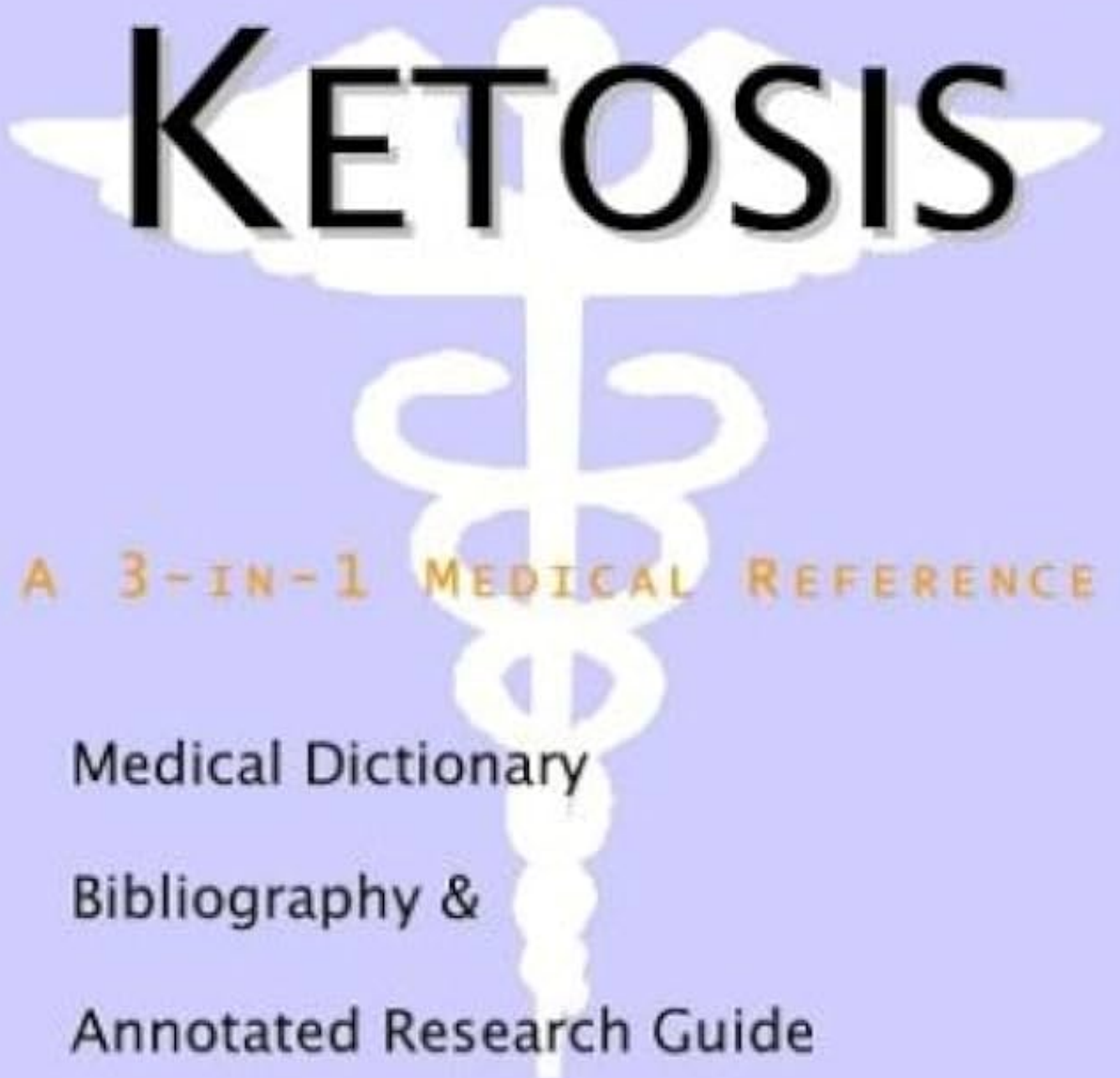


KETOSIS



A 3-IN-1 MEDICAL REFERENCE

Medical Dictionary

Bibliography &

Annotated Research Guide

TO INTERNET REFERENCES

KETOSIS

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



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

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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 ketosis. 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.

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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 ketosis 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 ketosis, 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 ketosis, 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 ketosis. 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 ketosis, 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 ketosis.

The Editors

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

CHAPTER 1. STUDIES ON KETOSIS

Overview

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

The Combined Health Information Database

The Combined Health Information Database summarizes studies across numerous federal agencies. To limit your investigation to research studies and ketosis, you will need to use the advanced search options. First, go to <http://chid.nih.gov/index.html>. From there, select the "Detailed Search" option (or go directly to that page with the following hyperlink: <http://chid.nih.gov/detail/detail.html>). The trick in extracting studies is found in the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer, and the format option "Journal Article." At the top of the search form, select the number of records you would like to see (we recommend 100) and check the box to display "whole records." We recommend that you type "ketosis" (or synonyms) into the "For these words:" box. Consider using the option "anywhere in record" to make your search as broad as possible. If you want to limit the search to only a particular field, such as the title of the journal, then select this option in the "Search in these fields" drop box. The following is what you can expect from this type of search:

- **Treatment of the Epileptic Patient in the Dental Office**

Source: New York State Dental Journal. 64(2): 26-31. February 1998.

Contact: Available from Dental Society of the State of New York. 7 Elk Street, Albany, NY 12207. (518) 465-0044; Fax (518) 427-0461.

Summary: Epilepsy is a relatively common problem in children, adults, and older adults. Dentists need to be familiar with the various manifestations of the disease, the anticonvulsant medications (AEDs) that patients are taking, and the complications and side effects of these drugs. In this article, the types of seizures and AEDs in common use are described, and the authors offer guidelines for treatment planning. Drugs covered include phenobarbital, Dilantin (phenytoin), Tegretol (carbamazepine), Depakene and Depakote (valproic acid and divalproex), Mysoline (primidone), Zarontine

(ethosuximide), Lamictal (lamotrigine), Neurontin (gabapentin), Tranxene (clorazepate dipotassium), and Topamax (topiramate); the use of a **ketosis** diet to control seizures is also discussed. Recommendations are also provided for managing the patient who has a seizure in the dental office, with emergency protocols and referral guidelines noted. The authors emphasize that the well-controlled patient with epilepsy can be treated safely and comfortably in the average dental office. 1 table. 12 references.

- **Insulin Therapy in Type II Diabetes: Who Needs It, How Much of It, and for How Long?**

Source: Postgraduate Medicine. 101(2): 85-90, 92-94, 96. February 1997.

Summary: Patients with Type II diabetes mellitus are not dependent on insulin for prevention of **ketosis** or maintenance of life. However, they often benefit from insulin therapy to control symptoms or correct disordered metabolism, and a temporary course may be used to control glucose levels. This article covers the underlying concepts that direct insulin therapy in Type II diabetes. The author also summarizes the present state of combination therapy in which insulin is paired with another glucose-lowering agent. Specific topics include therapeutic objectives, including those for lowering atherosclerotic risk, nutritional plans, and physical activity; indications for and choice of insulin; glucose toxicity, which can lead to impairment in insulin secretion and worsening of insulin resistance; temporary insulin therapy; discontinuation of insulin; basal insulin therapy; ongoing insulin therapy; the classification system used to categorize Type II diabetes as mild, moderate, severe, or very severe; the need for progressive therapy; latent autoimmune diabetes in adults; considerations in elderly patients; combination therapy, using sulfonylureas, biguanides, alpha-glucosidase inhibitors, and thiozolidinediones; insulin resistance; and insulin pump use. The author concludes that, because of insulin resistance in Type II diabetes, high doses may be required initially to attain satisfactory control; however, also because of insulin resistance, hypoglycemia with insulin therapy is much less common among patients with Type II diabetes than among those with Type I diabetes. 3 tables. (AA-M).

- **Insulin Use in NIDDM**

Source: Diabetes Care. 13(12): 1240-1264. December 1990.

Summary: The effects of insulin treatment on the pathophysiology of noninsulin-dependent diabetes mellitus (NIDDM) are reviewed in this article. Short-term studies indicate variable and partial reduction in excessive hepatic glucose output, decrease in insulin resistance, and enhancement of Beta-cell function following the use of insulin treatment. The author maintains that insulin should be used as the initial treatment of new-onset NIDDM in the presence of **ketosis**, significant diabetes-induced weight loss, and severe hyperglycemic symptoms. A potential adverse effect of insulin has been suggested by epidemiological studies showing associations between hyperinsulinemia or insulin resistance and increased risk for coronary artery disease, stroke, and hypertension. The author concludes that although some adverse effects may be correlated with insulin use, current evidence does not prove cause and effect and does not warrant withholding insulin therapy (or compromising on dosage) when it is needed. 3 figures. 2 tables. 225 references. (AA-M).

- **Answer to Weight Loss is Easy: Doing It Is Hard!**

Source: Clinical Diabetes. 19(3): 105-109. June 2001.

Contact: Available from American Diabetes Association. 1701 North Beauregard Street, Alexandria, VA 22311. (800) 232-3472. Website: www.diabetes.org.

Summary: This article addresses the issue of the problem of increasing overweight and obesity among Americans. Although there appear to be easy solutions to the weight loss problem, these solutions tend to be temporary. The latest solution to the problem of overweight and obesity is the high protein, low carbohydrate diet. This type of diet eliminates an entire category of nutrients, carbohydrates, and thus is lower in calories. With a high protein intake and strict limitation of carbohydrate, water stored with glycogen is released. Rapid loss of weight from fluid loss occurs. Fasting **ketosis** may also develop. Although this approach results in weight loss and improved blood glucose, there is no evidence that the weight lost is maintained over the long term. In addition, this diet eliminates whole categories of foods known to have health benefits, including fruits, whole grains, vegetables, and milk. A study conducted by the U.S. Department of Agriculture found that energy restriction, not manipulation of macronutrients, is associated with weight reduction in the short term. Another study found that physical fitness, not thinness, reduced the risk of mortality. The way to maintain weight loss over the long term is still unknown, so diabetes care providers should advise patients to eat healthfully, be physically active, and keep food and blood glucose records. 1 table. 45 references.

- **Normal Fuel Metabolism and Alterations in Diabetes Mellitus**

Source: Nurse Practitioner Forum. 2(3): 152-156. September 1991.

Summary: This article discusses normal fuel metabolism and the alterations that occur in diabetes mellitus. The author discusses insulin-dependent diabetes mellitus (IDDM), an autoimmune disease characterized by insulinopenia and **ketosis**; and noninsulin-dependent diabetes mellitus (NIDDM), a condition related to impaired insulin secretion, defective tissue sensitivity, and abnormalities in glucose transporter proteins. The author also traces the abnormal metabolic processes that lead to both IDDM and NIDDM. 2 figures. 4 tables. 19 references. (AA-M).

- **High-Protein Diets Really Do Make People Lose Fat: That's Where the Problems Start**

Source: Hippocrates. 10(9): 75-77. September 1996.

Contact: Available from Hippocrates. 301 Howard Street, Suite 1800, San Francisco, CA 94105.

Summary: This article notes the resurgence in the popularity of high-protein diet strategies to lose weight. The author describes why these diets are popular (they work, at least in the beginning) and why they are nutritionally unsound at best, and dangerous at worst. The author also explains how the body's metabolism changes when deprived of carbohydrates, why the weight loss occurs, **ketosis** and its complications, and why the high-protein diets don't work in the long run. One sidebar briefly reviews four of the latest offerings in high-protein diet guidebooks.

- **Diabetes-Related Complications of Pregnancy**

Source: Journal of the National Medical Association. 85(7): 537-545. July 1993.

Summary: This article on the diabetes-related complications of pregnancy focuses on preconception planning and contemporary treatment methods. Topics include the classification of diabetes in pregnancy; a historical perspective; diabetic retinopathy and pregnancy; diabetic nephropathy and pregnancy; diabetic neuropathy, notably

autonomic neuropathy; risk factors and the diagnosis of coronary artery disease; general diabetes management during pregnancy, including management goals; management components, including diet, exercise, and insulin therapy; insulin administration; hypoglycemia; and **ketosis**. 5 tables. 40 references.

- **Management Strategies for Diabetic Ketoacidosis**

Source: Journal of Critical Illness. 11(7): 437-443. July 1996.

Contact: Available from Cliggott Publishing Company. 55 Holly Hill Lane, Greenwich, CT 06831-0010. (203) 661-0600.

Summary: This article outlines management strategies for patients with diabetic ketoacidosis (DKA), clinically defines as uncontrolled hyperglycemia, **ketosis**, and acidemia. The authors note that in DKA the therapeutic goals are to correct hypovolemia, hyperglycemia, and electrolyte imbalance and to clear serum ketoacids. Half of the estimated fluid deficit should be replaced within the first 12 hours of therapy. Patients with moderate or severe DKA should be given an initial intravenous bolus dose of regular insulin, followed by continuous infusion. The infusion rate should be reduced by half when blood glucose levels reach approximately 250 mg/dL. Also, potassium chloride should be administered intravenously to maintain serum potassium levels of 4 to 5 mEq/L. The authors discuss why bicarbonate and phosphate replacement in patients with DKA is controversial and why phosphate therapy may be required in some cases. A patient care algorithm is provided. 2 figures. 1 table. 11 references. (AA-M).

- **J Type Diabetes Revisited**

Source: Journal of the National Medical Association. 84(7): 603-608. July 1992.

Summary: This article presents an update on J type diabetes, grouped as a subtype of malnutrition-related diabetes, known as protein-deficient pancreatic diabetes (PDPD). The authors report on comparative studies that were performed on a group of patients with diabetes and on normal controls. Studies performed included insulin receptor binding; renal, hepatic, and pancreatic function tests; and abdominal ultrasonography. The results show a considerably decreased white and red blood cell binding to insulin, extensive kidney damage, and increased pancreatic echogenicity in phasic insulin-dependent diabetes mellitus (PIDDM), supporting a separate identity of this syndrome from IDDM and NIDDM. The authors conclude that the features of relative insulin resistance, absence of **ketosis** even in the presence of severe hyperglycemia, and intermittent insulin requirement suggests that PIDDM, J type diabetes, and PDPD are all the same syndrome. 3 tables. 33 references. (AA-M).

- **Beyond Type 1 and Type 2**

Source: JDF International Countdown. 19(4): 26-29. Fall 1998.

Contact: Available from Juvenile Diabetes Foundation International. 120 Wall Street, New York, NY 10005-4001. (800) 533-2873 or (212) 785-9500. Website: www.jdfcure.com.

Summary: This article presents new findings on the different clinical manifestations of diabetes. In the past few decades, scientists have come to realize that diabetes is not one disease or even two diseases, but a mix of physiological defects with the common feature of an inability to metabolize glucose properly. Researchers have identified more than 30 distinct medical disorders that may cause diabetes or diabetes-like syndromes. Within the type 1 and type 2 categories, there is a lot of variance. There is now a distinct

subtype of type 1 diabetes known as latent autoimmune diabetes in adults. In addition, there is a subgroup called idiopathic diabetes because its cause is unknown. Researchers believe that type 2 diabetes represents a mixture of underlying disease processes. Another type of diabetes that does not follow the usual pattern of either type 1 or type 2 is known as maturity onset diabetes of the young (MODY). This form, which is inherited in an autosomal dominant pattern, commonly affects children and adolescents; however, it is different from type 1 diabetes because it develops gradually and does not produce **ketosis**. In addition, MODY is not a single disease, because five types have been identified and labeled MODY1 through MODY5. Each is caused by different genetic defects in insulin secretion. MODY is very important because researchers can test children of people who have it and detect MODY genes before the children develop diabetes. The article also presents the features of other types of diabetes, including gestational diabetes, impaired glucose tolerance, polycystic ovary syndrome, and miscellaneous conditions. 12 figures.

- **Insider's Look at Insulin Pump Therapy**

Source: Diabetes Self-Management. 17(2): 28, 30-31, 33. March-April 2000.

Contact: Available from R.A. Rapaport Publishing, Inc. 150 West 22nd Street, New York, NY 10011. (800) 234-0923. Website: www.diabetes-self-mgmt.com.

Summary: This article provides information on insulin pump therapy using a first person account of this form of insulin therapy. The insulin pump is a beeper size device that contains a cartridge filled with insulin. Insulin pump therapy mimics the pancreas by releasing small amounts of fast acting insulin every few minutes. This keeps the blood sugar level steady between meals and during sleep. When food is eaten, the pump delivers a larger quantity of insulin immediately to cover the carbohydrate in the meal. This type of treatment is ideal for people whose pancreas produces little or no insulin. Some of the advantages of pump therapy include more desirable blood sugar levels, fewer episodes of low blood sugar, a more flexible lifestyle, precise dosing, convenience, no shots, easy adjustments, and weight control. However, pump use does have some disadvantages. Disadvantages focus on the learning curve, inconvenience, technical difficulties, skin problems, risk of **ketosis**, and infusion set changes. The article describes what it is like to live with a pump, lists criteria for success in using an insulin pump, and outlines skills needed to make a successful transition to the pump. In addition, the article provides information on insulin pump manufacturers and distributors.

- **You Can Prevent Many Diabetes Complications**

Source: Diabetes In The News. 12(5): 26-27. October 1993.

Summary: This article reiterates the importance of tight blood glucose control in preventing many complications of diabetes. Using the results recently reported by the 10-year Diabetes Control and Complications Trial (DCCT), the author discusses how best to achieve the recommended tight blood glucose control. Fully half of the article consists of a chart that lists the signs and symptoms of the different diabetes complications with recommendations on how to respond to them. Complications included in the chart are: hypoglycemia, hyperglycemia, **ketosis**, ketoacidosis, background retinopathy, proliferative retinopathy, nephropathy, peripheral neuropathy, and autonomic neuropathy.

- **Risk of Diabetes in Siblings and Other Relatives of IDDM Subjects**

Source: Diabetes. 40(7): 831-836. July 1991.

Summary: This article reports on a study in which the risk of insulin-dependent diabetes mellitus (IDDM) was examined in siblings of an unselected population (n=194) of individuals younger than 30 years, newly diagnosed with diabetes (proband). The study, conducted in southern Wisconsin, from 1984 to 1987, discovered that family risk was associated with age of first diagnosis of the people with diabetes. Investigators also discuss risk factors by gender, duration of symptoms, and level of **ketosis**. In addition, the odds ratio for the association of IDDM in the proband with IDDM in parents and second-and third-degree family members was examined by case-control methodology. The researchers conclude that the increased risk of sibling IDDM for younger probands suggests variation in etiological factors by family. 5 figures. 4 tables. 23 references. (AA-M).

- **Diagnostic Criteria for Non-Insulin Dependent Diabetes in Youth (NIDDM-Y)**

Source: Clinical Pediatrics. 37(2): 67-71. February 1998.

Summary: This article reviews the diagnostic criteria for type 2 diabetes in youth. Differentiating type 2 diabetes from type 1 in youth is a diagnostic challenge. Biochemical criteria focus on blood glucose levels, serum insulin concentrations, and diabetes-specific autoantibodies. Serum insulin levels at diagnosis may help differentiate between types 2 and 1 if the level is elevated, but the serum insulin level is low or undetectable in 45 percent of patients with type 2 diabetes. Islet-specific antibodies may be present in serum at diagnosis, and **ketosis** or ketoacidosis may occur as well. Clinical features most helpful in differentiating type 2 diabetes from type 1 diabetes among First Nation youth in Manitoba, Canada, include ethnic background, age and gender at diagnosis, presence of obesity and acanthosis nigricans, lack of symptoms or weight loss, and strong family history of type 2 diabetes. The article concludes that the problems associated with differentiating between type 2 diabetes and type 1 in youth will resolve over time with increased experience, acceptable specific clinical criteria, and high-risk population screening programs for type 2 diabetes that include children. 1 table. 28 references. (AA-M).

- **Management of the Hyperosmolar Hyperglycemic Syndrome**

Source: American Family Physician. 60(5): 1468-1476. October 1, 1999.

Contact: Available from American Academy of Family Physicians. 11400 Tomahawk Creek Parkway, Leawood, KS 66211-2672. (800) 274-2237. Website: www.aafp.org.

Summary: This article, developed in collaboration with the American Diabetes Association, discusses the pathogenesis, clinical manifestations, and management of hyperosmolar hyperglycemic syndrome. Hyperglycemic hyperosmolarity is part of a clinical spectrum of severe hyperglycemic disorders ranging from pure hyperglycemia hyperosmolarity without **ketosis** to diabetic ketoacidosis, with significant overlap in the middle. From 50 to 75 percent of hospitalizable patients who have uncontrolled diabetes present with significant hyperosmolarity. An altered state of consciousness attributable to uncontrolled diabetes is virtually always the result of severe hyperosmolar hyperglycemia. The linchpin of therapy is prompt, rapid administration of crystalloid solutions that have tonicity appropriate to the level of hyperosmolarity. A decrease in the plasma glucose concentration indicates the adequacy of therapy, especially rehydration. The goal is for the plasma glucose level to decline by at least 75 to 100 milligrams per deciliter per hour. Patients who have hyperosmolar hyperglycemic syndrome are often chronically ill, and they may have major total body deficits of potassium, phosphate, and magnesium, as well as B-complex vitamins. These deficits

also require attention and correction during therapy. Vascular occlusions are important complications of hyperosmolar hyperglycemic syndrome. 2 tables. 27 references. (AA-M).

