leu SF.

Source: Journal of Andrology. 2001 September-October; 22(5): 831-7.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11545297

- **Cordyceps sinensis as an immunomodulatory agent.**
Author(s): Kuo YC, Tsai WJ, Shiao MS, Chen CF, Lin CY.
Source: The American Journal of Chinese Medicine. 1996; 24(2): 111-25.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8874668

- **Cordyceps sinensis extracts do not prevent Fas-receptor and hydrogen peroxide-induced T-cell apoptosis.**
Author(s): Buenz EJ, Weaver JG, Bauer BA, Chalpin SD, Badley AD.
Source: Journal of Ethnopharmacology. 2004 January; 90(1): 57-62.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14698509

- **Cordyceps sinensis increases the expression of major histocompatibility complex class II antigens on human hepatoma cell line HA22T/VGH cells.**
Author(s): Chiu JH, Ju CH, Wu LH, Lui WY, Wu CW, Shiao MS, Hong CY.
Source: The American Journal of Chinese Medicine. 1998; 26(2): 159-70.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9799968

- **Cordyceps Sinensis-I as an immunosuppressant in heterotopic heart allograft model in rats.**
Author(s): Zhang Z, Xia SS.
Source: J Tongji Med Univ. 1990; 10(2): 100-3.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2213952

- **Cordyceps sinesis (Berkeley) Saccardo: structure of cordycepic acid.**
Author(s): CHATTERJEE R, SRINIVASAN KS, MAITI PC.
Source: J Am Pharm Assoc Am Pharm Assoc (Baltim). 1957 February; 46(2): 114-8. No Abstract Available.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=13438728

- **Determination of nucleosides in natural Cordyceps sinensis and cultured Cordyceps mycelia by capillary electrophoresis.**
Author(s): Li SP, Li P, Dong TT, Tsim KW.
Source: Electrophoresis. 2001 January; 22(1): 144-50.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11197164

- **Determination of the anamorph of Cordyceps sinensis inferred from the analysis of the ribosomal DNA internal transcribed spacers and 5.8S rDNA.**
Author(s): Chen YQ, Wang N, Qu L, Li T, Zhang W.

Source: Biochemical Systematics and Ecology. 2001 June; 29(6): 597-607.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11336809

- **Differentiation of medicinal Cordyceps species by rDNA ITS sequence analysis.**
  Author(s): Yue-Qin C, Ning W, Hui Z, Liang-Hu Q.
  Source: Planta Medica. 2002 July; 68(7): 635-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12142999

- **Dissociation of a glucan fraction (CO-1) from protein-bound polysaccharide of Cordyceps ophioglossoides and analysis of its antitumor effect.**
  Author(s): Ohmori T, Tamura K, Wakaiki A, Kawanishi G, Tsuru S, Yadomae T, Nomoto K.
  Source: Chemical & Pharmaceutical Bulletin. 1988 November; 36(11): 4512-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3246019

- **Down-regulation of apoptotic and inflammatory genes by Cordyceps sinensis extract in rat kidney following ischemia/reperfusion.**
  Author(s): Shahed AR, Kim SI, Shoskes DA.
  Source: Transplantation Proceedings. 2001 September; 33(6): 2986-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11543822

- **Dynamical influence of Cordyceps sinensis on the activity of hepatic insulinase of experimental liver cirrhosis.**
  Author(s): Zhang X, Liu YK, Shen W, Shen DM.
  Source: Hepatobiliary Pancreat Dis Int. 2004 February; 3(1): 99-101.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14969848

- **Effect of agitation intensity on the exo-biopolymer production and mycelial morphology in Cordyceps militaris.**
  Author(s): Park JP, Kim YM, Kim SW, Hwang HJ, Cho YJ, Lee YS, Song CH, Yun JW.
  Source: Letters in Applied Microbiology. 2002; 34(6): 433-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12028425

- **Effect of Cordyceps sinensis on erythropoiesis in mouse bone marrow.**
  Author(s): Li Y, Chen GZ, Jiang DZ.
  Source: Chinese Medical Journal. 1993 April; 106(4): 313-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8325161

- **Effect of Cordyceps sinensis on the proliferation and differentiation of human leukemic U937 cells.**
  Author(s): Chen YJ, Shiao MS, Lee SS, Wang SY.

Source: Life Sciences. 1997; 60(25): 2349-59.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9194691

- **Effects of a water-soluble extract of Cordyceps sinensis on steroidogenesis and capsular morphology of lipid droplets in cultured rat adrenocortical cells.**
  Author(s): Wang SM, Lee LJ, Lin WW, Chang CM.
  Source: Journal of Cellular Biochemistry. 1998 June 15; 69(4): 483-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9620174

- **Effects of Cordyceps militaris extract on angiogenesis and tumor growth.**
  Author(s): Yoo HS, Shin JW, Cho JH, Son CG, Lee YW, Park SY, Cho CK.
  Source: Acta Pharmacologica Sinica. 2004 May; 25(5): 657-65.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15132834

- **Effects of Cordyceps sinensis on murine T lymphocyte subsets.**
  Author(s): Chen GZ, Chen GL, Sun T, Hsieh GC, Henshall JM.
  Source: Chinese Medical Journal. 1991 January; 104(1): 4-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1831743

- **Effects of Cordyceps sinensis on natural killer activity and colony formation of B16 melanoma.**
  Author(s): Xu RH, Peng XE, Chen GZ, Chen GL.
  Source: Chinese Medical Journal. 1992 February; 105(2): 97-101.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1597083

- **Effects of Cordyceps sinensis on testosterone production in normal mouse Leydig cells.**
  Author(s): Huang BM, Hsu CC, Tsai SJ, Sheu CC, Leu SF.
  Source: Life Sciences. 2001 October 19; 69(22): 2593-602.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11712663

- **Effects of extracted Cordyceps sinensis on steroidogenesis in MA-10 mouse Leydig tumor cells.**
  Author(s): Huang BM, Chuang YM, Chen CF, Leu SF.
  Source: Biological & Pharmaceutical Bulletin. 2000 December; 23(12): 1532-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11145193

- **Effects of the mycelial extract of cultured Cordyceps sinensis on in vivo hepatic energy metabolism and blood flow in dietary hypoferric anaemic mice.**
  Author(s): Manabe N, Azuma Y, Sugimoto M, Uchio K, Miyamoto M, Taketomo N, Tsuchita H, Miyamoto H.

Source: The British Journal of Nutrition. 2000 February; 83(2): 197-204.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10743500

- **Effects of the mycelial extract of cultured Cordyceps sinensis on in vivo hepatic energy metabolism in the mouse.**
  Author(s): Manabe N, Sugimoto M, Azuma Y, Taketomo N, Yamashita A, Tsuboi H, Tsunoo A, Kinjo N, Nian-Lai H, Miyamoto H.
  Source: Japanese Journal of Pharmacology. 1996 January; 70(1): 85-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8822093

- **Efficacy of a pure compound H1-A extracted from Cordyceps sinensis on autoimmune disease of MRL lpr/lpr mice.**
  Author(s): Yang LY, Chen A, Kuo YC, Lin CY.
  Source: The Journal of Laboratory and Clinical Medicine. 1999 November; 134(5): 492-500.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10560943

- **Evolutionary dynamics of multiple group I introns in nuclear ribosomal RNA genes of endoparasitic fungi of the genus Cordyceps.**
  Author(s): Nikoh N, Fukatsu T.
  Source: Molecular Biology and Evolution. 2001 September; 18(9): 1631-42.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11504844

- **Fermentation, partial purification, and use of serine palmitoyltransferase inhibitors from Isaria (= Cordyceps) sinclairii.**
  Author(s): Riley RT, Plattner RD.
  Source: Methods Enzymol. 2000; 311: 348-61. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10563339

- **Fine structure of mycota. 12. karyochorisis--somatic nuclear division-in Cordyceps militaris.**
  Author(s): MOORE RT.
  Source: Z Zellforsch Mikrosk Anat. 1964 September 30; 63: 921-37. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14315534

- **Genetic diversity and taxonomic implication of Cordyceps sinensis as revealed by RAPD markers.**
  Author(s): Chen Y, Zhang YP, Yang Y, Yang D.
  Source: Biochemical Genetics. 1999 June; 37(5-6): 201-13.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10544805

- **Genetic variation of Cordyceps sinensis, a fruit-body-producing entomopathogenic species from different geographical regions in China.**
  Author(s): Chen YQ, Hu B, Xu F, Zhang W, Zhou H, Qu LH.
  Source: Fems Microbiology Letters. 2004 January 15; 230(1): 153-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14734179

- **Growth inhibitors against tumor cells in Cordyceps sinensis other than cordycepin and polysaccharides.**
  Author(s): Kuo YC, Lin CY, Tsai WJ, Wu CL, Chen CF, Shiao MS.
  Source: Cancer Investigation. 1994; 12(6): 611-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7994596

- **Growth of unicellular forms of the fungus Cordyceps militaris and analysis of the chemical composition of their walls.**
  Author(s): Marks DB, Keller BJ, Guarino AJ.
  Source: J Gen Microbiol. 1971 December; 69(2): 253-9. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=4947819

- **H1-A extracted from Cordyceps sinensis suppresses the proliferation of human mesangial cells and promotes apoptosis, probably by inhibiting the tyrosine phosphorylation of Bcl-2 and Bcl-XL.**
  Author(s): Yang LY, Huang WJ, Hsieh HG, Lin CY.
  Source: The Journal of Laboratory and Clinical Medicine. 2003 January; 141(1): 74-83.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12518171

- **Homocitrullylaminoadenosine, a nucleoside isolated from Cordyceps militaris.**
  Author(s): KREDICH NM, GUARINO AJ.
  Source: The Journal of Biological Chemistry. 1961 December; 236: 3300-2.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14459513

- **Hot-water extract from mycelia of Cordyceps sinensis as a substitute for antibiotic growth promoters.**
  Author(s): Koh JH, Suh HJ, Ahn TS.
  Source: Biotechnology Letters. 2003 April; 25(7): 585-90.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12882149

- **Hypocholesterolemic effect of hot-water extract from mycelia of Cordyceps sinensis.**
  Author(s): Koh JH, Kim JM, Chang UJ, Suh HJ.
  Source: Biological & Pharmaceutical Bulletin. 2003 January; 26(1): 84-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12520179

- **Identification of cordycepin, a metabolite of Cordyceps militaris, as 3'-deoxyadenosine.**
  Author(s): Kaczka EA, Trenner NR, Arison B, Walker RW, Folkers K.
  Source: Biochemical and Biophysical Research Communications. 1964; 14: 456-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=5836541

- **Immunomodulatory functions of extracts from the Chinese medicinal fungus Cordyceps cicadae.**
  Author(s): Weng SC, Chou CJ, Lin LC, Tsai WJ, Kuo YC.
  Source: Journal of Ethnopharmacology. 2002 November; 83(1-2): 79-85.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12413710

- **In vivo and in vitro stimulatory effects of Cordyceps sinensis on testosterone production in mouse Leydig cells.**
  Author(s): Hsu CC, Huang YL, Tsai SJ, Sheu CC, Huang BM.
  Source: Life Sciences. 2003 September 5; 73(16): 2127-36.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12899935

- **In vivo stimulatory effect of Cordyceps sinensis mycelium and its fractions on reproductive functions in male mouse.**
  Author(s): Huang YL, Leu SF, Liu BC, Sheu CC, Huang BM.
  Source: Life Sciences. 2004 July 16; 75(9): 1051-62.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15207653

- **Inhibition of activated human mesangial cell proliferation by the natural product of Cordyceps sinensis (H1-A): an implication for treatment of IgA mesangial nephropathy.**
  Author(s): Lin CY, Ku FM, Kuo YC, Chen CF, Chen WP, Chen A, Shiao MS.
  Source: The Journal of Laboratory and Clinical Medicine. 1999 January; 133(1): 55-63.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10385482

- **Inhibitive effect of Cordyceps sinensis on experimental hepatic fibrosis and its possible mechanism.**
  Author(s): Liu YK, Shen W.
  Source: World Journal of Gastroenterology : Wjg. 2003 March; 9(3): 529-33.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12632512

- **Inhibitory effect of Cordyceps sinensis and Cordyceps militaris on human glomerular mesangial cell proliferation induced by native LDL.**
  Author(s): Zhao-Long W, Xiao-Xia W, Wei-Ying C.
  Source: Cell Biochemistry and Function. 2000 June; 18(2): 93-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10814966

- **Inhibitory effect of Cordyceps sinensis on spontaneous liver metastasis of Lewis lung carcinoma and B16 melanoma cells in syngeneic mice.**
  Author(s): Nakamura K, Yamaguchi Y, Kagota S, Kwon YM, Shinozuka K, Kunitomo M.
  Source: Japanese Journal of Pharmacology. 1999 March; 79(3): 335-41.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10230862

- **Inhibitory effects of water extracts from fruiting bodies of cultured Cordyceps sinensis on raised serum lipid peroxide levels and aortic cholesterol deposition in atherosclerotic mice.**
  Author(s): Yamaguchi Y, Kagota S, Nakamura K, Shinozuka K, Kunitomo M.
  Source: Phytotherapy Research : Ptr. 2000 December; 14(8): 650-2.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11114007

- **Interkingdom host jumping underground: phylogenetic analysis of entomoparasitic fungi of the genus Cordyceps.**
  Author(s): Nikoh N, Fukatsu T.
  Source: Molecular Biology and Evolution. 2000 April; 17(4): 629-38.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10742053

- **Isolation and identification of 3'-amino-3'-deoxyadenosine from Cordyceps militaris.**
  Author(s): GUARINO AJ, KREDICH NM.
  Source: Biochimica Et Biophysica Acta. 1963 February 26; 68: 317-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=13951025

- **Isolation of 3'-deoxyadenosine (cordycepin) from the liquid medium of Cordyceps militaris (l. ex fr.) link.**
  Author(s): FREDERIKSEN S, MALLING H, KLENOW H.
  Source: Biochimica Et Biophysica Acta. 1965 February 8; 95: 189-93.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14293693

- **Isolation of galactosaminoglycan moiety (CO-N) from protein-bound polysaccharide of Cordyceps ophioglossoides and its effects against murine tumors.**
  Author(s): Ohmori T, Tamura K, Fukui K, Kawanishi G, Mitsuyama M, Nomoto K, Miyazaki T.
  Source: Chemical & Pharmaceutical Bulletin. 1989 April; 37(4): 1019-22.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2766404

- **Isolation of vegetable wasps and plant worms, Cordyceps nutans, from fruit-body tissue.**
  Author(s): Sasaki F, Miyamoto T, Tamai Y, Yajima T.
  Source: Journal of Invertebrate Pathology. 2004 February; 85(2): 70-3.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15050835

- **Larvicidal activity against Plutella xylostella of cordycepin from the fruiting body of Cordyceps militaris.**
  Author(s): Kim JR, Yeon SH, Kim HS, Ahn YJ.
  Source: Pest Management Science. 2002 July; 58(7): 713-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12146173

- **Lead poisoning caused by contaminated Cordyceps, a Chinese herbal medicine: two case reports.**
  Author(s): Wu TN, Yang KC, Wang CM, Lai JS, Ko KN, Chang PY, Liou SH.
  Source: The Science of the Total Environment. 1996 April 5; 182(1-3): 193-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8854946

- **Methanol extract of Cordyceps pruinosa inhibits in vitro and in vivo inflammatory mediators by suppressing NF-kappaB activation.**
  Author(s): Kim KM, Kwon YG, Chung HT, Yun YG, Pae HO, Han JA, Ha KS, Kim TW, Kim YM.
  Source: Toxicology and Applied Pharmacology. 2003 July 1; 190(1): 1-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12831777

- **Nucleoside antibiotics. IV. Metabolic fate of adenosine and cordycepin by Cordyceps militaris during cordycepin biosynthesis.**
  Author(s): Chassy BM, Suhadolnik RJ.
  Source: Biochimica Et Biophysica Acta. 1969 June 17; 182(2): 307-15.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=4978604

- **Occurrence of Gal beta (1----3) GalNAc-Ser/Thr in the linkage region of polygalactosamine containing fungal glycoprotein from Cordyceps ophioglossoides.**
  Author(s): Kawaguchi N, Ohmori T, Takeshita Y, Kawanishi G, Katayama S, Yamada H.
  Source: Biochemical and Biophysical Research Communications. 1986 October 15; 140(1): 350-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3778454

- **Ophiocordin, an antifungal antibiotic of Cordyceps ophioglossoides.**
  Author(s): Kneifel H, Konig WA, Loeffler W, Muller R.
  Source: Archives of Microbiology. 1977 May 13; 113(1-2): 121-30.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=560831

- **Optimization of submerged culture conditions for the mycelial growth and exo-biopolymer production by Cordyceps militaris.**
  Author(s): Park JP, Kim SW, Hwang HJ, Yun JW.
  Source: Letters in Applied Microbiology. 2001 July; 33(1): 76-81.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11442820

- **Optimization of submerged culture process for the production of mycelial biomass and exo-polysaccharides by Cordyceps militaris C738.**
  Author(s): Kim SW, Hwang HJ, Xu CP, Sung JM, Choi JW, Yun JW.
  Source: Journal of Applied Microbiology. 2003; 94(1): 120-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12492932

- **Optimization of submerged culture requirements for the production of mycelial growth and exopolysaccharide by Cordyceps jiangxiensis JXPJ 0109.**
  Author(s): Xiao JH, Chen DX, Liu JW, Liu ZL, Wan WH, Fang N, Xiao Y, Qi Y, Liang ZQ.
  Source: Journal of Applied Microbiology. 2004; 96(5): 1105-16.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15078528

- **Pharmacological activities of stromata of Cordyceps scarabaecola.**
  Author(s): Yu KW, Kim KM, Suh HJ.
  Source: Phytotherapy Research : Ptr. 2003 March; 17(3): 244-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12672154

- **Polysaccharides in fungi. XIII. Antitumor activity of various polysaccharides isolated from Dictyophora indusiata, Ganoderma japonicum, Cordyceps cicadae, Auricularia auricula-judae, and Auricularia species.**
  Author(s): Ukai S, Kiho T, Hara C, Morita M, Goto A, Imaizumi N, Hasegawa Y.
  Source: Chemical & Pharmaceutical Bulletin. 1983 February; 31(2): 741-4.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6883594

- **Polysaccharides in fungi. XXXII. Hypoglycemic activity and chemical properties of a polysaccharide from the cultural mycelium of Cordyceps sinensis.**
  Author(s): Kiho T, Hui J, Yamane A, Ukai S.
  Source: Biological & Pharmaceutical Bulletin. 1993 December; 16(12): 1291-3.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8130781

- **Polysaccharides in fungi. XXXVI. Hypoglycemic activity of a polysaccharide (CS-F30) from the cultural mycelium of Cordyceps sinensis and its effect on glucose metabolism in mouse liver.**
  Author(s): Kiho T, Yamane A, Hui J, Usui S, Ukai S.
  Source: Biological & Pharmaceutical Bulletin. 1996 February; 19(2): 294-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8850325

- **Production and characterization of exopolysaccharides from an enthomopathogenic fungus Cordyceps militaris NG3.**
  Author(s): Kim SW, Xu CP, Hwang HJ, Choi JW, Kim CW, Yun JW.

