

Terminology Related to Biomarkers

Term	Definition	Source
Accuracy	A test method is said to be accurate when the test value approaches the absolute "true" value of the substance (analyte) being measured.	Lab Tests Online. c2001-2008. How reliable is laboratory testing? [Internet]. Washington (DC): American Association for Clinical Chemistry; [cited 2008 Apr 25]. Available from: http://www.labtestsonline.org/understanding/features/reliability-2.html
ACTH	<p>a. An anterior pituitary hormone that stimulates the ADRENAL CORTEX and its production of CORTICOSTEROIDS. ACTH is a 39-amino acid polypeptide of which the N-terminal 24-amino acid segment is identical in all species and contains the adrenocorticotrophic activity. Upon further tissue-specific processing, ACTH can yield ALPHA-MSH and corticotrophin-like intermediate lobe peptide (CLIP). Year introduced: 2007, 1987-1993 (1963)</p> <p>b. ...ACTH, which is distinct because of its very short half-life, is usually measured in plasma.</p>	<p>a. National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p> <p>b. Derr RL, Cameron SJ, Golden SH. 2006 Mar. Pre-analytic considerations for the proper assessment of hormones of the hypothalamic-pituitary axis in epidemiological research. European Journal of Epidemiology [Internet]. [cited 2008 Apr 25];21(3):217-26. Available from http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10654-006-0011-0</p>
Adreno-corticotropic Hormone (ACTH)	An anterior pituitary hormone that stimulates the ADRENAL CORTEX and its production of CORTICOSTEROIDS. ACTH is a 39-amino acid polypeptide of which the N-terminal 24-amino acid segment is identical in all species and contains the adrenocorticotrophic activity. Upon further tissue-specific processing, ACTH can yield ALPHA-MSH and corticotrophin-like intermediate lobe peptide (CLIP). Year introduced: 2007, 1987-1993 (1963)	National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html
Aliquot	<p>a. to divide (as a solution) into equal parts</p> <p>b. pertaining to a portion of the whole; any one of two or more samples of something, of the the same volume or weight</p>	<p>a. MEDLINEplus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html</p> <p>b. National Cancer Instititue. NCI Terminology Brower [Internet]. Bethesda (MD): NCI; [cited 2008 Apr 25]. Available from: http://nciterms.nci.nih.gov/NCIBrowser/Dictionary.do</p>

Alleles	<p>Variant forms of the same gene, occupying the same locus on homologous CHROMOSOMES, and governing the variants in production of the same gene product. Year introduced: 1968</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
Allostasis	<p>Biological adaptation, such as the rise of EPINEPHRINE in response to exercise, stress or perceived danger, followed by a fall of epinephrine during RELAXATION. Allostasis is the achievement of stability by turning on and turning off the allostatic systems including the IMMUNE SYSTEM; the AUTONOMIC NERVOUS SYSTEM and NEUROENDOCRINE SYSTEMS. Year introduced: 2007</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
Allostatic load (AL)	<p>a. "...physiological toll that builds up over the life course as a consequence of the body's response to stress."</p> <p>b. used to describe cumulative physiological wear and tear that results from repeated efforts to adapt to stressors over time. Operationalized as a composite index of biological risk factors (e.g., blood pressure, cholesterol, glycosylated hemoglobin, and cortisol, norepinephrine, and epinephrine), AL has been shown to increase with age, predict long-term morbidity and mortality among the elderly, and be associated with low parent education in a large adolescent sample.</p>	<p>a. Gersten O. 2008 Feb. Neuroendocrine biomarkers, social relations, and the cumulative costs of stress in Taiwan. Social Science & Medicine [Internet]. [cited 2008 May 28];66(3):507-19; discussion 520-35. Available from: http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/doi:10.1016/j.socscimed.2007.09.004</p> <p>b. Glover DA, Stuber M, Poland RE. 2006. Allostatic load in women with and without PTSD symptoms. Psychiatry [Internet]. [cited 2008 Apr 25];69(3):191-203. http://www.pubmedcentral.nih.gov/libproxy.lib.unc.edu/articlerender.fcgi?to=pubmed&pubmedid=17040172</p>
Amino acid	<p>One of the 20 building blocks of protein. The sequence of an amino acid in a protein and, hence, the function of that protein are determined by the genetic code in the DNA.</p>	<p>MedicineNet. c1996-2008. Medical Dictionary [Internet]. San Clemente (CA): MedicineNet, Inc.; [cited 2008 May 20]. Available from: http://www.medterms.com/script/main/hp.asp</p>
Analytes	<p>the sample being analyzed</p> <p>a. analysis (as of a drug) to determine the presence, absence, or quantity of one or more components</p>	<p>National Cancer Institute. 2007. Best practices for biospecimen resources [Internet]. Bethesda (MD): NCI; [cited 2008 Apr 29]. Available from: http://biospecimens.cancer.gov/practices/</p> <p>a. MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html</p>

Assay

b. "The first step in planning for hormone measurement is deciding the assay that will be used, as many of the collection considerations depend on the assay choice".

b. Derr RL, Cameron SJ, Golden SH. 2006. Pre-analytic considerations for the proper assessment of hormones of the hypothalamic-pituitary axis in epidemiological research. *European Journal of Epidemiology* [Internet]. [cited 2008 Apr 25];21(3):217-26. Available from: <http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10654-006-0011-0>

- Assay-Biochemical: Biological measurements performed with purified or crude biochemical reagents.
- Assay-Cell-based: Biological measurements performed in which at least one of the reagents consists of a population of live cells.
- Assay Design: see Multivariate (Factorial Experiments), aka, Experimental Design.
- Assay-In vitro: From the Latin meaning 'in glass'. Any assay (biochemical or cell-based) conducted in a synthetic container (e.g. microtiter plate, microfluidic cell).
- Assay-In vivo: From the Latin meaning 'in life'. Typically used for assays conducted in living animals (e.g. mice, rats, etc.) with the exception of microorganisms (e.g. yeast, bacteria or *C. elegans*).
- Assay Platform: Technology used to measure response or output. (e.g. Fluorescence polarization or Radiometric counting).
- Assay-Phenotypic: An assay where the measured signal corresponds to a complex response such as cell survival, proliferation, localization of a protein, nuclear translocation etc. The molecular target is not assumed.
- Assay-Primary: The first assay performed in a testing scheme to identify biologically active chemical entities in a screening
- Assay-Secondary: Assays that follow the primary assays to confirm the biological activity of chemical entities identified in the primary assays. This can also include selectivity and specificity
- Assay-Selectivity/Specificity: Assays employed to elucidate the specificity of biologically active chemical entities towards a set of closely related disease targets.
- Assay Validation: see Validation Assay-Separation: Prior to detection a physical separation of at least one component from the assay is performed. (Standard ELISA, filtration, HPLC etc.)
- Assay-non-separation: Any assay where a physical separation is not required prior to detection.
- Assay-Target based: An assay where the measured response can be linked to a known set of biological reagents such as a purified enzyme, domain or a reporter gene.

