

## Glossary

### A

Adduct—A compound formed by a chemical addition reaction.

ADME—Absorption, Distribution, Metabolism and Excretion; the four functions that determine the fate of a chemical or drug in the body.

Agenesis—Usually occurring at birth, the absence or partial development of an organ or body part.

Allantois—The extraembryonic membrane formed early in development as an outpouching of the yolk sac into the area of the future umbilical cord. It is the site of blood formation for the embryo and the blood vessels of the allantois become the umbilical artery and veins.

Allele—Alternative form of a gene. Alleles are usually found in pairs at a specific site on a chromosome.

Alpha fetoprotein—A protein produced by fetal tissues. An abnormally high amount of this protein in the amniotic fluid or maternal serum may signal a neural tube defect, or other abnormal opening in the fetus.

Amino acid—One of a group of organic compounds containing an amino group and a carboxyl group which are the building blocks of protein.

Amniocentesis—A procedure in which a small amount of amniotic fluid is removed and analyzed to detect genetic abnormalities of the fetus.

Amnion—The extraembryonic membrane that lines the amniotic cavity (sac).

Amniotic cavity—The fluid filled cavity that surrounds the developing embryo.

Anencephalus (anencephaly)—Congenital absence of the upper part of the brain and the flat bones of the skull. See also Exencephaly.

Angiotensin converting enzyme (ACE) inhibitors—A class of drugs that inhibit the proteolytic enzyme that converts angiotensin I into angiotensin II; used to treat high blood pressure.

Aneuploidy—An abnormal number of chromosomes.

Anotia—Congenital absence of the ears.

Antepartum—Before birth.

Anterior—A descriptive term meaning situated in the front.

Anti-mitotic—Refers to inhibition of cell division.

Apoptosis—Programmed cell death; a type of cell death in which the cell uses its own specialized machinery to kill itself.

ARND—Alcohol Related Neurodevelopmental Disabilities—A spectrum of functional neurologic (behavioral) defects resulting from *in utero* exposure to alcohol.

Ataxia—A loss of voluntary muscle coordination.

ATPase—An enzyme that hydrolyzes ATP to ADP and phosphate.

Atrial septal defect - A defect in the wall dividing the two atria of the heart

Atresia - Congenital absence or closure of a normal opening. The degeneration and resorption of ovarian follicles before maturation.

Atrophy—Wasting or decrease in size of a tissue or organ.

### B

Basal ganglia—Several large clusters of nerve cells, including the corpus striatum and the substantia nigra, deep in the brain below the cerebral hemispheres; participate in the regulation of motor

performance.

**Benchmark Dose (BMD)** - A dose or concentration that produces a predetermined change in response rate of an adverse effect (called the benchmark response or BMR) compared to background

**Bioinformatics**—The science of managing and analyzing large amounts of biological data using advanced computing techniques, especially in genomics.

**Biotransformation**—The conversion of a compound from one form to another by the actions of enzymes.

**Blastocyst**—An early stage of the embryo; a fluid-filled cavity surrounded by a single celled membrane, the trophoblast, and containing the inner cell mass, which will become the embryo.

**Blastulation**—The process by which the early embryo transforms from a solid mass of cells, the morula, to the blastocyst.

## C

**Caspase**—A member of a group of protease enzymes that mediate apoptosis.

**Cataract**—Partial or complete opacity (clouding) of the lens of the eye; a common cause of blindness but curable by surgery.

**Catecholamine**—One of a group of hormones (e.g. epinephrine) that affects the sympathetic nervous system.

**Caudal**—A descriptive term meaning towards the tail; inferior.

**Cerebellum**—A part of the brain that is important for a number of cognitive and motor functions, including balance and coordination of movement.

**Cerebral cortex**—The layer of unmyelinated neurons (the gray matter) forming the cortex of the cerebrum.

**Cerebrum**—The largest part of the brain important for integration of motor, sensory, and other mental functions, such as thought, reason, emotion, and memory.

**Cerebral palsy (spastic paralysis)**—A condition resulting from brain damage before, at, or shortly after birth, that is marked by lack of muscle control.

**Cerebrospinal fluid**—The fluid that fills the spaces in and around the brain and spinal cord.

**Chondrocyte**—A cartilage cell.

**Chorioallantoic placenta**—The placenta developed from the allantois and chorion; establishes a nutritive and excretory connection between the blood of the fetus and that of the mother.