Source: Biotechnology Progress. 2003 March-April; 19(2): 428-35.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12675583

- **Production of pure cordycepin (3'-deoxyadenosine) from Cordyceps militaris.**
Author(s): Melling J, Belton FC, Kitching D, Stones WR.
Source: The Journal of Pharmacy and Pharmacology. 1972 December; 24: Suppl: 125P.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=4144844

- **Protein constituent contributes to the hypotensive and vasorelaxant activities of Cordyceps sinensis.**
Author(s): Chiou WF, Chang PC, Chou CJ, Chen CF.
Source: Life Sciences. 2000 February 25; 66(14): 1369-76.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10755473

- **Regulation of bronchoalveolar lavage fluids cell function by the immunomodulatory agents from Cordyceps sinensis.**
Author(s): Kuo YC, Tsai WJ, Wang JY, Chang SC, Lin CY, Shiao MS.
Source: Life Sciences. 2001 January 19; 68(9): 1067-82.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11212870

- **Regulatory mechanism of Cordyceps sinensis mycelium on mouse Leydig cell steroidogenesis.**
Author(s): Hsu CC, Tsai SJ, Huang YL, Huang BM.
Source: Febs Letters. 2003 May 22; 543(1-3): 140-3.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12753921

- **Simultaneous determination of ergosterol, nucleosides and their bases from natural and cultured Cordyceps by pressurised liquid extraction and high-performance liquid chromatography.**
Author(s): Li SP, Li P, Lai CM, Gong YX, Kan KK, Dong TT, Tsim KW, Wang YT.
Source: J Chromatogr A. 2004 May 21; 1036(2): 239-43.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15146928

- **Simultaneous separation and determination of active components in Cordyceps sinensis and Cordyceps militarris by LC/ESI-MS.**
Author(s): Huang LF, Liang YZ, Guo FQ, Zhou ZF, Cheng BM.
Source: Journal of Pharmaceutical and Biomedical Analysis. 2003 December 4; 33(5): 1155-62.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14656607

- **Structural features and hypoglycemic activity of a polysaccharide (CS-F10) from the cultured mycelium of Cordyceps sinensis.**
Author(s): Kiho T, Ookubo K, Usui S, Ukai S, Hirano K.

Source: Biological & Pharmaceutical Bulletin. 1999 September; 22(9): 966-70.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10513622

- **Structure and antitumor activity of an alkali-soluble polysaccharide from Cordyceps ophioglossoides.**
  Author(s): Yamada H, Kawaguchi N, Ohmori T, Takeshita Y, Taneya S, Miyazaki T.
  Source: Carbohydrate Research. 1984 January 10; 125(1): 107-15.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6704989

- **Structures of cordypyridones A-D, antimalarial N-hydroxy- and N-methoxy-2-pyridones from the insect pathogenic fungus Cordyceps nipponica.**
  Author(s): Isaka M, Tanticharoen M, Kongsaeree P, Thebtaranonth Y.
  Source: The Journal of Organic Chemistry. 2001 July 13; 66(14): 4803-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11442408

- **Structures of the mating-type loci of Cordyceps takaomontana.**
  Author(s): Yokoyama E, Yamagishi K, Hara A.
  Source: Applied and Environmental Microbiology. 2003 August; 69(8): 5019-22.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12902305

- **The anti-hyperglycemic activity of the fruiting body of Cordyceps in diabetic rats induced by nicotinamide and streptozotocin.**
  Author(s): Lo HC, Tu ST, Lin KC, Lin SC.
  Source: Life Sciences. 2004 April 23; 74(23): 2897-908.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15050427

- **The composition of the cell wall fraction of the fungus, Cordyceps militaris.**
  Author(s): Marks DB, Keller BJ, Guarino AJ.
  Source: Biochimica Et Biophysica Acta. 1969 June 3; 183(1): 58-64.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=5792874

- **The correlation between molecular weight and antitumor activity of galactosaminoglycan (CO-N) from Cordyceps ophioglossoides.**
  Author(s): Ohmori T, Tamura K, Ohgane N, Nakamura T, Kawanishi G, Yamada H, Nomoto K.
  Source: Chemical & Pharmaceutical Bulletin. 1989 May; 37(5): 1337-40.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2630099

- **The determination of the partial 18 S ribosomal DNA sequences of Cordyceps species.**
  Author(s): Ito Y, Hirano T.

Source: Letters in Applied Microbiology. 1997 October; 25(4): 239-42.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9351269

- **The fruiting body and its caterpillar host of Cordyceps sinensis show close resemblance in main constituents and anti-oxidation activity.**
  Author(s): Li SP, Su ZR, Dong TT, Tsim KW.
  Source: Phytomedicine : International Journal of Phytotherapy and Phytopharmacology. 2002 May; 9(4): 319-24.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12120813

- **The presence in the fungus Cordyceps militaris of nuclear proteins resembling histones.**
  Author(s): Indik ZK, Keller BJ, Marks DB.
  Source: Archives of Biochemistry and Biophysics. 1975 September; 170(1): 315-25.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1164035

- **The scientific rediscovery of a precious ancient Chinese herbal regimen: Cordyceps sinensis: part II.**
  Author(s): Zhu JS, Halpern GM, Jones K.
  Source: Journal of Alternative and Complementary Medicine (New York, N.Y.). 1998 Winter; 4(4): 429-57. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9884180

- **The scientific rediscovery of an ancient Chinese herbal medicine: Cordyceps sinensis: part I.**
  Author(s): Zhu JS, Halpern GM, Jones K.
  Source: Journal of Alternative and Complementary Medicine (New York, N.Y.). 1998 Fall; 4(3): 289-303.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9764768

- **Two herbal preparations, Cordyceps Cs4 and Cogent db: do they act on blood glucose, insulin sensitivity, and diabetes as "viscous dietary fibers?".**
  Author(s): Hockaday TD.
  Source: Journal of Alternative and Complementary Medicine (New York, N.Y.). 2002 August; 8(4): 403-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12230899

- **Upregulation of steroidogenic enzymes and ovarian 17beta-estradiol in human granulosa-lutein cells by Cordyceps sinensis mycelium.**
  Author(s): Huang BM, Hsiao KY, Chuang PC, Wu MH, Pan HA, Tsai SJ.
  Source: Biology of Reproduction. 2004 May; 70(5): 1358-64.

Additional Web Resources

A number of additional Web sites offer encyclopedic information covering CAM and related topics. The following is a representative sample:

- Alternative Medicine Foundation, Inc.: **http://www.herbmed.org/**
- AOL: **http://search.aol.com/cat.adp?id=169&layer=&from=subcats**
- Chinese Medicine: **http://www.newcenturynutrition.com/**
- drkoop.com®: **http://www.drkoop.com/InteractiveMedicine/IndexC.html**
- Family Village: **http://www.familyvillage.wisc.edu/med_altn.htm**
- Google: **http://directory.google.com/Top/Health/Alternative/**
- Healthnotes: **http://www.healthnotes.com/**
- MedWebPlus: **http://medwebplus.com/subject/Alternative_and_Complementary_Medicine**
- Open Directory Project: **http://dmoz.org/Health/Alternative/**
- HealthGate: **http://www.tnp.com/**
- WebMD®Health: **http://my.webmd.com/drugs_and_herbs**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,00.html**
- Yahoo.com: **http://dir.yahoo.com/Health/Alternative_Medicine/**

The following is a specific Web list relating to Cordyceps; please note that any particular subject below may indicate either a therapeutic use, or a contraindication (potential danger), and does not reflect an official recommendation:

- **General Overview**

  Skin Cancer
  Source: Integrative Medicine Communications; www.drkoop.com

- **Alternative Therapy**

  Traditional Chinese Medicine
  Source: Integrative Medicine Communications; www.drkoop.com

- **Chinese Medicine**

  Dongchongxiacao
  Alternative names: Chinese Caterpillar Fungus; Cordyceps
  Source: Chinese Materia Medica

General References

A good place to find general background information on CAM is the National Library of Medicine. It has prepared within the MEDLINEplus system an information topic page dedicated to complementary and alternative medicine. To access this page, go to the MEDLINEplus site at **http://www.nlm.nih.gov/medlineplus/alternativemedicine.html**. This Web site provides a general overview of various topics and can lead to a number of general sources.

CHAPTER 4. DISSERTATIONS ON CORDYCEPS

Overview

In this chapter, we will give you a bibliography on recent dissertations relating to Cordyceps. We will also provide you with information on how to use the Internet to stay current on dissertations. **IMPORTANT NOTE:** When following the search strategy described below, you may discover non-medical dissertations that use the generic term "Cordyceps" (or a synonym) in their titles. To accurately reflect the results that you might find while conducting research on Cordyceps, we have not necessarily excluded non-medical dissertations in this bibliography.

Dissertations on Cordyceps

ProQuest Digital Dissertations, the largest archive of academic dissertations available, is located at the following Web address: **http://wwwlib.umi.com/dissertations**. From this archive, we have compiled the following list covering dissertations devoted to Cordyceps. You will see that the information provided includes the dissertation's title, its author, and the institution with which the author is associated. The following covers recent dissertations found when using this search procedure:

- **Application of chromatographic and chemometrics techniques to enhance chemical analysis of Cordyceps sinensis, Herba menthae and other Chinese herbal medicines** by Ma, King-wah, PhD from HONG KONG POLYTECHNIC UNIVERSITY (PEOPLE'S REPUBLIC OF CHINA), 2003, 240 pages
  http://wwwlib.umi.com/dissertations/fullcit/3107440
- **The concomitant effects of Cordyceps sinensis supplementation on physiological performance indices during cycling in males** by Colson, Sheree N., MS from BAYLOR UNIVERSITY, 2003, 66 pages
  http://wwwlib.umi.com/dissertations/fullcit/1417155

Keeping Current

Ask the medical librarian at your library if it has full and unlimited access to the *ProQuest Digital Dissertations* database. From the library, you should be able to do more complete searches via **http://wwwlib.umi.com/dissertations**.

CHAPTER 5. PATENTS ON CORDYCEPS

Overview

Patents can be physical innovations (e.g. chemicals, pharmaceuticals, medical equipment) or processes (e.g. treatments or diagnostic procedures). The United States Patent and Trademark Office defines a patent as a grant of a property right to the inventor, issued by the Patent and Trademark Office.[8] Patents, therefore, are intellectual property. For the United States, the term of a new patent is 20 years from the date when the patent application was filed. If the inventor wishes to receive economic benefits, it is likely that the invention will become commercially available within 20 years of the initial filing. It is important to understand, therefore, that an inventor's patent does not indicate that a product or service is or will be commercially available. The patent implies only that the inventor has "the right to exclude others from making, using, offering for sale, or selling" the invention in the United States. While this relates to U.S. patents, similar rules govern foreign patents.

In this chapter, we show you how to locate information on patents and their inventors. If you find a patent that is particularly interesting to you, contact the inventor or the assignee for further information. **IMPORTANT NOTE:** When following the search strategy described below, you may discover non-medical patents that use the generic term "Cordyceps" (or a synonym) in their titles. To accurately reflect the results that you might find while conducting research on Cordyceps, we have not necessarily excluded non-medical patents in this bibliography.

Patents on Cordyceps

By performing a patent search focusing on Cordyceps, you can obtain information such as the title of the invention, the names of the inventor(s), the assignee(s) or the company that owns or controls the patent, a short abstract that summarizes the patent, and a few excerpts from the description of the patent. The abstract of a patent tends to be more technical in nature, while the description is often written for the public. Full patent descriptions contain much more information than is presented here (e.g. claims, references, figures, diagrams, etc.). We will tell you how to obtain this information later in the chapter. The following is an

[8]Adapted from the United States Patent and Trademark Office: **http://www.uspto.gov/web/offices/pac/doc/general/whatis.htm**.

example of the type of information that you can expect to obtain from a patent search on Cordyceps:

- **Active fractions of Cordyceps sinensis and method of isolation thereof**

  Inventor(s): Lin; Ching-Yuang (4F, No. 193, Sec. 2, Ho-Ping E. Rd., Taipei, TW), Shiao; Ming-Shi (Taipei, TW), Wang; Zu-Nan (Tainan, TW)

  Assignee(s): Lin; Ching-Yuang (Taipei, TW)

  Patent Number: 5,582,828

  Date filed: March 15, 1995

  Abstract: A method for identifying and isolating the active fractions in **Cordyceps** sinensis. It covers a findings of the structure of an active compound that is present in the active fraction, an isolation method that can be used to extract the active fractions and a specific active compound, and the use of "H1-A", one specific active compound that is present in the active fractions thus isolated, to ameliorate the clinical symptoms and renal lesions in laboratory mice with induced IgA nephropathy (Berger's disease). This work has important pharmacological implications for the suppression of activated mesangial cells and IgA nephropathy in humans.

  Excerpt(s): This invention relates to a method of isolating the fractions of **Cordyceps** sinensis and extracting the constituent H1-A, which can suppress the activated human mesangial cells, alleviate IgA nephropathy (Berger's disease), and prevent the disease from progressing to the uremia stage. In animals, the extracts of **Cordyceps** sinensis raise the phagocytic index of macrophage and stimulates the secretion of interleukin 1; it induces proliferation of splenic Thy-1 cells and stimulates the synthesis and secretion of IgM. It also stimulates the replication of T lymphocytes and increases the number of interleukin 2 receptors expressed on B lymphocytes. The aqueous extract increases the activity of natural killer cells in both normal subjects and leukemia patients. Cordyceps sinensis reduces damages to renal tubules and protects the Na.sup.+, K.sup.+ -ATPase on cellular membranes, an action which is associated with a reduction in cellular lipid perioxidation. It can decrease chronic renal insufficiency. In rats, it can alleviate hematuria and reduce the elevation of serum creatinine.

  Web site: http://www.delphion.com/details?pn=US05582828__

- **Gene sequence and method for distinguishing Cordyceps sinensis**

  Inventor(s): Chen; Chih-Shang (Taipei, TW), Hseu; Ruey-Shyang (3rd Floor, No. 46, Lane 212, Chien Kuo S. Rd., Section 1, Taipei, TW)

  Assignee(s): Hseu; Ruey-Shyang (Taipei, TW), Lo; Soon (Taipei, TW), Wang; Shih-Jen (Yun Lin Hsian, TW)

  Patent Number: 6,251,606

  Date filed: November 30, 1999

  Abstract: The present invention utilizes the singularity of the 18S rRNA gene sequence of the **Cordyceps** sinensis between the NS3/NS6 primer pair as the index for distinguishing the **Cordyceps** sinensis from other **Cordyceps** species.

  Excerpt(s): The present invention utilizes the singularity of the 18S rRNA gene sequence of the **Cordyceps** sinensis between the NS3/INS6 primer pair as the index for

distinguishing the **Cordyceps** sinensis from other **Cordyceps** species. In the literatures, the study of **Cordyceps** sinensis is only limited on species collection, description, and identification. For some **Cordyceps** sinensis with medical value, the research can only be restricted in the analysis of active ingredients metabolized therefrom for therapy purposes. However, due to the unclearness in the sexuality and the life cycle of the **Cordyceps** sinensis and the related species and due to the collection and storage difficulty, cultivating a stroma is still hard to achieve. Therefore, a clear picture in classification and a genuine relationship between the sex generation and the sexless generation can't be clearly understood so far. Such an unclearness in understanding genuine **Cordyceps** sinensis makes dangerous of wide-spreading usage upon so-called healthy **Cordyceps** sinensis' products in Chinese communities all over the world. It is quite possible that the manufacturers use fake **Cordyceps** sinensis to produce the products, or the customers have the so-called healthy products without active ingredients of the **Cordyceps** sinensis. Either of them detours a positive cycle in using the **Cordyceps** sinensis and makes less benefit from using the **Cordyceps** sinensis. In view of lacking a standard process to identify real **Cordyceps** sinensis, the present invention introduces a new methodology of distinguishing **Cordyceps** sinensis by rRNA gene analysis. In a prior art, a 18S rRNA gene is successfully used to distinguish various fungi. Therefore, the gene analysis of the present invention also focuses on the 18S rRNA gene. Various specimens of candidate **Cordyceps** sinensis are collected at different locations and timings so that the characteristics of those candidate **Cordyceps** sinenis can be clearly observed. Further, specimens used in the present invention also include other **Cordyceps,** so-called **Cordyceps** sinensis reserved in some fungi centers, and candidate **Cordyceps** identified to be relatives of **Cordyceps** sinensis by a Gen Bank. By analyzing the data sorting from those candidate **Cordyceps** sinensis, the exclusive characteristics of a genuine **Cordyceps** sinensis can then be obtained.

Web site: http://www.delphion.com/details?pn=US06251606__

- **Healthful composition obtained from the hot water extract of Coratceps sinensis mycelia**

  Inventor(s): Itoh; Hiroyuki (Kanagawa, JP), Taketomo; Naoki (Tokyo, JP), Tsunoo; Akinobu (Tokyo, JP)

  Assignee(s): Meiji Milk Products Company Limited (Tokyo, JP)

  Patent Number: 5,948,404

  Date filed: December 30, 1996

  Abstract: This invention is a healthful composition comprising a hot-water extract of the cultivated mycelia of **Cordyceps** sinensis.The healthful composition of the invention is an oral healthful composition which is highly safe and has excellent cardiotonic, hypotensive, antitussive and anti-fatigue effects.

