

Breast Cancer and the Environment Research Program (BCERP)

GLOSSARY



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BCERP Coordinating Center, University of Wisconsin-Madison

Introduction

The Breast Cancer and the Environment Research Program (BCERP) is a joint effort co-funded by the National Institute of Environmental Health Sciences (NIEHS) and the National Cancer Institute (NCI). BCERP supports a multidisciplinary network of scientists, clinicians, and community partners to examine the effects of environmental exposures that may predispose a woman to breast cancer throughout her life.

The purpose of this glossary is to provide definitions of key terms used by BCERP researchers, clinicians, and lay persons to communicate and collaborate. Online access to this glossary and other BCERP materials can be found at <https://bcerp.org>.

Recommendations for new terms or changes can be sent to info@bcerp.org

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BCERP Glossary

Absolute risk: the probability of an event in a defined population over a specified period of time, for example, likelihood of an individual or group of individuals developing a disease over a specified time¹⁰

Absorb/Absorption: to take in; taking up of liquids by solids; passage of a substance through some surface of the body into body fluids and tissues¹⁰

ACTH: adrenocorticotrophic hormone (or corticotrophin); a polypeptide hormone secreted by the pituitary gland; part of the hypothalamic-pituitary-adrenal axis¹⁰

Adipogenesis: the formation of fat or fatty tissue¹⁰

Adipose tissue: a connective tissue consisting chiefly of fat cells that come from dietary fats or produced by the body; functions as an endocrine organ, producing hormones such as leptin¹⁰; the breast is primarily composed of adipose tissue

Adiposity: obesity¹⁰

Adrenal Cortex: the outer part of the adrenal gland; the adrenal cortex makes androgen and corticosteroid hormones⁴

Adrenal Gland: small glands on top of each kidney that makes steroid hormones, adrenaline, and noradrenaline; these hormones help control heart rate, blood pressure, and other important body functions⁴

Adrenarche: underarm/pubis hair growth during puberty induced by a normal increase in activity of the adrenal cortex which releases adrenal androgens.

Advocate: one who publically promotes an issue or supports a particular cause¹⁰

Adverse effect: a biological change in an organism that results in an impairment of functional capacity, a decrease in the capacity to compensate for stress, or an increase in susceptibility to other influences (adapted from IPCS 2004)

Adverse outcome pathway: a conceptual description of the sequence of causally linked events at various levels of biological organization; a structured sequence of molecular events that transform normal tissue to disease

Agonist: a chemical substance (such as a drug) capable of combining with a receptor on a cell and initiating the same reaction or activity typically produced by the binding of a substance originating from within the body (such as a natural hormone)¹

Aliquot: a measured portion of a sample collected for analysis; the sample could be biological (e.g., blood, urine) or environmental (e.g., air, water)¹⁰

Alkylphenols: chemicals used in the production of detergents, plastics and some pesticides; tend to persist in the environment and can have estrogen-like properties¹⁰

Analyte: the substance measured by a laboratory test¹⁰

Androgen: a generic term for hormones that stimulate the development of male sex characteristics¹⁰

Aneuploidy: the state of having an abnormal number of chromosomes¹⁰

Angiogenesis: the formation of new blood vessels; important in tumor growth¹⁰

Antagonist: a chemical that acts within the body to reduce the physiological activity of another chemical substance¹

Anthropometry (anthropomorphic measures): measurements of the human¹⁰

Antibodies: special proteins that are made by the immune system to attack and neutralize foreign substances called antigens.

Anti-estrogen: a substance that blocks the activity of estrogen¹⁰

Antigens: foreign substances (viruses, bacteria, toxins, or abnormal cell changes) that are attacked by the immune system¹⁰

Antineoplastic: preventing the development, maturation or spread of cancer (neoplastic) cells¹⁰

Apoptosis: programmed cell death; a process that limits cell growth¹⁰

Aromatase: an enzyme or group of enzymes that converts androgens (testosterone) into estrogens¹⁰

Asbestos: a strong, non-combustible mineral fiber used in the past for fireproofing and insulation; it can pollute air and water and cause cancer or asbestosis, a lung disease, when inhaled¹⁰

Assay: A procedure for testing or measuring the activity of a drug or biochemical in an organism or organic sample¹⁰

Atrazine: a widely used agricultural herbicide; mainly used on corn and soybean crops¹⁰

B cells (also called B lymphocytes): white blood cells that produce antibodies and protect against infection and disease¹⁰