**Chorion**—The outermost membrane enclosing the fetus.

**Chorionic villus**—Any of the tiny extensions from the chorion that contain fetal blood vessels and combine with the uterine tissue to form the placenta.

**Chorioretinitis**—Inflammation of the choroid layer behind the retina of the eye.

**Chromatin**—Genetic material composed of DNA and proteins that condense to form chromosomes.

**Chromosome**—An organized structure of genes formed from condensed chromatin. In humans, there are 46 chromosomes and 2 sex chromosomes (an X or Y).

**Cleft palate**—A congenital fissure along the midline of the hard palate.

**CNS**—Central nervous system: The brain and spinal cord, olfactory bulbs and optic nerves.

**Conceptus**—An embryo or fetus.

**Congenital**—Present at birth.

**Corpus callosum**—A band of white neural tissue that joins the left and right hemispheres of the cerebrum.

**Cranial**—Relating to the cranium or skull; also a term used for directionality meaning towards the head.

**Cranial placodes**—Thickenings in the surface ectoderm of the embryo associated with the future eye and ear regions.

**Craniosynostosis**—Premature fusion of the cranial bones leading to abnormal head shape.

**Cretinism**—A developmental disorder caused by deficiency of thyroid hormone, and characterized

by severe mental retardation, sometimes resulting from maternal iodine deficiency.

Cryptorchidism—Failure of the testes to descend into the scrotum.

Cytoplasm – The material in a living cell excluding the nucleus

Cytokinesis- the division of the cell cytoplasm at the end of mitosis or meiosis resulting in two new cells

Cytotrophoblast—The inner cellular layer of the trophoblast (trophoblast); part of the mammalian placenta.

Cyclopia – a rare form of holoprosencephaly presenting with a single center eye and other facial deformities.

## D

Developmental Neurotoxicity—Adverse effects on the development of the nervous system.

Diploid—Having a pair of each type of chromosome.

Distal—Farther or farthest from the center or trunk.

Down Syndrome—A disorder caused by an extra chromosome 21 (trisomy 21) and characterized by mental retardation and distinguishing physical features.

Ductus arteriosus – during fetal development, a blood vessel connecting the pulmonary artery to the proximal descending aorta that in utero, allows blood from the right ventricle to bypass the non-functioning fetal lungs. This blood vessel closes after birth when the lungs begin to function

Dysmorphia (also dysmorphic, dysmorphogenesis)— A descriptive term, often referring to a birth defect, that indicates a difference in appearance of a body part or organ.

## E

Ectoderm—The outermost layer in an embryo which will develop into the skin and nervous system.

Encephalitis—Inflammation of the brain.

Encephalocele—Protrusion of brain tissue through a fissure or defect in the skull.

Endocrine—Belonging to the endocrine glands or their secretions.

Endocytosis—A process by which extracellular materials are taken into cells.

Endoderm—The innermost layer of an embryo that will develop into the lining of the digestive tract and respiratory tract.

Endometrium—The inner lining of the uterus that is shed during menstruation.

Embryo—The developing organism from the stage after gastrulation when the central long axis appears until all major anatomical structures are present. In humans, this is from about the second week after fertilization to about the end of the seventh week of pregnancy.

Epiblast—The primitive ectoderm of the early embryo.

Epididymis—The tightly-coiled, thin-walled tube that conducts sperm from the testis to the vas deferens.

Epigenetic—Refers to changes in gene expression that are not the result of changes in the DNA sequence. The changes are stable and potentially heritable.

Epoxide hydrolase—A detoxification enzyme that modifies epoxides by adding a molecule of water and converts them to a molecular structure that can be more rapidly excreted.

Epstein-Barr virus—The herpes virus that causes infectious mononucleosis.

Estriol—One of the three naturally occurring forms of human estrogen. It is produced in significant amounts during pregnancy.

Ethanol—Ethyl alcohol.

Exencephaly—An open brain resulting from failure of the neural tube to close. In humans this is followed by degeneration of the brain, resulting in anencephaly.

External genitalia—The external sex organs.

Extracellular matrix—A non-cellular mesh of fibrous proteins and carbohydrate molecules

(glycosaminoglycans) in body tissue that helps maintain and support the cells of that tissue.  
Extraembryonic membranes—Membranes that surround the embryo; the chorion, yolk sac, allantois, and amnion.

## F

Fetal alcohol syndrome—Characteristic facial changes and impaired mental development resulting from maternal alcohol intoxication during pregnancy.

Fetus—An unborn baby from the 8th week after conception until birth.