  Excerpt(s): The present invention relates to a composition having excellent pharmaceutical and health-preserving effects and, more precisely, to a **Cordyceps** sinensis-derived medicine-type and/or food-and-drink-type composition. Vegetative wasps (plant worms) are fungi of Ascomycota, Pyrenomycetes, Clavicipitales, Clavicipitaceae and **Cordyceps,** undergoing both a complete metamorphic phase and an incomplete metamorphic phase. Their fruit bodies have been valued from ancient times as drugs marvelously effective for perennial youth and longevity or for nourishment and tonicity. The fruit bodies of vegetative wasps that have heretofore been considered

extremely valuable as Chinese medicines are generally powdered and administered powders.

Web site: http://www.delphion.com/details?pn=US05948404__

- **Herbal composition and method of treating viral infection of the liver**

  Inventor(s): Wang; Youwei (North Rd 1, Guisan Hanyang Wuhan, CN), Zhou; James H. (38 Blue Cliff Ter. #299, New Haven, CT 08513)

  Assignee(s): none reported

  Patent Number: 5,939,072

  Date filed: May 13, 1998

  Abstract: An herbal treatment composition includes a combination of mushroom derived polysaccharides wherein the polysaccharides are derived from at least two mushrooms from the group consisting of Maitake, Shiitake, Reishi, Poria, **Cordyceps** and Hericium.

  Excerpt(s): The invention relates to an herbal composition and method for treating viral infections of the liver, specifically for treating Hepatitis B. Hepatitis is a liver disorder which is manifested by various characteristics such as inflammation of the liver, fatigue and Hepatoma (liver tumor). The cause of the disorder is found to be associated with liver damage caused by viral infection or auto-immune response. Hepatitis B viral infection is one of the major causes of Hepatitis. There are approximately 300 million cases of Hepatitis B viral infection worldwide, and no cure of the infection is currently known. Interferon, which is a molecule released for none specific immune response, and anti-Hepatitis B immune ribonucleic acid (iRNA) are currently prescribed as therapy for Hepatitis B, and do show some effect in reduction of viral replication. However, iRNA treatment may be accompanied by undesirable side effects and health risks. Thus, the need remains for more effective treatments for viral infections of the liver such as Hepatitis B and the like.

  Web site: http://www.delphion.com/details?pn=US05939072__

- **Method and composition for treating ulcers and secretion of gastric acid**

  Inventor(s): Itoh; Hiroyuki (Kanagawa, JP), Taketomo; Naoki (Tokyo, JP), Tsunoo; Akinobu (Tokyo, JP)

  Assignee(s): Meiji Milk Products Company Limited (Tokyo, JP)

  Patent Number: 6,007,813

  Date filed: October 29, 1998

  Abstract: Secretion of gastric acid and development of ulcers can be inhibited by administering to a patient in need thereof an effective amount of a hot water extract of the cultivated mycelia of **Cordyceps** sinensis.

  Excerpt(s): The present invention relates to a method for treating ulcers and secretion of gastric acid comprising administering a pharmaceutical compositions derived from vegetative wasps. Vegetative wasps, e.g., plant worms, are fungi of Scoymycota, Pyrenomycetes, Clavicipitales, Clavicipitaceae, and **Cordyceps.** These wasps undergo both a complete metamorphic phase and an incomplete metamorphic phase. The fruits

on which these fungi are found have been valued from ancient times as drugs which are effective for imparting perennial youth and longevity or for nourishment and tonicity. The fruit bodies which bear vegetative wasps that have heretofore been considered extremely valuable as Chinese medicinals are generally powdered and administered as powders. According to the present invention, the mycelia of particular vegetative wasps are cultivated, and the thus-cultivated mycelia are extracted with hot water. The fact that the resulting extract from such mycelia has a cardiotonic and anti-fatigue effect, as well as an anti-ulcer effect, has heretofore been completely unknown.

Web site: http://www.delphion.com/details?pn=US06007813__

- **Method for identifying Cordyceps sinenis**

  Inventor(s): Chen; Chih-Shang (Taipei, TW), Hseu; Ruey-Shyang (3rd Floor, No.46, Lane 212, Chien Kuo S. Rd., Section 1, Taipei, TW)

  Assignee(s): Hseu; Ruey-Shyang (Taipei, TW), Lo; Soon (Taipei, TW), Wang; Shih-Jen (Hsian, TW)

  Patent Number: 6,271,003

  Date filed: June 15, 1999

  Abstract: The present invention is drawn to a method for identifying **Cordyceps** sinensis, by amplifying a specimen's 18S rRNA polymorphism by PCR using primer pair NS3 and NS6; digesting the PCR product with restriction enzyme Cfo I; and identifying a genuine **Cordyceps** sinensis specimen by determining the presence of a PCR product digestible with the restrictions enzyme Cfo I and a DNA fragment in the polymorphism of the specimen belonging to a specific DNA fragment in the polymorphism of **Cordyceps** sinensis.

  Excerpt(s): The invention relates to a method for distinguishing **Cordyceps** sinensis, and more particularly to a laser level apparatus that is easy to use and has multipurpose uses. Cordyceps sinensis (C. sinensis) is a complex having a sclerotium and a stroma and is grown from a bug-parasitized fungus that parasitizes in a worm of hepialus armoricanus oberthur. According to the Alexopoulos classification of 1996, C. sinensis belongs to the **Cordyceps** Fr of the Clavicipiyaceae of the Clavicipitales of Ascomycetes. Currently, there are about 400 species found on the planet, which belong to the **Cordyceps** Fr genus. Among those species, few possess medical ingredients; such as C. sinensis, C. sobolifera, C. militaris, C. hawkesii, and so on. Therein, C. sinensis is the most popular one. After pharmacological study, C. sinensis was found to have active ingredients for curing tumors, kidney inflammation and aging, and for improving immunizability. Therefore, C. sinensis has become one of the important topics with studies of medical fumgi. Due to the important medical potential of C. sinensis, healthy foods containing C. sinensis ingredients are popular products for health-care and age-care. However, while C. sinensis is widely accepted, questions arise to what C. sinensis really is. What are actual ingredients of a C. sinensis? What characteristics does a genuine C. sinensis have? How to identify a real C. sinensis? So far, no assured answer for any of the preceding questions is provided. Until now, people studying C. sinensis or the related **Cordyceps** can only work on the species collection, description, and identification. Regarding the medical potential of C. sinensis, "existing some metabolic products with some active ingredients for disease-prevention" is the only conclusion that can be provided. Of course, in some literatures, some efforts have been made to further understand the aspect of the **Cordyceps,** particularly C. sinensis, in view of the nature variety of the sexless **Cordyceps.** However, due to the collection difficulty,

identification and reservation of C. sinensis, and also due to the difficulty in artificially cultivating the stroma, a clear picture in classification and a genuine relationship between the sex generation and the sexless generation has not been found so far. Hence, the confusion in standardizedly distinguishing C. sinensis is still there.

Web site: http://www.delphion.com/details?pn=US06271003__

- **Method for propagating fungi using solid state fermentation**

  Inventor(s): Li; Pei-Jung (Miaoli Hsien, TW), Shen; Chung-Guang (Taipei, TW)

  Assignee(s): Sun Ten Pharmaceutical Co., Ltd. (Taipei, TW)

  Patent Number: 6,558,943

  Date filed: September 5, 2000

  Abstract: A solid state fermentation (SSF) method is provided which is effective for both small- and large-scale fungal cultivation. Also provided is SSF media for fungal cultivation. The media preferably contains a carbon source and nitrogen source to provide a carbon to nitrogen ratio of about 5:1 to about 25:1 by weight. The media may also contain a vitamin and an inorganic substance. A preferred SSF medium contains malt extract, yeast extract, peptone, glucose, water, solid base, and calcium carbonate or gypsum. Before propagating fungal mycelia in the SSF medium, the mycelia may be pre-cultivated in a solid culture medium and then in a liquid medium. Although the SSF method can be used in growing most fungi, preferred fungi include **Cordyceps** sinensis, Ganoderma lucidum, Antrodia camphorata, Trametes versicolor, and Agaricus blazei. The SSF method not only produces high yield of fungi, but also stimulates the production of fungal metabolites, particularly the kinds with pharmaceutical and medicinal activities. **Cordyceps** sinensis is preferably grown to produce the active compound H1A which is a derivative of ergosterol.

  Excerpt(s): The present invention relates to a method for propagating fungi using solid state fermentation (SSF). SSF is particularly suitable for propagating fungi which are used for food, medicine, or health purposes. The kinds of fungi which can be propagated by SSF include, but not limited to, **Cordyceps** sinensis, Trametes versicolor, Antrodia camphorata, Agaricus Blazei, and Ganoderma Lucidum. The present invention also relates to the formulations and preparations of SSF media. Cordyceps sinensis is a parasitic fungus that has been used as a traditional Chinese medicine since ancient times. It is particularly famous for treating patients with kidney failure and asthma. It is also known for its anti-tumor effects. Ergosterol is (3.beta., 22E)-Ergosta-5,7,22-trien-3-ol. H1A appears to have pharmacological effects on the immune system, renal function, and cardiovascular system. It has also been known to have clinical effects on suppressing the activated human mesangial cells (HMC) and alleviating IgA nephropathy (Berger's Disease), thus, preventing the disease from progressing to the uremia stage. Lin et al.'s J. Lab. Clin. Med., 133:55-63 (1999) article is herein incorporated by reference.

  Web site: http://www.delphion.com/details?pn=US06558943__

- **Method of producing a liquid composition comprising ginseng, Cordyceps, and ganoderma lucidum**

  Inventor(s): Ng; Michael S. (8383 Wilshire Blvd., Suite 360, Beverly Hills, CA 90211)

  Assignee(s): none reported

  Patent Number: 6,458,361

  Date filed: July 17, 2001

  Abstract: A producing method of Tien Hsien Liquid which mainly comprises ginseng, **Cordyceps,** and ganoderma lucidum, including the steps of: soaking and heating the ginseng, **Cordyceps,** ganoderma lucidum in water with honey and sorbic acid dissolved therein to form an extract solution; mixing and stirring the extracted solution with supplemental solution to form a combined solution; adding a predetermined amount of powder pearl into the combined solution; and filtering out the combined solution to obtain the Tien Hsien Liquid.

  Excerpt(s): The present invention relates to herbal health product, and more particularly to a producing method of Tien Hsien Liquid. According to Chinese (herbal) medicine, Ginseng is reputed to be effective in shock, collapse of the cardiovascular system, hemorrhaging, and heart failure. Clinical trails on volunteers show that ginseng extract can substantially slow down the heart rate and reduce oxygen demand. Besides, in Chinese medical journals, there have been reported on the effectiveness of a ginseng decoction in combination with other herbs in the treatment of cardiogenic shock and acute myocarditis. Therefore, if we successfully find out and extract that functional chemical from the ginseng and other herbs, the patients can effectively take dose of concentrated functional chemical as the herbal medicine instead of having the whole plant of ginseng. Like the Western medicine, it is more efficient and effective. The main object of the present invention is to provide a producing method of Tien Hsien Liquid, wherein the Tien Hsien liquid mainly is extracted mainly from ginseng, **Cordyceps,** ganoderma lucidum, and honey. The therapeutical function of ginseng is mainly for tonic, stimulant, regulating sugar and cholesterol levels, and stimulating the immune system. The **Cordyceps** exhibits an immunopotentiating effect in treating cancer and immunodeficient patients. The ganoderma lucidum contains ergosterol, fungal lysozyme, proteinase, several amino acids, and organic acids. These functional elements are extracted in form of liquid to form a composition named as Tien Hsien liquid for achieving a combined herbal health product.

  Web site: http://www.delphion.com/details?pn=US06458361__

- **Process to modulate disease risk with doses of a nutraceutical**

  Inventor(s): Block; Jerome Bernard (Rancho Palos Verdes, CA), Evans; Steven (Omaha, NE)

  Assignee(s): Genetic Services Management, Inc. (Omaha, NE)

  Patent Number: 6,630,160

  Date filed: September 5, 2000

  Abstract: A dietary supplement is created, comprised of material from the following nutrients, vitamins, herbs, minerals, and food and plant substances and food and plant derivatives: lycopene, vitamin E, selenium, green tea, coenzyme Q10, garlic, folic acid, vitamin C, curcumin, seaweed, **Cordyceps** sinsensis mushroom, Lentinus edodes

(shiitake) mushroom, and Ganoderma lucidum (reishi) mushroom. The composition is administered orally for individuals who wish to reduce their risk of disease, particularly cancer-risk.

Excerpt(s): Cancer care is reported to have cost Americans more than $110 billion in 1992, more than 11% of all expenditures spent on diseases in America. Researchers have indicated that from 50-90% of all cancers could be prevented through proper nutrition. There has evolved a new professional descriptive term "nutraceuticals" which combines the term "nutrient" and the term "pharmaceuticals" to describe this genre of medicinal agents that may be comprised of one or more complex combinations of ingredients made from nutrients, vitamins, minerals, herbs, and food and plant derivatives. We shall employ this term "nutraceutical" to refer to such a composition of one or more ingredients. This invention addresses the need for a dietary supplement that can reduce risk of disease, particularly cancer risk, that will be efficacious for a significant segment of the population. There have been tests and clinical trials on numerous individual agents for their role as cancer preventatives, such as coenzyme Q10 or selenium, but the daunting task of intelligently combining complex compositions has precluded exploration of complex compositions of nutraceuticals for cancer risk reduction. Thus in the past, one single ingredient would be selected and tested for its role as a cancer preventative for some specific cancer, usually in individuals who already had cancer. For example, selenium was tested for cancer prevention in patients who had had carcinoma of the skin [Clark, L. C., Combs; G. F., Jr., Turnbull, B. W., Slate, E. H., Chalker, D. K., Chow, J., Davis, L. S., Glover, R. A., Graham, G. F., Gross, E. G., Krongrad, A., Lesher, J. L., Park, H. K., Sanders, B. B., Jr., Smith, C. L., Taylor, J. R. Effects of selenium supplementation for cancer prevention in patients with carcinoma of the skin. A randomized controlled trial. JAMA. 276 (24): 1957-1963, Dec. 1996]. Similarly the effects of coenzyme Q10 suggested possible efficacious results in limited case studies with individuals with breast cancer [Lockwood, K., Moesgaard, S., Folkers, K. Partial and complete regression of breast cancer in patients in relation to dosage of coenzyme Q10. Biochem Biophys Res Comm. 199: 1504-1508, 1994]. However researchers as noted have been preoccupied with traditional experimental design methodology whereby these investigators wish to determine whether one specific ingredient is effective or not, usually for one specific cancer, and even then, as a treatment rather than a preventative. Another reason single individual ingredients were selected is because researchers have focused on just one of the following biologic, cancer-fighting, etiologically-oriented domains of interest: (1) anti-tumor activity, or (2) immune stimulating activity, or (3) anti-viral activity, or (4) anti-inflammatory activity, or (5) antimutagenic activity, or (6) antiproliferative activity, or (7) anti-free-radical development. This micro-focus has precluded the realization that by combining all those ingredients which work for one subset or another of the population, for one type of cancer or another, for one etiological reason or another, a powerful net effect can be achieved, along with the synergy of the ingredients working together. The present invention provides a complex composition (a "nutraceutical") comprising material from known nutrients, vitamins, herbs, minerals, and food and plant substances and food and plant derivatives which are useful to reduce risk of disease, particularly cancer risk, for one or more of all the known etiological factors that affect cancer development and hence yields cancer prevention for the consumer of this nutraceutical. This nutraceutical profoundly reduces risk of cancers through the multiple actions of all the etiological factors addressing cancer-causing conditions, such as providing (1) anti-tumor activity, and (2) immune stimulating activity, and (3) anti-viral activity, and (4) anti-inflammatory activity, and (5) antimutagenic activity, and (6) antiproliferative activity, and (7) anti-free-radical development. The nutraceutical is comprised of lycopene, vitamin E, selenium, green tea

polyphenols, Coenzyme Q-10, garlic, folic acid, vitamin C, curcumin, seaweed, **Cordyceps** sinsensis mushroom, Lentinus edodes (shiitake) mushroom, and Ganoderma lucidum (reishi) mushroom. Preferably the material from each of such entries is in dried powder form.

Web site: http://www.delphion.com/details?pn=US06630160__

Patent Applications on Cordyceps

As of December 2000, U.S. patent applications are open to public viewing.[9] Applications are patent requests which have yet to be granted. (The process to achieve a patent can take several years.) The following patent applications have been filed since December 2000 relating to Cordyceps:

- **Natural, non-allergenic, immune system stimulant**

  Inventor(s): Lam, Paul Y.S.; (Los Angeles, CA)

  Correspondence: Liniak Berenato Longacre & White; 6550 Rock Spring Drive; Suite 240; Bethesda; MD; 20817; US

  Patent Application Number: 20020044947

  Date filed: June 21, 2001

  Abstract: The invention concerns an immune system stimulator comprising Hericium, Radix Astragali, **Cordyceps** Sinensus, Radix Glycyrrhizae and Dioscoreae Oppositae. The composition is capable of mediating enhanced production of Interleukin-1 beta without causing an increase in the production of Interleukin-4.

  Excerpt(s): This application is a continuation-in part of U.S. patent application Ser. No. 60/279,457, filed Mar. 29, 2001, which is a continuation-in part of PCT Application Serial No. PCT/US00/24428, filed on Aug. 31, 2000, herein incorporated by reference. This invention relates to dietary supplements. More particularly, this invention relates to supplements which will stimulate the immune system without producing an allergic response. Recently, evidence has been accumulating that herbal supplements, taken regularly, may have beneficial effects. Herbal supplements, unlike medicines, are not effective instantaneously but must be taken over long periods of time in order to be effective. In other words, it takes time to create an effect in humans. There are many products on the market that claim to stimulate the immune system but the research behind such products seems to be borderline at best. See article on functional food to be published in California agriculture 2000, probably in November 2000 issue. Stimulating the immune system is a perfect application for herbal supplements because the immune system can be improved gradually. An improved immune system can be beneficial in fighting all kinds of illnesses from the common cold to deadly cancers.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

[9] This has been a common practice outside the United States prior to December 2000.