Federally Funded Research on Ketosis

The U.S. Government supports a variety of research studies relating to ketosis. 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 ketosis.

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 ketosis. The following is typical of the type of information found when searching the CRISP database for ketosis:

- **Project Title: 1, 3-DIOL AND KETONE BODY METABOLISM**

Principal Investigator & Institution: Brunengraber, Henri; Professor and Chair; Case Western Reserve University 10900 Euclid Ave Cleveland, Oh 44106

Timing: Fiscal Year 2001; Project Start 01-DEC-2000; Project End 30-NOV-2001

Summary: The long term goal is to devise new strategies for the treatment of nutritional diseases such as diabetes and specific inborn errors of energy metabolism. The specific aims: 1) to characterize the pharmacokinetics, metabolism, and safety of 1,3-butanediol diacetoacetate (ketone esters) in humans and its usefulness in patients suffering from pathologies which could be alleviated by therapeutic **ketosis**. 2) to devise a non-invasive clinical test to assess the activity ratio of pyruvate carboxylase; pyruvate dehydrogenase in the liver of normal subjects and of children with inborn errors of pyruvate metabolism or diabetes.

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

- **Project Title: CEREBRAL METABOLISM IN KETOSIS AND EPILEPSY**

Principal Investigator & Institution: Stein, Daniel T.; Yeshiva University 500 W 185Th St New York, Ny 10033

Timing: Fiscal Year 2001

Summary: There is no text on file for this abstract.

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

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).

- **Project Title: EFFECT OF KETOGENIC VERY LOW CALORIC DIET ON GLYCEMIA IN NIDDM**

Principal Investigator & Institution: Gumbiner, Barry; University of Rochester Orpa - Rc Box 270140 Rochester, Ny 14627

Timing: Fiscal Year 2001

Summary: Specific aims are to assess the role of **ketosis** in reducing glycemia during VLCD treatment of obese NIDDM and to determine the efficacy of a more ketogenic VLCD to achieve greater and more rapid glycemic control in obese NIDDM. The data from this protocol is being retained on the CDMAS for completion and future use.

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

- **Project Title: EFFICACY OF THE KETOGENIC DIET--A BLINDED STUDY**

Principal Investigator & Institution: Freeman, John M.; Neurology; Johns Hopkins University 3400 N Charles St Baltimore, Md 21218

Timing: Fiscal Year 2001; Project Start 15-JUL-1997; Project End 31-MAR-2002

Summary: This study is designed to establish the efficacy of the ketogenic diet in a blinded, placebo-controlled fashion. Twenty to thirty percent of children with epilepsy remain refractory to currently available anticonvulsant medications. The frequent atonic-myoclonic seizures of the Lennox-Gastaut Syndrome (LGS), are particularly handicapping. Preliminary data suggest that even when other medications have failed, these seizures respond rapidly and dramatically to a high-fat-low-carbohydrate ketogenic diet. Twenty children with LGS having more than 15 atonic/ myoclonic seizures/day will enter a randomized, blinded, crossover protocol to evaluate the efficacy of this diet. Efficacy will be defined as greater than 50% decrease from baseline seizure frequency utilizing continuous EEG monitoring obtained just prior to fasting. The diet will be instituted in a standard fashion following 36 hours of fasting. Children will be randomized to a liquid supplement containing either placebo (maintaining ketosis) or glucose negating ketosis. Seizure frequency (utilizing 24 hours continuous EEG monitoring) will be evaluated after full diet initiation (5 days). The child will be re-fasted for 24 hours and crossed to the alternate liquid supplement. At the end of 5 days on the second arm, a repeat 24 hours continuous EEG monitoring will be obtained, and the child will be discharged on the routine ketogenic diet. The primary endpoint will be the number of EEG documented seizures on the last day of each treatment period. We do not believe that there will be substantive sequence or carry-over effect. However, these assumptions will be examined, first by comparing the seizure frequency after the placebo diet to the frequency measured at baseline, and then by calculating the total seizure frequency for each sequence and comparing the two sequences. After discharge, each child's diet will be "fine-tuned" to optimize seizure control, followed in routine fashion with monthly seizure calendars maintained by the parents. Each child will return for follow-up at six months and one year. Twenty-four hour continuous EEG monitoring will be obtained at each of these visits. The secondary question of whether control can be maintained overtime will consist of either a simple proportion (with confidence interval), or will use survival methods, if those are indicated because of poor compliance or loss to follow-up. Analysis will be done both by intention to treat and by those on treatment.

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

- **Project Title: HUMAN BRAIN METABOLISM IN KETOSIS**

Principal Investigator & Institution: Pan, Jullie W.; Associate Director of Neurology and Neur; Neurology; Yeshiva University 500 W 185Th St New York, Ny 10033

Timing: Fiscal Year 2002; Project Start 01-FEB-2002; Project End 31-JAN-2005

Summary: (provided by applicant): It is well known that the brain can switch from its primary fuel of glucose to ketone bodies under states of fasting, vigorous exercise, specific diets as well as a number of clinical disorders. However, specifically how the human brain uses ketones is not well defined. This question is of major interest particularly since the ketogenic diet (KD) is known to be of significant therapeutic value in the treatment of intractable epilepsies. In order to understand how the metabolic state of **ketosis** is affecting brain function in epileptic patients, an understanding of how **ketosis** affects the non-epileptic brain is critical. Human brain ketone metabolism is thought to be limited by plasma levels and blood brain barrier transport reflecting the belief that brain ketone oxidation is rapid, thus preventing accumulation of ketones. However, recent human brain data have shown that significant accumulation of β -hydroxybutyrate (BHB) can occur. Since the brain pool of ketones is not negligible, especially during ketotic states such as fasting, this implies that oxidation of ketones is limited relative to its net influx. In this proposal we will investigate the brain accumulation of ketones to define its transport in healthy fasted and non-fasted adults, to determine whether induction of transport occurs with fasting. We will investigate how much ketones fractionally contribute towards oxidative flow, and determine how much this contribution changes with chronic (fasting induced) **ketosis**. These data will define the baseline effects of **ketosis**. In the last part of this application we will apply this work in adult and pediatric epilepsy patients being treated with the ketogenic diet. We will determine whether accumulation of cerebral ketones in these two patient groups is comparable to healthy controls. In doing so, we will establish a means by which the cerebral metabolic evaluation of the patients on the ketogenic diet can be made. We anticipate that these data will contribute towards better understanding of the mechanism of seizure control by the ketogenic diet.

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

- **Project Title: PH CONTROL OF PROTEIN SYNTHESIS**

Principal Investigator & Institution: Garlick, Peter J.; Professor and Director of Research; Surgery; State University New York Stony Brook Stony Brook, Ny 11794

Timing: Fiscal Year 2001; Project Start 01-JUN-2000; Project End 31-MAY-2004

Summary: Patients with renal failure, diabetic **ketosis**, severe trauma or sepsis often become acidotic. Moreover, they are also susceptible to body protein wasting. Experimental acidosis has been shown to result in negative nitrogen balance, and body protein loss in acidotic patients can be alleviated by normalization of pH. Previous work has concentrated on the effects of pH on protein degradation and no systematic studies have been performed on pH and protein synthesis. However, measurements in animals and human volunteers have shown that both metabolic and respiratory acidosis are associated with depressed rates of synthesis of skeletal muscle protein and serum albumin. The purpose of the present proposal is therefore to characterize the relationship between protein synthesis rates in tissues, especially muscle and liver, of rats and humans in relation to changes in intra- and extracellular pH, to confirm the hypotheses: (i) that changes in blood pH, both by metabolic and respiratory means, modify rates of tissue protein synthesis and gene expression and contribute to the protein wasting of patients with acidosis, and (ii) that these effects of pH operate

directly via the intracellular pH and do not involve extracellular mediators such as hormones. The studies will employ measurements of rates of protein synthesis in tissues of rats and human volunteers to characterize the responses to changes in intra- and extracellular pH induced by metabolic and respiratory means and to confirm that these effects are rapid, operate over the full range of pH from acidosis to alkalosis and are independent of oxygen supply. In the animals, the responses of gene expression in the liver will be investigated by determining the levels of mRNA for 3 liver proteins. In particular, the treatments studied will produce different changes in the intra- and extracellular pH. Measurements of intracellular pH will be made by nuclear magnetic resonance, to confirm the hypothesis that changes in protein synthesis are determined by the intracellular rather than extracellular pH. A separate set of studies will be performed in isolated tissues and cells, to determine whether responses to changes in pH are direct or act through circulating hormones. The cellular and molecular mechanisms through peptide chain initiation and initiation factors eIF-2 and eIF-4 will also be identified. Finally, the effect of changes in pH on tissue protein synthesis will be measured in human volunteers and hemodialysis patients, to identify the role of pH control of protein synthesis in health and in protein wasting conditions with abnormalities of pH control.

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

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.³ 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 ketosis, simply go to the PubMed Web site at <http://www.ncbi.nlm.nih.gov/pubmed>. Type "ketosis" (or synonyms) into the search box, and click "Go." The following is the type of output you can expect from PubMed for ketosis (hyperlinks lead to article summaries):

- **"Bovine ketosis" in a nondiabetic postpartum woman.**
 Author(s): Chernow B, Finton C, Rainey TG, O'Brian JT.
 Source: Diabetes Care. 1982 January-February; 5(1): 47-9.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7140499&dopt=Abstract

³ 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.

- **A case of diabetic ketosis presenting as an acute surgical abdomen.**
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CHAPTER 2. NUTRITION AND KETOSIS

Overview

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

Finding Nutrition Studies on Ketosis

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.⁴ 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 "ketosis" (or synonyms) into the search box, and click "Go." To narrow the search, you can also select the "Title" field.

⁴ 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 “ketosis” (or a synonym):

- **Subclinical ketosis affects protective value of sheep colostrum and passive immunisation of lambs.**
Author(s): Universita della Tuscia, Viterbo (Italy). Istituto di Zootecnica
Source: Lacetera, N. Bernabucci, U. Ronchi, B. Scalia, D. Proceedings-of-the-ASPA-Congress-Recent-Progress-in-Animal-Production-Science (Italy). (2001). volume 2 page 609-611.

Additional physician-oriented references include:

- **Analysis and a long-term follow up of ketosis-onset Japanese NIDDM patients.**
Author(s): Department of Internal Medicine, Kitasato, University School of Medicine, Sagamihara, Kanagawa, Japan.
Source: Tanaka, K Moriya, T Kanamori, A Yajima, Y Diabetes-Res-Clin-Pract. 1999 May; 44(2): 137-46 0168-8227
- **Breath acetone as a measure of systemic ketosis assessed in a rat model of the ketogenic diet.**
Author(s): Department of Nutritional Sciences and Department of Pharmacology and Bloorview Epilepsy Research Program, Faculty of Medicine, University of Toronto, Toronto, M5S 1A8 Canada.
Source: Likhodii, Sergei S Musa, Kathy Cunnane, Stephen C Clin-Chem. 2002 January; 48(1): 115-20 0009-9147
- **Breath acetone is a reliable indicator of ketosis in adults consuming ketogenic meals.**
Author(s): Department of Nutritional Sciences, University of Toronto, Ontario, Canada. kathy.musa@utoronto.ca
Source: Musa Veloso, Kathy Likhodii, Sergei S Cunnane, Stephen C Am-J-Clin-Nutr. 2002 July; 76(1): 65-70 0002-9165
- **D2-dopaminergic blockade does not influence post-exercise ketosis in non-athletes.**
Author(s): Department of Physiology, Medical School, University of Cape Town, Observatory, South Africa.
Source: Vahed, Y A Koeslag, J H Lochner, J V Eur-J-Appl-Physiol-Occup-Physiol. 1989; 59(3): 174-7 0301-5548
- **Dietary L-carnitine supplementation in obese cats alters carnitine metabolism and decreases ketosis during fasting and induced hepatic lipidosis.**
Author(s): UP de Nutrition, Ecole Nationale Veterinaire d'Alfort, 94704 Maisons Alfort, France. blanchard@vet-alfort.fr
Source: Blanchard, Geraldine Paragon, Bernard M Milliat, Fabien Lutton, Claude J-Nutr. 2002 February; 132(2): 204-10 0022-3166
- **Diet-induced ketosis increases monocarboxylate transporter (MCT1) levels in rat brain.**
Author(s): Department of Anatomy and Cell Biology, School of Medicine, University of Minnesota, Duluth, MN 55812, USA.
Source: Leino, R L Gerhart, D Z Duelli, R Enerson, B E Drewes, L R Neurochem-Int. 2001 May; 38(6): 519-27 0197-0186

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Source: Ballard, C.S. Mandebvu, P. Sniffen, C.J. Emanuele, S.M. Carter, M.P. Anim-feed-sci-technol. Amsterdam, The Netherlands : Elsevier Science B.V. Sept 17, 2001. volume 93 (1/2) page 55-69. 0377-8401
- **Effects of diet-induced ketosis in rats with hypoglycaemia due to a serially transplantable insulinoma.**
Author(s): Department of Biochemistry, University of Surrey, Guildford, U.K.
Source: Flatt, P R Swanson Flatt, S K Snell, K Tan, K S Marks, V Diabete-Metab. 1987 Sep-October; 13(5): 503-7 0338-1684
- **Glycogen metabolism and post-exercise ketosis in carbohydrate-restricted trained and untrained rats.**
Author(s): Department of Physiology, University of Cape Town Medical School, Observatory, South Africa.
Source: Adams, J H Koeslag, J H Q-J-Exp-Physiol. 1989 January; 74(1): 27-34 0144-8757
- **Ketosis in the Hawaiian Islands.**
Source: Hendershot, J.M. J-Am-Vet-Med-Assoc. Schaumburg, Ill. : The Association. February 1946. volume 108 page 74-75. 0003-1488
- **Ketosis resistance in the male offspring of protein-malnourished rat dams.**
Author(s): Department of Clinical Biochemistry, Addenbrooke's Hospital, Cambridge, UK.
Source: Ozanne, S E Wang, C L Petry, C J Smith, J M Hales, C N Metabolism. 1998 December; 47(12): 1450-4 0026-0495
- **Mastitis, ketosis, and milk fever in 31 organic and 93 conventional Norwegian dairy herds.**
Source: Hardeng, F. Edge, V.L. J-dairy-sci. Savoy, Ill. : American Dairy Science Association. December 2001. volume 84 (12) page 2673-2679. 0022-0302
- **Pantothenic acid as a weight-reducing agent: fasting without hunger, weakness and ketosis.**
Author(s): Department of General Surgery, Hong Kong Central Hospital.
Source: Leung, L H Med-Hypotheses. 1995 May; 44(5): 403-5 0306-9877
- **Post-exercise ketosis and the glycogen content of liver and muscle in rats on a high carbohydrate diet.**
Author(s): Department of Physiology, University of Cape Town Medical School, Observatory, South Africa.
Source: Adams, J H Koeslag, J H Eur-J-Appl-Physiol-Occup-Physiol. 1989; 59(3): 189-94 0301-5548
- **Prevention of bovine ketosis with glucogenic substance and its effect on fertility in Finnish dairy cows.**
Author(s): Department of Anatomy, University of Kuopio, Finland.
Source: Miettinen, P V Berl-Munch-Tierarztl-Wochenschr. 1995 January; 108(1): 14-9 0005-9366
- **Recovery by mouse embryos following teratogenic exposure to ketosis.**
Author(s): Department of Cell Biology and Anatomy, School of Medicine, University of North Carolina, Chapel Hill.
Source: Shum, L Sadler, T W Diabetologia. 1991 May; 34(5): 289-95 0012-186X
- **Suppressive effect of vasopressin on ketosis in diabetic rats.**
Author(s): Third Department of Medicine, Shiga University of Medical Science, Japan.

Source: Harano, A Hidaka, H Kojima, H Harano, Y Shigeta, Y Horm-Metab-Res. 1992 January; 24(1): 5-9 0018-5043

- **The impact of a monensin controlled-release capsule on subclinical ketosis in the transition dairy cow.**
Source: Green, B.L. McBride, B.W. Sandals, D. Leslie, K.E. Bagg, R. Dick, P. J-dairy-sci. Savoy, Ill. : American Dairy Science Association. February 1999. volume 82 (2) page 333-342. 0022-0302
- **Therapeutic considerations in ketosis and hepatic lipidosis in cattle.**
Source: Rings, D.M. Mod-Vet-Pract. Santa Barbara, Calif. : American Veterinary Publications. August 1985. volume 66 (8) page 523-526. 0362-8140
- **Use of a combination of propylene glycol and niacin for subclinical ketosis.**
Source: Rueggsegger, G.J. Schultz, L.H. J-Dairy-Sci. Champaign, Ill. : American Dairy Science Association. May 1986. volume 69 (5) page 1411-1415. 0022-0302

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>

The following is a specific Web list relating to ketosis; 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:

- **Food and Diet**

- Carbo-Loading Diet**

- Source: Healthnotes, Inc.; www.healthnotes.com

CHAPTER 3. ALTERNATIVE MEDICINE AND KETOSIS

Overview

In this chapter, we will begin by introducing you to official information sources on complementary and alternative medicine (CAM) relating to ketosis. 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 ketosis 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 "ketosis" (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 ketosis:

- **Alternative neurology: the ketogenic diet.**
 Author(s): Roach ES.
 Source: Archives of Neurology. 1998 November; 55(11): 1403-4.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9823821&dopt=Abstract
- **Antirheumatic effects of fasting.**
 Author(s): Palmblad J, Hafstrom I, Ringertz B.
 Source: Rheumatic Diseases Clinics of North America. 1991 May; 17(2): 351-62. Review.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1862244&dopt=Abstract
- **Attenuation of brain hyperbaric oxygen toxicity by fasting is not related to ketosis.**
 Author(s): Chavko M, Braisted JC, Harabin AL.

Source: Undersea & Hyperbaric Medicine : Journal of the Undersea and Hyperbaric Medical Society, Inc. 1999 Summer; 26(2): 99-103.

http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10372429&dopt=Abstract

- **Balanced calorie-restricted diets and carbohydrate-restricted diets.**
 Author(s): Williamson B, Newmark SR.
 Source: J Okla State Med Assoc. 1984 March; 77(3): 79-85. Review. No Abstract Available.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6371198&dopt=Abstract
- **Carnitine supplementation ameliorates the steatosis and ketosis induced by pivalate in rats.**
 Author(s): Bianchi PB, Lehotay DC, Davis AT.
 Source: The Journal of Nutrition. 1996 November; 126(11): 2873-9.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8914960&dopt=Abstract
- **Cystic fibrosis-related diabetes.**
 Author(s): Mackie AD, Thornton SJ, Edenborough FP.
 Source: Diabetic Medicine : a Journal of the British Diabetic Association. 2003 June; 20(6): 425-36. Review.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12786675&dopt=Abstract
- **Detection of coxsackie B virus RNA sequences in whole blood samples from adult patients at the onset of type I diabetes mellitus.**
 Author(s): Andreoletti L, Hober D, Hober-Vandenberghe C, Belaich S, Vantighem MC, Lefebvre J, Wattré P.
 Source: Journal of Medical Virology. 1997 June; 52(2): 121-7.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9179756&dopt=Abstract
- **Dietary L-carnitine supplementation in obese cats alters carnitine metabolism and decreases ketosis during fasting and induced hepatic lipidosis.**
 Author(s): Blanchard G, Paragon BM, Milliat F, Lutton C.
 Source: The Journal of Nutrition. 2002 February; 132(2): 204-10.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11823579&dopt=Abstract
- **Dietary protein and weight reduction: a statement for healthcare professionals from the Nutrition Committee of the Council on Nutrition, Physical Activity, and Metabolism of the American Heart Association.**
 Author(s): St Jeor ST, Howard BV, Prewitt TE, Bovee V, Bazzarre T, Eckel RH; Nutrition Committee of the Council on Nutrition, Physical Activity, and Metabolism of the American Heart Association.

Source: Circulation. 2001 October 9; 104(15): 1869-74.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11591629&dopt=Abstract

- **Effect of niacin supplementation on milk production and ketosis of dairy cattle.**
 Author(s): Dufva GS, Bartley EE, Dayton AD, Riddell DO.
 Source: Journal of Dairy Science. 1983 November; 66(11): 2329-36.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6655091&dopt=Abstract
- **Effect of prolonged modified fasting in obese persons on in vitro markers of immunity: lymphocyte function and serum effects on normal neutrophils.**
 Author(s): McMurray RW, Bradsher RW, Steele RW, Pilkington NS.
 Source: The American Journal of the Medical Sciences. 1990 June; 299(6): 379-85.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2356851&dopt=Abstract
- **Effects of a ketogenic diet on tumor metabolism and nutritional status in pediatric oncology patients: two case reports.**
 Author(s): Nebeling LC, Miraldi F, Shurin SB, Lerner E.
 Source: Journal of the American College of Nutrition. 1995 April; 14(2): 202-8.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7790697&dopt=Abstract
- **Effects of chromium and yeast supplements on carbohydrate and lipid metabolism in diabetic men.**
 Author(s): Rabinowitz MB, Gonick HC, Levin SR, Davidson MB.
 Source: Diabetes Care. 1983 July-August; 6(4): 319-27.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6352208&dopt=Abstract
- **Effects of severe dietary restriction on male reproductive hormones.**
 Author(s): Hoffer LJ, Beitins IZ, Kyung NH, Bistrian BR.
 Source: The Journal of Clinical Endocrinology and Metabolism. 1986 February; 62(2): 288-92.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3079771&dopt=Abstract
- **Ethylmalonic aciduria: an organic acidemia with CNS involvement and vasculopathy.**
 Author(s): Ozand PT, Rashed M, Millington DS, Sakati N, Hazzaa S, Rahbeeni Z, al Odaib A, Youssef N, Mazrou A, Gascon GG, et al.
 Source: Brain & Development. 1994 November; 16 Suppl: 12-22.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7726376&dopt=Abstract
- **Fasting lipoprotein and postprandial triacylglycerol responses to a low-carbohydrate diet supplemented with n-3 fatty acids.**
 Author(s): Volek JS, Gomez AL, Kraemer WJ.