Assays/Methods:

NIH Chemical Genomics Center. c2008. Glossary of Quantitative Biology Terms [Internet]. Bethesda (MD): NIHCGC. [cited 2008 Apr 25]. Available from: <http://www.ncgc.nih.gov/guidance/glossary.html>

Biobank	A collection of biological material and the associated data and information stored in an organised system, for a population or a large subset of a population.	OECD. 2007. Glossary of Statistical Terms [Internet]. Paris: OECD; [cited 2008 Apr 25]. Available from: http://stats.oecd.org/glossary/detail.asp?ID=7220
Biological markers	<p>Measurable and quantifiable biological parameters (e.g., specific enzyme concentration, specific hormone concentration, specific gene phenotype distribution in a population, presence of biological substances) which serve as indices for health- and physiology-related assessments, such as disease risk, psychiatric disorders, environmental exposure and its effects, disease diagnosis, metabolic processes, substance abuse, pregnancy, cell line development, epidemiologic studies, etc.</p> <p>Year introduced: 1989</p>	National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html
Biomarker	<p>a. A biological molecule found in blood, other body fluids, or tissues that is a sign of a normal or abnormal process, or of a condition or disease. A biomarker may be used to see how well the body responds to a treatment for a disease or condition. Also called molecular marker and signature molecule.</p> <p>b. A characteristic that is objectively measured and evaluated as an indicator of normal biological processes, pathogenic processes, or pharmacologic responses to a therapeutic intervention.</p>	<p>a. National Cancer Institute. Dictionary of Cancer Terms [Internet]. Bethesda (MD): NCI; [cited 2008 Apr 25]. Available from: http://www.cancer.gov/dictionary/</p> <p>b. Biomarkers Definitions Working Group. 2001. Biomarkers and surrogate endpoints: preferred definitions and conceptual framework. Clinical Pharmacology and Therapeutics [Internet]. [cited 2008 Apr 25];69(3):89-95. Review. Available from: http://www.nature.com/clpt/journal/v69/n3/full/clpt200113a.html</p> <p>c. Measure DHS. Using Biomarkers to Collect Health Data [Internet]. Calverton (MD): Macro International Inc.; [cited 2008 Apr 25]. Available from: http://www.measuredhs.com/topics/biomarkers/start.cfm</p>

	<p>c. Biomarkers are objective biologic measures of health conditions.</p> <p>d. The ideal exposure biomarker should show a clear-cut relationship to the degree of exposure...</p>	<p>d.-e. Grandjean P, Budtz-Jørgensen E, Jørgensen PJ, Weihe P. 2005 Jul. Umbilical cord mercury concentration as biomarker of prenatal exposure to methylmercury. Environmental Health Perspectives [Internet]. [cited 2008 Apr 25];113(7):905-8. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmed_id=16002381</p>
Biomonitoring	<p>e. ...all biomarkers are subject to imprecision</p> <p>CDC's highly trained laboratory scientists have built on more than three decades of experience in measuring chemicals directly in people's blood or urine, a process known as biomonitoring. Biomonitoring measurements are the most health-relevant assessments of exposure because they measure the amount of the chemical that actually gets into people from all environmental sources (e.g., air, soil, water, dust, or food) combined. With a few exceptions, it is the concentration of the chemical in people that provides the best exposure information to evaluate the potential for adverse health effects.</p>	<p>Environmental Health. 2008. National Biomonitoring Program [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; [cited 2008 May 2]. Available from: http://www.cdc.gov/biomonitoring/</p>
Biomedical research	<p>Research that involves the application of the natural sciences, especially biology and physiology, to medicine. (from American Heritage Dictionary, 4th ed) Year introduced: 2003</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
	<p>a. having no knowledge of information that may cause bias during the course of an experiment or test</p>	<p>a. MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 May 27]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html</p>
Blinding	<p>b. If possible, blinding should occur during all steps of the laboratory process including accessing samples, aliquotting, boxing and assaying.</p>	<p>b. Tworoger SS, Hankinson SE. 2006 Sep. Use of biomarkers in epidemiologic studies: minimizing the influence of measurement error in the study design and analysis. Cancer Causes & Control [Internet]. [cited 2008 May 27];17(7):889-99. Available from: http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10552-006-0035-5</p>

- Blood:**
- a. **Serum (plural: sera)** The clear liquid that can be separated from clotted blood. Serum differs from plasma, the liquid portion of normal unclotted blood containing the red and white cells and platelets. It is the clot that makes the difference between serum and plasma.
 - b. **Plasma** The liquid part of the blood and lymphatic fluid, which makes up about half of its volume. Plasma is devoid of cells and, unlike serum, has not clotted. Blood plasma contains antibodies and other proteins.
 - c. **White blood cells** One of the cells the body makes to help fight infections. There are several types of white blood cells (leukocytes). The two most common types are the lymphocytes and neutrophils.
 - d. **Red blood cells** The blood cells that carry oxygen. Red cells contain hemoglobin and it is the hemoglobin which permits them to transport oxygen (and carbon dioxide). Hemoglobin, aside from being a transport molecule, is a pigment. It gives the cells their red color (and their name).

MedicineNet. c1996-2008. Medical Dictionary [Internet]. San Clemente (CA): MedicineNet, Inc.; [cited 2008 Apr 29]. Available from: <http://www.medterms.com/script/main/hp.asp>

- Blood pressure** "There are two indicators of blood pressure. The systolic pressure is the maximum pressure in an artery at the moment when the heart is beating and pumping blood through the body. The diastolic pressure is the lowest pressure in an artery in the moments between beats when the heart is resting."

Network on Measurement of Biological Risk. c2005. Blood Pressure [Internet]. Los Angeles (CA): NIA Demography of Aging Centers; [cited 2008 Apr 25]. Available from: <http://www.usc.edu/dept/gero/CBPH/biomarker/biomarkers-blood%20pressure.htm>

- Blood spot**
(see also *Dried Blood Spot*) Dried blood spot specimens are clinical specimens collected by carefully applying a few drops of blood, freshly drawn by finger stick with a lancet from adults, or by heel stick with a lancet from infants, onto specially manufactured absorbent specimen collection (filter) paper. The blood is allowed to thoroughly saturate the paper and is air dried for a minimum of 3 hours.