Keeping Current

In order to stay informed about patents and patent applications dealing with Cordyceps, you can access the U.S. Patent Office archive via the Internet at the following Web address: **http://www.uspto.gov/patft/index.html**. You will see two broad options: (1) Issued Patent, and (2) Published Applications. To see a list of issued patents, perform the following steps: Under "Issued Patents," click "Quick Search." Then, type "Cordyceps" (or synonyms) into the "Term 1" box. After clicking on the search button, scroll down to see the various patents which have been granted to date on Cordyceps.

You can also use this procedure to view pending patent applications concerning Cordyceps. Simply go back to **http://www.uspto.gov/patft/index.html**. Select "Quick Search" under "Published Applications." Then proceed with the steps listed above.

APPENDICES

APPENDIX A. PHYSICIAN RESOURCES

Overview

In this chapter, we focus on databases and Internet-based guidelines and information resources created or written for a professional audience.

NIH Guidelines

Commonly referred to as "clinical" or "professional" guidelines, the National Institutes of Health publish physician guidelines for the most common diseases. Publications are available at the following by relevant Institute[10]:

- Office of the Director (OD); guidelines consolidated across agencies available at **http://www.nih.gov/health/consumer/conkey.htm**
- National Institute of General Medical Sciences (NIGMS); fact sheets available at **http://www.nigms.nih.gov/news/facts/**
- National Library of Medicine (NLM); extensive encyclopedia (A.D.A.M., Inc.) with guidelines: **http://www.nlm.nih.gov/medlineplus/healthtopics.html**
- National Cancer Institute (NCI); guidelines available at **http://www.cancer.gov/cancerinfo/list.aspx?viewid=5f35036e-5497-4d86-8c2c-714a9f7c8d25**
- National Eye Institute (NEI); guidelines available at **http://www.nei.nih.gov/order/index.htm**
- National Heart, Lung, and Blood Institute (NHLBI); guidelines available at **http://www.nhlbi.nih.gov/guidelines/index.htm**
- National Human Genome Research Institute (NHGRI); research available at **http://www.genome.gov/page.cfm?pageID=10000375**
- National Institute on Aging (NIA); guidelines available at **http://www.nia.nih.gov/health/**

[10] These publications are typically written by one or more of the various NIH Institutes.

- National Institute on Alcohol Abuse and Alcoholism (NIAAA); guidelines available at **http://www.niaaa.nih.gov/publications/publications.htm**
- National Institute of Allergy and Infectious Diseases (NIAID); guidelines available at **http://www.niaid.nih.gov/publications/**
- National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS); fact sheets and guidelines available at **http://www.niams.nih.gov/hi/index.htm**
- National Institute of Child Health and Human Development (NICHD); guidelines available at **http://www.nichd.nih.gov/publications/pubskey.cfm**
- National Institute on Deafness and Other Communication Disorders (NIDCD); fact sheets and guidelines at **http://www.nidcd.nih.gov/health/**
- National Institute of Dental and Craniofacial Research (NIDCR); guidelines available at **http://www.nidr.nih.gov/health/**
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK); guidelines available at **http://www.niddk.nih.gov/health/health.htm**
- National Institute on Drug Abuse (NIDA); guidelines available at **http://www.nida.nih.gov/DrugAbuse.html**
- National Institute of Environmental Health Sciences (NIEHS); environmental health information available at **http://www.niehs.nih.gov/external/facts.htm**
- National Institute of Mental Health (NIMH); guidelines available at **http://www.nimh.nih.gov/practitioners/index.cfm**
- National Institute of Neurological Disorders and Stroke (NINDS); neurological disorder information pages available at **http://www.ninds.nih.gov/health_and_medical/disorder_index.htm**
- National Institute of Nursing Research (NINR); publications on selected illnesses at **http://www.nih.gov/ninr/news-info/publications.html**
- National Institute of Biomedical Imaging and Bioengineering; general information at **http://grants.nih.gov/grants/becon/becon_info.htm**
- Center for Information Technology (CIT); referrals to other agencies based on keyword searches available at **http://kb.nih.gov/www_query_main.asp**
- National Center for Complementary and Alternative Medicine (NCCAM); health information available at **http://nccam.nih.gov/health/**
- National Center for Research Resources (NCRR); various information directories available at **http://www.ncrr.nih.gov/publications.asp**
- Office of Rare Diseases; various fact sheets available at **http://rarediseases.info.nih.gov/html/resources/rep_pubs.html**
- Centers for Disease Control and Prevention; various fact sheets on infectious diseases available at **http://www.cdc.gov/publications.htm**

NIH Databases

In addition to the various Institutes of Health that publish professional guidelines, the NIH has designed a number of databases for professionals.[11] Physician-oriented resources provide a wide variety of information related to the biomedical and health sciences, both past and present. The format of these resources varies. Searchable databases, bibliographic citations, full-text articles (when available), archival collections, and images are all available. The following are referenced by the National Library of Medicine:[12]

- **Bioethics:** Access to published literature on the ethical, legal, and public policy issues surrounding healthcare and biomedical research. This information is provided in conjunction with the Kennedy Institute of Ethics located at Georgetown University, Washington, D.C.: **http://www.nlm.nih.gov/databases/databases_bioethics.html**
- **HIV/AIDS Resources:** Describes various links and databases dedicated to HIV/AIDS research: **http://www.nlm.nih.gov/pubs/factsheets/aidsinfs.html**
- **NLM Online Exhibitions:** Describes "Exhibitions in the History of Medicine": **http://www.nlm.nih.gov/exhibition/exhibition.html**. Additional resources for historical scholarship in medicine: **http://www.nlm.nih.gov/hmd/hmd.html**
- **Biotechnology Information:** Access to public databases. The National Center for Biotechnology Information conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information for the better understanding of molecular processes affecting human health and disease: **http://www.ncbi.nlm.nih.gov/**
- **Population Information:** The National Library of Medicine provides access to worldwide coverage of population, family planning, and related health issues, including family planning technology and programs, fertility, and population law and policy: **http://www.nlm.nih.gov/databases/databases_population.html**
- **Cancer Information:** Access to cancer-oriented databases: **http://www.nlm.nih.gov/databases/databases_cancer.html**
- **Profiles in Science:** Offering the archival collections of prominent twentieth-century biomedical scientists to the public through modern digital technology: **http://www.profiles.nlm.nih.gov/**
- **Chemical Information:** Provides links to various chemical databases and references: **http://sis.nlm.nih.gov/Chem/ChemMain.html**
- **Clinical Alerts:** Reports the release of findings from the NIH-funded clinical trials where such release could significantly affect morbidity and mortality: **http://www.nlm.nih.gov/databases/alerts/clinical_alerts.html**
- **Space Life Sciences:** Provides links and information to space-based research (including NASA): **http://www.nlm.nih.gov/databases/databases_space.html**
- **MEDLINE:** Bibliographic database covering the fields of medicine, nursing, dentistry, veterinary medicine, the healthcare system, and the pre-clinical sciences: **http://www.nlm.nih.gov/databases/databases_medline.html**

---

[11] Remember, for the general public, the National Library of Medicine recommends the databases referenced in MEDLINE*plus* (**http://medlineplus.gov/** or **http://www.nlm.nih.gov/medlineplus/databases.html**).

[12] See **http://www.nlm.nih.gov/databases/databases.html**.

- **Toxicology and Environmental Health Information (TOXNET):** Databases covering toxicology and environmental health: **http://sis.nlm.nih.gov/Tox/ToxMain.html**
- **Visible Human Interface:** Anatomically detailed, three-dimensional representations of normal male and female human bodies: **http://www.nlm.nih.gov/research/visible/visible_human.html**

The NLM Gateway[13]

The NLM (National Library of Medicine) Gateway is a Web-based system that lets users search simultaneously in multiple retrieval systems at the U.S. National Library of Medicine (NLM). It allows users of NLM services to initiate searches from one Web interface, providing one-stop searching for many of NLM's information resources or databases.[14] To use the NLM Gateway, simply go to the search site at **http://gateway.nlm.nih.gov/gw/Cmd**. Type "Cordyceps" (or synonyms) into the search box and click "Search." The results will be presented in a tabular form, indicating the number of references in each database category.

Results Summary

Category	Items Found
Journal Articles	233
Books / Periodicals / Audio Visual	2
Consumer Health	268
Meeting Abstracts	0
Other Collections	1
Total	504

HSTAT[15]

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.[16] These documents include clinical practice guidelines, quick-reference guides for clinicians, consumer health brochures, evidence reports and technology assessments from the Agency for Healthcare Research and Quality (AHRQ), as well as AHRQ's Put Prevention Into Practice.[17] Simply search by "Cordyceps" (or synonyms) at the following Web site: **http://text.nlm.nih.gov**.

---

[13] Adapted from NLM: **http://gateway.nlm.nih.gov/gw/Cmd?Overview.x**.

[14] The NLM Gateway is currently being developed by the Lister Hill National Center for Biomedical Communications (LHNCBC) at the National Library of Medicine (NLM) of the National Institutes of Health (NIH).

[15] Adapted from HSTAT: **http://www.nlm.nih.gov/pubs/factsheets/hstat.html**.

[16] The HSTAT URL is **http://hstat.nlm.nih.gov/**.

[17] Other important documents in HSTAT include: the National Institutes of Health (NIH) Consensus Conference Reports and Technology Assessment Reports; the HIV/AIDS Treatment Information Service (ATIS) resource documents; the Substance Abuse and Mental Health Services Administration's Center for Substance Abuse Treatment (SAMHSA/CSAT) Treatment Improvement Protocols (TIP) and Center for Substance Abuse Prevention (SAMHSA/CSAP) Prevention Enhancement Protocols System (PEPS); the Public Health Service (PHS) Preventive Services Task Force's *Guide to Clinical Preventive Services*; the independent, nonfederal Task Force on Community Services' *Guide to Community Preventive Services*; and the Health Technology Advisory Committee (HTAC) of the Minnesota Health Care Commission (MHCC) health technology evaluations.

Coffee Break: Tutorials for Biologists[18]

Coffee Break is a general healthcare site that takes a scientific view of the news and covers recent breakthroughs in biology that may one day assist physicians in developing treatments. Here you will find a collection of short reports on recent biological discoveries. Each report incorporates interactive tutorials that demonstrate how bioinformatics tools are used as a part of the research process. Currently, all Coffee Breaks are written by NCBI staff.[19] Each report is about 400 words and is usually based on a discovery reported in one or more articles from recently published, peer-reviewed literature.[20] This site has new articles every few weeks, so it can be considered an online magazine of sorts. It is intended for general background information. You can access the Coffee Break Web site at the following hyperlink: **http://www.ncbi.nlm.nih.gov/Coffeebreak/**.

Other Commercial Databases

In addition to resources maintained by official agencies, other databases exist that are commercial ventures addressing medical professionals. Here are some examples that may interest you:

- **CliniWeb International:** Index and table of contents to selected clinical information on the Internet; see **http://www.ohsu.edu/cliniweb/**.
- **Medical World Search:** Searches full text from thousands of selected medical sites on the Internet; see **http://www.mwsearch.com/**.

---

[18] Adapted from **http://www.ncbi.nlm.nih.gov/Coffeebreak/Archive/FAQ.html**.

[19] The figure that accompanies each article is frequently supplied by an expert external to NCBI, in which case the source of the figure is cited. The result is an interactive tutorial that tells a biological story.

[20] After a brief introduction that sets the work described into a broader context, the report focuses on how a molecular understanding can provide explanations of observed biology and lead to therapies for diseases. Each vignette is accompanied by a figure and hypertext links that lead to a series of pages that interactively show how NCBI tools and resources are used in the research process.

APPENDIX B. PATIENT RESOURCES

Overview

Official agencies, as well as federally funded institutions supported by national grants, frequently publish a variety of guidelines written with the patient in mind. These are typically called "Fact Sheets" or "Guidelines." They can take the form of a brochure, information kit, pamphlet, or flyer. Often they are only a few pages in length. Since new guidelines on Cordyceps can appear at any moment and be published by a number of sources, the best approach to finding guidelines is to systematically scan the Internet-based services that post them.

Patient Guideline Sources

The remainder of this chapter directs you to sources which either publish or can help you find additional guidelines on topics related to Cordyceps. Due to space limitations, these sources are listed in a concise manner. Do not hesitate to consult the following sources by either using the Internet hyperlink provided, or, in cases where the contact information is provided, contacting the publisher or author directly.

The National Institutes of Health

The NIH gateway to patients is located at **http://health.nih.gov/**. From this site, you can search across various sources and institutes, a number of which are summarized below.

Topic Pages: MEDLINEplus

The National Library of Medicine has created a vast and patient-oriented healthcare information portal called MEDLINEplus. Within this Internet-based system are "health topic pages" which list links to available materials relevant to Cordyceps. To access this system, log on to **http://www.nlm.nih.gov/medlineplus/healthtopics.html**. From there you can either search using the alphabetical index or browse by broad topic areas.

You may also choose to use the search utility provided by MEDLINEplus at the following Web address: **http://www.nlm.nih.gov/medlineplus/**. Simply type a keyword into the search box and click "Search." This utility is similar to the NIH search utility, with the exception that it only includes materials that are linked within the MEDLINEplus system (mostly patient-oriented information). It also has the disadvantage of generating unstructured results. We recommend, therefore, that you use this method only if you have a very targeted search.

The National Guideline Clearinghouse™

The National Guideline Clearinghouse™ offers hundreds of evidence-based clinical practice guidelines published in the United States and other countries. You can search this site located at **http://www.guideline.gov/** by using the keyword "Cordyceps" (or synonyms).

Healthfinder™

Healthfinder™ is sponsored by the U.S. Department of Health and Human Services and offers links to hundreds of other sites that contain healthcare information. This Web site is located at **http://www.healthfinder.gov**. Again, keyword searches can be used to find guidelines.

The NIH Search Utility

The NIH search utility allows you to search for documents on over 100 selected Web sites that comprise the NIH-WEB-SPACE. Each of these servers is "crawled" and indexed on an ongoing basis. Your search will produce a list of various documents, all of which will relate in some way to Cordyceps. The drawbacks of this approach are that the information is not organized by theme and that the references are often a mix of information for professionals and patients. Nevertheless, a large number of the listed Web sites provide useful background information. We can only recommend this route, therefore, for relatively rare or specific disorders, or when using highly targeted searches. To use the NIH search utility, visit the following Web page: **http://search.nih.gov/index.html**.

NORD (The National Organization of Rare Disorders, Inc.)

NORD provides an invaluable service to the public by publishing short yet comprehensive guidelines on over 1,000 diseases. NORD primarily focuses on rare diseases that might not be covered by the previously listed sources. NORD's Web address is **http://www.rarediseases.org/**. A complete guide on Cordyceps can be purchased from NORD for a nominal fee.

Additional Web Sources

A number of Web sites are available to the public that often link to government sites. These can also point you in the direction of essential information. The following is a representative sample:

- AOL: **http://search.aol.com/cat.adp?id=168&layer=&from=subcats**
- Family Village: **http://www.familyvillage.wisc.edu/specific.htm**
- Google: **http://directory.google.com/Top/Health/Conditions_and_Diseases/**
- Med Help International: **http://www.medhelp.org/HealthTopics/A.html**
- Open Directory Project: **http://dmoz.org/Health/Conditions_and_Diseases/**
- Yahoo.com: **http://dir.yahoo.com/Health/Diseases_and_Conditions/**
- WebMD®Health: **http://my.webmd.com/health_topics**

Finding Associations

There are several Internet directories that provide lists of medical associations with information on or resources relating to Cordyceps. By consulting all of associations listed in this chapter, you will have nearly exhausted all sources for patient associations concerned with Cordyceps.

The National Health Information Center (NHIC)

The National Health Information Center (NHIC) offers a free referral service to help people find organizations that provide information about Cordyceps. For more information, see the NHIC's Web site at **http://www.health.gov/NHIC/** or contact an information specialist by calling 1-800-336-4797.

Directory of Health Organizations

The Directory of Health Organizations, provided by the National Library of Medicine Specialized Information Services, is a comprehensive source of information on associations. The Directory of Health Organizations database can be accessed via the Internet at **http://www.sis.nlm.nih.gov/Dir/DirMain.html**. It is composed of two parts: DIRLINE and Health Hotlines.

The DIRLINE database comprises some 10,000 records of organizations, research centers, and government institutes and associations that primarily focus on health and biomedicine. To access DIRLINE directly, go to the following Web site: **http://dirline.nlm.nih.gov/**. Simply type in "Cordyceps" (or a synonym), and you will receive information on all relevant organizations listed in the database.

Health Hotlines directs you to toll-free numbers to over 300 organizations. You can access this database directly at **http://www.sis.nlm.nih.gov/hotlines/**. On this page, you are given the option to search by keyword or by browsing the subject list. When you have received

your search results, click on the name of the organization for its description and contact information.

The Combined Health Information Database

Another comprehensive source of information on healthcare associations is the Combined Health Information Database. Using the "Detailed Search" option, you will need to limit your search to "Organizations" and "Cordyceps". Type the following hyperlink into your Web browser: **http://chid.nih.gov/detail/detail.html**. To find associations, use the drop boxes at the bottom of the search page where "You may refine your search by." For publication date, select "All Years." Then, select your preferred language and the format option "Organization Resource Sheet." Type "Cordyceps" (or synonyms) into the "For these words:" box. You should check back periodically with this database since it is updated every three months.

The National Organization for Rare Disorders, Inc.

The National Organization for Rare Disorders, Inc. has prepared a Web site that provides, at no charge, lists of associations organized by health topic. You can access this database at the following Web site: **http://www.rarediseases.org/search/orgsearch.html**. Type "Cordyceps" (or a synonym) into the search box, and click "Submit Query."

APPENDIX C. FINDING MEDICAL LIBRARIES

Overview

In this Appendix, we show you how to quickly find a medical library in your area.

Preparation

Your local public library and medical libraries have interlibrary loan programs with the National Library of Medicine (NLM), one of the largest medical collections in the world. According to the NLM, most of the literature in the general and historical collections of the National Library of Medicine is available on interlibrary loan to any library. If you would like to access NLM medical literature, then visit a library in your area that can request the publications for you.[21]

Finding a Local Medical Library

The quickest method to locate medical libraries is to use the Internet-based directory published by the National Network of Libraries of Medicine (NN/LM). This network includes 4626 members and affiliates that provide many services to librarians, health professionals, and the public. To find a library in your area, simply visit **http://nnlm.gov/members/adv.html** or call 1-800-338-7657.