Source: Journal of the American College of Nutrition. 2000 June; 19(3): 383-91.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10872901&dopt=Abstract

- **Hemorrhagic gastritis from topical isopropanol exposure.**
 Author(s): Dyer S, Mycyk MB, Ahrens WR, Zell-Kanter M.
 Source: The Annals of Pharmacotherapy. 2002 November; 36(11): 1733-5.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12398569&dopt=Abstract
- **Is a fast necessary when initiating the ketogenic diet?**
 Author(s): Wirrell EC, Darwish HZ, Williams-Dyjur C, Blackman M, Lange V.
 Source: Journal of Child Neurology. 2002 March; 17(3): 179-82.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12026232&dopt=Abstract
- **Ketosis with enhanced GABAergic tone promotes physiological changes in transcendental meditation.**
 Author(s): Elias AN, Guich S, Wilson AF.
 Source: Medical Hypotheses. 2000 April; 54(4): 660-2.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10859661&dopt=Abstract
- **Lipid and fatty acid profiles in rats consuming different high-fat ketogenic diets.**
 Author(s): Dell CA, Likhodii SS, Musa K, Ryan MA, Burnham WM, Cunnane SC.
 Source: Lipids. 2001 April; 36(4): 373-8.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11383688&dopt=Abstract
- **Low-dose versus high-dose insulin therapy for diabetic ketoacidosis.**
 Author(s): Pfeifer MA, Samols E, Wolter CF, Winkler CF.
 Source: Southern Medical Journal. 1979 February; 72(2): 149-54.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=106476&dopt=Abstract
- **MCAD deficiency in the Holderman Mennonite population in central Kansas.**
 Author(s): Casey JL.
 Source: Kans Med. 1992 November; 93(11): 306-8. No Abstract Available.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1460814&dopt=Abstract
- **Mixed acid-base abnormalities in diabetes.**
 Author(s): Sanders G, Boyle G, Hunter S, Poffenbarger PL.
 Source: Diabetes Care. 1978 November-December; 1(6): 362-4.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=103696&dopt=Abstract
- **Potential role of polyunsaturates in seizure protection achieved with the ketogenic diet.**
 Author(s): Cunnane SC, Musa K, Ryan MA, Whiting S, Fraser DD.

Source: Prostaglandins, Leukotrienes, and Essential Fatty Acids. 2002 August-September; 67(2-3): 131-5.

http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12324231&dopt=Abstract

- **Protein wasting due to acidosis of prolonged fasting.**
 Author(s): Hannaford MC, Leiter LA, Josse RG, Goldstein MB, Marliss EB, Halperin ML.
 Source: The American Journal of Physiology. 1982 September; 243(3): E251-6.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6287864&dopt=Abstract
- **Seizures decrease rapidly after fasting: preliminary studies of the ketogenic diet.**
 Author(s): Freeman JM, Vining EP.
 Source: Archives of Pediatrics & Adolescent Medicine. 1999 September; 153(9): 946-9.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10482210&dopt=Abstract
- **Serum levels of interleukin-6 and dehydroepiandrosterone sulphate in response to either fasting or a ketogenic diet in rheumatoid arthritis patients.**
 Author(s): Fraser DA, Thoen J, Djoseand O, Forre O, Kjeldsen-Kragh J.
 Source: Clin Exp Rheumatol. 2000 May-June; 18(3): 357-62.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10895373&dopt=Abstract
- **Short-term diabetic ketosis alters n-6 polyunsaturated fatty acid content in plasma phospholipids.**
 Author(s): Bassi A, Avogaro A, Crepaldi C, Pavan P, Zambon S, Marin R, Macdonald I, Manzato E.
 Source: The Journal of Clinical Endocrinology and Metabolism. 1996 April; 81(4): 1650-3.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8636382&dopt=Abstract
- **Subcutaneous absorption of insulin in insulin-dependent diabetic patients. Influence of species, physico-chemical properties of insulin and physiological factors.**
 Author(s): Hildebrandt P.
 Source: Dan Med Bull. 1991 August; 38(4): 337-46. Review.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1914533&dopt=Abstract
- **Supplement strategies for ruminants and management of feeding to maximize utilization of roughages.**
 Author(s): Orskov ER.
 Source: Preventive Veterinary Medicine. 1999 January 27; 38(2-3): 179-85.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10081797&dopt=Abstract
- **The ketogenic diet may have mood-stabilizing properties.**
 Author(s): El-Mallakh RS, Paskitti ME.

Source: Medical Hypotheses. 2001 December; 57(6): 724-6. Review.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11918434&dopt=Abstract

- **The protein-sparing modified fast for obesity-related medical problems.**
 Author(s): Walters JK, Hoogwerf BJ, Reddy SS.
 Source: Cleve Clin J Med. 1997 May; 64(5): 242-4. Review. No Abstract Available.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9149474&dopt=Abstract
- **Thiamin and niacin in the rumen.**
 Author(s): Brent BE, Bartley EE.
 Source: Journal of Animal Science. 1984 September; 59(3): 813-22. Review.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6386781&dopt=Abstract

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 ketosis; 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**

Epilepsy

Source: Healthnotes, Inc.; www.healthnotes.com

- **Herbs and Supplements**

- Medium-Chain Triglycerides**

- Source: Prima Communications, Inc. www.personalhealthzone.com

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 KETOSIS

Overview

In this chapter, we will give you a bibliography on recent dissertations relating to ketosis. 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 “ketosis” (or a synonym) in their titles. To accurately reflect the results that you might find while conducting research on ketosis, we have not necessarily excluded non-medical dissertations in this bibliography.

Dissertations on Ketosis

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 ketosis. 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:

- **Bovine Ketosis: Diagnostic and Clinical Studies** by Steen, Arvid; DrMedVet from Norges Veterinaerhogskole (Norway), 2002, 31 pages
<http://wwwlib.umi.com/dissertations/fullcit/f447873>
- **Metabolic Response to Ketosis Mimicking Challenge in Dairy Heifers As Marker for Genetic Merit** by Binder, Heinrich; PhD from The University of British Columbia (Canada), 1989
<http://wwwlib.umi.com/dissertations/fullcit/NL55061>
- **The Effects of Prolonged Exercise and the Ingestion of Alanine and Glucose during Recovery on Plasma Carnitine and Ketosis** by Carlin, James Irish, PhD from The University of Wisconsin - Madison, 1984, 121 pages
<http://wwwlib.umi.com/dissertations/fullcit/8415550>

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 KETOSIS

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.⁵ 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 "ketosis" (or a synonym) in their titles. To accurately reflect the results that you might find while conducting research on ketosis, we have not necessarily excluded non-medical patents in this bibliography.

Patents on Ketosis

By performing a patent search focusing on ketosis, 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

⁵Adapted from the United States Patent and Trademark Office:
<http://www.uspto.gov/web/offices/pac/doc/general/whatis.htm>.

will tell you how to obtain this information later in the chapter. The following is an example of the type of information that you can expect to obtain from a patent search on ketosis:

- **Composition and method**

Inventor(s): Jewell; Dennis Edward (Topeka, KS), Kirk; Claudia Ann (Lawrence, KS), Toll; Philip William (Valley Falls, KS), Zicker; Steven Curtis (Lawrence, KS)

Assignee(s): Hill's Pet Nutrition, Inc. (Topeka, KS)

Patent Number: 6,410,063

Date filed: June 13, 2000

Abstract: A diet which induces a state of **ketosis** in a canine or feline which comprises an edible composition relatively high in fats and relatively low in carbohydrates.

Excerpt(s): Diet has been used in an attempt to manage conditions in man for many years. Obesity is often times directly related to the total and type of caloric intake for man over a given period of time. Diabetes first line of control is usually an attempt at management through diet. Similarly an attempt to limit high cholesterol values, hypertension, and urinary stone formation is frequently attempted by diet. In man, it has additionally been observed that a diet, which brings about a state of **ketosis**, that is increased ketone bodies, has met with some success in controlling the seizures associated with epilepsy. In lower mammals, such as dogs, experiments to create a state of **ketosis** through the use of starvation has met with only limited attainment, J. J. de Bruijne, International Journal of Obesity (1979) 3, 239-247, see a further study on prolonged fasting in dogs by J. J. de Bruline, Metabolism (1981) Vol. 30, no. 2, 190-194. No ketotic state has been reported to have been achieved for a dog through use of a designed diet that uses a relatively high fat level combined with a relatively low carbohydrate level. The same lack of information concerning felines and lack of attainment of **ketosis** through use of diet, complete in all nutrients, is also present. It has now been discovered that a state of **ketosis** can be achieved in lower mammals through the use of diet, in general a diet that is relatively high in fat and relatively low in carbohydrates. This alteration of metabolism, **ketosis**, can be useful in the management of various medical or behavioral conditions including but not limited to seizures, more specifically those related to idiopathic epilepsy; body weight regulation; behavior problems; muscle metabolism; carbohydrate intolerance; disorders of insulin secretion or insulin deficiency; muscle fatigue; suboptimal exercise tolerance and a combination of any of these conditions. In addition, alterations in metabolism and **ketosis** can enhance exercise performance.

Web site: http://www.delphion.com/details?pn=US06410063__

- **Ketosis-treating agent**

Inventor(s): Kobayashi; Hisamine (Kanagawa, JP)

Assignee(s): Ajinomoto Co., Inc. (Tokyo, JP)

Patent Number: 6,620,967

Date filed: October 17, 2000

Abstract: A ketosis-treating agent comprising, as an active ingredient, at least one amino acid selected from valine, isoleucine, serine, glutamine and glutamic acid, or a peptide or protein comprising at least one amino acid selected from valine, isoleucine, serine,

glutamine and glutamic acid; a method for treating or preventing **ketosis**, comprising administering to a human or animal an effective amount of the above agent; and a method for treating or preventing symptoms relating to ketone bodies, comprising administering to a human or animal an effective amount of the above agent.

Excerpt(s): The present invention relates to a ketosis-treating agent. Particularly, it relates to a ketosis-treating agent which shows little influence on glucose metabolism and/or has a long duration of its effect. Mobilization of free fatty acids from fatty tissue increases at diabetes, starvation, physical exercise, external injury, surgical operation, attack of fever, or the like, so that fatty acid oxidation in the liver is accelerated because of decrease of utilization of sugars, deficiency of insulin, stress, and the like. As a result, formation of ketone bodies, which is the general term for acetoacetic acid, 3-hydroxybutyric acid and acetone, increases. When the formation of ketone bodies exceeds the capacity of treating it, the ketone bodies are accumulated in blood to cause ketonemia. Conditions where the concentration of ketone bodies is high in urine are called ketonuria, and both of them are called generally **ketosis**. Since acetoacetic acid and 3-hydroxybutyric acid are strong acids of a medium level, in the case where accumulation of ketone bodies exceeds the buffering capacity of a living body, metabolic acidosis is caused and the living body falls into a fatal state called ketoacidosis. For example, excessive formation of ketone bodies for a long period, of time such as diabetes causes ketoacidosis to finally result in death. Generally, in order to prevent or treat **ketosis**, insulin or a sugar, such as glucose or the like, is administered. However, as discussed above, glucose metabolism is disordered in many cases of falling into **ketosis** so that there is a problem that a blood glucose value largely varies by such administration of insulin or a sugar.

Web site: http://www.delphion.com/details?pn=US06620967__

- **Medical uses of pyruvates**

Inventor(s): Bomont; Catherine (Scotch Plains, NJ), Brunengraber; Henri (Shaker Heights, OH), Cooper; Kevin D. (Moreland Hills, OH), David; France (Shaker Heights, OH), Hallowell; Peter T. (Cleveland Heights, OH), Kasoumov; Takhar (Cleveland, OH)

Assignee(s): Case Western Reserve University (Cleveland, OH)

Patent Number: 6,086,789

Date filed: May 12, 1998

Abstract: A pyruvate compound suitable for cosmetically or dermatologically administering to the skin and for use in treating diabetic **ketosis** or other medical treatments. The compound includes a pyruvate selected from the group of pyruvate thioester, dihydroxyacetonepyruvate, and an ester of pyruvate and a sugar or a polyol.

Excerpt(s): This invention relates to several new pyruvate compounds and methods of (i) treating ischemia in mammalian hearts, lungs, veins, arteries and other organs or tissues, (ii) accelerating ethanol oxidation/preventing acute toxic effects of ethanol on the liver, (iii) using the novel pyruvates in other recognized uses of pyruvates including, but not limited to, treating of secondary effects of diabetes, lowering of cholesterol and lipid levels, as a nutrition source which can provide as much as 100% of caloric requirements and to treat injured organs requiring a readily accessible energy source, (iv) topical applications of pyruvates in the treatment of dermatological wounds or diseases and prevention thereof and to generally improve skin health, and (v) treatment of diabetic **ketosis**. Ischemia is defined herein as the interruption of oxygen supply, via

the blood, to an organ or to part of an organ. Examples of ischemic events include (i) myocardial, cerebral, or intestinal infarction following obstruction of a branch of a coronary, cerebral, or mesenteric artery, and (ii) removal and storage of an organ prior to transplantation. In the case of myocardial infarction, prompt restoration of blood flow to the ischemic myocardium, i.e. coronary reperfusion, is a key component of the treatment. This is because mortality is directly related to infarct size (tissue necrosed) which is related to the severity and duration of the ischemic event. Notwithstanding the need to supply an organ cut-off from a normal blood supply with oxygen, it has been found that reperfusion injury may occur upon restoration of blood flow. This results from the production of reactive oxygen species (ROS), namely, hydrogen peroxide, hydroxyl radicals and superoxide radicals which are formed from both extracellular and intracellular sources. ROS are highly reactive species that, under normal conditions, are scavenged by endogenous defense mechanisms. However, under conditions of post-ischemic oxidative stress, ROS interact with a variety of cellular components, causing peroxidation of lipids, denaturation of proteins, and interstitial matrix damage, resulting in increase of membrane permeability and release of tissue enzymes.

Web site: http://www.delphion.com/details?pn=US06086789__

- **Method for treating ketotic ruminants with antibiotic AV290**

Inventor(s): Dalrymple; Ronald H. (Titusville, NJ), Ingle; Donald L. (Trenton, NJ)

Assignee(s): American Cyanamid Company (Stamford, CT)

Patent Number: 4,206,203

Date filed: October 16, 1978

Abstract: This invention relates to a method for improving the production of propionic acid and thus increasing the propionate:acetate ratio in the course of the microbiological conversion of cellulose and starch containing feedstuffs to short chain volatile fatty acids in the ruminant animal. This invention further relates to the use of antibiotic AV290, antibiotic AV290 sulfate, an antibiotic AV290-syntan complex, an antibiotic AV290-alkyl sulfate complex, and/or an antibiotic AV290 alkylated derivative for increasing the production of propionic acid and suppressing the production of acetic acid during the microbiological digestive processes taking place in the animal rumen and treating **ketosis**.

Excerpt(s): The major nutritive portion of the ruminants diet consists primarily of polysaccharides such as cellulose and starches. These primary sources of said animals energy requirements, and of basic intermediates for tissue building processes, are hydrolized in said animals rumen by microbiological processes to monosaccharides, primarily to glucose. The thus formed glucose is then further degraded by enzymatic processes to pyruvic acid and derivatives thereof. These in turn are further converted through various enzymatic processes to acetic acid and propionic acid and derivatives thereof. Simultaneously, and also in the rumen, some of the acetic acid is converted to butyric acid. Although butyric acid is the component most efficiently metabolized by ruminants while acetic acid is the least efficiently utilized product of the above referred-to digestive processes, the formation of butyric acid in the course of said microbiological processes is energetically not very favorable. As stated above, butyric acid is formed from acetic acid, and since one mole of glucose yields two moles of acetic acid and two moles of methane and/or carbon dioxide gas, and since two moles of acetic acid are consumed in the formation of one mole of butyric acid, therefore, for every mole of butyric acid formed, two moles of methane and/or carbon dioxide gas are generated,

representing a considerable energy loss. Additionally, it is known that production of acetic acid (and/or acetates) in larger than normal amounts may lead to the production of ketone bodies (acetoacetate, acetone and .beta.-hydroxy butyrate) which can cause **ketosis** in ruminants, especially if said animals are under stress. It has been found that the supplementary feeding of propionic acid (and/or propionates) is beneficial for minimizing the effects of **ketosis**. A further advantage of feeding a diet high in propionic acid to ruminants such as cattle, sheep and goats is to lower the incidence of **ketosis**. Thus it would be of advantage both to the animal grower and feedlot operator if the microbiological processes of the rumen could be altered so that the production of propionic acid from carbohydrates is enhanced while that of acetic acid is suppressed. (2) antibiotic AV290 sulfate which is disclosed in U.S. Pat. No. 3,855,410.

Web site: http://www.delphion.com/details?pn=US04206203__

- **Method of treating ketosis**

Inventor(s): Wilkinson; John D. I. (Bagshot, GB3)

Assignee(s): Lilly Industries Limited (Basingstoke, GB2)

Patent Number: 5,494,670

Date filed: July 21, 1993

Abstract: In a method of treating **ketosis** in an animal during pregnancy or lactation, such as toxemia of pregnancy or fat cow syndrome, the amount or activity of somatotropin in the blood is increased while administering glucose or a glucose precursor to the affected animal.

Excerpt(s): This invention relates to the treatment of ketotic conditions in farm and other animals, especially in economically important animals such as sheep and cattle. Ketotic diseases occur when an animal's energy requirements exceed its intake from foodstuffs and body fat is catabolised to make up the deficit. A deficiency of glucose occurs and ketone bodies accumulate in the blood (Veterinary Medicine, 7th Edition, by Blood, DC & Radostits, OM. Publ: Bailliere Tindall, 1989). In sheep, **ketosis** (pregnancy toxemia) usually occurs in late pregnancy, particularly in animals bearing more than one foetus or a single large foetus. The conceptus exerts an excessive demand for glucose or other nutrients.

Web site: http://www.delphion.com/details?pn=US05494670__

- **Methods and formulations for the treatment of obesity**

Inventor(s): Howard; Alan Norman (10 Topcliffe Way, Cambridge, EN)

Assignee(s): none reported

Patent Number: 4,009,265

Date filed: March 5, 1973

Abstract: It has been discovered that the unfavorable effects observed in weight reduction treatments based on severe dietary restriction (less than 600 Kcals/day) or total fasting (as regards fat, carbohydrates and aminoacids) are avoided by the administration of aminoacids and carbohydrates in critical but much lower amounts than has been believed to be necessary. Nitrogen loss with aminoacid intake between about 15 and 30 g per day is affected by carbohydrate intake. Nitrogen balance is

maintained and **ketosis** and water retention are controlled when the daily intake includes, in addition to necessary minerals and vitamins, at least 15 g of aminoacids in the proportions required by man, and from 15 to 75 g, preferably 30 to 45 g, of carbohydrates, with a total caloric value of from 160 to about 600 Kcals, preferably less than 400 Kcals, very desirably less than 360 Kcals, and optimally in the range of from 180 to 360 Kcals. Formulations are described in which the least amount containing the minimum daily requirement of minerals also contains at least 15 g of aminoacids (as a monomeric aminoacid mixture or as natural protein) and from 15 to 75 g, preferably from 30 to 45 g, of carbohydrates, together with optional other constituents.

Excerpt(s): This invention relates to methods and formulations for the treatment of obesity. When it is required to bring about weight reduction in over-weight patients, it is naturally necessary to reduce their food intake, since the object of the weight-reduction treatment is to cause the body to consume its own fatty tissues in meeting its energy requirements. To this end, it has hitherto been necessary for the diet of the patients to be very strictly controlled and supervised during the period of weight-reduction, which might extend to several months. To exercise so complete a control over the patient's diet it is most convenient to incorporate all the food requirements of the patients into a single dietary composition, and this has been the normal practice. Unfortunately, such controlled diets have hitherto been very unsatisfying, and the patients feel constantly hungry, which is of course very unpleasant. This causes many patients to break off the diet; and even those patients who are motivated sufficiently strongly to stay the course often find that the diet is almost intolerable. Furthermore, many physiological and psychological problems have hitherto been associated with the clinical use of severe dietary restriction. One of these problems arises from the fact that the body requires a constant supply of nitrogen (in the form of aminoacids or their polymers) to replace the endogenous nitrogen losses resulting from the normal "wear and tear" of the body's protein. If an adequate amount of aminoacids is not supplied there is a loss of body protein, with consequent reduction in muscle mass; this leaves the patient feeling weak and languid. If this protein loss continues for too long it can be dangerous, and even the heart muscle may suffer damage. In fact, this loss of muscle mass is one of the main reasons why total fasting is not favoured as a weight-reduction treatment.