Folic acid—A B vitamin involved in DNA synthesis that is essential for growth and reproduction.

Frontonasal dysplasia—Also known as median cleft face syndrome, a rare craniofacial disorder.

## G

Gamete—A sex cell. In higher animals, a sperm or an egg.

Gastroschisis—A malformation in which the intestines and sometimes other organs protrude through a defect in the abdominal wall.

Gastrulation—A stage of embryo development in which a two-layered embryo (ectoderm and endoderm) develops a third layer (mesoderm) through the movement of specific cells.

Gene—A hereditary unit of DNA that codes for a protein, found in a specific location on a chromosome. Each human chromosome contains many thousands of genes.

Genital folds—The embryonic structure that will differentiate into the penis in boys or the labia in girls.

Genome—All the genetic material in the chromosomes of an organism.

Genomics—The study of genes and their function.

Genotype—The genetic make-up of an individual. Expressions of genotype result in the phenotype which is how the individual looks. In the case of a recessive gene, such as that for albinism, persons who carry one albino gene and one normal allele and persons who carry two normal alleles, have the same (normal) phenotype, but different genotypes.

Germ cells—Sperm and egg cells and their precursors.

GIFT (Gamete Intrafallopian Transfer)—A technique to treat infertility by fertilizing an egg in the laboratory and placing the resulting embryo into the fallopian tube. The embryo is expected to travel through the fallopian tube and implant in the uterus much as it would have had natural fertilization occurred.

Glaucoma—A disease caused by increased pressure of the fluid within the eye, resulting in damage to the optic nerve; advanced disease is a common cause of blindness.

Glial cell—A kind of connective tissue cell in the brain and spinal cord. Glial cells provide structural support and nourishment to nerve cells.

Glucocorticoids—A class of hormones, including cortisol, produced by the adrenal glands.

Glucocorticoids mediate a response to stress and affect protein and carbohydrate metabolism.

Glycolysis—The breaking down of glucose, a simple sugar, to produce energy.

Growth hormone releasing factor—A hormone, made in the hypothalamus, that causes the pituitary to release growth hormone. Growth hormone is involved in growth and in energy metabolism.

## H

Haploid—Having only one of each chromosome (see diploid).

HCG (human chorionic gonadotropin)—A hormone made by those cells of the embryo that form the placenta. HCG is the hormone that is detected by pregnancy tests.

Hepatosplenomegaly—Enlargement of the liver and spleen.

Hippocampus—A portion of the brain, located in each temporal lobe, and associated with memory.

Hirsutism—Hair growth in excessive amounts and in unusual places.

Holoprosencephaly—A birth defect in which the embryonic forebrain fails to divide completely into the cerebral hemispheres; results in varying degrees of mental impairment and abnormal development of the eye, nose, and lip.

Hormone—A chemical messenger produced by one organ and transmitted through the blood to initiate or alter the function of another organ or tissue.

HTS—High throughput screening

HTTK—High throughput toxicokinetic

Hydranencephaly—A rare condition in which the brain's cerebral hemispheres are replaced by sacs filled with cerebrospinal fluid.

Hydrocephalus—Accumulation of excess cerebrospinal fluid within the ventricles of the brain; head enlargement and brain damage may occur.

Hypoblast—The innermost of the three primary germ layers, adjacent to the blastocyst cavity, which develops into the endoderm.

Hypospadias—A birth defect in which the urethra opens on the underside of the penis instead of at its end.

Hypoxia—Lack of oxygen that may lead to tissue damage.

Hydrops—Accumulation of fluid in body tissues or cavities.

## I

ICSI (Intracytoplasmic sperm injection)—An infertility treatment in which the sperm is injected through the membrane of the egg into its cytoplasm.

Implantation—The embedding of the early embryo in the lining of the uterus.

Imprinting (Genetic)—Differential expression of a gene, depending on whether it was transmitted through the sperm or the egg; thought to be regulated by attachment of methyl groups to the DNA, and by chromatin structure.

Ischemia—Loss of blood flow that may lead to tissue damage.

Isotretinoin—A vitamin A-like medication (13-cis retinoic acid).

IVF (*in vitro* fertilization)—Fertilization outside the body, used as a treatment for infertility.

In silico – studies performed by computer or by computer simulation (e.g., computational toxicology)

In vitro – studies performed on cells, cellular components or microorganisms in controlled environments outside a living organism

In vivo – studies performed in animals, humans or whole plants

## K

Karyotype—A picture of an individual's chromosomes, arranged in order from largest to smallest, to make it easier to look for extra, missing, or rearranged chromosome material.