Medical Libraries in the U.S. and Canada

In addition to the NN/LM, the National Library of Medicine (NLM) lists a number of libraries with reference facilities that are open to the public. The following is the NLM's list and includes hyperlinks to each library's Web site. These Web pages can provide information on hours of operation and other restrictions. The list below is a small sample of

[21] Adapted from the NLM: **http://www.nlm.nih.gov/psd/cas/interlibrary.html**.

libraries recommended by the National Library of Medicine (sorted alphabetically by name of the U.S. state or Canadian province where the library is located)[22]:

- **Alabama:** Health InfoNet of Jefferson County (Jefferson County Library Cooperative, Lister Hill Library of the Health Sciences), **http://www.uab.edu/infonet/**
- **Alabama:** Richard M. Scrushy Library (American Sports Medicine Institute)
- **Arizona:** Samaritan Regional Medical Center: The Learning Center (Samaritan Health System, Phoenix, Arizona), **http://www.samaritan.edu/library/bannerlibs.htm**
- **California:** Kris Kelly Health Information Center (St. Joseph Health System, Humboldt), **http://www.humboldt1.com/~kkhic/index.html**
- **California:** Community Health Library of Los Gatos, **http://www.healthlib.org/orgresources.html**
- **California:** Consumer Health Program and Services (CHIPS) (County of Los Angeles Public Library, Los Angeles County Harbor-UCLA Medical Center Library) - Carson, CA, **http://www.colapublib.org/services/chips.html**
- **California:** Gateway Health Library (Sutter Gould Medical Foundation)
- **California:** Health Library (Stanford University Medical Center), **http://www-med.stanford.edu/healthlibrary/**
- **California:** Patient Education Resource Center - Health Information and Resources (University of California, San Francisco), **http://sfghdean.ucsf.edu/barnett/PERC/default.asp**
- **California:** Redwood Health Library (Petaluma Health Care District), **http://www.phcd.org/rdwdlib.html**
- **California:** Los Gatos PlaneTree Health Library, **http://planetreesanjose.org/**
- **California:** Sutter Resource Library (Sutter Hospitals Foundation, Sacramento), **http://suttermedicalcenter.org/library/**
- **California:** Health Sciences Libraries (University of California, Davis), **http://www.lib.ucdavis.edu/healthsci/**
- **California:** ValleyCare Health Library & Ryan Comer Cancer Resource Center (ValleyCare Health System, Pleasanton), **http://gaelnet.stmarys-ca.edu/other.libs/gbal/east/vchl.html**
- **California:** Washington Community Health Resource Library (Fremont), **http://www.healthlibrary.org/**
- **Colorado:** William V. Gervasini Memorial Library (Exempla Healthcare), **http://www.saintjosephdenver.org/yourhealth/libraries/**
- **Connecticut:** Hartford Hospital Health Science Libraries (Hartford Hospital), **http://www.harthosp.org/library/**
- **Connecticut:** Healthnet: Connecticut Consumer Health Information Center (University of Connecticut Health Center, Lyman Maynard Stowe Library), **http://library.uchc.edu/departm/hnet/**

[22] Abstracted from **http://www.nlm.nih.gov/medlineplus/libraries.html**.

- **Connecticut:** Waterbury Hospital Health Center Library (Waterbury Hospital, Waterbury), **http://www.waterburyhospital.com/library/consumer.shtml**
- **Delaware:** Consumer Health Library (Christiana Care Health System, Eugene du Pont Preventive Medicine & Rehabilitation Institute, Wilmington), **http://www.christianacare.org/health_guide/health_guide_pmri_health_info.cfm**
- **Delaware:** Lewis B. Flinn Library (Delaware Academy of Medicine, Wilmington), **http://www.delamed.org/chls.html**
- **Georgia:** Family Resource Library (Medical College of Georgia, Augusta), **http://cmc.mcg.edu/kids_families/fam_resources/fam_res_lib/frl.htm**
- **Georgia:** Health Resource Center (Medical Center of Central Georgia, Macon), **http://www.mccg.org/hrc/hrchome.asp**
- **Hawaii:** Hawaii Medical Library: Consumer Health Information Service (Hawaii Medical Library, Honolulu), **http://hml.org/CHIS/**
- **Idaho:** DeArmond Consumer Health Library (Kootenai Medical Center, Coeur d'Alene), **http://www.nicon.org/DeArmond/index.htm**
- **Illinois:** Health Learning Center of Northwestern Memorial Hospital (Chicago), **http://www.nmh.org/health_info/hlc.html**
- **Illinois:** Medical Library (OSF Saint Francis Medical Center, Peoria), **http://www.osfsaintfrancis.org/general/library/**
- **Kentucky:** Medical Library - Services for Patients, Families, Students & the Public (Central Baptist Hospital, Lexington), **http://www.centralbap.com/education/community/library.cfm**
- **Kentucky:** University of Kentucky - Health Information Library (Chandler Medical Center, Lexington), **http://www.mc.uky.edu/PatientEd/**
- **Louisiana:** Alton Ochsner Medical Foundation Library (Alton Ochsner Medical Foundation, New Orleans), **http://www.ochsner.org/library/**
- **Louisiana:** Louisiana State University Health Sciences Center Medical Library-Shreveport, **http://lib-sh.lsuhsc.edu/**
- **Maine:** Franklin Memorial Hospital Medical Library (Franklin Memorial Hospital, Farmington), **http://www.fchn.org/fmh/lib.htm**
- **Maine:** Gerrish-True Health Sciences Library (Central Maine Medical Center, Lewiston), **http://www.cmmc.org/library/library.html**
- **Maine:** Hadley Parrot Health Science Library (Eastern Maine Healthcare, Bangor), **http://www.emh.org/hll/hpl/guide.htm**
- **Maine:** Maine Medical Center Library (Maine Medical Center, Portland), **http://www.mmc.org/library/**
- **Maine:** Parkview Hospital (Brunswick), **http://www.parkviewhospital.org/**
- **Maine:** Southern Maine Medical Center Health Sciences Library (Southern Maine Medical Center, Biddeford), **http://www.smmc.org/services/service.php3?choice=10**
- **Maine:** Stephens Memorial Hospital's Health Information Library (Western Maine Health, Norway), **http://www.wmhcc.org/Library/**

- **Manitoba, Canada:** Consumer & Patient Health Information Service (University of Manitoba Libraries), **http://www.umanitoba.ca/libraries/units/health/reference/chis.html**
- **Manitoba, Canada:** J.W. Crane Memorial Library (Deer Lodge Centre, Winnipeg), **http://www.deerlodge.mb.ca/crane_library/about.asp**
- **Maryland:** Health Information Center at the Wheaton Regional Library (Montgomery County, Dept. of Public Libraries, Wheaton Regional Library), **http://www.mont.lib.md.us/healthinfo/hic.asp**
- **Massachusetts:** Baystate Medical Center Library (Baystate Health System), **http://www.baystatehealth.com/1024/**
- **Massachusetts:** Boston University Medical Center Alumni Medical Library (Boston University Medical Center), **http://med-libwww.bu.edu/library/lib.html**
- **Massachusetts:** Lowell General Hospital Health Sciences Library (Lowell General Hospital, Lowell), **http://www.lowellgeneral.org/library/HomePageLinks/WWW.htm**
- **Massachusetts:** Paul E. Woodard Health Sciences Library (New England Baptist Hospital, Boston), **http://www.nebh.org/health_lib.asp**
- **Massachusetts:** St. Luke's Hospital Health Sciences Library (St. Luke's Hospital, Southcoast Health System, New Bedford), **http://www.southcoast.org/library/**
- **Massachusetts:** Treadwell Library Consumer Health Reference Center (Massachusetts General Hospital), **http://www.mgh.harvard.edu/library/chrcindex.html**
- **Massachusetts:** UMass HealthNet (University of Massachusetts Medical School, Worchester), **http://healthnet.umassmed.edu/**
- **Michigan:** Botsford General Hospital Library - Consumer Health (Botsford General Hospital, Library & Internet Services), **http://www.botsfordlibrary.org/consumer.htm**
- **Michigan:** Helen DeRoy Medical Library (Providence Hospital and Medical Centers), **http://www.providence-hospital.org/library/**
- **Michigan:** Marquette General Hospital - Consumer Health Library (Marquette General Hospital, Health Information Center), **http://www.mgh.org/center.html**
- **Michigan:** Patient Education Resouce Center - University of Michigan Cancer Center (University of Michigan Comprehensive Cancer Center, Ann Arbor), **http://www.cancer.med.umich.edu/learn/leares.htm**
- **Michigan:** Sladen Library & Center for Health Information Resources - Consumer Health Information (Detroit), **http://www.henryford.com/body.cfm?id=39330**
- **Montana:** Center for Health Information (St. Patrick Hospital and Health Sciences Center, Missoula)
- **National:** Consumer Health Library Directory (Medical Library Association, Consumer and Patient Health Information Section), **http://caphis.mlanet.org/directory/index.html**
- **National:** National Network of Libraries of Medicine (National Library of Medicine) - provides library services for health professionals in the United States who do not have access to a medical library, **http://nnlm.gov/**
- **National:** NN/LM List of Libraries Serving the Public (National Network of Libraries of Medicine), **http://nnlm.gov/members/**

- **Nevada:** Health Science Library, West Charleston Library (Las Vegas-Clark County Library District, Las Vegas), **http://www.lvccld.org/special_collections/medical/index.htm**
- **New Hampshire:** Dartmouth Biomedical Libraries (Dartmouth College Library, Hanover), **http://www.dartmouth.edu/~biomed/resources.htmld/conshealth.htmld/**
- **New Jersey:** Consumer Health Library (Rahway Hospital, Rahway), **http://www.rahwayhospital.com/library.htm**
- **New Jersey:** Dr. Walter Phillips Health Sciences Library (Englewood Hospital and Medical Center, Englewood), **http://www.englewoodhospital.com/links/index.htm**
- **New Jersey:** Meland Foundation (Englewood Hospital and Medical Center, Englewood), **http://www.geocities.com/ResearchTriangle/9360/**
- **New York:** Choices in Health Information (New York Public Library) - NLM Consumer Pilot Project participant, **http://www.nypl.org/branch/health/links.html**
- **New York:** Health Information Center (Upstate Medical University, State University of New York, Syracuse), **http://www.upstate.edu/library/hic/**
- **New York:** Health Sciences Library (Long Island Jewish Medical Center, New Hyde Park), **http://www.lij.edu/library/library.html**
- **New York:** ViaHealth Medical Library (Rochester General Hospital), **http://www.nyam.org/library/**
- **Ohio:** Consumer Health Library (Akron General Medical Center, Medical & Consumer Health Library), **http://www.akrongeneral.org/hwlibrary.htm**
- **Oklahoma:** The Health Information Center at Saint Francis Hospital (Saint Francis Health System, Tulsa), **http://www.sfh-tulsa.com/services/healthinfo.asp**
- **Oregon:** Planetree Health Resource Center (Mid-Columbia Medical Center, The Dalles), **http://www.mcmc.net/phrc/**
- **Pennsylvania:** Community Health Information Library (Milton S. Hershey Medical Center, Hershey), **http://www.hmc.psu.edu/commhealth/**
- **Pennsylvania:** Community Health Resource Library (Geisinger Medical Center, Danville), **http://www.geisinger.edu/education/commlib.shtml**
- **Pennsylvania:** HealthInfo Library (Moses Taylor Hospital, Scranton), **http://www.mth.org/healthwellness.html**
- **Pennsylvania:** Hopwood Library (University of Pittsburgh, Health Sciences Library System, Pittsburgh), **http://www.hsls.pitt.edu/guides/chi/hopwood/index_html**
- **Pennsylvania:** Koop Community Health Information Center (College of Physicians of Philadelphia), **http://www.collphyphil.org/kooppg1.shtml**
- **Pennsylvania:** Learning Resources Center - Medical Library (Susquehanna Health System, Williamsport), **http://www.shscares.org/services/lrc/index.asp**
- **Pennsylvania:** Medical Library (UPMC Health System, Pittsburgh), **http://www.upmc.edu/passavant/library.htm**
- **Quebec, Canada:** Medical Library (Montreal General Hospital), **http://www.mghlib.mcgill.ca/**

- **South Dakota:** Rapid City Regional Hospital Medical Library (Rapid City Regional Hospital), **http://www.rcrh.org/Services/Library/Default.asp**
- **Texas:** Houston HealthWays (Houston Academy of Medicine-Texas Medical Center Library), **http://hhw.library.tmc.edu/**
- **Washington:** Community Health Library (Kittitas Valley Community Hospital), **http://www.kvch.com/**
- **Washington:** Southwest Washington Medical Center Library (Southwest Washington Medical Center, Vancouver), **http://www.swmedicalcenter.com/body.cfm?id=72**

ONLINE GLOSSARIES

The Internet provides access to a number of free-to-use medical dictionaries. The National Library of Medicine has compiled the following list of online dictionaries:

- ADAM Medical Encyclopedia (A.D.A.M., Inc.), comprehensive medical reference: **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**
- MedicineNet.com Medical Dictionary (MedicineNet, Inc.): **http://www.medterms.com/Script/Main/hp.asp**
- Merriam-Webster Medical Dictionary (Inteli-Health, Inc.): **http://www.intelihealth.com/IH/**
- Multilingual Glossary of Technical and Popular Medical Terms in Eight European Languages (European Commission) - Danish, Dutch, English, French, German, Italian, Portuguese, and Spanish: **http://allserv.rug.ac.be/~rvdstich/eugloss/welcome.html**
- On-line Medical Dictionary (CancerWEB): **http://cancerweb.ncl.ac.uk/omd/**
- Rare Diseases Terms (Office of Rare Diseases): **http://ord.aspensys.com/asp/diseases/diseases.asp**
- Technology Glossary (National Library of Medicine) - Health Care Technology: **http://www.nlm.nih.gov/nichsr/ta101/ta10108.htm**

Beyond these, MEDLINEplus contains a very patient-friendly encyclopedia covering every aspect of medicine (licensed from A.D.A.M., Inc.). The ADAM Medical Encyclopedia can be accessed at **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**. ADAM is also available on commercial Web sites such as drkoop.com (**http://www.drkoop.com/**) and Web MD (**http://my.webmd.com/adam/asset/adam_disease_articles/a_to_z/a**).

Online Dictionary Directories

The following are additional online directories compiled by the National Library of Medicine, including a number of specialized medical dictionaries:

- Medical Dictionaries: Medical & Biological (World Health Organization): **http://www.who.int/hlt/virtuallibrary/English/diction.htm#Medical**
- MEL-Michigan Electronic Library List of Online Health and Medical Dictionaries (Michigan Electronic Library): **http://mel.lib.mi.us/health/health-dictionaries.html**
- Patient Education: Glossaries (DMOZ Open Directory Project): **http://dmoz.org/Health/Education/Patient_Education/Glossaries/**
- Web of Online Dictionaries (Bucknell University): **http://www.yourdictionary.com/diction5.html#medicine**

CORDYCEPS DICTIONARY

The definitions below are derived from official public sources, including the National Institutes of Health [NIH] and the European Union [EU].

Acceptor: A substance which, while normally not oxidized by oxygen or reduced by hydrogen, can be oxidized or reduced in presence of a substance which is itself undergoing oxidation or reduction. [NIH]

Adenine: A purine base and a fundamental unit of adenine nucleotides. [NIH]

Adenosine: A nucleoside that is composed of adenine and d-ribose. Adenosine or adenosine derivatives play many important biological roles in addition to being components of DNA and RNA. Adenosine itself is a neurotransmitter. [NIH]

Adverse Effect: An unwanted side effect of treatment. [NIH]

Affinity: 1. Inherent likeness or relationship. 2. A special attraction for a specific element, organ, or structure. 3. Chemical affinity; the force that binds atoms in molecules; the tendency of substances to combine by chemical reaction. 4. The strength of noncovalent chemical binding between two substances as measured by the dissociation constant of the complex. 5. In immunology, a thermodynamic expression of the strength of interaction between a single antigen-binding site and a single antigenic determinant (and thus of the stereochemical compatibility between them), most accurately applied to interactions among simple, uniform antigenic determinants such as haptens. Expressed as the association constant (K litres mole -1), which, owing to the heterogeneity of affinities in a population of antibody molecules of a given specificity, actually represents an average value (mean intrinsic association constant). 6. The reciprocal of the dissociation constant. [EU]

Age of Onset: The age or period of life at which a disease or the initial symptoms or manifestations of a disease appear in an individual. [NIH]

Algorithms: A procedure consisting of a sequence of algebraic formulas and/or logical steps to calculate or determine a given task. [NIH]

Alimentary: Pertaining to food or nutritive material, or to the organs of digestion. [EU]

Alkaline: Having the reactions of an alkali. [EU]

Allograft: An organ or tissue transplant between two humans. [NIH]

Alternative medicine: Practices not generally recognized by the medical community as standard or conventional medical approaches and used instead of standard treatments. Alternative medicine includes the taking of dietary supplements, megadose vitamins, and herbal preparations; the drinking of special teas; and practices such as massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

Amino Acids: 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. [NIH]

Amino Acids: 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. [NIH]

Anemia: A reduction in the number of circulating erythrocytes or in the quantity of hemoglobin. [NIH]

Antibiotic: A drug used to treat infections caused by bacteria and other microorganisms.