Office of Health and Safety, Biosafety Branch. 1995. Guidelines for the Shipment of Dried Blood Spot Specimens [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; [cited 2008 Apr 25]. Available from: <http://www.cdc.gov/od/ohs/biosfty/driblood.htm>

Alternative collection methods	"...alternative collection methods (i.e., blood spot, urine, and saliva samples) that may be more amenable to use in large epidemiological field studies"	Derr RL, Cameron SJ, Golden SH. 2006 Mar. Pre-analytic considerations for the proper assessment of hormones of the hypothalamic-pituitary axis in epidemiological research. <i>European Journal of Epidemiology</i> [Internet]. [cited 2008 Apr 25];21(3):217-26. Available from http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10654-006-0011-0
Body Weights and Measures	Measurements of the height, weight, length, area, etc., of the human and animal body or its parts. Year introduced: 1998 AKA Anthropometry	National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html
Buccal smear	A buccal smear (pronounced "buckle") is the painless removal of a sample of cells from the lining of the mouth (inside of the cheek) for study.	MedlinePlus. c1997-2008. Medical Encyclopedia [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/medlineplus/encyclopedia.html
Buffy coat	the superficial layer of yellowish or buff coagulated plasma from which the red corpuscles have settled out in slowly coagulated blood	MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html
Capillary Collection	...involves a skin puncture and the collection of drops of blood from the puncture site	Holland Hospital Laboratory Services. Pediatric blood collection. [Internet]. Holland, MI: HHLS; [cited 2008 Jun 30]. Available from: http://www.hollandhospital.org/our%20services/laboratory%20services/Lab_Peds_brochure.pdf
Chain of custody	a legal protocol describing the documentation of specimen transfer from the time of collection until final disposition	Laboratory Corporation of America. c2007. Chain-of-custody protocol, specimen [Internet]. Burlington (NC): Laboratory Corporation of America Holdings and Lexi-Comp Inc.; [cited 2008 Apr 25]. Available from: http://www.labcorp.com/datasets/labcorp/html/chapter/mono/fo000700.htm
Cold chain	A system of protection against high environmental temperatures for heat-labile vaccines, sera and other biological preparations.	CancerWEB. c1997-2007. Online Medical Dictionary [Internet]. Newcastle upon Tyne (UK): University of Newcastle; [cited 2008 Apr 25]. Available from: http://cancerweb.ncl.ac.uk/omd/index.html
Collection kit	Specimen collection materials ("collection kits")	Office of Health and Safety, Biosafety Branch. 1995. Guidelines for the Shipment of Dried Blood Spot Specimens [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; [cited 2008 Apr 25]. Available from: http://www.cdc.gov/od/ohs/biosfty/driblood.htm

Complete blood count	<p>a common blood test, providing information on general health status and is a tool for checking disorders such as anemia, infection and thrombocytopenia. CBC provides detailed information about three types of cells including white blood cells (WBC), red blood cells (RBC), and platelets.</p>	<p>Network on Measurement of Biological Risk. c2005. Complete Blood Count [Internet]. Los Angeles (CA): NIA Demography of Aging Centers; [cited 2008 Apr 25]. Available from: http://www.usc.edu/dept/gero/CBPH/biomarker/biomarkers-CBC.htm</p>
Containment of Biohazards	<p>Provision of physical and biological barriers to the dissemination of potentially hazardous biologically active agents (bacteria, viruses, recombinant DNA, etc.). Physical containment involves the use of special equipment, facilities, and procedures to prevent the escape of the agent. Biological containment includes use of immune personnel and the selection of agents and hosts that will minimize the risk should the agent escape the containment facility. Year introduced: 1980</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
Cortisol	<p>a. ... hormone produced by the adrenal glands (small organs on top of each kidney). Production and secretion of cortisol is stimulated by ACTH (adrenocorticotrophic hormone), a hormone produced by the pituitary gland – a tiny organ located inside the head below the brain. Cortisol has a range of roles in the body.</p> <p>b. ..."the most important glucocorticoid in humans is cortisol, present in higher levels in women than in men."</p>	<p>a. Lab Tests Online. c2001-2008. Cortisol [Internet]. Washington (DC): American Association for Clinical Chemistry; [cited 2008 Apr 25]. Available from: http://www.labtestsonline.org/understanding/analytes/cortisol/sample.html</p> <p>b. Swaab DF, Bao AM, Lucassen PJ. 2005 May. The stress system in the human brain in depression and neurodegeneration. Ageing Research Reviews [Internet]. [cited 2008 Apr 25];4(2):141-94. Available from: http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/doi:10.1016/j.arr.2005.03.003</p>
Coefficient of variation of sample estimates (CV)	<p>The ratio of the standard error for an estimate to the mean value of the estimate. This is used to measure the imprecision in survey estimates introduced by sampling. A coefficient of variation of 1 percent would indicate that an estimate could vary slightly due to sampling error, while a coefficient of variation of 50 percent means that the estimate is very imprecise. The most common way to improve the coefficient of variation requires increases in sample size that are typically expensive to accomplish.</p>	<p>Division of Science Resources Statistics (SRS). 2005. Statistical terminology [Internet]. Arlington (VA): National Science Foundation; [cited 2008 Apr 25]. Available from: http://www.nsf.gov/statistics/help/term.cfm#coefficient</p>

Corticotropin	<p>A hormone made in the pituitary gland. Corticotropin acts on the outer part of the adrenal gland to control its release of corticosteroid hormones. More corticotropin is made during times of stress. Also called adrenocorticotrophic hormone and ACTH.</p>	<p>National Cancer Institute. Dictionary of Cancer Terms [Internet]. Bethesda (MD): NCI; [cited 2008 Apr 25]. Available from: http://www.cancer.gov/dictionary/</p>
Degradation	<p>change of a chemical compound to a less complex compound</p>	<p>MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html</p>
Diabetes	<p>... a group of diseases...characterized by elevated blood glucose levels due to defects in insulin secretion or insulin action. The great majority of cases are classified as type 1 or type 2 diabetes, depending on the etiology of the disease.</p> <p>Type 1 (referred to as juvenile diabetes) occurs because of destruction of beta cells in the pancreas and usually leads to absolute insulin dependency. Type 1 diabetes typically accounts for between 5 and 10 percent of all diagnosed diabetes cases. Risk factors include autoimmune disease and unknown genetic and environmental factors.</p> <p>Type 2 (referred to as adult-onset diabetes) is the most prevalent form of the disease. Risk factors include age over 40, obesity, genetic predisposition, a history of gestational diabetes, impaired glucose tolerance, and physical inactivity. Type 2 diabetes is often asymptomatic in the early stages and may remain undiagnosed for many years. If uncontrolled, type 2 diabetes can lead to many serious conditions, such as peripheral vascular disease, stroke, heart disease, kidney failure, blindness, and nerve damage.</p>	<p>Analytical and Information Center, Ministry of Health of the Republic of Uzbekistan, State Department of Statistics, Ministry of Macroeconomics and Statistics, ORC Macro. 2004 Apr. Uzbekistan Health Examination Survey 2002 [Internet]. Calverton (MD): Analytical and Information Center, State Department of Statistics, and ORC, Macro. 379p. Available from: http://www.measuredhs.com/pubs/pdf/FR143/14Chapter14.pdf</p>