Web site: http://www.delphion.com/details?pn=US04009265__

- **Nutritional supplement for calving ruminant animals**

Inventor(s): Parker; Richard B. (Portland, OR)

Assignee(s): Great Lakes Biochemical Company, Inc. (Milwaukee, WI)

Patent Number: 5,601,836

Date filed: February 1, 1994

Abstract: The method of the present invention is directed to a nutritional supplement for ruminant animals at or about the time of freshening. The nutritional supplement comprises, in unit dosage form, prophylactically effective amounts of calcium propionate, or mixture of calcium propionate and calcium oxide, and a water soluble magnesium salt, as active ingredients in a pharmaceutically acceptable gel carrier that imparts flowability to the nutritional supplement. The present invention is also directed to a method of preventing or inhibiting a triad of diseases--hypocalcemia, **ketosis** and tetany--that commonly occur in ruminant animals during freshening. The method of the

present invention comprises administering to a ruminant animal during its time of freshening, the above described nutritional supplement in a unit dose form.

Excerpt(s): The present invention is directed to the field of nutritional supplements for ruminant animals, especially dairy cattle, during calving. More particularly, the present invention is directed to a nutritional supplement in a unit dosage form that is capable of preventing or minimizing the effects of three ailments that commonly afflict calving ruminant animals, especially calving dairy cattle. The present invention is useful because it is capable of preventing and/or inhibiting one of more of the three serious ailments of calving ruminant animals and the subsequent need for veterinary treatment. The first ailment is metabolic and it concerns the animal's need for calcium. The demand for calcium comes from the heavy milk production at freshening. This demand is even greater in dairy cattle. During freshening, the udder of the lactating animal extracts calcium from the blood and converts it into calcium caseinate--a milk protein. Normally, the extracted calcium is replaced by calcium absorbed from the rumen. However, if there is insufficient calcium in the rumen to replace the calcium extracted by the udder, the animal's blood calcium concentration falls. A low blood calcium means that less calcium is available for muscle tissue contraction and the cow goes "down." This condition is commonly referred to as "down cow" syndrome or "milk fever." Medically, the condition is known as "hypocalcemia." Regardless of its name, the condition is not always foreseen. Thus, any treatment is usually in response to the problem and not directed to preventing the condition. However, treatment is not an adequate substitute for prevention, since even with treatment, the animal may suffer some permanent damage.

Web site: http://www.delphion.com/details?pn=US05601836__

- **Powder mixture having high propylene glycol content and process for the preparation thereof**

Inventor(s): Bezzegh; Denes (Budapest, HU), Egri; Janos (Budapest, HU), Kelemen; Jozsef (Budapest, HU), Magyar; Karoly (Budapest, HU), Mandi; Attila (Budapest, HU), Zalai; Gabor (Budapest, HU)

Assignee(s): EGYT Gyogyszervegyeszeti Gyar (Budapest, HU)

Patent Number: 4,680,315

Date filed: January 7, 1985

Abstract: The invention refers to a powder mixture having a high propylene glycol content and a process for the preparation thereof. The powder mixture consists of 25 to 75 percent by weight of propylene glycol and 75 to 25 percent by weight of magnesium oxide and/or magnesium peroxide and/or magnesium carbonate as a solid carrier(s). The powder mixture can be treated as a solid powder and it does not deliquesce in the air even when stored for a long time. The mixture can be used as solid propylene glycol in dietetic products for calf, piglet and lamb, in pharmaceutical compositions for the treatment of **ketosis** and in other pharmaceutical compositions for veterinary use.

Excerpt(s): The invention relates to a powder mixture having high propylene glycol content and a process for the preparation thereof. The powder mixture of the invention can be employed for the preparation of veterinary compositions and animal feeds. Propylene glycol can be extensively used in the field of veterinary medicine and animal husbandry. Thus, it is an important ingredient of the pharmaceutical compositions used in the treatment of **ketosis** in cattles. In addition, it can be employed to preserve feeds

and improve the taste thereof, to hinder the formation of clouds of dust when mixing fine particles, and to avoid the segregation of particles in mixtures. Furthermore, propylene glycol is a fungicide and antioxidant in feeds and acts as a wetting agent in the dissolution of milk powder [Feed Additive Compendium, 1977, p. 300]. However, it is a serious problem that in most cases the liquid propylene glycol has to be homogenized with solid substances or mixtures, propylene glycol being often non-compatible with certain components thereof. A further difficulty is due to the very high hygroscopicity of propylene glycol since the solid mixtures comprising it can easily deliquesce on standing. Since the difficulties listed above cannot be eliminated, the use of propylene glycol is limited. At present, propylene glycol is sprayed to the animal feeds directly before use, mostly at the place of use. However, it is required to have a homogenizing device equipped with a sprayer, to have available liquid propylene glycol e.g. in tank-trucks and to employ the animal feed comprising propylene glycol in a short time after preparation. Of course, every farm does not possess suitable devices to manufacture animal feeds comprising propylene glycol when needed. But it is not possible, either, to prepare huge quantities of animal feeds in factories and to transport the products to the farms since such mixtures cannot be stored for a longer time.

Web site: http://www.delphion.com/details?pn=US04680315__

Patent Applications on Ketosis

As of December 2000, U.S. patent applications are open to public viewing.⁶ 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 ketosis:

- **Combinations comprising dipeptidylpeptidase-iv inhibitor**

Inventor(s): Balkan, Bork; (Madison, CT), Holmes, David Grenville; (Binningen, CH), Hughes, Thomas Edward; (Somerville, NJ), Villhauer, Edwin Bernard; (Morristown, NJ)

Correspondence: Thomas Hoxie; Novartis, Patent And Trademark Department; One Health Plaza 430/2; East Hanover; NJ; 07936-1080; US

Patent Application Number: 20030139434

Date filed: October 10, 2002

Abstract: The invention relates to a combination which comprises a DPP-IV inhibitor and at least one further antidiabetic compound, preferably selected from the group consisting of insulin signalling pathway modulators, like inhibitors of protein tyrosine phosphatases (PTPases), non-small molecule mimetic compounds and inhibitors of glutamine-fructose-6-phosphate amidotransferase (GFAT), compounds influencing a dysregulated hepatic glucose production, like inhibitors of glucose-6-phosphatase (G6Pase), inhibitors of fructose-1,6-bisphosphatase (F-1,6-BPase), inhibitors of glycogen phosphorylase (GP), glucagon receptor antagonists and inhibitors of phosphoenolpyruvate carboxykinase (PEPCK), pyruvate dehydrogenase kinase (PDHK) inhibitors, insulin sensitivity enhancers, insulin secretion enhancers, .alpha.-glucosidase inhibitors, inhibitors of gastric emptying, insulin, and .alpha.-adrenergic antagonists, for simultaneous, separate or sequential use in the prevention, delay of progression or treatment of conditions mediated by dipeptidylpeptidase-IV (DPP-IV), in

⁶ This has been a common practice outside the United States prior to December 2000.

particular diabetes, more especially type 2 diabetes mellitus, conditions of impaired glucose tolerance (IGT), conditions of impaired fasting plasma glucose, metabolic acidosis, **ketosis**, arthritis, obesity and osteoporosis; and the use of such combination for the cosmetic treatment of a mammal in order to effect a cosmetically beneficial loss of body weight.

Excerpt(s): The invention relates to a combination, such as a combined preparation or pharmaceutical composition, respectively, which comprises a dipeptidylpeptidase-IV (DPP-IV) inhibitor and at least one further antidiabetic compound, preferably selected from the group consisting of insulin signalling pathway modulators, like inhibitors of protein tyrosine phosphatases (PTPases), non-small molecule mimetic compounds and inhibitors of glutamine-fructose-6-phosphate amidotransferase (GFAT), compounds influencing a dysregulated hepatic glucose production, like inhibitors of glucose-6-phosphatase (G6Pase), inhibitors of fructose-1,6-bisphosphatase (F-1,6-BPase), inhibitors of glycogen phosphorylase (GP), glucagon receptor antagonists and inhibitors of phosphoenolpyruvate carboxykinase (PEPCK), pyruvate dehydrogenase kinase (PDHK) inhibitors, insulin sensitivity enhancers, insulin secretion enhancers, α -glucosidase inhibitors, inhibitors of gastric emptying, insulin, and α -adrenergic antagonists, for simultaneous, separate or sequential use, especially in the prevention, delay of progression or treatment of conditions mediated by dipeptidylpeptidase-IV (DPP-IV), in particular diabetes, more particularly type 2 diabetes mellitus, conditions of impaired glucose tolerance (IGT), conditions of impaired fasting plasma glucose, metabolic acidosis, **ketosis**, arthritis, obesity and osteoporosis; the use of such combination for the preparation of a pharmaceutical preparation for the prevention, delay of progression or treatment of such conditions; the use of such combination for the cosmetic treatment of a mammal in order to effect a cosmetically beneficial loss of body weight; a method of prevention, delay of progression or treatment of conditions mediated by DPP-IV; a method of improving the bodily appearance of a warm-blooded animal. DPP-IV is responsible for inactivating GLP-1. More particularly, DPP-IV generates a GLP-1 receptor antagonist and thereby shortens the physiological response to GLP-1. GLP-1 is a major stimulator of pancreatic insulin secretion and has direct beneficial effects on glucose disposal. Non-insulin dependent diabetes mellitus (type 2 diabetes mellitus) is characterized by both increased peripheral insulin resistance and abnormal insulin secretion. At least three abnormalities of insulin secretion are recognized: in the first phase, insulin secretion is lost and in the second phase insulin is both delayed and inadequate in the face of elevated circulating glucose levels. Several metabolic, hormonal, and pharmacological entities are known to stimulate insulin secretion including glucose, amino-acids and gastrointestinal peptides. The Diabetes Control and Complications Trial (DCCT) has established that lowering of blood glucose is associated with decreases in the onset and progression of diabetic microvascular complications (Diabetes Control and Complications Trial Research Group; N. Engl. J. Med. 1993, 329, 977-986). IGT is an impairment of glucose homeostasis closely related to type 2 diabetes mellitus. Both conditions convey a great risk of macrovascular disease. Therefore, one therapeutic focus is on optimizing and potentially normalizing glycemic control in subjects with type 2 diabetes mellitus, conditions of impaired fasting plasma glucose, or IGT. Presently available agents need to be improved in order to better meet this therapeutic challenge.

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

- **Flowable cottonseed and method for its preparation**

Inventor(s): Dale, Ross; (Pella, IA), Summer, Paul; (Oskaloosa, IA), Yamamoto, Koryu; (Kanagawa, JP)

Correspondence: Oblon, Spivak, McClelland, Maier & Neustadt, P.C.; 1940 Duke Street; Alexandria; VA; 22314; US

Patent Application Number: 20030049363

Date filed: September 13, 2001

Abstract: A method for the preparation of a handleable, flowable coated cottonseed product is provided which involves coating cottonseed with a composition of (a) water or a liquid feed product, (b) one or more organic acids and (c) a metal compound capable of interacting with the one or more organic acids to form a coating on the cottonseed, and curing the coating formed thereby, and the flowable cottonseed product formed thereby, as well as its use as a feed supplement for ruminants such as cattle, as a plantable source of cottonseed, in a method for treatment and/or prevention of urinary calculi or prevention of milk fever in cattle, or in a method for increasing milk fat in dairy cattle, a method for increasing milk production in dairy cattle, and a method for preventing **ketosis** in ruminants.

Excerpt(s): The present invention relates to a cottonseed composition having improved flowability and handability and a method for its preparation, and its use as a feed for ruminants, particularly cattle or as a plantable source of cottonseed. Cottonseed is an ideal feed ingredient for ruminants, due to the balanced combination of protein, fiber and other nutrients contained therein. However, its use has not been widespread, due to significant handling problems. Cottonseed used for feeding has an outer coating of short cotton linters (short fibrous "hair-like" structures). These linters remain on the cottonseed after processing in cotton gins. During normal handling, the linters cause the cottonseed to clump together and cause difficulties in handling with traditional feed-grain handling equipment. One solution proposed for this problem has been the preparation of a starch coated cottonseed. This is described in Wedegaertner, U.S. Pat. No. 5,750,466. The starch-coated cottonseed is produced by spraying gelatinized starch on the cottonseed and drying the coating. However, this process is very energy intensive and expensive, requiring significant expenditures in equipment for its production.

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

- **System for optimising the production performance of a milk producing animal herd**

Inventor(s): Chen, Fei; (Lyngby, DK), Hansen, Henrik; (Farum, DK), Larsen, Flemming; (Haarby, DK), Mathiasen, Thomas; (Kobenhavn O, DK)

Correspondence: Hunton & Williams; Intellectual Property Department; 1900 K Street, N.W.; Suite 1200; Washington; DC; 20006-1109; US

Patent Application Number: 20020124803

Date filed: March 7, 2002

Abstract: A system for optimizing the production performance of a milk producing animal herd is provided. The system comprises milk sampling means, analytical means comprising separate means for analyzing compounds or parameters that in the presence of compounds indicative of the physiological or nutritional condition of the herd member, generates detectable signals, and means for directing a part of the milk sample

to each separate analyzing means which is controlled by data for the physiological and nutritional state of a herd member such that the directing means is only activated at pre-selected points in time or at pre-selected time intervals in the production and or lactation cycles. Specific compounds are compounds indicative of mastitis, including beta-N-acetylhexosaminidase (NAGase) E.C. 3.2.1.52 and lactate dehydrogenase (LDH), protein balance, including milk urea nitrogen (MUN) and total protein, **ketosis**, including acetolactate, beta-hydroxybutyrate, acetone and lipids, fat and state in reproduction cycle, including a steroid or peptide hormone such as progesterone. Furthermore, the system comprises signal detection means for recording and processing the signals, means for data storage and data output means. Additionally there are provided methods for optimizing the production performance of a milk producing animal herd and an apparatus herefor.

Excerpt(s): The present invention relates generally to a system and methods for optimising the production performance of a milk producing animal herd. More specifically, it provides automated or semi-automated means for dynamic real time analyses of milk compounds and parameters to provide quantitative analytical data that are indicative of the overall physiological and nutritional state of the milking animals and which, if required, permit appropriate corrective measures to be taken. It is known to monitor the physiological and nutritional condition of milking animals, such as cows. It is also known to collect data from individual milking animals, including data for milk yield and composition, health condition data, feeding scheme data and breeding data such as genetic data. A currently common procedure is to collect milk samples manually from individual milking animals at regular intervals and subsequently ship the samples to a central laboratory for chemical and biological analyses, thereby deriving information on the milk quality as well as the health condition of each individual milking animal. In most milk producing countries, dairy herd improvement associations (DHIAs) will collect, evaluate and distribute such data relating to e.g. milk yield, milk quality and mastitis (i.e. inflammation of the mammary gland). Based on these data that are available from the DHIAs, the dairy farmers can select the best milking animals for breeding, make appropriate adjustments to feeding schemes and control health to thereby optimise the milk production.

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

Keeping Current

In order to stay informed about patents and patent applications dealing with ketosis, 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 "ketosis" (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 ketosis.

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

CHAPTER 6. BOOKS ON KETOSIS

Overview

This chapter provides bibliographic book references relating to ketosis. In addition to online booksellers such as **www.amazon.com** and **www.bn.com**, excellent sources for book titles on ketosis include the Combined Health Information Database and the National Library of Medicine. Your local medical library also may have these titles available for loan.

Book Summaries: Federal Agencies

The Combined Health Information Database collects various book abstracts from a variety of healthcare institutions and federal agencies. To access these summaries, go directly to the following hyperlink: <http://chid.nih.gov/detail/detail.html>. You will need to use the "Detailed Search" option. To find book summaries, use the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer. For the format option, select "Monograph/Book." Now type "ketosis" (or synonyms) into the "For these words:" box. You should check back periodically with this database which is updated every three months. The following is a typical result when searching for books on ketosis:

- **Diabetes and the Adolescent**

Source: Australia: Miranova Publishers. 384 p. 1998.

Contact: Available from Miranova Publishers. P.O. Box 1041, Camberwell, Victoria 3124, Australia. Fax 61398828414. E-mail: mwconf@ozemail.com.au. PRICE: \$94.95 plus shipping and handling. ISBN: 0958714215.

Summary: This textbook focuses on the complicated issue of diabetes and the adolescent. The text includes twenty chapters in five sections: the health behaviors of youth with diabetes, the impact of diabetes on adolescence, early vascular complications of diabetes, strategies for diabetes care in adolescence, and diabetes camping. Topics including a family systems perspective on coping, psychosocial challenges and issues, factors affecting adherence, neuropsychological function, eating disorders, sexual function and pregnancy, patient education, peer support, and the transition to adult health care. The final sixty pages of the book consists of a series of twelve appendices,

each providing overviews of practical approaches to the management of specific problems in the adolescent with diabetes: insulin therapy, diabetic ketoacidosis, investigation of recurrent ketoacidosis or persistent poor control, prevention of **ketosis** during illness, management of surgery and anesthesia, dietary management, diabetes complications screening, the effect of alcohol, drugs, and smoking on diabetes, school and youth with diabetes, obtaining a driving license, safety standards at camps for adolescents, and useful Internet web sites on diabetes. Each chapter concludes with a list of references and a subject index concludes the volume.

The National Library of Medicine Book Index

The National Library of Medicine at the National Institutes of Health has a massive database of books published on healthcare and biomedicine. Go to the following Internet site, <http://locatorplus.gov/>, and then select "Search LOCATORplus." Once you are in the search area, simply type "ketosis" (or synonyms) into the search box, and select "books only." From there, results can be sorted by publication date, author, or relevance. The following was recently catalogued by the National Library of Medicine:⁷

- **Dicarboxylic acids in diabetic and starvation ketosis** Author: Pettersen, Jon Elling.; Year: 1975; Oslo: [s.n.], 1975
- **Ketosis (acetonemia) an annotated bibliography of this disease in cattle and sheep.** Author: Merck and Company, inc.; Year: 1953; Rahway, N. J., 1953
- **Studies on ketosis in dairy cows.** Author: Pehrson, Bo.; Year: 1966; Stockholm, 1966
- **The concept of ketosis as an endocrine disturbance. A new therapeutic approach to bovine ketosis; adrenomone therapy.** Author: Armour and Company, Chicago. Veterinary Laboratories, Kansas City, Kan.; Year: 1929; Kansas City [1953]

⁷ In addition to LOCATORPlus, in collaboration with authors and publishers, the National Center for Biotechnology Information (NCBI) is currently adapting biomedical books for the Web. The books may be accessed in two ways: (1) by searching directly using any search term or phrase (in the same way as the bibliographic database PubMed), or (2) by following the links to PubMed abstracts. Each PubMed abstract has a "Books" button that displays a facsimile of the abstract in which some phrases are hypertext links. These phrases are also found in the books available at NCBI. Click on hyperlinked results in the list of books in which the phrase is found. Currently, the majority of the links are between the books and PubMed. In the future, more links will be created between the books and other types of information, such as gene and protein sequences and macromolecular structures. See <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books>.

CHAPTER 7. MULTIMEDIA ON KETOSIS

Overview

In this chapter, we show you how to keep current on multimedia sources of information on ketosis. We start with sources that have been summarized by federal agencies, and then show you how to find bibliographic information catalogued by the National Library of Medicine.

Bibliography: Multimedia on Ketosis

The National Library of Medicine is a rich source of information on healthcare-related multimedia productions including slides, computer software, and databases. To access the multimedia database, go to the following Web site: <http://locatorplus.gov/>. Select "Search LOCATORplus." Once in the search area, simply type in ketosis (or synonyms). Then, in the option box provided below the search box, select "Audiovisuals and Computer Files." From there, you can choose to sort results by publication date, author, or relevance. The following multimedia has been indexed on ketosis:

- **Troubles at the metabolic mill [slide]: a study of ketosis** Source: David J. Gerrick; Year: 1979; Format: Slide; Lorain, OH: Dayton Lab, c1979

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 Institute⁸:

- 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/>

⁸ 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.⁹ 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:¹⁰

- **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/aidsinfo.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

⁹ Remember, for the general public, the National Library of Medicine recommends the databases referenced in MEDLINEplus (<http://medlineplus.gov/> or <http://www.nlm.nih.gov/medlineplus/databases.html>).

¹⁰ 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 Combined Health Information Database

A comprehensive source of information on clinical guidelines written for professionals is the Combined Health Information Database. You will need to limit your search to one of the following: Brochure/Pamphlet, Fact Sheet, or Information Package, and "ketosis" using the "Detailed Search" option. Go directly to the following hyperlink: <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 the publication date, select "All Years." Select your preferred language and the format option "Fact Sheet." Type "ketosis" (or synonyms) into the "For these words:" box. The following is a sample result:

- **Age-Specific Management**

Source: in Plotnick, L. and Henderson, R. Clinical Management of the Child and Teenager with Diabetes. Baltimore, MD: The Johns Hopkins University Press. 1998. p. 139-156.

Contact: Johns Hopkins University Press. 2715 North Charles Street, Baltimore, MD 21218-4363. (410) 516-6900. Fax (410) 516-6998. Website: www.press.jhu.edu. PRICE: \$24.95 for paperback; \$55.00 for hardcover; plus shipping and handling. ISBN: 0801859093.