[NIH]

Antibody: A type of protein made by certain white blood cells in response to a foreign substance (antigen). Each antibody can bind to only a specific antigen. The purpose of this binding is to help destroy the antigen. Antibodies can work in several ways, depending on the nature of the antigen. Some antibodies destroy antigens directly. Others make it easier for white blood cells to destroy the antigen. [NIH]

Antifungal: Destructive to fungi, or suppressing their reproduction or growth; effective against fungal infections. [EU]

Antigen: Any substance which is capable, under appropriate conditions, of inducing a specific immune response and of reacting with the products of that response, that is, with specific antibody or specifically sensitized T-lymphocytes, or both. Antigens may be soluble substances, such as toxins and foreign proteins, or particulate, such as bacteria and tissue cells; however, only the portion of the protein or polysaccharide molecule known as the antigenic determinant (q.v.) combines with antibody or a specific receptor on a lymphocyte. Abbreviated Ag. [EU]

Anti-infective: An agent that so acts. [EU]

Anti-inflammatory: Having to do with reducing inflammation. [NIH]

Antimetabolite: A chemical that is very similar to one required in a normal biochemical reaction in cells. Antimetabolites can stop or slow down the reaction. [NIH]

Antineoplastic: Inhibiting or preventing the development of neoplasms, checking the maturation and proliferation of malignant cells. [EU]

Antiproliferative: Counteracting a process of proliferation. [EU]

Antitussive: An agent that relieves or prevents cough. [EU]

Anuria: Inability to form or excrete urine. [NIH]

Apoptosis: One of the two mechanisms by which cell death occurs (the other being the pathological process of necrosis). Apoptosis is the mechanism responsible for the physiological deletion of cells and appears to be intrinsically programmed. It is characterized by distinctive morphologic changes in the nucleus and cytoplasm, chromatin cleavage at regularly spaced sites, and the endonucleolytic cleavage of genomic DNA (DNA fragmentation) at internucleosomal sites. This mode of cell death serves as a balance to mitosis in regulating the size of animal tissues and in mediating pathologic processes associated with tumor growth. [NIH]

Aqueous: Having to do with water. [NIH]

Arginine: An essential amino acid that is physiologically active in the L-form. [NIH]

Arterioles: The smallest divisions of the arteries located between the muscular arteries and the capillaries. [NIH]

Artery: Vessel-carrying blood from the heart to various parts of the body. [NIH]

Autoimmune disease: A condition in which the body recognizes its own tissues as foreign and directs an immune response against them. [NIH]

Bacteria: Unicellular prokaryotic microorganisms which generally possess rigid cell walls, multiply by cell division, and exhibit three principal forms: round or coccal, rodlike or bacillary, and spiral or spirochetal. [NIH]

Bactericidal: Substance lethal to bacteria; substance capable of killing bacteria. [NIH]

Base: In chemistry, the nonacid part of a salt; a substance that combines with acids to form salts; a substance that dissociates to give hydroxide ions in aqueous solutions; a substance whose molecule or ion can combine with a proton (hydrogen ion); a substance capable of

donating a pair of electrons (to an acid) for the formation of a coordinate covalent bond. [EU]

Bewilderment: Impairment or loss of will power. [NIH]

Bile: An emulsifying agent produced in the liver and secreted into the duodenum. Its composition includes bile acids and salts, cholesterol, and electrolytes. It aids digestion of fats in the duodenum. [NIH]

Bile Acids: Acids made by the liver that work with bile to break down fats. [NIH]

Bile Acids and Salts: Steroid acids and salts. The primary bile acids are derived from cholesterol in the liver and usually conjugated with glycine or taurine. The secondary bile acids are further modified by bacteria in the intestine. They play an important role in the digestion and absorption of fat. They have also been used pharmacologically, especially in the treatment of gallstones. [NIH]

Bile duct: A tube through which bile passes in and out of the liver. [NIH]

Biochemical: Relating to biochemistry; characterized by, produced by, or involving chemical reactions in living organisms. [EU]

Biomass: Total mass of all the organisms of a given type and/or in a given area. (From Concise Dictionary of Biology, 1990) It includes the yield of vegetative mass produced from any given crop. [NIH]

Biosynthesis: The building up of a chemical compound in the physiologic processes of a living organism. [EU]

Biotechnology: 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. [NIH]

Blood Coagulation: The process of the interaction of blood coagulation factors that results in an insoluble fibrin clot. [NIH]

Blood Glucose: Glucose in blood. [NIH]

Blood pressure: The pressure of blood against the walls of a blood vessel or heart chamber. Unless there is reference to another location, such as the pulmonary artery or one of the heart chambers, it refers to the pressure in the systemic arteries, as measured, for example, in the forearm. [NIH]

Blood vessel: A tube in the body through which blood circulates. Blood vessels include a network of arteries, arterioles, capillaries, venules, and veins. [NIH]

Body Fluids: Liquid components of living organisms. [NIH]

Bone Marrow: The soft tissue filling the cavities of bones. Bone marrow exists in two types, yellow and red. Yellow marrow is found in the large cavities of large bones and consists mostly of fat cells and a few primitive blood cells. Red marrow is a hematopoietic tissue and is the site of production of erythrocytes and granular leukocytes. Bone marrow is made up of a framework of connective tissue containing branching fibers with the frame being filled with marrow cells. [NIH]

Boron: A trace element with the atomic symbol B, atomic number 5, and atomic weight 10.81. Boron-10, an isotope of boron, is used as a neutron absorber in boron neutron capture therapy. [NIH]

Bronchoalveolar Lavage: Washing out of the lungs with saline or mucolytic agents for diagnostic or therapeutic purposes. It is very useful in the diagnosis of diffuse pulmonary

infiltrates in immunosuppressed patients. [NIH]

Bronchoalveolar Lavage Fluid: Fluid obtained by washout of the alveolar compartment of the lung. It is used to assess biochemical and inflammatory changes in and effects of therapy on the interstitial lung tissue. [NIH]

Calcium: A basic element found in nearly all organized tissues. It is a member of the alkaline earth family of metals with the atomic symbol Ca, atomic number 20, and atomic weight 40. Calcium is the most abundant mineral in the body and combines with phosphorus to form calcium phosphate in the bones and teeth. It is essential for the normal functioning of nerves and muscles and plays a role in blood coagulation (as factor IV) and in many enzymatic processes. [NIH]

Calcium Carbonate: Carbonic acid calcium salt (CaCO3). An odorless, tasteless powder or crystal that occurs in nature. It is used therapeutically as a phosphate buffer in hemodialysis patients and as a calcium supplement. [NIH]

Capillary: Any one of the minute vessels that connect the arterioles and venules, forming a network in nearly all parts of the body. Their walls act as semipermeable membranes for the interchange of various substances, including fluids, between the blood and tissue fluid; called also vas capillare. [EU]

Carbohydrate: An aldehyde or ketone derivative of a polyhydric alcohol, particularly of the pentahydric and hexahydric alcohols. They are so named because the hydrogen and oxygen are usually in the proportion to form water, (CH2O)n. The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

Carcinoma: Cancer that begins in the skin or in tissues that line or cover internal organs. [NIH]

Cardiogenic: Originating in the heart; caused by abnormal function of the heart. [EU]

Cardiotonic: 1. Having a tonic effect on the heart. 2. An agent that has a tonic effect on the heart. [EU]

Cardiovascular: Having to do with the heart and blood vessels. [NIH]

Cardiovascular System: The heart and the blood vessels by which blood is pumped and circulated through the body. [NIH]

Case report: A detailed report of the diagnosis, treatment, and follow-up of an individual patient. Case reports also contain some demographic information about the patient (for example, age, gender, ethnic origin). [NIH]

Cell: The individual unit that makes up all of the tissues of the body. All living things are made up of one or more cells. [NIH]

Cell Cycle: The complex series of phenomena, occurring between the end of one cell division and the end of the next, by which cellular material is divided between daughter cells. [NIH]

Cell Death: The termination of the cell's ability to carry out vital functions such as metabolism, growth, reproduction, responsiveness, and adaptability. [NIH]

Cell Division: The fission of a cell. [NIH]

Cell proliferation: An increase in the number of cells as a result of cell growth and cell division. [NIH]

Chlorophyll: Porphyrin derivatives containing magnesium that act to convert light energy in photosynthetic organisms. [NIH]

Cholesterol: The principal sterol of all higher animals, distributed in body tissues, especially

the brain and spinal cord, and in animal fats and oils. [NIH]

Chromatin: The material of chromosomes. It is a complex of DNA, histones, and nonhistone proteins (chromosomal proteins, non-histone) found within the nucleus of a cell. [NIH]

Chromosomal: Pertaining to chromosomes. [EU]

Chromosome: Part of a cell that contains genetic information. Except for sperm and eggs, all human cells contain 46 chromosomes. [NIH]

Chronic: A disease or condition that persists or progresses over a long period of time. [NIH]

Chronic renal: Slow and progressive loss of kidney function over several years, often resulting in end-stage renal disease. People with end-stage renal disease need dialysis or transplantation to replace the work of the kidneys. [NIH]

Clinical trial: A research study that tests how well new medical treatments or other interventions work in people. Each study is designed to test new methods of screening, prevention, diagnosis, or treatment of a disease. [NIH]

Cloning: The production of a number of genetically identical individuals; in genetic engineering, a process for the efficient replication of a great number of identical DNA molecules. [NIH]

Coenzyme: An organic nonprotein molecule, frequently a phosphorylated derivative of a water-soluble vitamin, that binds with the protein molecule (apoenzyme) to form the active enzyme (holoenzyme). [EU]

Collapse: 1. A state of extreme prostration and depression, with failure of circulation. 2. Abnormal falling in of the walls of any part of organ. [EU]

Colloidal: Of the nature of a colloid. [EU]

Complement: A term originally used to refer to the heat-labile factor in serum that causes immune cytolysis, the lysis of antibody-coated cells, and now referring to the entire functionally related system comprising at least 20 distinct serum proteins that is the effector not only of immune cytolysis but also of other biologic functions. Complement activation occurs by two different sequences, the classic and alternative pathways. The proteins of the classic pathway are termed 'components of complement' and are designated by the symbols C1 through C9. C1 is a calcium-dependent complex of three distinct proteins C1q, C1r and C1s. The proteins of the alternative pathway (collectively referred to as the properdin system) and complement regulatory proteins are known by semisystematic or trivial names. Fragments resulting from proteolytic cleavage of complement proteins are designated with lower-case letter suffixes, e.g., C3a. Inactivated fragments may be designated with the suffix 'i', e.g. C3bi. Activated components or complexes with biological activity are designated by a bar over the symbol e.g. C1 or C4b,2a. The classic pathway is activated by the binding of C1 to classic pathway activators, primarily antigen-antibody complexes containing IgM, IgG1, IgG3; C1q binds to a single IgM molecule or two adjacent IgG molecules. The alternative pathway can be activated by IgA immune complexes and also by nonimmunologic materials including bacterial endotoxins, microbial polysaccharides, and cell walls. Activation of the classic pathway triggers an enzymatic cascade involving C1, C4, C2 and C3; activation of the alternative pathway triggers a cascade involving C3 and factors B, D and P. Both result in the cleavage of C5 and the formation of the membrane attack complex. Complement activation also results in the formation of many biologically active complement fragments that act as anaphylatoxins, opsonins, or chemotactic factors. [EU]

Complementary and alternative medicine: CAM. Forms of treatment that are used in addition to (complementary) or instead of (alternative) standard treatments. These practices are not considered standard medical approaches. CAM includes dietary supplements, megadose vitamins, herbal preparations, special teas, massage therapy, magnet therapy,

spiritual healing, and meditation. [NIH]

Complementary medicine: Practices not generally recognized by the medical community as standard or conventional medical approaches and used to enhance or complement the standard treatments. Complementary medicine includes the taking of dietary supplements, megadose vitamins, and herbal preparations; the drinking of special teas; and practices such as massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

Computational Biology: A field of biology concerned with the development of techniques for the collection and manipulation of biological data, and the use of such data to make biological discoveries or predictions. This field encompasses all computational methods and theories applicable to molecular biology and areas of computer-based techniques for solving biological problems including manipulation of models and datasets. [NIH]

Concomitant: Accompanying; accessory; joined with another. [EU]

Confusion: A mental state characterized by bewilderment, emotional disturbance, lack of clear thinking, and perceptual disorientation. [NIH]

Conjugated: Acting or operating as if joined; simultaneous. [EU]

Connective Tissue: Tissue that supports and binds other tissues. It consists of connective tissue cells embedded in a large amount of extracellular matrix. [NIH]

Connective Tissue: Tissue that supports and binds other tissues. It consists of connective tissue cells embedded in a large amount of extracellular matrix. [NIH]

Constriction: The act of constricting. [NIH]

Contraindications: Any factor or sign that it is unwise to pursue a certain kind of action or treatment, e. g. giving a general anesthetic to a person with pneumonia. [NIH]

Cordycepin: An anticancer drug that belongs to a family of drugs called antitumor antibiotics. [NIH]

Cornea: The transparent part of the eye that covers the iris and the pupil and allows light to enter the inside. [NIH]

Corpus: The body of the uterus. [NIH]

Corpus Luteum: The yellow glandular mass formed in the ovary by an ovarian follicle that has ruptured and discharged its ovum. [NIH]

Cortex: The outer layer of an organ or other body structure, as distinguished from the internal substance. [EU]

Coumarin: A fluorescent dye. [NIH]

Creatinine: A compound that is excreted from the body in urine. Creatinine levels are measured to monitor kidney function. [NIH]

Curcumin: A dye obtained from tumeric, the powdered root of Curcuma longa Linn. It is used in the preparation of curcuma paper and the detection of boron. Curcumin appears to possess a spectrum of pharmacological properties, due primarily to its inhibitory effects on metabolic enzymes. [NIH]

Cytoplasm: The protoplasm of a cell exclusive of that of the nucleus; it consists of a continuous aqueous solution (cytosol) and the organelles and inclusions suspended in it (phaneroplasm), and is the site of most of the chemical activities of the cell. [EU]

Deletion: A genetic rearrangement through loss of segments of DNA (chromosomes), bringing sequences, which are normally separated, into close proximity. [NIH]

Deoxyribonucleic: A polymer of subunits called deoxyribonucleotides which is the primary genetic material of a cell, the material equivalent to genetic information. [NIH]

Deoxyribonucleic acid: A polymer of subunits called deoxyribonucleotides which is the primary genetic material of a cell, the material equivalent to genetic information. [NIH]

Deuterium: Deuterium. The stable isotope of hydrogen. It has one neutron and one proton in the nucleus. [NIH]

Diagnostic procedure: A method used to identify a disease. [NIH]

Dietary Fiber: The remnants of plant cell walls that are resistant to digestion by the alimentary enzymes of man. It comprises various polysaccharides and lignins. [NIH]

Digestion: The process of breakdown of food for metabolism and use by the body. [NIH]

Direct: 1. Straight; in a straight line. 2. Performed immediately and without the intervention of subsidiary means. [EU]

Disinfectant: An agent that disinfects; applied particularly to agents used on inanimate objects. [EU]

Disorientation: The loss of proper bearings, or a state of mental confusion as to time, place, or identity. [EU]

Duct: A tube through which body fluids pass. [NIH]

Duodenum: The first part of the small intestine. [NIH]

Electrolyte: A substance that dissociates into ions when fused or in solution, and thus becomes capable of conducting electricity; an ionic solute. [EU]

Electrons: Stable elementary particles having the smallest known negative charge, present in all elements; also called negatrons. Positively charged electrons are called positrons. The numbers, energies and arrangement of electrons around atomic nuclei determine the chemical identities of elements. Beams of electrons are called cathode rays or beta rays, the latter being a high-energy biproduct of nuclear decay. [NIH]

Electrophoresis: An electrochemical process in which macromolecules or colloidal particles with a net electric charge migrate in a solution under the influence of an electric current. [NIH]

End-stage renal: Total chronic kidney failure. When the kidneys fail, the body retains fluid and harmful wastes build up. A person with ESRD needs treatment to replace the work of the failed kidneys. [NIH]

Environmental Health: The science of controlling or modifying those conditions, influences, or forces surrounding man which relate to promoting, establishing, and maintaining health. [NIH]

Enzymatic: Phase where enzyme cuts the precursor protein. [NIH]

Enzyme: A protein that speeds up chemical reactions in the body. [NIH]

Epidemic: Occurring suddenly in numbers clearly in excess of normal expectancy; said especially of infectious diseases but applied also to any disease, injury, or other health-related event occurring in such outbreaks. [EU]

Epinephrine: The active sympathomimetic hormone from the adrenal medulla in most species. It stimulates both the alpha- and beta- adrenergic systems, causes systemic vasoconstriction and gastrointestinal relaxation, stimulates the heart, and dilates bronchi and cerebral vessels. It is used in asthma and cardiac failure and to delay absorption of local anesthetics. [NIH]

Erythrocytes: Red blood cells. Mature erythrocytes are non-nucleated, biconcave disks containing hemoglobin whose function is to transport oxygen. [NIH]

Erythropoiesis: The production of erythrocytes. [EU]

Estradiol: The most potent mammalian estrogenic hormone. It is produced in the ovary, placenta, testis, and possibly the adrenal cortex. [NIH]

Ethanol: A clear, colorless liquid rapidly absorbed from the gastrointestinal tract and distributed throughout the body. It has bactericidal activity and is used often as a topical disinfectant. It is widely used as a solvent and preservative in pharmaceutical preparations as well as serving as the primary ingredient in alcoholic beverages. [NIH]

Excrete: To get rid of waste from the body. [NIH]

Exogenous: Developed or originating outside the organism, as exogenous disease. [EU]

Extracellular: Outside a cell or cells. [EU]

Extraction: The process or act of pulling or drawing out. [EU]

Family Planning: Programs or services designed to assist the family in controlling reproduction by either improving or diminishing fertility. [NIH]

Fat: Total lipids including phospholipids. [NIH]

Fatigue: The state of weariness following a period of exertion, mental or physical, characterized by a decreased capacity for work and reduced efficiency to respond to stimuli. [NIH]

Fermentation: An enzyme-induced chemical change in organic compounds that takes place in the absence of oxygen. The change usually results in the production of ethanol or lactic acid, and the production of energy. [NIH]

Fibrosis: Any pathological condition where fibrous connective tissue invades any organ, usually as a consequence of inflammation or other injury. [NIH]

Folate: A B-complex vitamin that is being studied as a cancer prevention agent. Also called folic acid. [NIH]

Folic Acid: N-(4-(((2-Amino-1,4-dihydro-4-oxo-6-pteridinyl)methyl)amino)benzoyl)-L-glutamic acid. A member of the vitamin B family that stimulates the hematopoietic system. It is present in the liver and kidney and is found in mushrooms, spinach, yeast, green leaves, and grasses. Folic acid is used in the treatment and prevention of folate deficiencies and megaloblastic anemia. [NIH]

Fungistatic: Inhibiting the growth of fungi. [EU]

Fungus: A general term used to denote a group of eukaryotic protists, including mushrooms, yeasts, rusts, moulds, smuts, etc., which are characterized by the absence of chlorophyll and by the presence of a rigid cell wall composed of chitin, mannans, and sometimes cellulose. They are usually of simple morphological form or show some reversible cellular specialization, such as the formation of pseudoparenchymatous tissue in the fruiting body of a mushroom. The dimorphic fungi grow, according to environmental conditions, as moulds or yeasts. [EU]