Diurnal variation	<p>Also known as Circadian Rhythm. The regular recurrence, in cycles of about 24 hours, of biological processes or activities, such as sensitivity to drugs and stimuli, hormone secretion, sleeping, feeding, etc. This rhythm seems to be set by a 'biological clock' which seems to be set by recurring daylight and darkness. Year introduced: 1966(1964)</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
DNA	<p>A deoxyribonucleotide polymer that is the primary genetic material of all cells</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
Dried blood spots	<p>a. ...drops of whole blood collected on filter paper from a finger prick...</p> <p>b. ...their application dates back to the early 1960s when Dr. Robert Guthrie first began collecting heel-prick, blood spot samples from newborns to detect phenylketonuria...</p> <p>c. Use of dried blood spots (DBS) is a convenient and inexpensive method for biobanking commonly used in low-resource settings as well as a backup strategy for conventional biobanks.</p>	<p>a.-b. McDade TW, Williams S, Snodgrass JJ. 2007 Nov. What a drop can do: dried blood spots as a minimally invasive method for integrating biomarkers into population-based research. Demography [Internet]. [cited 2008 Apr 25];44(4):899-925. http://muse.jhu.edu/journals/demography/v044/44.4mcdade.pdf</p> <p>c. Sjöholm MI, Dillner J, Carlson J. 2007 Aug. Assessing quality and functionality of DNA from fresh and archival dried blood spots and recommendations for quality control guidelines. Clinical Chemistry [Internet]. [cited 2008 Apr 25];53(8):1401-7. Available from: http://www.clinchem.org/cgi/content/full/53/8/1401</p>
DBS DBSS	<p>Dried blood spots Dried blood spot sample</p>	
Dry ice	<p>...frozen carbon dioxide, a normal part of our earth's atmosphere. It is the gas that we exhale during breathing and the gas that plants use in photosynthesis. It is also the same gas commonly added to water to make soda water. Dry Ice is particularly useful for freezing, and keeping things frozen because of its very cold temperature: -109.3°F or -78.5°C. ...is widely used because it is simple to freeze and easy to handle using insulated gloves. ... changes directly from a solid to a gas -sublimation- in normal atmospheric conditions without going through a wet liquid stage. Therefore it gets the name "dry ice."</p>	<p>dryiceInfo.com. c200-2005. The Web's leading source of Information about Dry Ice [Internet]. DryiceWeb.com; [cited 2008 Apr 25]. Available from: http://www.dryiceinfo.com/</p>

EDTA

an additive

"EDTA-plasma sample tubes, which prevent coagulation allowing plasma to be more effectively separated..."

Derr RL, Cameron SJ, Golden SH. 2006 Mar. Pre-analytic considerations for the proper assessment of hormones of the hypothalamic-pituitary axis in epidemiological research. *European Journal of Epidemiology* [Internet]. [cited 2008 Apr 25];21(3):217-26. Available from <http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10654-006-0011-0>

An immunoassay utilizing an antibody labeled with an enzyme marker such as horseradish peroxidase. While either the enzyme or the antibody is bound to an immunosorbent substrate, they both retain their biologic activity; the change in enzyme activity as a result of the enzyme-antibody-antigen reaction is proportional to the concentration of the antigen and can be measured spectrophotometrically or with the naked eye. Many variations of the method have been developed. Year introduced: 1986(1977)

National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: <http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html>

ELISA (Enzyme-Linked Immunosorbent Assay)

..."enzyme-linked immunosorbent assay."...a rapid immunochemical test that involves an enzyme (a protein that catalyzes a biochemical reaction). It also involves an antibody or antigen (immunologic molecules).

ELISA tests are utilized to detect substances that have antigenic properties...Some of these include hormones, bacterial antigens and antibodies.

ELISA tests are generally highly sensitive and specific and compare favorably with radioimmune assay (RIA) tests. They have the added advantages of not needing radioisotopes or a radiation-counting apparatus.

MedicineNet.com. c1996-2008. MedTerms medical dictionary [Internet]. San Clemente (CA): MedicineNet Inc.; [cited 2008 Apr 25]. Available from: <http://www.medterms.com/script/main/hp.asp>

Epigenesis, Genetic	<p>A genetic process by which the adult organism is realized via mechanisms that lead to the restriction in the possible fates of cells, eventually leading to their differentiated state. Mechanisms involved cause heritable changes to cells without changes to DNA sequence such as DNA METHYLATION; HISTONE modification; DNA REPLICATION TIMING; NUCLEOSOME positioning; and heterochromatization which result in selective gene expression or repression.</p> <p>Year introduced: 2004</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 25]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
Epigenetics	<p>The study of factors that affect genes in a lasting way without modifying the genetic code itself.</p>	<p>News in Health. 2006 Feb. Genes or Environment? Epigenetics Sheds Light on Debate [Internet]. Bethesda (MD): National Institutes of Health; [cited 2008 Apr 25]. Available from: http://newsinhealth.nih.gov/2006/February/docs/01features_02.htm</p>
Ethical, Legal, and Social Implications (ELSI) Group	<p>The International HapMap Project raises both familiar and new ethical issues. The Project has addressed these issues by incorporating ethical considerations into the initial design of the study and by close and continuing collaborations among geneticists and ethicists. An Ethical, Legal, and Social Implications (ELSI) Group provides ongoing guidance to the HapMap Consortium.</p> <p>At its January 1989 meeting, the Program Advisory Committee on the Human Genome established a working group on ethics to develop a plan for the ELSI component of the human genome program. This working group, later named the National Institutes of Health-Department of Energy Joint Working Group on Ethical, Legal and Social Implications of Human Genome Research, held its first meeting in September 1989.</p>	<p>The International HapMap Project. 2007. Ethical, Legal and Social Implications (ELSI) Group [Internet]. The International HapMap Consortium; [cited 2008 Apr 25]. Available from: http://snp.cshl.org/elsi_memberlist.html.en</p> <p>National Human Genome Research Institute. 2007. The Ethical, Legal and Social Implications (ELSI) Research Program [Internet]. Bethesda (MD): National Institutes of Health; [cited 2008 Apr 25]. Available from: http://www.genome.gov/page.cfm?pageID=1000175</p>
ETS	<p>Environmental tobacco smoke</p>	<p>Al-Delaimy WK, Crane J, Woodward A. 2002 Jan. Is the hair nicotine level a more accurate biomarker of environmental tobacco smoke exposure than urine cotinine? Journal of Epidemiology and Community Health [Internet]. [cited 2008 Apr 30];56(1):66-71. Available from: http://jech.bmj.com/cgi/content/full/56/1</p>

Fibrinogen	<p>a. The protein from which is generated fibrin, the essence of a normal blood clot.</p> <p>b. ...a protein produced by the liver...helps stop bleeding by helping blood clots to form.</p>	<p>MedicineNet.com. c1996-2008. MedTerms medical dictionary [Internet]. San Clemente (CA): MedicineNet Inc.; [cited 2008 Apr 29]. Available from: http://www.medterms.com/script/main/hp.asp</p> <p>University of Maryland Medical Center. c2004. Medical Encyclopedia Index-English [Internet]. Baltimore (MD): UMMC; [cited 2008 Apr 29]. Available from: http://www.umm.edu/ency/index/index.htm</p>
Filter paper	porous unsized paper used especially for filtering	<p>MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 May 20]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html</p>
Genomics	<p>Pertaining to the genome, all of the genetic information possessed by any organism. There are, for instance, the human genome, the elephant genome, the mouse genome, the yeast genome, etc. Humans and many other higher animals have two genomes, namely:</p> <ul style="list-style-type: none"> * A chromosomal genome which is in the nucleus of the cell; and * A mitochondrial genome which is outside the nucleus in the cytoplasm of the cell. <p>Together these two genomes make up the total genome. The study of a genome is called genomics.</p> <p>The systematic study of the complete DNA sequences (GENOME) of organisms. Year introduced: 2001</p>	<p>MedicineNet.com. c1996-2008. MedTerms medical dictionary [Internet]. San Clemente (CA): MedicineNet Inc.; [cited 2008 Apr 29]. Available from: http://www.medterms.com/script/main/hp.asp</p> <p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>