Ketoacidosis—Abnormally high levels of ketones and acids in the blood; may occur in a diabetic person who does not get enough insulin.

## L

Leydig cells—Cells in the testes that produce testosterone in the presence of luteinizing hormone (LH).

Leprosy—A disease caused by infection with the bacterium *Mycobacterium leprae*, often affecting the skin and nerves and causing body parts to become deformed.

LOAEL (Lowest Observed Adverse Effect Level)—  
In a toxicology study, the lowest tested dose that produces detectable damage.

Luteinizing hormone (LH)—A hormone made by the pituitary gland that acts on the ovary to control

egg maturation and triggers ovulation and acts in the testes for the production of testosterone.  
Lysosome—A cell organelle that contains enzymes for intracellular digestion of proteins and other molecules.

## M

Macrosomia—An abnormally large body or body part.

Malformation—A structural defect due to abnormal development.

Meiosis—The cell division used to make germ cells from body cells. The diploid number of chromosomes is

reduced to a haploid number; for example, in humans with 46 chromosomes, meiosis results in germ cells with 23 chromosomes each.

Membrane—A thin layer of tissue separating or connecting structures or organs.

Mendelian inheritance—Passing of genetic traits from parents to offspring, as expected when they are determined by single genes.

Meningomyelocele—A birth defect following failure of the neural tube to close; results in protrusion of a sac of nerve tissue and its covering membranes.

Mesoderm—A middle layer of cells in the embryo, lying between the ectoderm and the endoderm.

Metabolism—The chemical processes necessary for life that occur in the body.

Metallothionein—A protein in the body that binds metals such as zinc.

Methylation—Attachment of a methyl group to a molecule. Methylation of DNA is an epigenetic event that alters gene expression which affects cell function.

Microarray—A two dimensional display, typically on a glass, filter, or silicon wafer, upon which hundreds of

DNA or protein samples are deposited or synthesized in a high-density matrix, in a predetermined spatial order, allowing them to be tested with labeled probes in a high-throughput, parallel manner. Used to study how

large numbers of genes interact with each other and how a cell's regulatory networks control vast batteries of genes simultaneously.

Micromass culture—A laboratory technique in which dispersed cells of an embryonic organ such as the brain are allowed to reaggregate in culture.

Minimata disease—A syndrome of mental deficiency and neurologic impairment caused by exposure of a fetus to methylmercury.

Mitochondria—Cellular organelles that generate ATP molecules, the chemical energy source for the body.

Mitosis—Cell division that creates two genetically identical daughter cells by duplicating the genetic material of a parent cell.

Microcephaly—A small head.

Microphthalmia—A small eye.

Morphogen—A chemical message that directs tissue development in the embryo. An example of this has been described during development of the limbs.

Morphological—Pertaining to structure or form.

Morula—an early multi-celled stage of the embryo from which the blastocyst is formed.

MSAFP—Maternal Serum Alpha-Fetoprotein. Alpha-fetoprotein is a protein made in the fetus that normally leaks, in small amounts, into the mother's circulation. If there is an abnormal opening in the fetus, such as a neural tube defect, larger amounts appear in the mother's serum, providing a screening test for such fetal anomalies.

Multicotyledonary placentation—Formation of a placenta with many lobes

Multifactorial inheritance—The transmission of a trait from parents to offspring that is determined by multiple genetic and environmental factors, each with a small effect.

Mutagen—An agent that increases the mutation rate.

Mutation—A permanent change in the genetic material.

Mycoplasma—A kind of minute microorganism that sometimes causes disease in humans.  
Myelination—Coating of certain nerve fibers with a fatty sheath that enhances nerve signal transmission.  
Myocarditis—Inflammation of the heart muscle.  
Myositis—Inflammation of muscle.

## N

Necrosis—Abnormal cell or tissue death.  
Neural—Pertaining to nerves.  
Neural crest—A band of cells on either side of the neural tube. Cells from these regions migrate to form parts of the nervous system, face, skin, and heart.  
Neural plate—A flat area in the middle of the early embryo that will roll up to form the neural tube.  
Neural tube—The embryonic tube that becomes the brain and spinal cord.  
Neurobehavioral—Pertaining to the function of the nervous system as it relates to behavior.  
Neuroendocrine—Pertaining to the nervous and endocrine systems in anatomical or functional relationship.  
Neuron—A nerve cell.  
Neuropore—An opening at the cranial or caudal end of the neural tube before it completes closure.  
Neurulation—The formation of the neural plate and its rolling up into the neural tube.  
NOAEL (No Observed Adverse Event Level)—In a toxicology study, the highest dose used that fails to produce evidence of damage.  
Nucleotide—One of the basic building blocks of DNA and RNA, consisting of a nitrogenous base, a phosphate group, and a sugar molecule.