Gas: Air that comes from normal breakdown of food. The gases are passed out of the body through the rectum (flatus) or the mouth (burp). [NIH]

Gastric: Having to do with the stomach. [NIH]

Gastric Acid: Hydrochloric acid present in gastric juice. [NIH]

Gastrointestinal: Refers to the stomach and intestines. [NIH]

Gastrointestinal tract: The stomach and intestines. [NIH]

Gene: The functional and physical unit of heredity passed from parent to offspring. Genes are pieces of DNA, and most genes contain the information for making a specific protein. [NIH]

Ginseng: An araliaceous genus of plants that contains a number of pharmacologically active agents used as stimulants, sedatives, and tonics, especially in traditional medicine. [NIH]

Gland: An organ that produces and releases one or more substances for use in the body. Some glands produce fluids that affect tissues or organs. Others produce hormones or participate in blood production. [NIH]

Glomerular: Pertaining to or of the nature of a glomerulus, especially a renal glomerulus. [EU]

Glomerulus: A tiny set of looping blood vessels in the nephron where blood is filtered in the kidney. [NIH]

Glucose: D-Glucose. A primary source of energy for living organisms. It is naturally occurring and is found in fruits and other parts of plants in its free state. It is used therapeutically in fluid and nutrient replacement. [NIH]

Glucose tolerance: The power of the normal liver to absorb and store large quantities of glucose and the effectiveness of intestinal absorption of glucose. The glucose tolerance test is a metabolic test of carbohydrate tolerance that measures active insulin, a hepatic function based on the ability of the liver to absorb glucose. The test consists of ingesting 100 grams of glucose into a fasting stomach; blood sugar should return to normal in 2 to 21 hours after ingestion. [NIH]

Glucose Tolerance Test: Determination of whole blood or plasma sugar in a fasting state before and at prescribed intervals (usually 1/2 hr, 1 hr, 3 hr, 4 hr) after taking a specified amount (usually 100 gm orally) of glucose. [NIH]

Glutamic Acid: A non-essential amino acid naturally occurring in the L-form. Glutamic acid (glutamate) is the most common excitatory neurotransmitter in the central nervous system. [NIH]

Glutathione Peroxidase: An enzyme catalyzing the oxidation of 2 moles of glutathione in the presence of hydrogen peroxide to yield oxidized glutathione and water. EC 1.11.1.9. [NIH]

Glycine: A non-essential amino acid. It is found primarily in gelatin and silk fibroin and used therapeutically as a nutrient. It is also a fast inhibitory neurotransmitter. [NIH]

Glycoprotein: A protein that has sugar molecules attached to it. [NIH]

Governing Board: The group in which legal authority is vested for the control of health-related institutions and organizations. [NIH]

Granulosa Cells: Cells of the membrana granulosa lining the vesicular ovarian follicle which become luteal cells after ovulation. [NIH]

Grasses: A large family, Gramineae, of narrow-leaved herbaceous monocots. Many grasses produce highly allergenic pollens and are hosts to cattle parasites and toxic fungi. [NIH]

Heart failure: Loss of pumping ability by the heart, often accompanied by fatigue, breathlessness, and excess fluid accumulation in body tissues. [NIH]

Hematuria: Presence of blood in the urine. [NIH]

Hemodialysis: The use of a machine to clean wastes from the blood after the kidneys have failed. The blood travels through tubes to a dialyzer, which removes wastes and extra fluid. The cleaned blood then flows through another set of tubes back into the body. [NIH]

Hemorrhaging: A copious discharge of blood from the blood vessels. [NIH]

Hepatic: Refers to the liver. [NIH]

Hepatoma: A liver tumor. [NIH]

Heredity: 1. The genetic transmission of a particular quality or trait from parent to offspring.

2. The genetic constitution of an individual. [EU]

Histones: Small chromosomal proteins (approx 12-20 kD) possessing an open, unfolded structure and attached to the DNA in cell nuclei by ionic linkages. Classification into the various types (designated histone I, histone II, etc.) is based on the relative amounts of arginine and lysine in each. [NIH]

Homeostasis: The processes whereby the internal environment of an organism tends to remain balanced and stable. [NIH]

Hormone: A substance in the body that regulates certain organs. Hormones such as gastrin help in breaking down food. Some hormones come from cells in the stomach and small intestine. [NIH]

Hydrogen: The first chemical element in the periodic table. It has the atomic symbol H, atomic number 1, and atomic weight 1. It exists, under normal conditions, as a colorless, odorless, tasteless, diatomic gas. Hydrogen ions are protons. Besides the common H1 isotope, hydrogen exists as the stable isotope deuterium and the unstable, radioactive isotope tritium. [NIH]

Hydrogen Peroxide: A strong oxidizing agent used in aqueous solution as a ripening agent, bleach, and topical anti-infective. It is relatively unstable and solutions deteriorate over time unless stabilized by the addition of acetanilide or similar organic materials. [NIH]

Hypoglycemic: An orally active drug that produces a fall in blood glucose concentration. [NIH]

Hypotensive: Characterized by or causing diminished tension or pressure, as abnormally low blood pressure. [EU]

Immune response: The activity of the immune system against foreign substances (antigens). [NIH]

Immune system: The organs, cells, and molecules responsible for the recognition and disposal of foreign ("non-self") material which enters the body. [NIH]

Immunosuppressant: An agent capable of suppressing immune responses. [EU]

In vitro: In the laboratory (outside the body). The opposite of in vivo (in the body). [NIH]

In vivo: In the body. The opposite of in vitro (outside the body or in the laboratory). [NIH]

Infarction: A pathological process consisting of a sudden insufficient blood supply to an area, which results in necrosis of that area. It is usually caused by a thrombus, an embolus, or a vascular torsion. [NIH]

Infection: 1. Invasion and multiplication of microorganisms in body tissues, which may be clinically unapparent or result in local cellular injury due to competitive metabolism, toxins, intracellular replication, or antigen-antibody response. The infection may remain localized, subclinical, and temporary if the body's defensive mechanisms are effective. A local infection may persist and spread by extension to become an acute, subacute, or chronic clinical infection or disease state. A local infection may also become systemic when the microorganisms gain access to the lymphatic or vascular system. 2. An infectious disease. [EU]

Inflammation: A pathological process characterized by injury or destruction of tissues caused by a variety of cytologic and chemical reactions. It is usually manifested by typical signs of pain, heat, redness, swelling, and loss of function. [NIH]

Ingestion: Taking into the body by mouth [NIH]

Inhalation: The drawing of air or other substances into the lungs. [EU]

Inorganic: Pertaining to substances not of organic origin. [EU]

Insulin: A protein hormone secreted by beta cells of the pancreas. Insulin plays a major role in the regulation of glucose metabolism, generally promoting the cellular utilization of glucose. It is also an important regulator of protein and lipid metabolism. Insulin is used as a drug to control insulin-dependent diabetes mellitus. [NIH]

Insulin-dependent diabetes mellitus: A disease characterized by high levels of blood glucose resulting from defects in insulin secretion, insulin action, or both. Autoimmune, genetic, and environmental factors are involved in the development of type I diabetes. [NIH]

Interstitial: Pertaining to or situated between parts or in the interspaces of a tissue. [EU]

Intestinal: Having to do with the intestines. [NIH]

Intestines: The section of the alimentary canal from the stomach to the anus. It includes the large intestine and small intestine. [NIH]

Intracellular: Inside a cell. [NIH]

Introns: Non-coding, intervening sequences of DNA that are transcribed, but are removed from within the primary gene transcript and rapidly degraded during maturation of messenger RNA. Most genes in the nuclei of eukaryotes contain introns, as do mitochondrial and chloroplast genes. [NIH]

Ions: An atom or group of atoms that have a positive or negative electric charge due to a gain (negative charge) or loss (positive charge) of one or more electrons. Atoms with a positive charge are known as cations; those with a negative charge are anions. [NIH]

Ischemia: Deficiency of blood in a part, due to functional constriction or actual obstruction of a blood vessel. [EU]

Kb: A measure of the length of DNA fragments, 1 Kb = 1000 base pairs. The largest DNA fragments are up to 50 kilobases long. [NIH]

Keto: It consists of 8 carbon atoms and within the endotoxins, it connects poysaccharide and lipid A. [NIH]

Kidney Disease: Any one of several chronic conditions that are caused by damage to the cells of the kidney. People who have had diabetes for a long time may have kidney damage. Also called nephropathy. [NIH]

Kidney Failure: The inability of a kidney to excrete metabolites at normal plasma levels under conditions of normal loading, or the inability to retain electrolytes under conditions of normal intake. In the acute form (kidney failure, acute), it is marked by uremia and usually by oliguria or anuria, with hyperkalemia and pulmonary edema. The chronic form (kidney failure, chronic) is irreversible and requires hemodialysis. [NIH]

Kidney Failure, Acute: A clinical syndrome characterized by a sudden decrease in glomerular filtration rate, often to values of less than 1 to 2 ml per minute. It is usually associated with oliguria (urine volumes of less than 400 ml per day) and is always associated with biochemical consequences of the reduction in glomerular filtration rate such as a rise in blood urea nitrogen (BUN) and serum creatinine concentrations. [NIH]

Kidney Failure, Chronic: An irreversible and usually progressive reduction in renal function in which both kidneys have been damaged by a variety of diseases to the extent that they are unable to adequately remove the metabolic products from the blood and regulate the body's electrolyte composition and acid-base balance. Chronic kidney failure requires hemodialysis or surgery, usually kidney transplantation. [NIH]

Killer Cells: Lymphocyte-like effector cells which mediate antibody-dependent cell cytotoxicity. They kill antibody-coated target cells which they bind with their Fc receptors. [NIH]

Lesion: An area of abnormal tissue change. [NIH]

Leukemia: Cancer of blood-forming tissue. [NIH]

Life cycle: The successive stages through which an organism passes from fertilized ovum or spore to the fertilized ovum or spore of the next generation. [NIH]

Ligation: Application of a ligature to tie a vessel or strangulate a part. [NIH]

Linkage: The tendency of two or more genes in the same chromosome to remain together from one generation to the next more frequently than expected according to the law of independent assortment. [NIH]

Lipid: Fat. [NIH]

Liver: A large, glandular organ located in the upper abdomen. The liver cleanses the blood and aids in digestion by secreting bile. [NIH]

Liver Cirrhosis: Liver disease in which the normal microcirculation, the gross vascular anatomy, and the hepatic architecture have been variably destroyed and altered with fibrous septa surrounding regenerated or regenerating parenchymal nodules. [NIH]

Localized: Cancer which has not metastasized yet. [NIH]

Lutein Cells: The cells of the corpus luteum which are derived from the granulosa cells and the theca cells of the Graafian follicle. [NIH]

Lycopene: A red pigment found in tomatoes and some fruits. [NIH]

Lymphatic: The tissues and organs, including the bone marrow, spleen, thymus, and lymph nodes, that produce and store cells that fight infection and disease. [NIH]

Lymphocyte Subsets: A classification of lymphocytes based on structurally or functionally different populations of cells. [NIH]

Lymphocytes: White blood cells formed in the body's lymphoid tissue. The nucleus is round or ovoid with coarse, irregularly clumped chromatin while the cytoplasm is typically pale blue with azurophilic (if any) granules. Most lymphocytes can be classified as either T or B (with subpopulations of each); those with characteristics of neither major class are called null cells. [NIH]

Lymphoid: Referring to lymphocytes, a type of white blood cell. Also refers to tissue in which lymphocytes develop. [NIH]

Lysine: An essential amino acid. It is often added to animal feed. [NIH]

Macrophage: A type of white blood cell that surrounds and kills microorganisms, removes dead cells, and stimulates the action of other immune system cells. [NIH]

Major Histocompatibility Complex: The genetic region which contains the loci of genes which determine the structure of the serologically defined (SD) and lymphocyte-defined (LD) transplantation antigens, genes which control the structure of the immune response-associated (Ia) antigens, the immune response (Ir) genes which control the ability of an animal to respond immunologically to antigenic stimuli, and genes which determine the structure and/or level of the first four components of complement. [NIH]

Mannans: Polysaccharides consisting of mannose units. [NIH]

Mannitol: A diuretic and renal diagnostic aid related to sorbitol. It has little significant energy value as it is largely eliminated from the body before any metabolism can take place. It can be used to treat oliguria associated with kidney failure or other manifestations of inadequate renal function and has been used for determination of glomerular filtration rate. Mannitol is also commonly used as a research tool in cell biological studies, usually to control osmolarity. [NIH]

MEDLINE: An online database of MEDLARS, the computerized bibliographic Medical Literature Analysis and Retrieval System of the National Library of Medicine. [NIH]

Megaloblastic: A large abnormal red blood cell appearing in the blood in pernicious anaemia. [EU]

Melanin: The substance that gives the skin its color. [NIH]

Melanocytes: Epidermal dendritic pigment cells which control long-term morphological color changes by alteration in their number or in the amount of pigment they produce and store in the pigment containing organelles called melanosomes. Melanophores are larger cells which do not exist in mammals. [NIH]

Melanoma: A form of skin cancer that arises in melanocytes, the cells that produce pigment. Melanoma usually begins in a mole. [NIH]

Membranes: Thin layers of tissue which cover parts of the body, separate adjacent cavities, or connect adjacent structures. [NIH]

Memory: Complex mental function having four distinct phases: (1) memorizing or learning, (2) retention, (3) recall, and (4) recognition. Clinically, it is usually subdivided into immediate, recent, and remote memory. [NIH]

Mental: Pertaining to the mind; psychic. 2. (L. mentum chin) pertaining to the chin. [EU]

Metabolite: Any substance produced by metabolism or by a metabolic process. [EU]

Metastasis: The spread of cancer from one part of the body to another. Tumors formed from cells that have spread are called "secondary tumors" and contain cells that are like those in the original (primary) tumor. The plural is metastases. [NIH]

Methotrexate: An antineoplastic antimetabolite with immunosuppressant properties. It is an inhibitor of dihydrofolate reductase and prevents the formation of tetrahydrofolate, necessary for synthesis of thymidylate, an essential component of DNA. [NIH]

Microcirculation: The vascular network lying between the arterioles and venules; includes capillaries, metarterioles and arteriovenous anastomoses. Also, the flow of blood through this network. [NIH]

Microorganism: An organism that can be seen only through a microscope. Microorganisms include bacteria, protozoa, algae, and fungi. Although viruses are not considered living organisms, they are sometimes classified as microorganisms. [NIH]

Mitosis: A method of indirect cell division by means of which the two daughter nuclei normally receive identical complements of the number of chromosomes of the somatic cells of the species. [NIH]

Molecular: Of, pertaining to, or composed of molecules : a very small mass of matter. [EU]

Molecule: A chemical made up of two or more atoms. The atoms in a molecule can be the same (an oxygen molecule has two oxygen atoms) or different (a water molecule has two hydrogen atoms and one oxygen atom). Biological molecules, such as proteins and DNA, can be made up of many thousands of atoms. [NIH]

Monitor: An apparatus which automatically records such physiological signs as respiration, pulse, and blood pressure in an anesthetized patient or one undergoing surgical or other procedures. [NIH]

Morphological: Relating to the configuration or the structure of live organs. [NIH]

Morphology: The science of the form and structure of organisms (plants, animals, and other forms of life). [NIH]

Mucolytic: Destroying or dissolving mucin; an agent that so acts : a mucopolysaccharide or glycoprotein, the chief constituent of mucus. [EU]

Myocarditis: Inflammation of the myocardium; inflammation of the muscular walls of the heart. [EU]

Myocardium: The muscle tissue of the heart composed of striated, involuntary muscle known as cardiac muscle. [NIH]

Naphthoquinones: Naphthalene rings which contain two ketone moieties in any position. They can be substituted in any position except at the ketone groups. [NIH]

Natural killer cells: NK cells. A type of white blood cell that contains granules with enzymes that can kill tumor cells or microbial cells. Also called large granular lymphocytes (LGL). [NIH]

Nausea: An unpleasant sensation in the stomach usually accompanied by the urge to vomit. Common causes are early pregnancy, sea and motion sickness, emotional stress, intense pain, food poisoning, and various enteroviruses. [NIH]

Necrosis: A pathological process caused by the progressive degradative action of enzymes that is generally associated with severe cellular trauma. It is characterized by mitochondrial swelling, nuclear flocculation, uncontrolled cell lysis, and ultimately cell death. [NIH]

Neoplasm: A new growth of benign or malignant tissue. [NIH]

Nephropathy: Disease of the kidneys. [EU]

Nervous System: The entire nerve apparatus composed of the brain, spinal cord, nerves and ganglia. [NIH]

Neurotransmitter: Any of a group of substances that are released on excitation from the axon terminal of a presynaptic neuron of the central or peripheral nervous system and travel across the synaptic cleft to either excite or inhibit the target cell. Among the many substances that have the properties of a neurotransmitter are acetylcholine, norepinephrine, epinephrine, dopamine, glycine, y-aminobutyrate, glutamic acid, substance P, enkephalins, endorphins, and serotonin. [EU]

Nitrogen: An element with the atomic symbol N, atomic number 7, and atomic weight 14. Nitrogen exists as a diatomic gas and makes up about 78% of the earth's atmosphere by volume. It is a constituent of proteins and nucleic acids and found in all living cells. [NIH]

Nuclear: A test of the structure, blood flow, and function of the kidneys. The doctor injects a mildly radioactive solution into an arm vein and uses x-rays to monitor its progress through the kidneys. [NIH]

Nuclear Proteins: Proteins found in the nucleus of a cell. Do not confuse with nucleoproteins which are proteins conjugated with nucleic acids, that are not necessarily present in the nucleus. [NIH]

Nuclei: A body of specialized protoplasm found in nearly all cells and containing the chromosomes. [NIH]

Nucleic acid: Either of two types of macromolecule (DNA or RNA) formed by polymerization of nucleotides. Nucleic acids are found in all living cells and contain the information (genetic code) for the transfer of genetic information from one generation to the next. [NIH]

Nucleoproteins: Proteins conjugated with nucleic acids. [NIH]

Nucleus: A body of specialized protoplasm found in nearly all cells and containing the chromosomes. [NIH]

Oliguria: Clinical manifestation of the urinary system consisting of a decrease in the amount of urine secreted. [NIH]