Genomic Biomarker	<p>A measurable DNA and/or RNA characteristic that is an indicator of normal biological processes, pathogenic processes, and/or response to therapeutic or other interventions. A genomic biomarker:</p> <ul style="list-style-type: none"> - can consist of one or more DNA and/or RNA characteristics. - could be the measurement of the expression, function or regulation of a gene. <p>The definition of a genomic biomarker:</p> <ul style="list-style-type: none"> - is not limited to human samples. - does not include the measurement and characterization of proteins or low molecular weight metabolites. 	<p>U.S. Department of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research, Center for Biologics Evaluation and Research. 2008 Apr. Guidance for Industry: E15 Definitions for Genomic Biomarkers, Pharmacogenomics, Pharmacogenetics, Genomic Data and Sample Coding Categories [Internet]. Silver Spring (MD): Food and Drug Administration; [cited 2008 May 20]. 10p. Available from: http://www.fda.gov/cder/Guidance/8083fnl.pdf</p>
Genotype	<p>a. The genetic constitution (the genome) of a cell, an individual or an organism.</p> <p>b. The genotype determines the hereditary potentials and limitations of an individual from embryonic formation through adulthood. Year introduced: 1968</p>	<p>a. MedicineNet.com. c1996-2008. MedTerms medical dictionary [Internet]. San Clemente (CA): MedicineNet Inc.; [cited 2008 May 23]. Available from: http://www.medterms.com/script/main/hp.asp</p> <p>b. Encyclopedia Britannica Online. c2008. Genotype [Internet]. Chicago (IL): Encyclopedia Britannica, Inc.; [cited 2008 May 23]. Available from: http://www.britannica.com/eb/article-9036421/genotype</p>
Haplotypes	<p>The genetic constitution of individuals with respect to one member of a pair of allelic genes, or sets of genes that are closely linked and tend to be inherited together such as those of the MAJOR HISTOCOMPATIBILITY COMPLEX. Year introduced: 1987</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
Half-life	<p>The time it takes for a substance (drug, radioactive nuclide, or other) to lose half of its pharmacologic, physiologic, or radiologic activity. Year introduced: 1974(1971)</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
Heparin	<p>A substance that slows the formation of blood clots. Heparin is made by the liver, lungs, and other tissues in the body and can also made in the laboratory. Heparin may be injected into muscle or blood to prevent or break up blood clots. It is a type of anticoagulant.</p>	<p>National Cancer Institute. Dictionary of Cancer Terms [Internet]. Bethesda (MD): NCI; [cited 2008 Apr 25]. Available from: http://www.cancer.gov/dictionary/</p>

Hormone binding proteins

a. A general term for class of blood transport proteins for otherwise insoluble hormone molecules.

b. "The precision of an immunoassay and the accuracy of measurements of active hormone levels may be disrupted by hormone binding proteins; as a result, assay methodologies have been developed to abrogate the influence of binding protein interference."

Hypothalamic-pituitary-adrenal (HPA)-axis

a. A self-regulating system, based on negative feedback, in which hormones are released from the hypothalamus, stimulating the release of a different class of hormones from the pituitary gland, which in turn stimulate secretions of a third class of hormones from the adrenal glands and the testes, or ovaries, the whole cycle playing an important role in the regulation of hunger, thirst, sleep, mood, sexual activity, learning, and memory.

b. "...the final common pathway in the stress response."

Hypothalamic-pituitary-gonadal axis

"The reproductive hormonal axis in men consists of three main components: (A) the hypothalamus, (B) the pituitary gland, (C) the testis. Regulation of this axis impacts on the steroid-sensitive end organs such as the prostate and penis. This axis normally functions in a tightly regulated manner to produce concentrations of circulating steroids required for normal male sexual development, sexual function and fertility."

a. Wrong Diagnosis. c2000-2008. Medical Dictionary: A-Z [Internet]. Queensland (AU): Adviware Pty Ltd; [cited 2008 May 23]. Available from: <http://www.wrongdiagnosis.com/lists/dictaz.htm>

b. Derr RL, Cameron SJ, Golden SH. 2006. Pre-analytic considerations for the proper assessment of hormones of the hypothalamic-pituitary axis in epidemiological research. European Journal of Epidemiology [Internet]. [cited 2008 Apr 25];21(3):217-26. Available from: <http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10654-006-0011-0>

HighBeam Encyclopedia. c2008. HPA axis [Internet]. Chicago (IL): HighBeam Research Inc.; [cited 2008 May 23].
Colman AM. 2001. A dictionary of psychology. Oxford: Oxford University Press. 864p. (cited in HighBeam Encyclopedia c2008)
Available from: <http://www.encyclopedia.com/doc/1O87-HPAaxis.html>

b. Swaab DF, Bao AM, Lucassen PJ. 2005 May. The stress system in the human brain in depression and neurodegeneration. Ageing Research Reviews [Internet]. [cited 2008 Apr 25];4(2):141-94. Available from: <http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/doi:10.1016/j.arr.2005.03.003>

Gingrich JR. (2003). Testicular disorders and clinical conferences. Memphis, TN: University of Tennessee, Memphis; [cited 2008 May 28]. Available from: <http://www.utmem.edu/endocrinology/Endocrine%20pathophysiology/Chap%2012%20.htm>

ICPMS	<p>Inductively Coupled Plasma Mass Spectrometry (ICP-MS) is a very powerful tool for the analysis of trace and ultra-trace elements. A plasma or gas consisting of ions, electrons and neutral particles is formed, and the plasma is used to atomize and ionize the elements in a sample. The resulting ions are then passed through a series of cones into a high vacuum mass analyzer. The isotopes of the elements are identified and the intensity of a specific peak in the mass spectrum is proportional to the amount of that isotope (element) in the original sample.</p>	<p>University of Missouri- Columbia. c2003-2007. ICP-MS [Internet]. Columbia (MO): University of Missouri Reseach Reactor Center; [cited 2008 May 23]. Available from: http://web.missouri.edu/~umcreactorweb/pages/ac_icpms1.shtml</p>
IGF-1	<p>A well-characterized basic peptide believed to be secreted by the liver and to circulate in the blood. It has growth-regulating, insulin-like, and mitogenic activities. This growth factor has a major, but not absolute, dependence on GROWTH HORMONE. It is believed to be mainly active in adults in contrast to INSULIN-LIKE GROWTH FACTOR II, which is a major fetal growth factor. Year introduced: 1991(1986)</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
IL-6	<p>Interleukin-6 (IL-6) is a protein produced throughout the body as part of the immune response. IL-6 is one of a class of immune system regulators called cytokines that serve a variety of immune functions in response to acute illness or injury. As a pro-inflammatory cytokine, IL-6 is involved in activating inflammatory pathways. IL-6 is always present in the body in small amounts (<1-2 ug/mL), and concentration varies by time of day. However, in periods of immune activation, blood levels of IL-6 increase quickly, reaching as high as 40 times normal levels. IL-6 levels also rise with advancing age and are related to a variety of chronic conditions.</p>	<p>Network on Measurement of Biological Risk. c2005. IL6 [Internet]. Los Angeles (CA): NIA Demography of Aging Centers; [cited 2008 Apr 25]. Available from: http://www.usc.edu/dept/gero/CBPH/biomarker/biomarkers-IL6.htm</p>
Immunoassay	<p>A technique using antibodies for identifying or quantifying a substance. Usually the substance being studied serves as antigen both in antibody production and in measurement of antibody by the test substance. Year introduced: 1967(1966)</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>