Summary: This chapter addresses age specific issues related to diabetes management. Although many principles and strategies can be applied to the management of diabetes in children of all ages, there are many specific issues that arise that are age specific. One of the main issues concerning infants who have diabetes is the need for parents to assume all diabetes management tasks. A technical problem results from the tiny amounts of insulin that are needed for very small children. Basic developmental feeding decisions such as breastfeeding and the introduction of solid foods do not need to be influenced by diabetes. The major medical goals of treatment for infants who have diabetes include avoiding hypoglycemia, significant hyperglycemia, and **ketosis**. Young children should not be allowed to become manipulative about receiving injections. Insulin regimens for young children are similar to those for older children. The eating behavior of young children should be kept as normal as possible. As children become older, they can begin assuming some of the responsibilities of diabetes management. There are no age guidelines that will determine when a child should or should not be allowed to do a specific task, so emotional maturation and willingness are indications of when the child can assume more self care responsibilities. Technical skills are likely to precede cognitive skills. Once children enter school, a concerted effort is needed to manage a student's diabetes. Families may need to consult with mental health professionals if child behavior problems arise. Issues relevant to adolescents include driving, using alcohol and illegal drugs, smoking, and coping with sexual maturation.

- **Surgical Management of Diabetes**

Source: in Haire-Joshu, D., ed. *Management of Diabetes Mellitus: Perspectives of Care Across the Life Span*. 2nd ed. St. Louis, MO: Mosby Year-Book, Inc. 1996. p. 450-469.

Contact: Available from Mosby Year-Book, Inc. 11830 Westline Industrial Drive, St. Louis, MO 63146. (800) 426-4545. Fax (800) 535-9935. E-mail: customer.support@mosby.com. PRICE: \$41.95. ISBN: 0815142234.

Summary: This chapter on the surgical management of diabetes is from a textbook that provides information to health care professionals who deliver comprehensive diabetes care. The endocrine environment during the perioperative period promotes protein and fat catabolism and glucose production. The metabolic consequences of these processes may have devastating consequences in persons with diabetes, and sufficient insulin and glucose must be administered to prevent tissue breakdown. The author notes that some disagreements still exist regarding optimal glycemic targets or the most effective protocol to manage individuals with diabetes during the perioperative period. However, consensus does exist for preoperative evaluation of diabetic complications, especially coronary artery disease, autonomic dysfunction, and diabetic nephropathy. In addition, recommendations are nearly universal for the need for frequent metabolic monitoring (especially blood glucose levels), and the avoidance of hypoglycemia, 'excessive' hyperglycemia, **ketosis**, and electrolyte disturbances. The author focuses on the rationale for the options available for perioperative diabetes management, notably for insulin administration perioperatively.

- **Oral Malodor**

Source: in Newman, M.G. and van Winkelhoff, A.J., eds. *Antibiotic and Antimicrobial Use in Dental Practice*. 2nd ed. Chicago, IL: Quintessence Publishing Co, Inc. 2001. p. 127-141.

Contact: Available from Quintessence Publishing Co, Inc. 551 Kimberly Drive, Carol Stream, IL 60188-9981. (800) 621-0387 or (630) 682-3223. Fax (630) 682-3288. E-mail: quintpub@aol.com. Website: www.quintpub.com. PRICE: \$32.00 plus shipping and handling. ISBN: 0867153970.

Summary: This chapter outlines a basic overview of oral malodor (OM, bad breath or halitosis) and describes most of the antimicrobial agents presently involved or suggested in its treatment. The chapter is from a textbook that integrates basic facts and principles of antibiotic therapy with recently-emerged concepts of care. The author first reviews the oral and nonoral causes of OM, noting that the oral causes of OM can include periodontitis, gingivitis, and plaque coating on the tongue; nonoral causes include diabetic **ketosis**, uremia, gastrointestinal conditions, irregular bowel movement, hepatic (liver) and renal (kidney) failure, and certain types of carcinomas (cancer) such as leukemia. The author then outlines oral malodor assessment parameters, including organoleptic measurements, the portable sulfide meter, an 'electronic nose,' and the spoon test. Management strategies are then considered: proper oral hygiene, antimicrobial agents, zinc rinses, chlorhexidine rinses, chlorine dioxide rinses, triclosan rinses, two-phase rinses, hydrogen peroxide, topical antimicrobial agents, and alternative remedies. Important principles, key facts, and clinical insights are highlighted and the chapter concludes with a list of references. 8 figures. 57 references.

The NLM Gateway¹¹

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.¹² To use the NLM Gateway, simply go to the search site at <http://gateway.nlm.nih.gov/gw/Cmd>. Type "ketosis" (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	1994
Books / Periodicals / Audio Visual	17
Consumer Health	760
Meeting Abstracts	2
Other Collections	0
Total	2773

HSTAT¹³

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.¹⁴ 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.¹⁵ Simply search by "ketosis" (or synonyms) at the following Web site: <http://text.nlm.nih.gov>.

Coffee Break: Tutorials for Biologists¹⁶

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

¹¹ Adapted from NLM: <http://gateway.nlm.nih.gov/gw/Cmd?Overview.x>.

¹² 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).

¹³ Adapted from HSTAT: <http://www.nlm.nih.gov/pubs/factsheets/hstat.html>.

¹⁴ The HSTAT URL is <http://hstat.nlm.nih.gov/>.

¹⁵ 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.

¹⁶ Adapted from <http://www.ncbi.nlm.nih.gov/Coffeebreak/Archive/FAQ.html>.

staff.¹⁷ 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.¹⁸ 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/clinweb/>.
- **Medical World Search:** Searches full text from thousands of selected medical sites on the Internet; see <http://www.mwsearch.com/>.

¹⁷ 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.

¹⁸ 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 ketosis 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 ketosis. 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 ketosis. 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. Recently, MEDLINEplus listed the following when searched for “ketosis”:

- Other guides

Dietary Proteins

<http://www.nlm.nih.gov/medlineplus/dietaryproteins.html>

Epilepsy

<http://www.nlm.nih.gov/medlineplus/epilepsy.html>

Ovarian Cysts

<http://www.nlm.nih.gov/medlineplus/ovariancysts.html>

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 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 ketosis. 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>.

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://dmaz.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 ketosis. By consulting all of associations listed in this chapter, you will have nearly exhausted all sources for patient associations concerned with ketosis.

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 ketosis. 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 "ketosis" (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 "ketosis". 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 "ketosis" (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 "ketosis" (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.¹⁹

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

¹⁹ 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)²⁰:

- **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/rwdlib.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://gaenet.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/>

²⁰ 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.lsuhscc.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, Worcester), <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 Resource 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.lvcld.org/special_collections/medical/index.htm
- **New Hampshire:** Dartmouth Biomedical Libraries (Dartmouth College Library, Hanover), <http://www.dartmouth.edu/~biomed/resources.html#conshealth.html#d/>
- **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/commmlib.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.shscare.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>

KETOSIS DICTIONARY

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

Abdomen: That portion of the body that lies between the thorax and the pelvis. [NIH]

Abdominal: Having to do with the abdomen, which is the part of the body between the chest and the hips that contains the pancreas, stomach, intestines, liver, gallbladder, and other organs. [NIH]

Acanthosis Nigricans: A circumscribed melanosis consisting of a brown-pigmented, velvety verrucosity or fine papillomatosis appearing in the axillae and other body folds. It occurs in association with endocrine disorders, underlying malignancy, administration of certain drugs, or as in inherited disorder. [NIH]

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]

Acetone: A colorless liquid used as a solvent and an antiseptic. It is one of the ketone bodies produced during ketoacidosis. [NIH]

Acetylcarnitine: An acetic acid ester of carnitine that facilitates movement of acetyl CoA into the matrices of mammalian mitochondria during the oxidation of fatty acids. [NIH]

Acetylcholine: A neurotransmitter. Acetylcholine in vertebrates is the major transmitter at neuromuscular junctions, autonomic ganglia, parasympathetic effector junctions, a subset of sympathetic effector junctions, and at many sites in the central nervous system. It is generally not used as an administered drug because it is broken down very rapidly by cholinesterases, but it is useful in some ophthalmological applications. [NIH]

Acidemia: Increased acidity of blood. [NIH]

Acidosis: A pathologic condition resulting from accumulation of acid or depletion of the alkaline reserve (bicarbonate content) in the blood and body tissues, and characterized by an increase in hydrogen ion concentration. [EU]

Acquired Immunodeficiency Syndrome: An acquired defect of cellular immunity associated with infection by the human immunodeficiency virus (HIV), a CD4-positive T-lymphocyte count under 200 cells/microliter or less than 14% of total lymphocytes, and increased susceptibility to opportunistic infections and malignant neoplasms. Clinical manifestations also include emaciation (wasting) and dementia. These elements reflect criteria for AIDS as defined by the CDC in 1993. [NIH]

Adaptation: 1. The adjustment of an organism to its environment, or the process by which it enhances such fitness. 2. The normal ability of the eye to adjust itself to variations in the intensity of light; the adjustment to such variations. 3. The decline in the frequency of firing of a neuron, particularly of a receptor, under conditions of constant stimulation. 4. In dentistry, (a) the proper fitting of a denture, (b) the degree of proximity and interlocking of restorative material to a tooth preparation, (c) the exact adjustment of bands to teeth. 5. In microbiology, the adjustment of bacterial physiology to a new environment. [EU]

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]

Adipose Tissue: Connective tissue composed of fat cells lodged in the meshes of areolar

tissue. [NIH]

Adjustment: The dynamic process wherein the thoughts, feelings, behavior, and biophysiological mechanisms of the individual continually change to adjust to the environment. [NIH]

Adolescence: The period of life beginning with the appearance of secondary sex characteristics and terminating with the cessation of somatic growth. The years usually referred to as adolescence lie between 13 and 18 years of age. [NIH]

Adrenal Cortex: The outer layer of the adrenal gland. It secretes mineralocorticoids, androgens, and glucocorticoids. [NIH]

Adrenal Medulla: The inner part of the adrenal gland; it synthesizes, stores and releases catecholamines. [NIH]

Adrenergic: Activated by, characteristic of, or secreting epinephrine or substances with similar activity; the term is applied to those nerve fibres that liberate norepinephrine at a synapse when a nerve impulse passes, i.e., the sympathetic fibres. [EU]

Adrenergic Antagonists: Drugs that bind to but do not activate adrenergic receptors. Adrenergic antagonists block the actions of the endogenous adrenergic transmitters epinephrine and norepinephrine. [NIH]

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

Agar: A complex sulfated polymer of galactose units, extracted from *Gelidium cartilagineum*, *Gracilaria confervoides*, and related red algae. It is used as a gel in the preparation of solid culture media for microorganisms, as a bulk laxative, in making emulsions, and as a supporting medium for immunodiffusion and immunoelectrophoresis. [NIH]

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]

Alanine: A non-essential amino acid that occurs in high levels in its free state in plasma. It is produced from pyruvate by transamination. It is involved in sugar and acid metabolism, increases immunity, and provides energy for muscle tissue, brain, and the central nervous system. [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]

Alkalosis: A pathological condition that removes acid or adds base to the body fluids. [NIH]

Allylamine: Possesses an unusual and selective cytotoxicity for vascular smooth muscle cells in dogs and rats. Useful for experiments dealing with arterial injury, myocardial fibrosis or cardiac decompensation. [NIH]

Alpha-1: A protein with the property of inactivating proteolytic enzymes such as leucocyte collagenase and elastase. [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]

Amenorrhea: Absence of menstruation. [NIH]

Amine: An organic compound containing nitrogen; any member of a group of chemical

compounds formed from ammonia by replacement of one or more of the hydrogen atoms by organic (hydrocarbon) radicals. The amines are distinguished as primary, secondary, and tertiary, according to whether one, two, or three hydrogen atoms are replaced. The amines include allylamine, amylamine, ethylamine, methylamine, phenylamine, propylamine, and many other compounds. [EU]

Amino Acid Sequence: The order of amino acids as they occur in a polypeptide chain. This is referred to as the primary structure of proteins. It is of fundamental importance in determining protein conformation. [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]

Ammonia: A colorless alkaline gas. It is formed in the body during decomposition of organic materials during a large number of metabolically important reactions. [NIH]

Anaesthesia: Loss of feeling or sensation. Although the term is used for loss of tactile sensibility, or of any of the other senses, it is applied especially to loss of the sensation of pain, as it is induced to permit performance of surgery or other painful procedures. [EU]

Anatomical: Pertaining to anatomy, or to the structure of the organism. [EU]

Anesthesia: A state characterized by loss of feeling or sensation. This depression of nerve function is usually the result of pharmacologic action and is induced to allow performance of surgery or other painful procedures. [NIH]

Anesthetics: Agents that are capable of inducing a total or partial loss of sensation, especially tactile sensation and pain. They may act to induce general anesthesia, in which an unconscious state is achieved, or may act locally to induce numbness or lack of sensation at a targeted site. [NIH]

Animal Husbandry: The science of breeding, feeding, and care of domestic animals; includes housing and nutrition. [NIH]

Anions: Negatively charged atoms, radicals or groups of atoms which travel to the anode or positive pole during electrolysis. [NIH]

Anomalies: Birth defects; abnormalities. [NIH]

Anovulation: Suspension or cessation of ovulation in animals and humans. [NIH]

Antagonism: Interference with, or inhibition of, the growth of a living organism by another living organism, due either to creation of unfavorable conditions (e. g. exhaustion of food supplies) or to production of a specific antibiotic substance (e. g. penicillin). [NIH]

Antibacterial: A substance that destroys bacteria or suppresses their growth or reproduction. [EU]

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

Antibodies: Immunoglobulin molecules having a specific amino acid sequence by virtue of which they interact only with the antigen that induced their synthesis in cells of the lymphoid series (especially plasma cells), or with an antigen closely related to it. [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]

Anticoagulant: A drug that helps prevent blood clots from forming. Also called a blood thinner. [NIH]

Anticonvulsant: An agent that prevents or relieves convulsions. [EU]

Antidiabetic: An agent that prevents or alleviates diabetes. [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]

Antimicrobial: Killing microorganisms, or suppressing their multiplication or growth. [EU]

Antioxidant: A substance that prevents damage caused by free radicals. Free radicals are highly reactive chemicals that often contain oxygen. They are produced when molecules are split to give products that have unpaired electrons. This process is called oxidation. [NIH]

Antiseptic: A substance that inhibits the growth and development of microorganisms without necessarily killing them. [EU]

Anus: The opening of the rectum to the outside of the body. [NIH]

Anxiety: Persistent feeling of dread, apprehension, and impending disaster. [NIH]

Apolipoproteins: The protein components of lipoproteins which remain after the lipids to which the proteins are bound have been removed. They play an important role in lipid transport and metabolism. [NIH]

Aqueous: Having to do with water. [NIH]

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

Arterial: Pertaining to an artery or to the arteries. [EU]

Arteries: The vessels carrying blood away from the heart. [NIH]

Arteriosclerosis: Thickening and loss of elasticity of arterial walls. Atherosclerosis is the most common form of arteriosclerosis and involves lipid deposition and thickening of the intimal cell layers within arteries. Additional forms of arteriosclerosis involve calcification of the media of muscular arteries (Monckeberg medial calcific sclerosis) and thickening of the walls of small arteries or arterioles due to cell proliferation or hyaline deposition (arteriolosclerosis). [NIH]

Assay: Determination of the amount of a particular constituent of a mixture, or of the biological or pharmacological potency of a drug. [EU]

Atmospheric Pressure: The pressure at any point in an atmosphere due solely to the weight of the atmospheric gases above the point concerned. [NIH]

Atypical: Irregular; not conformable to the type; in microbiology, applied specifically to strains of unusual type. [EU]

Autoantibodies: Antibodies that react with self-antigens (autoantigens) of the organism that produced them. [NIH]

Autoantigens: Endogenous tissue constituents that have the ability to interact with autoantibodies and cause an immune response. [NIH]

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

Autonomic: Self-controlling; functionally independent. [EU]

Autonomic Neuropathy: A disease of the nerves affecting mostly the internal organs such as the bladder muscles, the cardiovascular system, the digestive tract, and the genital organs. These nerves are not under a person's conscious control and function automatically. Also called visceral neuropathy. [NIH]

Autopsy: Postmortem examination of the body. [NIH]

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

Bacterial Physiology: Physiological processes and activities of bacteria. [NIH]

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

Bacteriophage: A virus whose host is a bacterial cell; A virus that exclusively infects bacteria. It generally has a protein coat surrounding the genome (DNA or RNA). One of the coliphages most extensively studied is the lambda phage, which is also one of the most important. [NIH]

Bacteriostatic: 1. Inhibiting the growth or multiplication of bacteria. 2. An agent that inhibits the growth or multiplication of bacteria. [EU]

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]

Bilateral: Affecting both the right and left side of body. [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]

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

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]

Biotin: Hexahydro-2-oxo-1H-thieno(3,4-d)imidazole-4-pentanoic acid. Growth factor present in minute amounts in every living cell. It occurs mainly bound to proteins or polypeptides and is abundant in liver, kidney, pancreas, yeast, and milk. The biotin content of cancerous tissue is higher than that of normal tissue. [NIH]

Biotransformation: The chemical alteration of an exogenous substance by or in a biological system. The alteration may inactivate the compound or it may result in the production of an active metabolite of an inactive parent compound. The alteration may be either non-synthetic (oxidation-reduction, hydrolysis) or synthetic (glucuronide formation, sulfate conjugation, acetylation, methylation). This also includes metabolic detoxication and

clearance. [NIH]

Bladder: The organ that stores urine. [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]

Body Mass Index: One of the anthropometric measures of body mass; it has the highest correlation with skinfold thickness or body density. [NIH]

Bolus: A single dose of drug usually injected into a blood vessel over a short period of time. Also called bolus infusion. [NIH]

Bolus infusion: A single dose of drug usually injected into a blood vessel over a short period of time. Also called bolus. [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]

Bowel: The long tube-shaped organ in the abdomen that completes the process of digestion. There is both a small and a large bowel. Also called the intestine. [NIH]

Bowel Movement: Body wastes passed through the rectum and anus. [NIH]

Bradykinin: A nonapeptide messenger that is enzymatically produced from kallidin in the blood where it is a potent but short-lived agent of arteriolar dilation and increased capillary permeability. Bradykinin is also released from mast cells during asthma attacks, from gut walls as a gastrointestinal vasodilator, from damaged tissues as a pain signal, and may be a neurotransmitter. [NIH]

Brain Diseases: Pathologic conditions affecting the brain, which is composed of the intracranial components of the central nervous system. This includes (but is not limited to) the cerebral cortex; intracranial white matter; basal ganglia; thalamus; hypothalamus; brain stem; and cerebellum. [NIH]

Brain Stem: The part of the brain that connects the cerebral hemispheres with the spinal cord. It consists of the mesencephalon, pons, and medulla oblongata. [NIH]

Branch: Most commonly used for branches of nerves, but applied also to other structures. [NIH]

Breakdown: A physical, mental, or nervous collapse. [NIH]

Breeding: The science or art of changing the constitution of a population of plants or animals through sexual reproduction. [NIH]

Bronchi: The larger air passages of the lungs arising from the terminal bifurcation of the trachea. [NIH]

Bronchial: Pertaining to one or more bronchi. [EU]

Bulbar: Pertaining to a bulb; pertaining to or involving the medulla oblongata, as bulbar paralysis. [EU]

Butyric Acid: A four carbon acid, $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$, with an unpleasant odor that occurs in butter and animal fat as the glycerol ester. [NIH]

Cachexia: General ill health, malnutrition, and weight loss, usually associated with chronic disease. [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]

Calculi: An abnormal concretion occurring mostly in the urinary and biliary tracts, usually composed of mineral salts. Also called stones. [NIH]

Caloric intake: Refers to the number of calories (energy content) consumed. [NIH]

Camping: Living outdoors as a recreational activity. [NIH]

Carbamazepine: An anticonvulsant used to control grand mal and psychomotor or focal seizures. Its mode of action is not fully understood, but some of its actions resemble those of phenytoin; although there is little chemical resemblance between the two compounds, their three-dimensional structure is similar. [NIH]

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, $(\text{CH}_2\text{O})_n$. The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

Carbon Dioxide: A colorless, odorless gas that can be formed by the body and is necessary for the respiration cycle of plants and animals. [NIH]

Carcinogenic: Producing carcinoma. [EU]

Carcinogens: Substances that increase the risk of neoplasms in humans or animals. Both genotoxic chemicals, which affect DNA directly, and nongenotoxic chemicals, which induce neoplasms by other mechanism, are included. [NIH]

Cardiac: Having to do with the heart. [NIH]

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]

Carnitine: Constituent of striated muscle and liver. It is used therapeutically to stimulate gastric and pancreatic secretions and in the treatment of hyperlipoproteinemias. [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]

Catabolism: Any destructive metabolic process by which organisms convert substances into excreted compounds. [EU]

Catalyse: To speed up a chemical reaction. [EU]

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 Division: The fission of a cell. [NIH]

Cell membrane: Cell membrane = plasma membrane. The structure enveloping a cell, enclosing the cytoplasm, and forming a selective permeability barrier; it consists of lipids, proteins, and some carbohydrates, the lipids thought to form a bilayer in which integral proteins are embedded to varying degrees. [EU]