Oral Health: The optimal state of the mouth and normal functioning of the organs of the mouth without evidence of disease. [NIH]

Ovary: Either of the paired glands in the female that produce the female germ cells and

secrete some of the female sex hormones. [NIH]

Ovum: A female germ cell extruded from the ovary at ovulation. [NIH]

Oxidation: The act of oxidizing or state of being oxidized. Chemically it consists in the increase of positive charges on an atom or the loss of negative charges. Most biological oxidations are accomplished by the removal of a pair of hydrogen atoms (dehydrogenation) from a molecule. Such oxidations must be accompanied by reduction of an acceptor molecule. Univalent o. indicates loss of one electron; divalent o., the loss of two electrons. [EU]

Pancreas: A mixed exocrine and endocrine gland situated transversely across the posterior abdominal wall in the epigastric and hypochondriac regions. The endocrine portion is comprised of the Islets of Langerhans, while the exocrine portion is a compound acinar gland that secretes digestive enzymes. [NIH]

Parasite: An animal or a plant that lives on or in an organism of another species and gets at least some of its nutrition from that other organism. [NIH]

Parasitic: Having to do with or being a parasite. A parasite is an animal or a plant that lives on or in an organism of another species and gets at least some of its nutrients from it. [NIH]

Pathogen: Any disease-producing microorganism. [EU]

Pathologic: 1. Indicative of or caused by a morbid condition. 2. Pertaining to pathology (= branch of medicine that treats the essential nature of the disease, especially the structural and functional changes in tissues and organs of the body caused by the disease). [EU]

Pathologic Processes: The abnormal mechanisms and forms involved in the dysfunctions of tissues and organs. [NIH]

Perennial: Lasting through the year of for several years. [EU]

Peroxide: Chemical compound which contains an atom group with two oxygen atoms tied to each other. [NIH]

Pharmacologic: Pertaining to pharmacology or to the properties and reactions of drugs. [EU]

Phenylalanine: An aromatic amino acid that is essential in the animal diet. It is a precursor of melanin, dopamine, noradrenalin, and thyroxine. [NIH]

Phosphorus: A non-metallic element that is found in the blood, muscles, nevers, bones, and teeth, and is a component of adenosine triphosphate (ATP; the primary energy source for the body's cells.) [NIH]

Phosphorylated: Attached to a phosphate group. [NIH]

Phosphorylation: The introduction of a phosphoryl group into a compound through the formation of an ester bond between the compound and a phosphorus moiety. [NIH]

Physiologic: Having to do with the functions of the body. When used in the phrase "physiologic age," it refers to an age assigned by general health, as opposed to calendar age. [NIH]

Pigment: A substance that gives color to tissue. Pigments are responsible for the color of skin, eyes, and hair. [NIH]

Placenta: A highly vascular fetal organ through which the fetus absorbs oxygen and other nutrients and excretes carbon dioxide and other wastes. It begins to form about the eighth day of gestation when the blastocyst adheres to the decidua. [NIH]

Plants: Multicellular, eukaryotic life forms of the kingdom Plantae. They are characterized by a mainly photosynthetic mode of nutrition; essentially unlimited growth at localized regions of cell divisions (meristems); cellulose within cells providing rigidity; the absence of organs of locomotion; absense of nervous and sensory systems; and an alteration of haploid

and diploid generations. [NIH]

Plasma: The clear, yellowish, fluid part of the blood that carries the blood cells. The proteins that form blood clots are in plasma. [NIH]

Pneumonia: Inflammation of the lungs. [NIH]

Poisoning: A condition or physical state produced by the ingestion, injection or inhalation of, or exposure to a deleterious agent. [NIH]

Polymorphism: The occurrence together of two or more distinct forms in the same population. [NIH]

Polysaccharide: A type of carbohydrate. It contains sugar molecules that are linked together chemically. [NIH]

Practice Guidelines: Directions or principles presenting current or future rules of policy for the health care practitioner to assist him in patient care decisions regarding diagnosis, therapy, or related clinical circumstances. The guidelines may be developed by government agencies at any level, institutions, professional societies, governing boards, or by the convening of expert panels. The guidelines form a basis for the evaluation of all aspects of health care and delivery. [NIH]

Precursor: Something that precedes. In biological processes, a substance from which another, usually more active or mature substance is formed. In clinical medicine, a sign or symptom that heralds another. [EU]

Prevalence: The total number of cases of a given disease in a specified population at a designated time. It is differentiated from incidence, which refers to the number of new cases in the population at a given time. [NIH]

Progressive: Advancing; going forward; going from bad to worse; increasing in scope or severity. [EU]

Protein S: The vitamin K-dependent cofactor of activated protein C. Together with protein C, it inhibits the action of factors VIIIa and Va. A deficiency in protein S can lead to recurrent venous and arterial thrombosis. [NIH]

Proteins: Polymers of amino acids linked by peptide bonds. The specific sequence of amino acids determines the shape and function of the protein. [NIH]

Protons: Stable elementary particles having the smallest known positive charge, found in the nuclei of all elements. The proton mass is less than that of a neutron. A proton is the nucleus of the light hydrogen atom, i.e., the hydrogen ion. [NIH]

Public Policy: A course or method of action selected, usually by a government, from among alternatives to guide and determine present and future decisions. [NIH]

Publishing: "The business or profession of the commercial production and issuance of literature" (Webster's 3d). It includes the publisher, publication processes, editing and editors. Production may be by conventional printing methods or by electronic publishing. [NIH]

Pulmonary: Relating to the lungs. [NIH]

Pulmonary Edema: An accumulation of an excessive amount of watery fluid in the lungs, may be caused by acute exposure to dangerous concentrations of irritant gasses. [NIH]

Purines: A series of heterocyclic compounds that are variously substituted in nature and are known also as purine bases. They include adenine and guanine, constituents of nucleic acids, as well as many alkaloids such as caffeine and theophylline. Uric acid is the metabolic end product of purine metabolism. [NIH]

Pyridones: Pyridine derivatives with one or more keto groups on the ring. [NIH]

Pyrimidines: A family of 6-membered heterocyclic compounds occurring in nature in a wide variety of forms. They include several nucleic acid constituents (cytosine, thymine, and uracil) and form the basic structure of the barbiturates. [NIH]

Radioactive: Giving off radiation. [NIH]

Randomized: Describes an experiment or clinical trial in which animal or human subjects are assigned by chance to separate groups that compare different treatments. [NIH]

Receptor: A molecule inside or on the surface of a cell that binds to a specific substance and causes a specific physiologic effect in the cell. [NIH]

Reductase: Enzyme converting testosterone to dihydrotestosterone. [NIH]

Refer: To send or direct for treatment, aid, information, de decision. [NIH]

Regimen: A treatment plan that specifies the dosage, the schedule, and the duration of treatment. [NIH]

Reishi: A mushroom, Ganoderma lucidum, of the aphyllophorales order of basidomycetous fungi. It has long been used in traditional Chinese medicine in various forms. Contains sterols, coumarin, mannitol, polysaccharides, and triterpenoids. [NIH]

Reperfusion: Restoration of blood supply to tissue which is ischemic due to decrease in normal blood supply. The decrease may result from any source including atherosclerotic obstruction, narrowing of the artery, or surgical clamping. It is primarily a procedure for treating infarction or other ischemia, by enabling viable ischemic tissue to recover, thus limiting further necrosis. However, it is thought that reperfusion can itself further damage the ischemic tissue, causing reperfusion injury. [NIH]

Reperfusion Injury: Functional, metabolic, or structural changes, including necrosis, in ischemic tissues thought to result from reperfusion to ischemic areas of the tissue. The most common instance is myocardial reperfusion injury. [NIH]

Retinoids: Derivatives of vitamin A. Used clinically in the treatment of severe cystic acne, psoriasis, and other disorders of keratinization. Their possible use in the prophylaxis and treatment of cancer is being actively explored. [NIH]

Ribonucleic acid: RNA. One of the two nucleic acids found in all cells. The other is deoxyribonucleic acid (DNA). Ribonucleic acid transfers genetic information from DNA to proteins produced by the cell. [NIH]

Ribose: A pentose active in biological systems usually in its D-form. [NIH]

Saline: A solution of salt and water. [NIH]

Screening: Checking for disease when there are no symptoms. [NIH]

Secondary tumor: Cancer that has spread from the organ in which it first appeared to another organ. For example, breast cancer cells may spread (metastasize) to the lungs and cause the growth of a new tumor. When this happens, the disease is called metastatic breast cancer, and the tumor in the lungs is called a secondary tumor. Also called secondary cancer. [NIH]

Secretion: 1. The process of elaborating a specific product as a result of the activity of a gland; this activity may range from separating a specific substance of the blood to the elaboration of a new chemical substance. 2. Any substance produced by secretion. [EU]

Selenium: An element with the atomic symbol Se, atomic number 34, and atomic weight 78.96. It is an essential micronutrient for mammals and other animals but is toxic in large amounts. Selenium protects intracellular structures against oxidative damage. It is an essential component of glutathione peroxidase. [NIH]

Sequence Analysis: A multistage process that includes the determination of a sequence

(protein, carbohydrate, etc.), its fragmentation and analysis, and the interpretation of the resulting sequence information. [NIH]

Serine: A non-essential amino acid occurring in natural form as the L-isomer. It is synthesized from glycine or threonine. It is involved in the biosynthesis of purines, pyrimidines, and other amino acids. [NIH]

Serum: The clear liquid part of the blood that remains after blood cells and clotting proteins have been removed. [NIH]

Sex Characteristics: Those characteristics that distinguish one sex from the other. The primary sex characteristics are the ovaries and testes and their related hormones. Secondary sex characteristics are those which are masculine or feminine but not directly related to reproduction. [NIH]

Shock: The general bodily disturbance following a severe injury; an emotional or moral upset occasioned by some disturbing or unexpected experience; disruption of the circulation, which can upset all body functions: sometimes referred to as circulatory shock. [NIH]

Side effect: A consequence other than the one(s) for which an agent or measure is used, as the adverse effects produced by a drug, especially on a tissue or organ system other than the one sought to be benefited by its administration. [EU]

Sodium: An element that is a member of the alkali group of metals. It has the atomic symbol Na, atomic number 11, and atomic weight 23. With a valence of 1, it has a strong affinity for oxygen and other nonmetallic elements. Sodium provides the chief cation of the extracellular body fluids. Its salts are the most widely used in medicine. (From Dorland, 27th ed) Physiologically the sodium ion plays a major role in blood pressure regulation, maintenance of fluid volume, and electrolyte balance. [NIH]

Soft tissue: Refers to muscle, fat, fibrous tissue, blood vessels, or other supporting tissue of the body. [NIH]

Solvent: 1. Dissolving; effecting a solution. 2. A liquid that dissolves or that is capable of dissolving; the component of a solution that is present in greater amount. [EU]

Soma: The body as distinct from the mind; all the body tissue except the germ cells; all the axial body. [NIH]

Somatic: 1. Pertaining to or characteristic of the soma or body. 2. Pertaining to the body wall in contrast to the viscera. [EU]

Sorbic Acid: Mold and yeast inhibitor. Used as a fungistatic agent for foods, especially cheeses. [NIH]

Species: A taxonomic category subordinate to a genus (or subgenus) and superior to a subspecies or variety, composed of individuals possessing common characters distinguishing them from other categories of individuals of the same taxonomic level. In taxonomic nomenclature, species are designated by the genus name followed by a Latin or Latinized adjective or noun. [EU]

Spectrum: A charted band of wavelengths of electromagnetic vibrations obtained by refraction and diffraction. By extension, a measurable range of activity, such as the range of bacteria affected by an antibiotic (antibacterial s.) or the complete range of manifestations of a disease. [EU]

Spinal cord: The main trunk or bundle of nerves running down the spine through holes in the spinal bone (the vertebrae) from the brain to the level of the lower back. [NIH]

Stimulant: 1. Producing stimulation; especially producing stimulation by causing tension on muscle fibre through the nervous tissue. 2. An agent or remedy that produces stimulation.

[EU]

Stomach: An organ of digestion situated in the left upper quadrant of the abdomen between the termination of the esophagus and the beginning of the duodenum. [NIH]

Stroma: The middle, thickest layer of tissue in the cornea. [NIH]

Subacute: Somewhat acute; between acute and chronic. [EU]

Subclinical: Without clinical manifestations; said of the early stage(s) of an infection or other disease or abnormality before symptoms and signs become apparent or detectable by clinical examination or laboratory tests, or of a very mild form of an infection or other disease or abnormality. [EU]

Subspecies: A category intermediate in rank between species and variety, based on a smaller number of correlated characters than are used to differentiate species and generally conditioned by geographical and/or ecological occurrence. [NIH]

Substance P: An eleven-amino acid neurotransmitter that appears in both the central and peripheral nervous systems. It is involved in transmission of pain, causes rapid contractions of the gastrointestinal smooth muscle, and modulates inflammatory and immune responses. [NIH]

Supplementation: Adding nutrients to the diet. [NIH]

Suppression: A conscious exclusion of disapproved desire contrary with repression, in which the process of exclusion is not conscious. [NIH]

Systemic: Affecting the entire body. [NIH]

Testis: Either of the paired male reproductive glands that produce the male germ cells and the male hormones. [NIH]

Testosterone: A hormone that promotes the development and maintenance of male sex characteristics. [NIH]

Theca Cells: The connective tissue cells of the ovarian follicle. [NIH]

Threonine: An essential amino acid occurring naturally in the L-form, which is the active form. It is found in eggs, milk, gelatin, and other proteins. [NIH]

Thyroid: A gland located near the windpipe (trachea) that produces thyroid hormone, which helps regulate growth and metabolism. [NIH]

Tissue: A group or layer of cells that are alike in type and work together to perform a specific function. [NIH]

Tolerance: 1. The ability to endure unusually large doses of a drug or toxin. 2. Acquired drug tolerance; a decreasing response to repeated constant doses of a drug or the need for increasing doses to maintain a constant response. [EU]

Tone: 1. The normal degree of vigour and tension; in muscle, the resistance to passive elongation or stretch; tonus. 2. A particular quality of sound or of voice. 3. To make permanent, or to change, the colour of silver stain by chemical treatment, usually with a heavy metal. [EU]

Tonic: 1. Producing and restoring the normal tone. 2. Characterized by continuous tension. 3. A term formerly used for a class of medicinal preparations believed to have the power of restoring normal tone to tissue. [EU]

Tonicity: The normal state of muscular tension. [NIH]

Topical: On the surface of the body. [NIH]

Toxic: Having to do with poison or something harmful to the body. Toxic substances usually cause unwanted side effects. [NIH]

Toxicology: The science concerned with the detection, chemical composition, and pharmacologic action of toxic substances or poisons and the treatment and prevention of toxic manifestations. [NIH]

Toxins: Specific, characterizable, poisonous chemicals, often proteins, with specific biological properties, including immunogenicity, produced by microbes, higher plants, or animals. [NIH]

Transfection: The uptake of naked or purified DNA into cells, usually eukaryotic. It is analogous to bacterial transformation. [NIH]

Transplantation: Transference of a tissue or organ, alive or dead, within an individual, between individuals of the same species, or between individuals of different species. [NIH]

Tropolone: A seven-membered aromatic ring compound. It is structurally related to a number of naturally occurring antifungal compounds. [NIH]

Tumour: 1. Swelling, one of the cardinal signs of inflammations; morbid enlargement. 2. A new growth of tissue in which the multiplication of cells is uncontrolled and progressive; called also neoplasm. [EU]

Type 2 diabetes: Usually characterized by a gradual onset with minimal or no symptoms of metabolic disturbance and no requirement for exogenous insulin. The peak age of onset is 50 to 60 years. Obesity and possibly a genetic factor are usually present. [NIH]

Tyrosine: A non-essential amino acid. In animals it is synthesized from phenylalanine. It is also the precursor of epinephrine, thyroid hormones, and melanin. [NIH]

Ulcer: A localized necrotic lesion of the skin or a mucous surface. [NIH]

Urea: A compound (CO(NH2)2), formed in the liver from ammonia produced by the deamination of amino acids. It is the principal end product of protein catabolism and constitutes about one half of the total urinary solids. [NIH]

Uremia: The illness associated with the buildup of urea in the blood because the kidneys are not working effectively. Symptoms include nausea, vomiting, loss of appetite, weakness, and mental confusion. [NIH]

Urine: Fluid containing water and waste products. Urine is made by the kidneys, stored in the bladder, and leaves the body through the urethra. [NIH]

Vascular: Pertaining to blood vessels or indicative of a copious blood supply. [EU]

Vegetative: 1. Concerned with growth and with nutrition. 2. Functioning involuntarily or unconsciously, as the vegetative nervous system. 3. Resting; denoting the portion of a cell cycle during which the cell is not involved in replication. 4. Of, pertaining to, or characteristic of plants. [EU]

Vein: Vessel-carrying blood from various parts of the body to the heart. [NIH]

Venules: The minute vessels that collect blood from the capillary plexuses and join together to form veins. [NIH]

Veterinary Medicine: The medical science concerned with the prevention, diagnosis, and treatment of diseases in animals. [NIH]

Viral: Pertaining to, caused by, or of the nature of virus. [EU]

Virus: Submicroscopic organism that causes infectious disease. In cancer therapy, some viruses may be made into vaccines that help the body build an immune response to, and kill, tumor cells. [NIH]

Viscera: Any of the large interior organs in any one of the three great cavities of the body, especially in the abdomen. [NIH]

Vitamin A: A substance used in cancer prevention; it belongs to the family of drugs called retinoids. [NIH]

Vitro: Descriptive of an event or enzyme reaction under experimental investigation occurring outside a living organism. Parts of an organism or microorganism are used together with artificial substrates and/or conditions. [NIH]

Vivo: Outside of or removed from the body of a living organism. [NIH]

Wasps: Any of numerous winged hymenopterous insects of social as well as solitary habits and having formidable stings. [NIH]

White blood cell: A type of cell in the immune system that helps the body fight infection and disease. White blood cells include lymphocytes, granulocytes, macrophages, and others. [NIH]

X-ray: High-energy radiation used in low doses to diagnose diseases and in high doses to treat cancer. [NIH]

Yeasts: A general term for single-celled rounded fungi that reproduce by budding. Brewers' and bakers' yeasts are Saccharomyces cerevisiae; therapeutic dried yeast is dried yeast. [NIH]

INDEX


9 780497 003005