Immunoradiometric assay (IRMA)	"...uses excess labeled antibody, achieves greater sensitivity and specificity for assaying GH, IGF-1, and ACTH."	Derr RL, Cameron SJ, Golden SH. 2006. Pre-analytic considerations for the proper assessment of hormones of the hypothalamic-pituitary axis in epidemiological research. <i>European Journal of Epidemiology</i> [Internet]. [cited 2008 Apr 25];21(3):217-26. Available from: http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10654-006-0011-0
Immunoassay	a technique or test (as the enzyme-linked immunosorbent assay) used to detect the presence or quantity of a substance (as a protein) based on its capacity to act as an antigen or antibody	MedlinePlus. c2005. <i>Medical Dictionary</i> [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 May 27]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html
Informed consent	Making a decision about participating in a research study involves understanding the potential risks and benefits as well as your rights and responsibilities. The presentation and discussion of these important issues are part of the process called informed consent.	National Cancer Institute. 2006 Mar. A guide to understanding informed consent [Internet]. Bethesda (MD): NCI; [cited 2008 Apr 29]. Available from: http://www.cancer.gov/clinicaltrials/AGuidetoUnderstandingInformedConsent/Page1
Institutional Review Board (IRB)	Hospital or other institutional committees established to protect the welfare of research subjects. Federal regulations (the "Common Rule" (45 CFR 46)) mandate the use of these committees to monitor federally-funded biomedical and behavioral research involving human subjects. Year introduced: 2002 AKA Ethics Committees, Research One of the two sources of laboratory errors introduced when using biomarkers; the other laboratory error being intra-assay (within-batch) variability.	National Library of Medicine. 2008. <i>Medical Subject Headings (MeSH)</i> [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html
Inter-assay variability	"Inter-assay (between-batch) variability occurs when there is additional variability added between batches or runs of an assay, particularly if the batches are conducted over an extended period of time." "A key method for reducing the effects of inter-assay variability is appropriate sample allocation...."	Tworoger SS, Hankinson SE. 2006 Sep. Use of biomarkers in epidemiologic studies: minimizing the influence of measurement error in the study design and analysis. <i>Cancer Causes & Control</i> [Internet]. [cited 2008 May 27];17(7):889-99. Available from: http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10552-006-0035-5

Interindividual variations	differences between individuals; e.g, in physiology and nutrient metabolism	Potischman N. 2003 Mar. Biologic and methodologic issues for nutritional biomarkers. Journal of Nutrition [Internet]. [cited 2008 May 27];133 Suppl 3:875S-880S. Available from: http://jn.nutrition.org/cgi/content/full/133/3/875S?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&andorexacttitle=&andorexacttitleabs=&andorexactfulltext=&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=133&firstpage=875S&resourcetype=HWCIT
Intraclass correlation (ICC)	"The ICC is used to measure the stability or reliability with groups or individuals, and can be used as an alternate measure to the CV. It is calculated as the ratio of the between-group (or person or assay batch) variance over the total variance (between plus within-group variance), and ranges from 0 to 1.0."	TwoRoger SS, Hankinson SE. 2006 Sep. Use of biomarkers in epidemiologic studies: minimizing the influence of measurement error in the study design and analysis. Cancer Causes & Control [Internet]. [cited 2008 May 27];17(7):889-99. Available from: http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10552-006-0035-5
Ligase chain reaction (LCR)	A DNA amplification technique based upon the ligation of OLIGONUCLEOTIDE PROBES. The probes are designed to exactly match two adjacent sequences of a specific target DNA. The chain reaction is repeated in three steps in the presence of excess probe: (1) heat denaturation of double-stranded DNA, (2) annealing of probes to target DNA, and (3) joining of the probes by thermostable DNA ligase. After the reaction is repeated for 20-30 cycles the production of ligated probe is measured. Year introduced: 2001	National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 May 27]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html
Linearity	Linearity is the variation between a known standard, or "truth," across the low and high end of the gage. It is the difference between an individual's measurements and that of a known standard or truth over the full range of expected values.	iSixSigma. C2000-2008. Dictionary:term definition [Internet]. Bainbridge Island (WA): CTQ Media LLC; [cited 2008 May 27]. Available from : http://www.isixsigma.com/dictionary/Linearity-270.htm
Lyophilize	freeze dry	MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html

Markers	<p>Short-term: dietary intake within hours Medium-term: weeks or months Long-term: months or years</p>	<p>Potischman N. 2003 Mar. Biologic and methodologic issues for nutritional biomarkers. Journal of Nutrition [Internet]. [cited 2008 May 27];133 Suppl 3:875S-880S. Available from: http://jn.nutrition.org/cgi/content/full/133/3/875S?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&andorexacttitle=&andorexacttitleabs=&andorexactfulltext=&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=133&firstpage=875S&resource-type=HWCIT</p>
Metabolomics	<p>The global study of all the small molecules produced in the human body.</p>	<p>Wellcome Trust. c2004-2005. The Human Genome: Metabolomics [Internet]. London (UK): Wellcome Trust; [cited 2008 Apr 29]. Available from: http://genome.wellcome.ac.uk/doc_WTD020768.html</p>
Microarray technology	<p>A new way of studying how large numbers of genes interact with each other and how a cell's regulatory networks control vast batteries of genes simultaneously. The method uses a robot to precisely apply tiny droplets containing functional DNA to glass slides. Researchers then attach fluorescent labels to DNA from the cell they are studying. The labeled probes are allowed to bind to complementary DNA strands on the slides. The slides are put into a scanning microscope that can measure the brightness of each fluorescent dot; brightness reveals how much of a specific DNA fragment is present, an indicator of how active it is.</p>	<p>National Human Genome Research Institute. Talking Glossary of Genetic Terms [Internet]. Bethesda (MD): NHGRI; [cited 2008 Apr 29]. Available from: http://www.genome.gov/10002096</p>
Minimally invasive	<p>Examples of minimally-invasive biosamples for biomarker development include samples of blood, urine, saliva, breath, skin, buccal and nasal cells</p>	<p>Genes, Environment and Health Initiative. 2006 Sep. NIH Exposure Biology Workshop- Executive Summary [Internet]. Bethesda (MD): National Institutes of Health; [cited 2008 May 27]. Available from: http://www.gei.nih.gov/exposurebiology/meetings/exposurebiology06/</p>
Moiety	<p>one of the portions into which something is divided</p>	<p>MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 May 27]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html</p>
Molecular risk assessment	<p>A procedure in which biomarkers (for example, biological molecules or changes in tumor cell DNA) are used to estimate a person's risk for developing cancer. Specific biomarkers may be linked to particular types of cancer.</p>	<p>National Cancer Institute. Dictionary of Cancer Terms [Internet]. Bethesda (MD): NCI; [cited 2008 May 27]. Available from: http://www.cancer.gov/dictionary/</p>