Cellobiose: A disaccharide consisting of two glucose units in beta (1-4) glycosidic linkage. Obtained from the partial hydrolysis of cellulose. [NIH]

Cellulose: A polysaccharide with glucose units linked as in cellobiose. It is the chief constituent of plant fibers, cotton being the purest natural form of the substance. As a raw material, it forms the basis for many derivatives used in chromatography, ion exchange materials, explosives manufacturing, and pharmaceutical preparations. [NIH]

Central Nervous System: The main information-processing organs of the nervous system, consisting of the brain, spinal cord, and meninges. [NIH]

Cerebral: Of or pertaining of the cerebrum or the brain. [EU]

Cerebrospinal: Pertaining to the brain and spinal cord. [EU]

Cerebrum: The largest part of the brain. It is divided into two hemispheres, or halves, called the cerebral hemispheres. The cerebrum controls muscle functions of the body and also controls speech, emotions, reading, writing, and learning. [NIH]

Child Behavior: Any observable response or action of a child from 24 months through 12 years of age. For neonates or children younger than 24 months, infant behavior is available. [NIH]

Chlorhexidine: Disinfectant and topical anti-infective agent used also as mouthwash to prevent oral plaque. [NIH]

Chlorine: A greenish-yellow, diatomic gas that is a member of the halogen family of elements. It has the atomic symbol Cl, atomic number 17, and atomic weight 70.906. It is a powerful irritant that can cause fatal pulmonary edema. Chlorine is used in manufacturing, as a reagent in synthetic chemistry, for water purification, and in the production of chlorinated lime, which is used in fabric bleaching. [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]

Cholesterol Esters: Fatty acid esters of cholesterol which constitute about two-thirds of the cholesterol in the plasma. The accumulation of cholesterol esters in the arterial intima is a characteristic feature of atherosclerosis. [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]

Chromium: A trace element that plays a role in glucose metabolism. It has the atomic symbol Cr, atomic number 24, and atomic weight 52. According to the Fourth Annual Report on Carcinogens (NTP85-002,1985), chromium and some of its compounds have been listed as known carcinogens. [NIH]

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 Disease: Disease or ailment of long duration. [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]

Chylomicrons: A class of lipoproteins that carry dietary cholesterol and triglycerides from the small intestines to the tissues. [NIH]

Circulatory system: The system that contains the heart and the blood vessels and moves blood throughout the body. This system helps tissues get enough oxygen and nutrients, and it helps them get rid of waste products. The lymph system, which connects with the blood system, is often considered part of the circulatory system. [NIH]

Clinical Medicine: The study and practice of medicine by direct examination of the patient. [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]

Clorazepate Dipotassium: A water-soluble benzodiazepine derivative effective in the treatment of anxiety. It has also muscle relaxant and anticonvulsant actions. [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]

Cofactor: A substance, microorganism or environmental factor that activates or enhances the action of another entity such as a disease-causing agent. [NIH]

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]

Colostrum: The thin, yellow, serous fluid secreted by the mammary glands during pregnancy and immediately postpartum before lactation begins. It consists of immunologically active substances, white blood cells, water, protein, fat, and carbohydrates. [NIH]

Combination Therapy: Association of 3 drugs to treat AIDS (AZT + DDC or DDI + protease inhibitor). [NIH]

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]

Conception: The onset of pregnancy, marked by implantation of the blastocyst; the formation of a viable zygote. [EU]

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

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

Consciousness: Sense of awareness of self and of the environment. [NIH]

Constriction: The act of constricting. [NIH]

Consumption: Pulmonary tuberculosis. [NIH]

Continuous infusion: The administration of a fluid into a blood vessel, usually over a prolonged period of time. [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]

Control group: In a clinical trial, the group that does not receive the new treatment being studied. This group is compared to the group that receives the new treatment, to see if the new treatment works. [NIH]

Convulsions: A general term referring to sudden and often violent motor activity of cerebral or brainstem origin. Convulsions may also occur in the absence of an electrical cerebral discharge (e.g., in response to hypotension). [NIH]

Coronary: Encircling in the manner of a crown; a term applied to vessels; nerves, ligaments, etc. The term usually denotes the arteries that supply the heart muscle and, by extension, a pathologic involvement of them. [EU]

Coronary Thrombosis: Presence of a thrombus in a coronary artery, often causing a myocardial infarction. [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]

Cortical: Pertaining to or of the nature of a cortex or bark. [EU]

Cranial: Pertaining to the cranium, or to the anterior (in animals) or superior (in humans) end of the body. [EU]

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

Curative: Tending to overcome disease and promote recovery. [EU]

Cyclic: Pertaining to or occurring in a cycle or cycles; the term is applied to chemical compounds that contain a ring of atoms in the nucleus. [EU]

Cystine: A covalently linked dimeric nonessential amino acid formed by the oxidation of cysteine. Two molecules of cysteine are joined together by a disulfide bridge to form cystine. [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]

Databases, Bibliographic: Extensive collections, reputedly complete, of references and citations to books, articles, publications, etc., generally on a single subject or specialized subject area. Databases can operate through automated files, libraries, or computer disks. The concept should be differentiated from factual databases which is used for collections of data and facts apart from bibliographic references to them. [NIH]

Deamination: The removal of an amino group (NH₂) from a chemical compound. [NIH]

Decubitus: An act of lying down; also the position assumed in lying down. [EU]

Defense Mechanisms: Unconscious process used by an individual or a group of individuals in order to cope with impulses, feelings or ideas which are not acceptable at their conscious level; various types include reaction formation, projection and self reversal. [NIH]

Degenerative: Undergoing degeneration : tending to degenerate; having the character of or involving degeneration; causing or tending to cause degeneration. [EU]

Dehydroepiandrosterone: DHEA. A substance that is being studied as a cancer prevention drug. It belongs to the family of drugs called steroids. [NIH]

Dementia: An acquired organic mental disorder with loss of intellectual abilities of sufficient severity to interfere with social or occupational functioning. The dysfunction is multifaceted and involves memory, behavior, personality, judgment, attention, spatial relations, language, abstract thought, and other executive functions. The intellectual decline is usually progressive, and initially spares the level of consciousness. [NIH]

Denaturation: Rupture of the hydrogen bonds by heating a DNA solution and then cooling it rapidly causes the two complementary strands to separate. [NIH]

Density: The logarithm to the base 10 of the opacity of an exposed and processed film. [NIH]

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

Diabetes Mellitus: A heterogeneous group of disorders that share glucose intolerance in common. [NIH]

Diabetic Ketoacidosis: Complication of diabetes resulting from severe insulin deficiency coupled with an absolute or relative increase in glucagon concentration. The metabolic

acidosis is caused by the breakdown of adipose stores and resulting increased levels of free fatty acids. Glucagon accelerates the oxidation of the free fatty acids producing excess ketone bodies (ketosis). [NIH]

Diabetic Retinopathy: Retinopathy associated with diabetes mellitus, which may be of the background type, progressively characterized by microaneurysms, interretinal punctuate macular edema, or of the proliferative type, characterized by neovascularization of the retina and optic disk, which may project into the vitreous, proliferation of fibrous tissue, vitreous hemorrhage, and retinal detachment. [NIH]

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

Dialyzer: A part of the hemodialysis machine. (See hemodialysis under dialysis.) The dialyzer has two sections separated by a membrane. One section holds dialysate. The other holds the patient's blood. [NIH]

Diastolic: Of or pertaining to the diastole. [EU]

Dietary Fats: Fats present in food, especially in animal products such as meat, meat products, butter, ghee. They are present in lower amounts in nuts, seeds, and avocados. [NIH]

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

Digestive tract: The organs through which food passes when food is eaten. These organs are the mouth, esophagus, stomach, small and large intestines, and rectum. [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]

Distal: Remote; farther from any point of reference; opposed to proximal. In dentistry, used to designate a position on the dental arch farther from the median line of the jaw. [EU]

Diuresis: Increased excretion of urine. [EU]

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

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

Dyes: Chemical substances that are used to stain and color other materials. The coloring may or may not be permanent. Dyes can also be used as therapeutic agents and test reagents in medicine and scientific research. [NIH]

Eating Disorders: A group of disorders characterized by physiological and psychological disturbances in appetite or food intake. [NIH]

Edema: Excessive amount of watery fluid accumulated in the intercellular spaces, most commonly present in subcutaneous tissue. [NIH]

Efficacy: The extent to which a specific intervention, procedure, regimen, or service produces a beneficial result under ideal conditions. Ideally, the determination of efficacy is based on the results of a randomized control trial. [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]

ELISA: A sensitive analytical technique in which an enzyme is complexed to an antigen or antibody. A substrate is then added which generates a color proportional to the amount of binding. This method can be adapted to a solid-phase technique. [NIH]

Emaciation: Clinical manifestation of excessive leanness usually caused by disease or a lack of nutrition. [NIH]

Embolus: Bit of foreign matter which enters the blood stream at one point and is carried until it is lodged or impacted in an artery and obstructs it. It may be a blood clot, an air bubble, fat or other tissue, or clumps of bacteria. [NIH]

Embryo: The prenatal stage of mammalian development characterized by rapid morphological changes and the differentiation of basic structures. [NIH]

Emollient: Softening or soothing; called also malactic. [EU]

Encephalopathy: A disorder of the brain that can be caused by disease, injury, drugs, or chemicals. [NIH]

Endothelial cell: The main type of cell found in the inside lining of blood vessels, lymph vessels, and the heart. [NIH]

Endothelium: A layer of epithelium that lines the heart, blood vessels (endothelium, vascular), lymph vessels (endothelium, lymphatic), and the serous cavities of the body. [NIH]

Endothelium-derived: Small molecule that diffuses to the adjacent muscle layer and relaxes it. [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]

Enhancers: Transcriptional element in the virus genome. [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]

Epidemiological: Relating to, or involving epidemiology. [EU]

Epigastric: Having to do with the upper middle area of the abdomen. [NIH]

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]

Epithelial: Refers to the cells that line the internal and external surfaces of the body. [NIH]

Epithelial Cells: Cells that line the inner and outer surfaces of the body. [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]

Ether: One of a class of organic compounds in which any two organic radicals are attached directly to a single oxygen atom. [NIH]

Ethosuximide: An anticonvulsant especially useful in the treatment of absence seizures unaccompanied by other types of seizures. [NIH]

Evacuation: An emptying, as of the bowels. [EU]

Excitatory: When cortical neurons are excited, their output increases and each new input they receive while they are still excited raises their output markedly. [NIH]

Exercise Test: Controlled physical activity, more strenuous than at rest, which is performed in order to allow assessment of physiological functions, particularly cardiovascular and pulmonary, but also aerobic capacity. Maximal (most intense) exercise is usually required but submaximal exercise is also used. The intensity of exercise is often graded, using criteria such as rate of work done, oxygen consumption, and heart rate. Physiological data obtained from an exercise test may be used for diagnosis, prognosis, and evaluation of disease severity, and to evaluate therapy. Data may also be used in prescribing exercise by determining a person's exercise capacity. [NIH]

Exercise Tolerance: The exercise capacity of an individual as measured by endurance (maximal exercise duration and/or maximal attained work load) during an exercise test. [NIH]

Exocrine: Secreting outwardly, via a duct. [EU]

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

Extracellular: Outside a cell or cells. [EU]

Eye Movements: Voluntary or reflex-controlled movements of the eye. [NIH]

Facial: Of or pertaining to the face. [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]

Fatty acids: A major component of fats that are used by the body for energy and tissue development. [NIH]

Fatty Liver: The buildup of fat in liver cells. The most common cause is alcoholism. Other causes include obesity, diabetes, and pregnancy. Also called steatosis. [NIH]

Feces: The excrement discharged from the intestines, consisting of bacteria, cells exfoliated from the intestines, secretions, chiefly of the liver, and a small amount of food residue. [EU]

Fertilizers: Substances or mixtures that are added to the soil to supply nutrients or to make available nutrients already present in the soil, in order to increase plant growth and productivity. [NIH]

Fetus: The developing offspring from 7 to 8 weeks after conception until birth. [NIH]

Fibrin: A protein derived from fibrinogen in the presence of thrombin, which forms part of the blood clot. [NIH]

Fibroblasts: Connective tissue cells which secrete an extracellular matrix rich in collagen and other macromolecules. [NIH]

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

Flatus: Gas passed through the rectum. [NIH]

Fold: A plication or doubling of various parts of the body. [NIH]

Forearm: The part between the elbow and the wrist. [NIH]

Fructose: A type of sugar found in many fruits and vegetables and in honey. Fructose is

used to sweeten some diet foods. It is considered a nutritive sweetener because it has calories. [NIH]

Fungi: A kingdom of eukaryotic, heterotrophic organisms that live as saprobes or parasites, including mushrooms, yeasts, smuts, molds, etc. They reproduce either sexually or asexually, and have life cycles that range from simple to complex. Filamentous fungi refer to those that grow as multicellular colonies (mushrooms and molds). [NIH]

Fungicide: An agent that destroys fungi. [EU]

Fungistatic: Inhibiting the growth of fungi. [EU]

Gallbladder: The pear-shaped organ that sits below the liver. Bile is concentrated and stored in the gallbladder. [NIH]

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

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

Gastric Emptying: The evacuation of food from the stomach into the duodenum. [NIH]

Gastrin: A hormone released after eating. Gastrin causes the stomach to produce more acid. [NIH]

Gastritis: Inflammation of the stomach. [EU]

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]

Gene Expression: The phenotypic manifestation of a gene or genes by the processes of gene action. [NIH]

Genital: Pertaining to the genitalia. [EU]

Gestation: The period of development of the young in viviparous animals, from the time of fertilization of the ovum until birth. [EU]

Gestational: Psychosis attributable to or occurring during pregnancy. [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]

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 Intolerance: A pathological state in which the fasting plasma glucose level is less than 140 mg per deciliter and the 30-, 60-, or 90-minute plasma glucose concentration following a glucose tolerance test exceeds 200 mg per deciliter. This condition is seen frequently in diabetes mellitus but also occurs with other diseases. [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]

Glucose-6-Phosphatase: An enzyme that catalyzes the conversion of D-glucose 6-phosphate and water to D-glucose and orthophosphate. EC 3.1.3.9. [NIH]

Glutamate: Excitatory neurotransmitter of the brain. [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]

Glutamine: A non-essential amino acid present abundantly throughout the body and is involved in many metabolic processes. It is synthesized from glutamic acid and ammonia. It is the principal carrier of nitrogen in the body and is an important energy source for many cells. [NIH]

Glycerol: A trihydroxy sugar alcohol that is an intermediate in carbohydrate and lipid metabolism. It is used as a solvent, emollient, pharmaceutical agent, and sweetening agent. [NIH]

Glycerophospholipids: Derivatives of phosphatidic acid in which the hydrophobic regions are composed of two fatty acids and a polar alcohol is joined to the C-3 position of glycerol through a phosphodiester bond. They are named according to their polar head groups, such as phosphatidylcholine and phosphatidylethanolamine. [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]

Glycogen: A sugar stored in the liver and muscles. It releases glucose into the blood when cells need it for energy. Glycogen is the chief source of stored fuel in the body. [NIH]

Glycols: A generic grouping for dihydric alcohols with the hydroxy groups (-OH) located on different carbon atoms. They are viscous liquids with high boiling points for their molecular weights. [NIH]

Glycosidic: Formed by elimination of water between the anomeric hydroxyl of one sugar and a hydroxyl of another sugar molecule. [NIH]

Goats: Any of numerous agile, hollow-horned ruminants of the genus *Capra*, closely related to the sheep. [NIH]

Gonadal: Pertaining to a gonad. [EU]

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

Growth: The progressive development of a living being or part of an organism from its earliest stage to maturity. [NIH]

Guanylate Cyclase: An enzyme that catalyzes the conversion of GTP to 3',5'-cyclic GMP and pyrophosphate. It also acts on ITP and dGTP. (From Enzyme Nomenclature, 1992) EC 4.6.1.2. [NIH]

Halitosis: An offensive, foul breath odor resulting from a variety of causes such as poor oral hygiene, dental or oral infections, or the ingestion of certain foods. [NIH]

Headache: Pain in the cranial region that may occur as an isolated and benign symptom or as a manifestation of a wide variety of conditions including subarachnoid hemorrhage; craniocerebral trauma; central nervous system infections; intracranial hypertension; and other disorders. In general, recurrent headaches that are not associated with a primary

disease process are referred to as headache disorders (e.g., migraine). [NIH]

Health Behavior: Behaviors expressed by individuals to protect, maintain or promote their health status. For example, proper diet, and appropriate exercise are activities perceived to influence health status. Life style is closely associated with health behavior and factors influencing life style are socioeconomic, educational, and cultural. [NIH]

Health Status: The level of health of the individual, group, or population as subjectively assessed by the individual or by more objective measures. [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]

Hemoglobin: One of the fractions of glycosylated hemoglobin A1c. Glycosylated hemoglobin is formed when linkages of glucose and related monosaccharides bind to hemoglobin A and its concentration represents the average blood glucose level over the previous several weeks. HbA1c levels are used as a measure of long-term control of plasma glucose (normal, 4 to 6 percent). In controlled diabetes mellitus, the concentration of glycosylated hemoglobin A is within the normal range, but in uncontrolled cases the level may be 3 to 4 times the normal concentration. Generally, complications are substantially lower among patients with Hb levels of 7 percent or less than in patients with HbA1c levels of 9 percent or more. [NIH]

Hemorrhage: Bleeding or escape of blood from a vessel. [NIH]

Hepatic: Refers to the liver. [NIH]

Heredity: 1. The genetic transmission of a particular quality or trait from parent to offspring.
2. The genetic constitution of an individual. [EU]

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

Homologous: Corresponding in structure, position, origin, etc., as (a) the feathers of a bird and the scales of a fish, (b) antigen and its specific antibody, (c) allelic chromosomes. [EU]

Hormonal: Pertaining to or of the nature of a hormone. [EU]

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]

Hybridomas: Cells artificially created by fusion of activated lymphocytes with neoplastic cells. The resulting hybrid cells are cloned and produce pure or "monoclonal" antibodies or T-cell products, identical to those produced by the immunologically competent parent, and continually grow and divide as the neoplastic parent. [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]

Hydrolysis: The process of cleaving a chemical compound by the addition of a molecule of water. [NIH]

Hydrophobic: Not readily absorbing water, or being adversely affected by water, as a

hydrophobic colloid. [EU]

Hydroxides: Inorganic compounds that contain the OH- group. [NIH]

Hydroxyl Radical: The univalent radical OH that is present in hydroxides, alcohols, phenols, glycols. [NIH]

Hyperbaric: Characterized by greater than normal pressure or weight; applied to gases under greater than atmospheric pressure, as hyperbaric oxygen, or to a solution of greater specific gravity than another taken as a standard of reference. [EU]

Hyperbaric oxygen: Oxygen that is at an atmospheric pressure higher than the pressure at sea level. Breathing hyperbaric oxygen to enhance the effectiveness of radiation therapy is being studied. [NIH]

Hyperglycemia: Abnormally high blood sugar. [NIH]

Hyperlipoproteinemia: Metabolic disease characterized by elevated plasma cholesterol and/or triglyceride levels. The inherited form is attributed to a single gene mechanism. [NIH]

Hypersensitivity: Altered reactivity to an antigen, which can result in pathologic reactions upon subsequent exposure to that particular antigen. [NIH]

Hypertension: Persistently high arterial blood pressure. Currently accepted threshold levels are 140 mm Hg systolic and 90 mm Hg diastolic pressure. [NIH]

Hyperthyroidism: Excessive functional activity of the thyroid gland. [NIH]

Hypertriglyceridemia: Condition of elevated triglyceride concentration in the blood; an inherited form occurs in familial hyperlipoproteinemia IIb and hyperlipoproteinemia type IV. It has been linked to higher risk of heart disease and arteriosclerosis. [NIH]

Hypoglycaemia: An abnormally diminished concentration of glucose in the blood, which may lead to tremulousness, cold sweat, piloerection, hypothermia, and headache, accompanied by irritability, confusion, hallucinations, bizarre behaviour, and ultimately, convulsions and coma. [EU]

Hypoglycemia: Abnormally low blood sugar [NIH]

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

Hypoglycemic Agents: Agents which lower the blood glucose level. [NIH]

Hypothalamic: Of or involving the hypothalamus. [EU]

Hypothalamus: Ventral part of the diencephalon extending from the region of the optic chiasm to the caudal border of the mammillary bodies and forming the inferior and lateral walls of the third ventricle. [NIH]

Hypothermia: Lower than normal body temperature, especially in warm-blooded animals; in man usually accidental or unintentional. [NIH]

Hypovolemia: An abnormally low volume of blood circulating through the body. It may result in hypovolemic shock. [NIH]

Id: The part of the personality structure which harbors the unconscious instinctive desires and strivings of the individual. [NIH]

Idiopathic: Describes a disease of unknown cause. [NIH]

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]

Immunity: Nonsusceptibility to the invasive or pathogenic effects of foreign

microorganisms or to the toxic effect of antigenic substances. [NIH]

Immunodeficiency: The decreased ability of the body to fight infection and disease. [NIH]

Immunoglobulins: Glycoproteins present in the blood (antibodies) and in other tissue. They are classified by structure and activity into five classes (IgA, IgD, IgE, IgG, IgM). [NIH]