## O

Omphalocele—The abnormal presence of abdominal contents in the umbilical cord. It results from failure of the normal withdrawal of the intestines from the cord into the abdomen during development.  
Oocyte—A female germ cell in the ovary; precursor of the ovum.  
Organogenesis—Formation and development of organs.  
Orofacial cleft—The failure of the lip or palate to fuse properly.

## P

Palate (secondary)—The roof of the mouth, consisting of the hard palate, soft palate, and uvula.  
Pharmacogenetics—The study of single gene interactions with drugs.  
Pharmacogenomics—The study of the relationship between an individual's genetic make-up (genome) and drug response.  
Phenotype—How an individual looks as a function of their genetic makeup (see genotype).  
Phenylketonuria—A recessively inherited condition in which metabolism of an amino acid, phenylalanine, is blocked; increased phenylalanine in the infant causes nerve and brain cell damage, and mental retardation.  
Phocomelia—A birth defect with hands and feet attached to underdeveloped limbs; this and other severe malformations are associated with prenatal thalidomide exposure.  
Phytoestrogen – An estrogenic molecule occurring naturally in plants  
Pinocytosis—The engulfment of liquid droplets by a cell through minute invaginations of its membrane.  
Placenta—The organ that is formed in pregnancy from both fetal and maternal tissues and functions

in the growth and protection of the fetus.

Pluripotent—Able to differentiate into a variety of cell types; examples are the ovum and embryonic stem cells.

Polydactyly—The presence of extra fingers or toes.

Polymorphism—The occurrence of two or more genetically different forms of a gene in the same population, where the less frequent form has a frequency of 1% or more.

Porencephaly—A cystic cavity in the brain; may result from brain tissue destruction or maldevelopment.

Posterior—A descriptive term meaning situated at the back.

Post-implantation—Occurring after the early embryo embeds into the lining of the uterus.

Postpartum—After birth.

Prader-Willi syndrome—A condition resulting from a deletion in chromosome 16; it is associated with short stature, mental retardation, small hands and feet, obesity, overeating, and underdeveloped gonads.

Pre-Implantation—Occurring before the early embryo embeds in the lining of the uterus

Progesterone—A steroid hormone produced in the ovary by the corpus luteum; essential for the maintenance of pregnancy.

Protein kinase—An enzyme essential for protein phosphorylation; often involved in the signal transduction pathways activated by stressors.

Proteomics—Analysis of protein expression and function.

Psychomotor retardation—Retardation of both cognitive and motor development.

## Q

QSAR—Quantitative Structure Activity Relationship; the study of the relationship of the structure of a chemical to its biological effect.

## R

Receptor—A cell component that combines with a drug or other substance and thereby alters cell function.

Retinoid—A group of compounds that includes many metabolites of vitamin A.

Retinopathy—Disease of the retina, the innermost layer of the eye that receives and transmits images.

## S

Sacral agenesis (caudal regression syndrome)—Absence or significant underdevelopment of the lower part of the spine and lower limbs. This congenital malformation is associated with maternal diabetes.

*Salmonella*—Gram negative rod shaped motile bacteria, some of which cause intestinal inflammation.

SARS—Severe Acute Respiratory Syndrome; a respiratory illness caused by a coronavirus.

Sertoli cells—Somatic cells within the seminiferous tubule which support germ cell development and form tight junctions to create the blood testis barrier.

Signal Transduction—Within a cell, any process by which one kind of signal or stimulus is converted to another.

SiRNA—Short or Small interfering RNA molecules that decrease the expression of a specific gene by degrading its messenger RNA.

Somatic—Pertaining to the body (excludes reproductive cells).

**Somatomedin**—A growth factor produced by the liver upon stimulation by somatotropin that acts directly on cartilage cells to stimulate skeletal growth.

**Somatotropin**—A hormone produced in the pituitary gland that acts in the liver to produce somatomedin.

**Somite**—One of paired, segmented blocks of mesodermal cells on either side of the neural tube of the embryo which give rise to connective tissue, bone, muscle, and the dermis of the skin.