MOP	Manual of operating procedures	National Children's Study. 2008. The National Children's Study Plan [Internet]. Rockville (MD): U.S. Department of Health and Human Services and U.S. Environmental Protection Agency; [cited 2008 Apr 29]. 34p. Available from: http://www.nationalchildrensstudy.gov/research/study_plan/upload/NCS-Study-Plan-2004.pdf
Mutagenicity	the capacity to induce mutations	MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html
Nested case control study	<p>"In the nested case-control study, cases of a disease that occur in a defined cohort are identified and, for each, a specified number of matched controls is selected from among those in the cohort who have not developed the disease by the time of disease occurrence in the case."</p> <p>Nested case-control design offers reductions in cost and effort in data collection and analysis compared with the full cohort approach, with relatively minor loss in statistical efficiency. The nested case-control design is particularly advantageous for studies of biologic precursors of disease.</p>	Ernster VL. 1994 Sep. Nested case-control studies. Preventive Medicine [Internet]. [cited 2008 May 27];23(5):587-90. Available from: http://www.sciencedirect.com/science/journal/00917435
Non-Competitive	Type of immunometric assay; aka "two-site or sandwich immunoassay"	Derr RL, Cameron SJ, Golden SH. 2006. Pre-analytic considerations for the proper assessment of hormones of the hypothalamic-pituitary axis in epidemiological research. European Journal of Epidemiology [Internet]. [cited 2008 Apr 25];21(3):217-26. Available from: http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10654-006-0011-0
Noninvasive	not being or involving an invasive medical procedure	MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html
Nutrigenomics	<p>The study of the relationship between NUTRITIONAL PHYSIOLOGY and genetic makeup. It includes the effect of different food components on GENE EXPRESSION and how variations in GENES effect responses to food components. Year introduced: 2008</p>	National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html

Pituitary gland	<p>The main endocrine gland which is connected to the hypothalamus by a short stalk. It is called the master gland because it produces hormones that control other glands and many body functions including growth.</p>	<p>MedicineNet.com. c1996-2008. MedTerms medical dictionary [Internet]. San Clemente (CA): MedicineNet Inc.; [cited 2008 May 27]. Available from: http://www.medterms.com/script/main/hp.asp</p>
Polymerase Chain Reaction (PCR)	<p>In vitro method for producing large amounts of specific DNA or RNA fragments of defined length and sequence from small amounts of short oligonucleotide flanking sequences (primers). The essential steps include thermal denaturation of the double-stranded target molecules, annealing of the primers to their complementary sequences, and extension of the annealed primers by enzymatic synthesis with DNA polymerase. The reaction is efficient, specific, and extremely sensitive. Uses for the reaction include disease diagnosis, detection of difficult-to-isolate pathogens, mutation analysis, genetic testing, DNA sequencing, and analyzing evolutionary relationships. Year introduced: 1991(1990)</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
Precise	<p>A test method is said to be precise when repeated analyses on the same sample give similar results.</p>	<p>Lab Tests Online. c2001-2008. How reliable is laboratory testing? [Internet]. Washington (DC): American Association for Clinical Chemistry; [cited 2008 Apr 25]. Available from: http://www.labtestsonline.org/understanding/features/reliability-2.html</p>
Protease inhibitor	<p>Protease Inhibitors Compounds which inhibit or antagonize biosynthesis or actions of proteases (ENDOPEPTIDASES). Year introduced: 1979</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>
Proteome	<p>...the full complement of proteins produced by the human genome at any one time. Unlike the genome, which is the same in most cells, the proteome is very dynamic. Distinct sets of proteins are produced in different cell types and developmental stages.</p>	<p>Wellcome Trust. c2004-2005. The Human Genome: Metabolomics [Internet]. London (UK): Wellcome Trust; [cited 2008 Apr 29]. Available from: http://genome.wellcome.ac.uk/doc_WTD020768.html</p>
Proteomics	<p>...study of protein shape, function, and patterns of expression</p>	<p>National Cancer Institute. 2006. National Cancer Institute Fact Sheet: Tumor Markers: Questions and Answers [Internet]. Bethesda (MD): NCI; [cited 2008 Apr 29]. Available from: http://www.cancer.gov/cancertopics/factsheet/Detection/tumor-markers</p>

Prothrombin	A coagulation (clotting) factor that is need for the normal clotting of blood. A cascade of biochemical events leads to the formation of the final clot. In this cascade, prothrombin is a precursor to thrombin.	MedicineNet.com. c1996-2008. MedTerms medical dictionary [Internet]. San Clemente (CA): MedicineNet Inc.; [cited 2008 May 27]. Available from: http://www.medterms.com/script/main/hp.asp
QA/QC Quality assurance / Quality control	...actions performed to ensure the quality of a product, service or process.	American Society for Quality. Basic Concepts: Glossary. [Internet]. Milwaukee, WI: ASQ. [cited 2008 Jun 30]. Available from: http://www.asq.org/glossary/q.html .
Q.N.S.	On a lab report, q.n.s. (or qns or QNS) means Quantity Not Sufficient. Not enough blood, urine or whatever to do the test.	MedicineNet.com. c1996-2008. MedTerms medical dictionary [Internet]. San Clemente (CA): MedicineNet Inc.; [cited 2008 Apr 29]. Available from: http://www.medterms.com/script/main/hp.asp
Quality control	A system for verifying and maintaining a desired level of quality in a product or process by careful planning, use of proper equipment, continued inspection, and corrective action as required. (Random House Unabridged Dictionary, 2d ed) Year introduced: 1974(1971)	National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html
Indicators and Reagents	Substances used for the detection, identification, analysis, etc. of chemical, biological, or pathologic processes or conditions. Indicators are substances that change in physical appearance, e.g., color, at or approaching the endpoint of a chemical titration, e.g., on the passage between acidity and alkalinity. Reagents are substances used for the detection or determination of another substance by chemical or microscopical means, especially analysis. Types of reagents are precipitants, solvents, oxidizers, reducers, fluxes, and colorimetric reagents. (From Grant & Hackh's Chemical Dictionary, 5th ed, p301, p499)	National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html
Psychobiology	the study of mental functioning and behavior in relation to other biological processes	MedlinePlus. c2005. Medical Dictionary [Internet]. Bethesda (MD): National Library of Medicine; [cited 2008 May 28]. Available from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html