Impairment: In the context of health experience, an impairment is any loss or abnormality of psychological, physiological, or anatomical structure or function. [NIH]

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]

Incision: A cut made in the body during surgery. [NIH]

Indicative: That indicates; that points out more or less exactly; that reveals fairly clearly. [EU]

Induction: The act or process of inducing or causing to occur, especially the production of a specific morphogenetic effect in the developing embryo through the influence of evocators or organizers, or the production of anaesthesia or unconsciousness by use of appropriate agents. [EU]

Infant Behavior: Any observable response or action of a neonate or infant up through the age of 23 months. [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]

Infusion: A method of putting fluids, including drugs, into the bloodstream. Also called intravenous infusion. [NIH]

Ingestion: Taking into the body by mouth [NIH]

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

Initiation: Mutation induced by a chemical reactive substance causing cell changes; being a step in a carcinogenic process. [NIH]

Inlay: In dentistry, a filling first made to correspond with the form of a dental cavity and then cemented into the cavity. [NIH]

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]

Interleukin-6: Factor that stimulates the growth and differentiation of human B-cells and is also a growth factor for hybridomas and plasmacytomas. It is produced by many different cells including T-cells, monocytes, and fibroblasts. [NIH]

Intermittent: Occurring at separated intervals; having periods of cessation of activity. [EU]

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

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

Intestine: A long, tube-shaped organ in the abdomen that completes the process of digestion. There is both a large intestine and a small intestine. Also called the bowel. [NIH]

Intoxication: Poisoning, the state of being poisoned. [EU]

Intracellular: Inside a cell. [NIH]

Intracranial Pressure: Pressure within the cranial cavity. It is influenced by brain mass, the circulatory system, CSF dynamics, and skull rigidity. [NIH]

Intramuscular: IM. Within or into muscle. [NIH]

Intravenous: IV. Into a vein. [NIH]

Invasive: 1. Having the quality of invasiveness. 2. Involving puncture or incision of the skin or insertion of an instrument or foreign material into the body; said of diagnostic techniques. [EU]

Involuntary: Reaction occurring without intention or volition. [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]

Islet: Cell producing insulin in pancreas. [NIH]

Isoleucine: An essential branched-chain amino acid found in many proteins. It is an isomer of LEUCINE. It is important in hemoglobin synthesis and regulation of blood sugar and energy levels. [NIH]

Isopropyl: A gene mutation inducer. [NIH]

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 polysaccharide and lipid A. [NIH]

Ketone Bodies: Chemicals that the body makes when there is not enough insulin in the blood and it must break down fat for its energy. Ketone bodies can poison and even kill body cells. When the body does not have the help of insulin, the ketones build up in the blood and then "spill" over into the urine so that the body can get rid of them. The body can also rid itself of one type of ketone, called acetone, through the lungs. This gives the breath a fruity odor. Ketones that build up in the body for a long time lead to serious illness and coma. [NIH]

Ketonuria: Having ketone bodies in the urine; a warning sign of diabetic ketoacidosis (DKA). [NIH]

Ketosis: A condition of having ketone bodies build up in body tissues and fluids. The signs of ketosis are nausea, vomiting, and stomach pain. Ketosis can lead to ketoacidosis. [NIH]

Kidney stone: A stone that develops from crystals that form in urine and build up on the inner surfaces of the kidney, in the renal pelvis, or in the ureters. [NIH]

Kinetic: Pertaining to or producing motion. [EU]

Lactate Dehydrogenase: A tetrameric enzyme that, along with the coenzyme NAD⁺, catalyzes the interconversion of lactate and pyruvate. In vertebrates, genes for three different subunits (LDH-A, LDH-B and LDH-C) exist. [NIH]

Lactation: The period of the secretion of milk. [EU]

Latent: Phoria which occurs at one distance or another and which usually has no troublesome effect. [NIH]

Laxative: An agent that acts to promote evacuation of the bowel; a cathartic or purgative. [EU]

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

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

Leukocytes: White blood cells. These include granular leukocytes (basophils, eosinophils, and neutrophils) as well as non-granular leukocytes (lymphocytes and monocytes). [NIH]

Library Services: Services offered to the library user. They include reference and circulation. [NIH]

Ligaments: Shiny, flexible bands of fibrous tissue connecting together articular extremities of bones. They are pliant, tough, and inextensible. [NIH]

Ligase: An enzyme that repairs single stranded discontinuities in double-stranded DNA molecules in the cell. Purified DNA ligase is used in gene cloning to join DNA molecules together. [NIH]

Linkages: 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]

Lipase: An enzyme of the hydrolase class that catalyzes the reaction of triacylglycerol and water to yield diacylglycerol and a fatty acid anion. It is produced by glands on the tongue and by the pancreas and initiates the digestion of dietary fats. (From Dorland, 27th ed) EC 3.1.1.3. [NIH]

Lipid: Fat. [NIH]

Lipid Peroxidation: Peroxidase catalyzed oxidation of lipids using hydrogen peroxide as an electron acceptor. [NIH]

Lipolysis: The hydrolysis of lipids. [NIH]

Lipoprotein: Any of the lipid-protein complexes in which lipids are transported in the blood; lipoprotein particles consist of a spherical hydrophobic core of triglycerides or cholesterol esters surrounded by an amphipathic monolayer of phospholipids, cholesterol, and apolipoproteins; the four principal classes are high-density, low-density, and very-low-density lipoproteins and chylomicrons. [EU]

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

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

Low-density lipoprotein: Lipoprotein that contains most of the cholesterol in the blood. LDL carries cholesterol to the tissues of the body, including the arteries. A high level of LDL increases the risk of heart disease. LDL typically contains 60 to 70 percent of the total serum cholesterol and both are directly correlated with CHD risk. [NIH]

Lymph: The almost colorless fluid that travels through the lymphatic system and carries cells that help fight infection and disease. [NIH]

Lymphocyte: A white blood cell. Lymphocytes have a number of roles in the immune system, including the production of antibodies and other substances that fight infection and diseases. [NIH]

Lymphocyte Count: A count of the number of lymphocytes in the blood. [NIH]

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

Macronutrients: Nutrients in the diet that are the key sources of energy, namely protein, fat, and carbohydrates. [NIH]

Magnesium Hydroxide: Magnesium hydroxide ($\text{Mg}(\text{OH})_2$). An inorganic compound that occurs in nature as the mineral brucite. It acts as an antacid with cathartic effects. [NIH]

Magnesium Oxide: Magnesium oxide (MgO). An inorganic compound that occurs in nature as the mineral periclase. In aqueous media combines quickly with water to form magnesium hydroxide. It is used as an antacid and mild laxative and has many nonmedicinal uses. [NIH]

Malignancy: A cancerous tumor that can invade and destroy nearby tissue and spread to other parts of the body. [NIH]

Malignant: Cancerous; a growth with a tendency to invade and destroy nearby tissue and spread to other parts of the body. [NIH]

Malnutrition: A condition caused by not eating enough food or not eating a balanced diet. [NIH]

Mammary: Pertaining to the mamma, or breast. [EU]

Mastitis: Inflammatory disease of the breast, or mammary gland. [NIH]

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

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

Melanosis: Disorders of increased melanin pigmentation that develop without preceding inflammatory disease. [NIH]

Membrane: A very thin layer of tissue that covers a surface. [NIH]

Menstrual Cycle: The period of the regularly recurring physiologic changes in the endometrium occurring during the reproductive period in human females and some primates and culminating in partial sloughing of the endometrium (menstruation). [NIH]

Mental Health: The state wherein the person is well adjusted. [NIH]

Mental Retardation: Refers to sub-average general intellectual functioning which originated during the developmental period and is associated with impairment in adaptive behavior. [NIH]

Mesenteric: Pertaining to the mesentery : a membranous fold attaching various organs to the body wall. [EU]

Mesentery: A layer of the peritoneum which attaches the abdominal viscera to the abdominal wall and conveys their blood vessels and nerves. [NIH]

MI: Myocardial infarction. Gross necrosis of the myocardium as a result of interruption of the blood supply to the area; it is almost always caused by atherosclerosis of the coronary arteries, upon which coronary thrombosis is usually superimposed. [NIH]

Microbe: An organism which cannot be observed with the naked eye; e. g. unicellular animals, lower algae, lower fungi, bacteria. [NIH]

Microbiological: Pertaining to microbiology : the science that deals with microorganisms, including algae, bacteria, fungi, protozoa and viruses. [EU]

Microbiology: The study of microorganisms such as fungi, bacteria, algae, archaea, and viruses. [NIH]

Mitochondria: Parts of a cell where aerobic production (also known as cell respiration) takes place. [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]

Monensin: An antiprotozoal agent produced by *Streptomyces cinnamonensis*. It exerts its effect during the development of first-generation trophozoites into first-generation schizonts within the intestinal epithelial cells. It does not interfere with hosts' development of acquired immunity to the majority of coccidial species. Monensin is a sodium and proton selective ionophore and is widely used as such in biochemical studies. [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]

Monocytes: Large, phagocytic mononuclear leukocytes produced in the vertebrate bone marrow and released into the blood; contain a large, oval or somewhat indented nucleus surrounded by voluminous cytoplasm and numerous organelles. [NIH]

Mononuclear: A cell with one nucleus. [NIH]

Motor Activity: The physical activity of an organism as a behavioral phenomenon. [NIH]

Muscle Fatigue: A state arrived at through prolonged and strong contraction of a muscle. Studies in athletes during prolonged submaximal exercise have shown that muscle fatigue increases in almost direct proportion to the rate of muscle glycogen depletion. Muscle fatigue in short-term maximal exercise is associated with oxygen lack and an increased level of blood and muscle lactic acid, and an accompanying increase in hydrogen-ion concentration in the exercised muscle. [NIH]

Muscle relaxant: An agent that specifically aids in reducing muscle tension, as those acting at the polysynaptic neurons of motor nerves (e.g. meprobamate) or at the myoneural junction (curare and related compounds). [EU]

Muscular Diseases: Acquired, familial, and congenital disorders of skeletal muscle and smooth muscle. [NIH]

Myocardial infarction: Gross necrosis of the myocardium as a result of interruption of the blood supply to the area; it is almost always caused by atherosclerosis of the coronary arteries, upon which coronary thrombosis is usually superimposed. [NIH]

Myocardial Reperfusion: Generally, restoration of blood supply to heart 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. Reperfusion can be induced to treat ischemia. Methods include chemical dissolution of an occluding thrombus, administration of vasodilator drugs, angioplasty, catheterization, and artery bypass graft surgery. However, it is thought that reperfusion can itself further

damage the ischemic tissue, causing myocardial reperfusion injury. [NIH]

Myocardial Reperfusion Injury: Functional, metabolic, or structural changes in ischemic heart muscle thought to result from reperfusion to the ischemic areas. Changes can be fatal to muscle cells and may include edema with explosive cell swelling and disintegration, sarcolemma disruption, fragmentation of mitochondria, contraction band necrosis, enzyme washout, and calcium overload. Other damage may include hemorrhage and ventricular arrhythmias. One possible mechanism of damage is thought to be oxygen free radicals. Treatment currently includes the introduction of scavengers of oxygen free radicals, and injury is thought to be prevented by warm blood cardioplegic infusion prior to reperfusion. [NIH]

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

Need: A state of tension or dissatisfaction felt by an individual that impels him to action toward a goal he believes will satisfy the impulse. [NIH]

Neonatal: Pertaining to the first four weeks after birth. [EU]

Neonatal Screening: The identification of selected parameters in newborn infants by various tests, examinations, or other procedures. Screening may be performed by clinical or laboratory measures. A screening test is designed to sort out healthy neonates from those not well, but the screening test is not intended as a diagnostic device, rather instead as epidemiologic. [NIH]

Neoplasms: New abnormal growth of tissue. Malignant neoplasms show a greater degree of anaplasia and have the properties of invasion and metastasis, compared to benign neoplasms. [NIH]

Nephropathy: Disease of the kidneys. [EU]

Nerve: A cordlike structure of nervous tissue that connects parts of the nervous system with other tissues of the body and conveys nervous impulses to, or away from, these tissues. [NIH]

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

Neurology: A medical specialty concerned with the study of the structures, functions, and diseases of the nervous system. [NIH]

Neuromuscular: Pertaining to muscles and nerves. [EU]

Neuromuscular Diseases: A general term encompassing lower motor neuron disease; peripheral nervous system diseases; and certain muscular diseases. Manifestations include muscle weakness; fasciculation; muscle atrophy; spasm; myokymia; muscle hypertonia, myalgias, and musclehypotonia. [NIH]

Neuropathy: A problem in any part of the nervous system except the brain and spinal cord. Neuropathies can be caused by infection, toxic substances, or disease. [NIH]

Neutrophils: Granular leukocytes having a nucleus with three to five lobes connected by slender threads of chromatin, and cytoplasm containing fine inconspicuous granules and stainable by neutral dyes. [NIH]

Niacin: Water-soluble vitamin of the B complex occurring in various animal and plant tissues. Required by the body for the formation of coenzymes NAD and NADP. Has pellagra-curative, vasodilating, and antilipemic properties. [NIH]

Nitric Oxide: A free radical gas produced endogenously by a variety of mammalian cells. It is synthesized from arginine by a complex reaction, catalyzed by nitric oxide synthase. Nitric oxide is endothelium-derived relaxing factor. It is released by the vascular endothelium and mediates the relaxation induced by some vasodilators such as acetylcholine and bradykinin. It also inhibits platelet aggregation, induces disaggregation of aggregated platelets, and inhibits platelet adhesion to the vascular endothelium. Nitric oxide activates cytosolic guanylate cyclase and thus elevates intracellular levels of cyclic GMP. [NIH]

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]

Norepinephrine: Precursor of epinephrine that is secreted by the adrenal medulla and is a widespread central and autonomic neurotransmitter. Norepinephrine is the principal transmitter of most postganglionic sympathetic fibers and of the diffuse projection system in the brain arising from the locus ceruleus. It is also found in plants and is used pharmacologically as a sympathomimetic. [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]

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]

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

Nursing Care: Care given to patients by nursing service personnel. [NIH]

Nutritional Status: State of the body in relation to the consumption and utilization of nutrients. [NIH]

Odds Ratio: The ratio of two odds. The exposure-odds ratio for case control data is the ratio of the odds in favor of exposure among cases to the odds in favor of exposure among noncases. The disease-odds ratio for a cohort or cross section is the ratio of the odds in favor of disease among the exposed to the odds in favor of disease among the unexposed. The prevalence-odds ratio refers to an odds ratio derived cross-sectionally from studies of prevalent cases. [NIH]

Oligomenorrhea: Abnormally infrequent menstruation. [NIH]

Oncology: The study of cancer. [NIH]

Opportunistic Infections: An infection caused by an organism which becomes pathogenic under certain conditions, e.g., during immunosuppression. [NIH]

Optic Disk: The portion of the optic nerve seen in the fundus with the ophthalmoscope. It is formed by the meeting of all the retinal ganglion cell axons as they enter the optic nerve. [NIH]

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

Oral Hygiene: The practice of personal hygiene of the mouth. It includes the maintenance of

oral cleanliness, tissue tone, and general preservation of oral health. [NIH]

Organelles: Specific particles of membrane-bound organized living substances present in eukaryotic cells, such as the mitochondria; the golgi apparatus; endoplasmic reticulum; lysosomes; plastids; and vacuoles. [NIH]

Organoleptic: Of, relating to, or involving the employment of the sense organs; used especially of subjective testing (as of flavor, odor, appearance) of food and drug products. [NIH]

Osmotic: Pertaining to or of the nature of osmosis (= the passage of pure solvent from a solution of lesser to one of greater solute concentration when the two solutions are separated by a membrane which selectively prevents the passage of solute molecules, but is permeable to the solvent). [EU]

Osteoporosis: Reduction of bone mass without alteration in the composition of bone, leading to fractures. Primary osteoporosis can be of two major types: postmenopausal osteoporosis and age-related (or senile) osteoporosis. [NIH]

Ovaries: The pair of female reproductive glands in which the ova, or eggs, are formed. The ovaries are located in the pelvis, one on each side of the uterus. [NIH]

Overweight: An excess of body weight but not necessarily body fat; a body mass index of 25 to 29.9 kg/m². [NIH]

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

Oxalate: A chemical that combines with calcium in urine to form the most common type of kidney stone (calcium oxalate stone). [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]

Oxidative Stress: A disturbance in the prooxidant-antioxidant balance in favor of the former, leading to potential damage. Indicators of oxidative stress include damaged DNA bases, protein oxidation products, and lipid peroxidation products (Sies, Oxidative Stress, 1991, p xv-xvi). [NIH]

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]

Pancreatic: Having to do with the pancreas. [NIH]

Pancreatic Function Tests: Tests based on the biochemistry and physiology of the exocrine pancreas and involving analysis of blood, duodenal contents, feces, or urine for products of pancreatic secretion. [NIH]

Paralysis: Loss of ability to move all or part of the body. [NIH]

Parathyroid: 1. Situated beside the thyroid gland. 2. One of the parathyroid glands. 3. A sterile preparation of the water-soluble principle(s) of the parathyroid glands, administered parenterally as an antihypocalcaemic, especially in the treatment of acute hypoparathyroidism with tetany. [EU]

Parenteral: Not through the alimentary canal but rather by injection through some other route, as subcutaneous, intramuscular, intraorbital, intracapsular, intraspinal, intrasternal, intravenous, etc. [EU]

Parenteral Nutrition: The administering of nutrients for assimilation and utilization by a patient who cannot maintain adequate nutrition by enteral feeding alone. Nutrients are administered by a route other than the alimentary canal (e.g., intravenously, subcutaneously). [NIH]

Pathogenesis: The cellular events and reactions that occur in the development of disease. [NIH]

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]

Pathologies: The study of abnormality, especially the study of diseases. [NIH]

Pathophysiology: Altered functions in an individual or an organ due to disease. [NIH]

Patient Education: The teaching or training of patients concerning their own health needs. [NIH]

Penicillin: An antibiotic drug used to treat infection. [NIH]

Peptide: Any compound consisting of two or more amino acids, the building blocks of proteins. Peptides are combined to make proteins. [NIH]

Peptide Chain Initiation: The process whereby the formation of a peptide chain is started. This process requires (1) the 30s subunit, (2) the mRNA coding for the polypeptide to be made, (3) Met-tRNA_i, (4) initiation factors, and (5) GTP. [NIH]

Periodontitis: Inflammation of the periodontal membrane; also called periodontitis simplex. [NIH]

Perioperative: Around the time of surgery; usually lasts from the time of going into the hospital or doctor's office for surgery until the time the patient goes home. [NIH]

Peripheral Nervous System: The nervous system outside of the brain and spinal cord. The peripheral nervous system has autonomic and somatic divisions. The autonomic nervous system includes the enteric, parasympathetic, and sympathetic subdivisions. The somatic nervous system includes the cranial and spinal nerves and their ganglia and the peripheral sensory receptors. [NIH]

Peripheral Nervous System Diseases: Diseases of the peripheral nerves external to the brain and spinal cord, which includes diseases of the nerve roots, ganglia, plexi, autonomic nerves, sensory nerves, and motor nerves. [NIH]

Peripheral Neuropathy: Nerve damage, usually affecting the feet and legs; causing pain, numbness, or a tingling feeling. Also called "somatic neuropathy" or "distal sensory polyneuropathy." [NIH]

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

Pharmaceutical Preparations: Drugs intended for human or veterinary use, presented in their finished dosage form. Included here are materials used in the preparation and/or formulation of the finished dosage form. [NIH]

Pharmacokinetic: The mathematical analysis of the time courses of absorption, distribution, and elimination of drugs. [NIH]

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

Phenobarbital: A barbituric acid derivative that acts as a nonselective central nervous system depressant. It promotes binding to inhibitory GABA subtype receptors, and modulates chloride currents through receptor channels. It also inhibits glutamate induced depolarizations. [NIH]

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

Phospholipids: Lipids containing one or more phosphate groups, particularly those derived from either glycerol (phosphoglycerides; glycerophospholipids) or sphingosine (sphingolipids). They are polar lipids that are of great importance for the structure and function of cell membranes and are the most abundant of membrane lipids, although not stored in large amounts in the system. [NIH]

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

Phosphorylase: An enzyme of the transferase class that catalyzes the phosphorylysis of a terminal alpha-1,4-glycosidic bond at the non-reducing end of a glycogen molecule, releasing a glucose 1-phosphate residue. Phosphorylase should be qualified by the natural substance acted upon. EC 2.4.1.1. [NIH]

Physical Fitness: A state of well-being in which performance is optimal, often as a result of physical conditioning which may be prescribed for disease therapy. [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]

Physiology: The science that deals with the life processes and functions of organisms, their cells, tissues, and organs. [NIH]

Piloerection: Involuntary erection or bristling of hairs. [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; absence of nervous and sensory systems; and an alternation of haploid and diploid generations. [NIH]

Plaque: A clear zone in a bacterial culture grown on an agar plate caused by localized destruction of bacterial cells by a bacteriophage. The concentration of infective virus in a fluid can be estimated by applying the fluid to a culture and counting the number of. [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]

Plasma cells: A type of white blood cell that produces antibodies. [NIH]

Plasma protein: One of the hundreds of different proteins present in blood plasma, including carrier proteins (such as albumin, transferrin, and haptoglobin), fibrinogen and other coagulation factors, complement components, immunoglobulins, enzyme inhibitors, precursors of substances such as angiotensin and bradykinin, and many other types of proteins. [EU]