**Spermatid**—A haploid male germ cell resulting from the division of a spermatocyte; the precursors of spermatozoa.

**Spermatocyte**—A male germ cell arising from the division of a spermatogonium during meiosis.

**Spermatogonium**—An undifferentiated male germ cell located close to the basement membrane of the seminiferous epithelium in the testis; gives rise to spermatocytes.

**Spina bifida**—A defect in which part of the vertebral column is absent, allowing the spinal membranes and sometimes the spinal cord to protrude; a result of failure of the neural tube to close.

**Steroid**—Any of a number of hormones with a common molecular structure that regulate body functions.

**Syncytiotrophoblast**—The layer of trophoblast cells that invades the endometrium during implantation.

**Syndactyly**—Fusion or webbing of fingers or toes.

## T

**Tay-Sachs disease**—A recessively inherited disease, in which a deficiency of hexosaminidase A causes abnormal storage of a ganglioside. There is progressive mental deterioration and early death.

**Teratogen**—An agent that may induce abnormal embryo/ fetal development when administered during pregnancy.

**Teratology**—The study of malformations or serious deviations from the normal type in organisms. It is the branch of science concerned with the production, development, anatomy, and classification of malformed fetuses.

**Teratogenesis**—The process by which birth defects arise.

**Teratogenetics**—The study of how genes and teratogens interact to cause birth defects.

**Tetralogy of Fallot**—A complex congenital heart disease involving four abnormalities: a ventricular septal defect, pulmonary stenosis, right ventricular hypertrophy, and an overriding aorta, which means that the aorta lies directly over the ventricular septal defect.

**Thalidomide**—A sedative, anti-nauseant, and hypnotic drug that causes abnormalities of limbs, heart, ear, and craniofacial structures when taken by pregnant women.

**Threshold dose**—The dose at which an agent has begun to have an effect.

**Thrombocytopenia**—An abnormally low number of platelets in the blood.

**Toxicokinetics (TK)** – describes the relationship of systemic exposure of a compound and its toxicity in animal studies

**Toxoplasmosis**—A disease caused by the protozoon *Toxoplasma gondii*. Infants infected during gestation may have hydrocephaly, microcephaly, encephalitis, cerebral palsy, mental retardation, loss of vision, deafness, and other problems.

**Transcripts**—Messenger RNAs that carry the genetic information from DNA to the ribosome to produce protein.

**Transgenic organism**—An organism derived by the transfer of one or more genes from another organism.

**Trimester**—A period of three months; human pregnancy is divided into three trimesters.

**Triple screen**—A combination of three tests (levels of MSAFP, estriol and HCG) which, if abnormal, indicate that the health of the fetus may be at risk.

**Trisomy 18**—The presence of an extra chromosome 18; Edwards syndrome.

Trisomy 21—The presence of an extra chromosome 21; Down syndrome.

Trophoblast—The outer layer of flattened cells forming the wall of the blastocyst.

## U

Ultrasound—Sound waves of frequency higher than the range audible to the human ear used to delineate body structures by measuring the reflected waves.

Urogenital—Relating to the organs of the urinary and genital tracts.

## V

Vas deferens—The tube that conveys sperm from the epididymis to the ejaculatory duct.

Ventral—On the belly side of the trunk; in humans, to the front of the body.

Ventricular septal defect—A defect in the wall dividing the two ventricles of the heart.

Vestigial - a remnant of an organ or body part that no longer functions

## W

Whole embryo culture—A technique in which embryos undergoing organogenesis are cultured *in vitro*.

Williams syndrome—A syndrome resulting from a deletion in chromosome 7, which is associated with an elf-like face, mental retardation, short stature, and cardiac abnormalities.

## X

X-linked—Refers to a gene that is located on one of the sex chromosomes, which is carried by the female in a double dose (XX) and the male in a single dose (XY).

Xenobiotic—A compound that is foreign to a living organism. Examples of xenobiotics include drugs, carcinogens or compounds that have been introduced into the body.

## Y

Yolk sac—A fluid filled sac on the ventral side of the early embryo. Important in the transfer of nutrients during the second and third weeks of development.

## Z

ZIFT (Zygote Intrafallopian Transfer)—The transfer of an *in vitro* fertilized zygote into the fallopian tube.

Zona pellucida—The membrane that encloses the mature ovum.

Zygote—The fertilized ovum.