Replication	The duplication of DNA as part of the reproductive cycle of a cell or virus. During replication the two DNA strands in the double helix separate, and each strand then acts as a template specifying the base sequence of newly synthesized complementary strands.	International Union of Pure and Applied Chemistry. c2005-2006. IUPAC Compendium of Chemical Terminology (Gold Book) [Internet]. RTP (NC): IUPAC; [cited 2008 Apr 29]. Available from: http://goldbook.iupac.org/R05300.html
Replicate (duplicate) sample	Multiple (or two) samples taken under comparable conditions. This selection may be accomplished by taking units adjacent in time or space. Although the replicate samples are expected to be identical, often the only thing replicated is the act of taking the physical sample. A duplicate sample is a replicate sample consisting of two portions. The umpire sample is usually used to settle a dispute; the replicate sample is usually used to estimate sample variability.	International Union of Pure and Applied Chemistry. c2005-2006. IUPAC Compendium of Chemical Terminology (Gold Book) [Internet]. RTP (NC): IUPAC; [cited 2008 Apr 29]. Available from: http://goldbook.iupac.org/R05299.html
Radioimmunoassay (RIA)	A very sensitive, specific laboratory test (assay) using radiolabeled (and unlabeled) substances in an immunological (antibody-antigen) reaction.	MedicineNet.com. c1996-2008. MedTerms medical dictionary [Internet]. San Clemente (CA): MedicineNet Inc.; [cited 2008 May 28]. Available from: http://www.medterms.com/script/main/hp.asp
RNA	A polynucleotide consisting essentially of chains with a repeating backbone of phosphate and ribose units to which nitrogenous bases are attached. RNA is unique among biological macromolecules in that it can encode genetic information, serve as an abundant structural component of cells, and also possesses catalytic activity. (Rieger et al., Glossary of Genetics: Classical and Molecular, 5th ed) Year introduced: RNA, NON-POLYADENYLATED was NON-POLYADENYLATED RNA (NM) 1981-1994	National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html
Sensitivity	ability of a test to correctly identify individuals who have a given disease or condition	Lab Tests Online. c2001-2008. How reliable is laboratory testing? [Internet]. Washington (DC): American Association for Clinical Chemistry; [cited 2008 Apr 25]. Available from: http://www.labtestsonline.org/understanding/features/reliability-2.html

Single nucleotide polymorphism (SNP)	<p>Single nucleotide polymorphisms or SNPs (pronounced "snips") are DNA sequence variations that occur when a single nucleotide (A,T,C,or G) in the genome sequence is altered...SNPs do not cause disease, but they can help determine the likelihood that someone will develop a particular disease. One of the genes associated with Alzheimer's, apolipoprotein E or ApoE, is a good example of how SNPs affect disease development.</p>	<p>Human Genome Management Information System. 2007. Human Genome Project Information: SNP Fact Sheet [Internet]. Oak Ridge (TN): Oak Ridge National Laboratory; [cited 2008 Apr 29]. Available from: http://www.ornl.gov/sci/techresources/Human_Genome/faq/snps.shtml</p>
Specificity	<p>ability of a test to correctly exclude individuals who do not have a given disease or condition</p>	<p>Lab Tests Online. c2001-2008. How reliable is laboratory testing? [Internet]. Washington (DC): American Association for Clinical Chemistry; [cited 2008 Apr 25]. Available from: http://www.labtestsonline.org/understanding/features/reliability-2.html</p>
Specimen Chain-of-Custody Protocol	<p>...a legal protocol describing the documentation of specimen transfer from the time of collection until final disposition.</p>	<p>Laboratory Corporation of America. 2003. Directory of Services and Interpretive Guide. [Internet]. Burlington, NC: LabCorp. [cited 2008 Jun 30]. Available from: http://www.labcorp.com/datasets/labcorp/html/chapter/</p>
Tracking system	<p>To make certain that specimens can be tracked effectively from the site at which they are collected through their arrival and subsequent shipment from the Repository, certain systems must be in place. Such systems include the use of labels that identify the samples as they are transported and stored, shipping logs that document specimen arrival and departure from the Repository, and an inventory system that allows specimen location within the repository to be known to all appropriate staff.</p>	<p>ISBER. 2005. Best Practices For Repositories Collection, Storage, Retrieval and Distribution of Biological Materials for Research. [Internet]. [cited 2008 Apr 25]. Cell Preservation Technology 3(1): 5-48. Available from: http://www.liebertonline.com/doi/pdf/10.1089/cpt.2005.3.5</p>
Two-site immunoassays	<p>aka "sandwich immunoassays" A "non-competitive" type of immunometric assay "where exogenously applied reagents are in excess."</p>	<p>Derr RL, Cameron SJ, Golden SH. 2006. Pre-analytic considerations for the proper assessment of hormones of the hypothalamic-pituitary axis in epidemiological research. European Journal of Epidemiology [Internet]. [cited 2008 Apr 25];21(3):217-26. Available from: http://libproxy.lib.unc.edu/login?url=http://dx.doi.org/10.1007/s10654-006-0011-0</p>
Venipuncture	<p>The techniques used to draw blood from a vein for diagnostic purposes or for treatment of certain blood disorders such as erythrocytosis, hemochromatosis, polycythemia vera, and porphyria cutanea tarda. Year introduced: 1996</p>	<p>National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html</p>

Venous collection	...performed by threading a needle into the vein and using either a syringe or vacuum tube to obtain a blood sample.	Holland Hospital Laboratory Services. Pediatric blood collection. [Internet]. Holland, MI: HHLS; [cited 2008 Jun 30]. Available from: http://www.hollandhospital.org/our%20services/laboratory%20services/Lab_Peds_brochure.pdf
Universal Precautions	...since most antineoplastic agents and/or their metabolites are excreted in the urine and a large percentage of them are mutagenic, the analysis of the urine of workers handling antineoplastic agents is a means to document exposure.	National Library of Medicine. 2008. Medical Subject Headings (MeSH) [Internet]. Bethesda (MD): NLM; [cited 2008 Apr 29]. Available from: http://www.nlm.nih.gov/libproxy.lib.unc.edu/mesh/2008/MBrowser.html
Urinary mutagenicity	Since most antineoplastic agents and/or their metabolites are excreted in the urine and a large percentage of them are mutagenic, the analysis of the urine of workers handling antineoplastic agents is a means to document exposure.	National Institute for Occupational Safety and Health. NIOSH Safety and Health Topic: Occupational Exposure to Antineoplastic Agents [Internet]. Atlanta (GA): NIOSH, Centers for Disease Control and Prevention; [cited 2008 Apr 29]. Available from: http://www.cdc.gov/niosh/topics/antineoplastic/monitoring.html .
µg	microgram: one millionth of a gram	CancerWEB. c1997-2007. Online Medical Dictionary [Internet]. Newcastle upon Tyne (UK): University of Newcastle; [cited 2008 Apr 25]. Available from: http://cancerweb.ncl.ac.uk/omd/index.html
µg/dl	micrograms per deciliter	CancerWEB. c1997-2007. Online Medical Dictionary [Internet]. Newcastle upon Tyne (UK): University of Newcastle; [cited 2008 Apr 25]. Available from: http://cancerweb.ncl.ac.uk/omd/index.html
ng/ml	nanograms per millilitre	CancerWEB. c1997-2007. Online Medical Dictionary [Internet]. Newcastle upon Tyne (UK): University of Newcastle; [cited 2008 Apr 25]. Available from: http://cancerweb.ncl.ac.uk/omd/index.html