Platelet Aggregation: The attachment of platelets to one another. This clumping together can be induced by a number of agents (e.g., thrombin, collagen) and is part of the mechanism leading to the formation of a thrombus. [NIH]

Platelets: A type of blood cell that helps prevent bleeding by causing blood clots to form. Also called thrombocytes. [NIH]

Polycystic: An inherited disorder characterized by many grape-like clusters of fluid-filled

cysts that make both kidneys larger over time. These cysts take over and destroy working kidney tissue. PKD may cause chronic renal failure and end-stage renal disease. [NIH]

Polycystic Ovary Syndrome: Clinical symptom complex characterized by oligomenorrhea or amenorrhea, anovulation, and regularly associated with bilateral polycystic ovaries. [NIH]

Polymers: Compounds formed by the joining of smaller, usually repeating, units linked by covalent bonds. These compounds often form large macromolecules (e.g., polypeptides, proteins, plastics). [NIH]

Polypeptide: A peptide which on hydrolysis yields more than two amino acids; called tripeptides, tetrapeptides, etc. according to the number of amino acids contained. [EU]

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

Polyunsaturated fat: An unsaturated fat found in greatest amounts in foods derived from plants, including safflower, sunflower, corn, and soybean oils. [NIH]

Posterior: Situated in back of, or in the back part of, or affecting the back or dorsal surface of the body. In lower animals, it refers to the caudal end of the body. [EU]

Postmenopausal: Refers to the time after menopause. Menopause is the time in a woman's life when menstrual periods stop permanently; also called "change of life." [NIH]

Postoperative: After surgery. [NIH]

Postprandial: Occurring after dinner, or after a meal; postcibal. [EU]

Potassium: An element that is in the alkali group of metals. It has an atomic symbol K, atomic number 19, and atomic weight 39.10. It is the chief cation in the intracellular fluid of muscle and other cells. Potassium ion is a strong electrolyte and it plays a significant role in the regulation of fluid volume and maintenance of the water-electrolyte balance. [NIH]

Potassium Chloride: Potassium chloride. A white crystal or crystalline powder used as an electrolyte replenisher, in the treatment of hypokalemia, in buffer solutions, and in fertilizers and explosives. [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]

Primary endpoint: The main result that is measured at the end of a study to see if a given treatment worked (e.g., the number of deaths or the difference in survival between the treatment group and the control group). What the primary endpoint will be is decided before the study begins. [NIH]

Progesterone: Pregn-4-ene-3,20-dione. The principal progestational hormone of the body, secreted by the corpus luteum, adrenal cortex, and placenta. Its chief function is to prepare the uterus for the reception and development of the fertilized ovum. It acts as an antiovarian agent when administered on days 5-25 of the menstrual cycle. [NIH]

Progression: Increase in the size of a tumor or spread of cancer in the body. [NIH]

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

Projection: A defense mechanism, operating unconsciously, whereby that which is emotionally unacceptable in the self is rejected and attributed (projected) to others. [NIH]

Proliferative Retinopathy: A disease of the small blood vessels of the retina of the eye. [NIH]

Prone: Having the front portion of the body downwards. [NIH]

Proportional: Being in proportion : corresponding in size, degree, or intensity, having the same or a constant ratio; of, relating to, or used in determining proportions. [EU]

Propylene Glycol: A clear, colorless, viscous organic solvent and diluent used in pharmaceutical preparations. [NIH]

Protease: Proteinase (= any enzyme that catalyses the splitting of interior peptide bonds in a protein). [EU]

Protein C: A vitamin-K dependent zymogen present in the blood, which, upon activation by thrombin and thrombomodulin exerts anticoagulant properties by inactivating factors Va and VIIIa at the rate-limiting steps of thrombin formation. [NIH]

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]

Protocol: The detailed plan for a clinical trial that states the trial's rationale, purpose, drug or vaccine dosages, length of study, routes of administration, who may participate, and other aspects of trial design. [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]

Protozoa: A subkingdom consisting of unicellular organisms that are the simplest in the animal kingdom. Most are free living. They range in size from submicroscopic to macroscopic. Protozoa are divided into seven phyla: Sarcomastigophora, Labyrinthomorpha, Apicomplexa, Microspora, Ascetospora, Myxozoa, and Ciliophora. [NIH]

Psychic: Pertaining to the psyche or to the mind; mental. [EU]

Psychomotor: Pertaining to motor effects of cerebral or psychic activity. [EU]

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]

Puerperal Disorders: Disorders or diseases associated with the six-to-eight-week period immediately following labor and delivery. [NIH]

Pulmonary: Relating to the lungs. [NIH]

Pulmonary Artery: The short wide vessel arising from the conus arteriosus of the right ventricle and conveying unaerated blood 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]

Pulse: The rhythmical expansion and contraction of an artery produced by waves of pressure caused by the ejection of blood from the left ventricle of the heart as it contracts. [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]

Pyridoxal: 3-Hydroxy-5-(hydroxymethyl)-2-methyl-4- pyridinecarboxaldehyde. [NIH]

Pyruvate Carboxylase: A biotin-dependent enzyme belonging to the ligase family that catalyzes the addition of carbon dioxide to pyruvate. It occurs in both plants and animals. Deficiency of this enzyme causes severe psychomotor retardation and lactic acidosis in infants. EC 6.4.1.1. [NIH]

Quadriplegia: Severe or complete loss of motor function in all four limbs which may result from brain diseases; spinal cord diseases; peripheral nervous system diseases; neuromuscular diseases; or rarely muscular diseases. The locked-in syndrome is characterized by quadriplegia in combination with cranial muscle paralysis. Consciousness is spared and the only retained voluntary motor activity may be limited eye movements. This condition is usually caused by a lesion in the upper brain stem which injures the descending cortico-spinal and cortico-bulbar tracts. [NIH]

Quality of Life: A generic concept reflecting concern with the modification and enhancement of life attributes, e.g., physical, political, moral and social environment. [NIH]

Radiation: Emission or propagation of electromagnetic energy (waves/rays), or the waves/rays themselves; a stream of electromagnetic particles (electrons, neutrons, protons, alpha particles) or a mixture of these. The most common source is the sun. [NIH]

Radiation therapy: The use of high-energy radiation from x-rays, gamma rays, neutrons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body in the area near cancer cells (internal radiation therapy, implant radiation, or brachytherapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Also called radiotherapy. [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]

Reactive Oxygen Species: Reactive intermediate oxygen species including both radicals and non-radicals. These substances are constantly formed in the human body and have been shown to kill bacteria and inactivate proteins, and have been implicated in a number of diseases. Scientific data exist that link the reactive oxygen species produced by inflammatory phagocytes to cancer development. [NIH]

Reagent: A substance employed to produce a chemical reaction so as to detect, measure, produce, etc., other substances. [EU]

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]

Rectum: The last 8 to 10 inches of the large intestine. [NIH]

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

Refraction: A test to determine the best eyeglasses or contact lenses to correct a refractive error (myopia, hyperopia, or astigmatism). [NIH]

Refractory: Not readily yielding to treatment. [EU]

Regimen: A treatment plan that specifies the dosage, the schedule, and the duration of

treatment. [NIH]

Rehydration: The restoration of water or of fluid content to a body or to substance which has become dehydrated. [EU]

Renal failure: Progressive renal insufficiency and uremia, due to irreversible and progressive renal glomerular tubular or interstitial disease. [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]

Respiration: The act of breathing with the lungs, consisting of inspiration, or the taking into the lungs of the ambient air, and of expiration, or the expelling of the modified air which contains more carbon dioxide than the air taken in (Blakiston's Gould Medical Dictionary, 4th ed.). This does not include tissue respiration (= oxygen consumption) or cell respiration (= cell respiration). [NIH]

Restoration: Broad term applied to any inlay, crown, bridge or complete denture which restores or replaces loss of teeth or oral tissues. [NIH]

Retina: The ten-layered nervous tissue membrane of the eye. It is continuous with the optic nerve and receives images of external objects and transmits visual impulses to the brain. Its outer surface is in contact with the choroid and the inner surface with the vitreous body. The outer-most layer is pigmented, whereas the inner nine layers are transparent. [NIH]

Retinal: 1. Pertaining to the retina. 2. The aldehyde of retinol, derived by the oxidative enzymatic splitting of absorbed dietary carotene, and having vitamin A activity. In the retina, retinal combines with opsins to form visual pigments. One isomer, 11-cis retinal combines with opsin in the rods (scotopsin) to form rhodopsin, or visual purple. Another, all-trans retinal (trans-r.); visual yellow; xanthopsin) results from the bleaching of rhodopsin by light, in which the 11-cis form is converted to the all-trans form. Retinal also combines with opsins in the cones (photopsins) to form the three pigments responsible for colour vision. Called also retinal, and retinene1. [EU]

Retinopathy: 1. Retinitis (= inflammation of the retina). 2. Retinosis (= degenerative, noninflammatory condition of the retina). [EU]

Rheumatism: A group of disorders marked by inflammation or pain in the connective tissue structures of the body. These structures include bone, cartilage, and fat. [NIH]

Rheumatoid: Resembling rheumatism. [EU]

Rheumatoid arthritis: A form of arthritis, the cause of which is unknown, although infection, hypersensitivity, hormone imbalance and psychologic stress have been suggested as possible causes. [NIH]

Rigidity: Stiffness or inflexibility, chiefly that which is abnormal or morbid; rigor. [EU]

Risk factor: A habit, trait, condition, or genetic alteration that increases a person's chance of developing a disease. [NIH]

Saponins: Sapogenin glycosides. A type of glycoside widely distributed in plants. Each consists of a sapogenin as the aglycon moiety, and a sugar. The sapogenin may be a steroid or a triterpene and the sugar may be glucose, galactose, a pentose, or a methylpentose.

Sapogenins are poisonous towards the lower forms of life and are powerful hemolytics when injected into the blood stream able to dissolve red blood cells at even extreme dilutions. [NIH]

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

Segregation: The separation in meiotic cell division of homologous chromosome pairs and their contained allelomorphous gene pairs. [NIH]

Seizures: Clinical or subclinical disturbances of cortical function due to a sudden, abnormal, excessive, and disorganized discharge of brain cells. Clinical manifestations include abnormal motor, sensory and psychic phenomena. Recurrent seizures are usually referred to as epilepsy or "seizure disorder." [NIH]

Self Care: Performance of activities or tasks traditionally performed by professional health care providers. The concept includes care of oneself or one's family and friends. [NIH]

Senile: Relating or belonging to old age; characteristic of old age; resulting from infirmity of old age. [NIH]

Sensibility: The ability to receive, feel and appreciate sensations and impressions; the quality of being sensitive; the extent to which a method gives results that are free from false negatives. [NIH]

Sepsis: The presence of bacteria in the bloodstream. [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]

Serous: Having to do with serum, the clear liquid part of blood. [NIH]

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

Serum Albumin: A major plasma protein that serves in maintaining the plasma colloidal osmotic pressure and transporting large organic anions. [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]

Signs and Symptoms: Clinical manifestations that can be either objective when observed by a physician, or subjective when perceived by the patient. [NIH]

Skeletal: Having to do with the skeleton (bony part of the body). [NIH]

Skeleton: The framework that supports the soft tissues of vertebrate animals and protects many of their internal organs. The skeletons of vertebrates are made of bone and/or cartilage. [NIH]

Skull: The skeleton of the head including the bones of the face and the bones enclosing the brain. [NIH]

Small intestine: The part of the digestive tract that is located between the stomach and the large intestine. [NIH]

Soaps: Sodium or potassium salts of long chain fatty acids. These detergent substances are obtained by boiling natural oils or fats with caustic alkali. Sodium soaps are harder and are used as topical anti-infectives and vehicles in pills and liniments; potassium soaps are soft, used as vehicles for ointments and also as topical antimicrobials. [NIH]

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]

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]

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

Somatostatin: A polypeptide hormone produced in the hypothalamus, and other tissues and organs. It inhibits the release of human growth hormone, and also modulates important physiological functions of the kidney, pancreas, and gastrointestinal tract. Somatostatin receptors are widely expressed throughout the body. Somatostatin also acts as a neurotransmitter in the central and peripheral nervous systems. [NIH]

Somatotropin: A small peptide hormone released by the anterior pituitary under hypothalamic control. Somatotropin, or growth hormone, stimulates mitosis, cell growth, and, for some cell types, differentiation in many tissues of the body. It has profound effects on many aspects of gene expression and metabolism. [NIH]

Soybean Oil: Oil from soybean or soybean plant. [NIH]

Spasm: An involuntary contraction of a muscle or group of muscles. Spasms may involve skeletal muscle or smooth muscle. [NIH]

Specialist: In medicine, one who concentrates on 1 special branch of medical science. [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]

Spinal Cord Diseases: Pathologic conditions which feature spinal cord damage or dysfunction, including disorders involving the meninges and perimeningeal spaces surrounding the spinal cord. Traumatic injuries, vascular diseases, infections, and inflammatory/autoimmune processes may affect the spinal cord. [NIH]

Sprayer: A device for converting a medicated liquid into a vapor for inhalation; an

instrument for applying a spray which is a jet of fine medicated vapor used either as an application to a diseased part or to charge the air of a room with a disinfectant. [NIH]

Steatosis: Fatty degeneration. [EU]

Steroid: A group name for lipids that contain a hydrogenated cyclopentanoperhydrophenanthrene ring system. Some of the substances included in this group are progesterone, adrenocortical hormones, the gonadal hormones, cardiac aglycones, bile acids, sterols (such as cholesterol), toad poisons, saponins, and some of the carcinogenic hydrocarbons. [EU]

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]

Stress: Forcibly exerted influence; pressure. Any condition or situation that causes strain or tension. Stress may be either physical or psychologic, or both. [NIH]

Stridor: The loud, harsh, vibrating sound produced by partial obstruction of the larynx or trachea. [NIH]

Stroke: Sudden loss of function of part of the brain because of loss of blood flow. Stroke may be caused by a clot (thrombosis) or rupture (hemorrhage) of a blood vessel to the brain. [NIH]

Struvite: A type of kidney stone caused by infection. [NIH]

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]

Subcutaneous: Beneath the skin. [NIH]

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]

Substrate: A substance upon which an enzyme acts. [EU]

Superoxide: Derivative of molecular oxygen that can damage cells. [NIH]

Supplementation: Adding nutrients to the diet. [NIH]

Sweat: The fluid excreted by the sweat glands. It consists of water containing sodium chloride, phosphate, urea, ammonia, and other waste products. [NIH]

Sympathomimetic: 1. Mimicking the effects of impulses conveyed by adrenergic postganglionic fibres of the sympathetic nervous system. 2. An agent that produces effects similar to those of impulses conveyed by adrenergic postganglionic fibres of the sympathetic nervous system. Called also adrenergic. [EU]

Systemic: Affecting the entire body. [NIH]

Systolic: Indicating the maximum arterial pressure during contraction of the left ventricle of the heart. [EU]

Teratogenic: Tending to produce anomalies of formation, or teratism (= anomaly of formation or development : condition of a monster). [EU]

Tetany: 1. Hyperexcitability of nerves and muscles due to decrease in concentration of extracellular ionized calcium, which may be associated with such conditions as parathyroid hypofunction, vitamin D deficiency, and alkalosis or result from ingestion of alkaline salts; it is characterized by carpopedal spasm, muscular twitching and cramps, laryngospasm with inspiratory stridor, hyperreflexia and choreiform movements. 2. Tetanus. [EU]

Theophylline: Alkaloid obtained from *Thea sinensis* (tea) and others. It stimulates the heart and central nervous system, dilates bronchi and blood vessels, and causes diuresis. The drug is used mainly in bronchial asthma and for myocardial stimulation. Among its more prominent cellular effects are inhibition of cyclic nucleotide phosphodiesterases and antagonism of adenosine receptors. [NIH]

Thinness: A state of insufficient flesh on the body usually defined as having a body weight less than skeletal and physical standards. [NIH]

Thorax: A part of the trunk between the neck and the abdomen; the chest. [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]

Threshold: For a specified sensory modality (e. g. light, sound, vibration), the lowest level (absolute threshold) or smallest difference (difference threshold, difference limen) or intensity of the stimulus discernible in prescribed conditions of stimulation. [NIH]

Thrombin: An enzyme formed from prothrombin that converts fibrinogen to fibrin. (Dorland, 27th ed) EC 3.4.21.5. [NIH]

Thrombomodulin: A cell surface glycoprotein of endothelial cells that binds thrombin and serves as a cofactor in the activation of protein C and its regulation of blood coagulation. [NIH]

Thrombosis: The formation or presence of a blood clot inside a blood vessel. [NIH]

Thrombus: An aggregation of blood factors, primarily platelets and fibrin with entrapment of cellular elements, frequently causing vascular obstruction at the point of its formation. Some authorities thus differentiate thrombus formation from simple coagulation or clot formation. [EU]

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

Thyroid Gland: A highly vascular endocrine gland consisting of two lobes, one on either side of the trachea, joined by a narrow isthmus; it produces the thyroid hormones which are concerned in regulating the metabolic rate of the body. [NIH]

Tin: A trace element that is required in bone formation. It has the atomic symbol Sn, atomic number 50, and atomic weight 118.71. [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]

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

Tooth Preparation: Procedures carried out with regard to the teeth or tooth structures preparatory to specified dental therapeutic and surgical measures. [NIH]

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

Torsion: A twisting or rotation of a bodily part or member on its axis. [NIH]

Toxaemia: 1. The condition resulting from the spread of bacterial products (toxins) by the

bloodstream. 2. A condition resulting from metabolic disturbances, e.g. toxæmia of pregnancy. [EU]

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

Toxicity: The quality of being poisonous, especially the degree of virulence of a toxic microbe or of a poison. [EU]

Toxicokinetics: Study of the absorption, distribution, metabolism, and excretion of test substances. [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]

Trace element: Substance or element essential to plant or animal life, but present in extremely small amounts. [NIH]

Transaminase: Aminotransferase (= a subclass of enzymes of the transferase class that catalyse the transfer of an amino group from a donor (generally an amino acid) to an acceptor (generally 2-keto acid). Most of these enzymes are pyridoxal-phosphate-proteins. [EU]

Transcendental meditation: TM. A mental technique used to promote relaxation, reduce stress, and improve quality of life. [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]

Trauma: Any injury, wound, or shock, must frequently physical or structural shock, producing a disturbance. [NIH]

Triad: Trivalent. [NIH]

Triclosan: A diphenyl ether derivative used in cosmetics and toilet soaps as an antiseptic. It has some bacteriostatic and fungistatic action. [NIH]

Triglyceride: A lipid carried through the blood stream to tissues. Most of the body's fat tissue is in the form of triglycerides, stored for use as energy. Triglycerides are obtained primarily from fat in foods. [NIH]

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]

Ultrasonography: The visualization of deep structures of the body by recording the reflections of echoes of pulses of ultrasonic waves directed into the tissues. Use of ultrasound for imaging or diagnostic purposes employs frequencies ranging from 1.6 to 10 megahertz. [NIH]

Unconscious: Experience which was once conscious, but was subsequently rejected, as the "personal unconscious". [NIH]

Univalent: Pertaining to an unpaired chromosome during the zygotene stage of prophase to

first metaphase in meiosis. [NIH]

Urea: A compound ($\text{CO}(\text{NH}_2)_2$), 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]

Urethra: The tube through which urine leaves the body. It empties urine from the bladder. [NIH]

Uric: A kidney stone that may result from a diet high in animal protein. When the body breaks down this protein, uric acid levels rise and can form stones. [NIH]

Urinary: Having to do with urine or the organs of the body that produce and get rid of urine. [NIH]

Urinary Calculi: Calculi in any part of the urinary tract. According to their composition or pattern of chemical composition distribution, urinary calculi types may include alternating or combination, cystine, decubitus, encysted, fibrin, hemp seed, matrix, mulberry, oxalate, struvite, urostealith, and xanthic calculi. [NIH]

Urinary tract: The organs of the body that produce and discharge urine. These include the kidneys, ureters, bladder, and urethra. [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]

Uterus: The small, hollow, pear-shaped organ in a woman's pelvis. This is the organ in which a fetus develops. Also called the womb. [NIH]

Vaccine: A substance or group of substances meant to cause the immune system to respond to a tumor or to microorganisms, such as bacteria or viruses. [NIH]

Valine: A branched-chain essential amino acid that has stimulant activity. It promotes muscle growth and tissue repair. It is a precursor in the penicillin biosynthetic pathway. [NIH]

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

Vasoconstriction: Narrowing of the blood vessels without anatomic change, for which constriction, pathologic is used. [NIH]

Vasodilators: Any nerve or agent which induces dilatation of the blood vessels. [NIH]

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

Venous: Of or pertaining to the veins. [EU]

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

Virulence: The degree of pathogenicity within a group or species of microorganisms or viruses as indicated by case fatality rates and/or the ability of the organism to invade the tissues of the host. [NIH]

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]

Visceral: , from viscus a viscus) pertaining to a viscus. [EU]

Vitreous Hemorrhage: Hemorrhage into the vitreous body. [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]

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]

Zymogen: Inactive form of an enzyme which can then be converted to the active form, usually by excision of a polypeptide, e. g. trypsinogen is the zymogen of trypsin. [NIH]

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