Bacteria: any of a large group of single-cell, microscopic organisms that live in soil, water, plants, organic matter, animals and/or people; some can cause disease¹⁰

Benign proliferative breast disease: a group of non-cancerous conditions that may increase the risk of developing breast cancer; examples include ductal hyperplasia, lobular hyperplasia and papillomas¹⁰

BBP: n-butyl benzyl phthalate; a type of synthetic chemical, used primarily in vinyl flooring

Benign tumor: a non-cancerous growth that does not invade nearby tissue or spread to other parts of the body¹⁰

Benzene: a carcinogenic compound widely used in the chemical industry; also found in tobacco smoke, vehicle emissions, and gasoline fumes¹⁰

Benzo(a)pyrene: a polycyclic aromatic hydrocarbon found in coal tar, automobile exhaust (especially diesel engines), wood smoke, and charbroiled foods; causes changes in the chromosomes of genes (i.e., it is mutagenic) and is highly carcinogenic¹⁰

BFR (Brominated Flame Retardants): industrial chemicals that are found in a broad number of products; over 75 variants are produced to treat electronics, furniture and clothing; some are considered persistent organic pollutants which are known to accumulate in the body¹⁰

Bile: a secretion of the liver; bile is stored in the gallbladder and discharged into the duodenum (small intestine) during eating, aiding the digestion of lipids¹⁰

Bioaccumulation: the increase in concentration of a substance(s) in an organism or a part, e.g., fat tissues, of the organism; the organism has a higher concentration of the substance than the concentration in the organism's surrounding environment¹⁰

Bioconcentration: bioaccumulation of substances taken in by the organism from water only; the rate of uptake of a substance from water is greater than its rate of excretion¹⁰

Bioinformatics: the science of managing and analyzing biological data using advanced computing techniques; especially important in analyzing genetic research data¹⁰

Biological monitoring (Biomonitoring): the measurement of toxic substances or their metabolites in samples of blood, tissues, secretions (e.g., saliva), excretions (e.g., urine, stool, breast milk, semen) or exhaled air¹⁰

Biologically effective dose: the amount of a chemical that reaches the cells or organs where an adverse effect occurs or where the chemical interacts with a membrane surface¹⁰

Biomagnification (or Bioamplification): the increase in concentration of a substance in a food chain (not an organism); persistent organic pollutants (POPs) are compounds that biomagnify¹⁰ (See Persistent Organic Pollutants)

Biomarker: a substance detected in the blood, urine, other body fluids and/or tissues used to measure or indicate exposure to or alterations caused by a chemical compound; also used to detect the presence/progress of a disease (tumor marker)¹⁰; biomarkers are generally grouped into biomarkers of effect, exposure, and susceptibility.

Biomarker of exposure: a substance detected in body fluids and/or tissues used to measure or indicate exposure to a chemical compound¹⁰

Biomarker of susceptibility: a substance detected in body fluids and/or tissues used to measure or indicate increased sensitivity to target chemical compounds

Bioremediation: any process that uses microorganisms, fungi, green plants or their enzymes to clean a contaminated environment to its original condition¹⁰

BRCA1 and BRCA2: two of the primary genes involved in repairing damaged DNA; classified as tumor suppressor genes¹⁰; inherited mutations in these genes increase the risk of breast and ovarian cancers

Body Mass Index (BMI): a number calculated from a person's height and weight. It provides a reliable indicator of body fatness for most individuals and is often used to screen for overweight and obesity, which may lead to health problems⁷

BP-3: benzophenone-3, oxybenzone; an endocrine disrupting chemical used in sunscreen and other personal care products

BPA (Bisphenol A): a synthetic chemical that is thought to be an endocrine disruptor. BPA is added to certain hard-plastic containers often used for food and beverages, and can be used

to line the insides of metal cans used for canned food. Plastic food and beverage containers with the number 7 in the recycling triangle often contain BPA. Recent studies have found BPA in some cash register receipts⁷

Breast cancer: cancer that forms in tissues of the breast, usually the ducts (tubes that carry milk to the nipple) and lobules (glands that make milk). It occurs in both men and women, although male breast cancer is rare⁷

Caloric restriction: regulation of the consumption of calories¹⁰

Cancer: a term for diseases in which abnormal cells divide without control; cancer cells can invade nearby tissues and can spread through the bloodstream and lymphatic system to other parts of the body (metastasize)¹⁰

Carcinogen: a substance that causes cancer¹⁰

Carcinogenesis: a process by which normal/healthy cells turn into cancer cells¹⁰

Carcinoma: a type of cancer that starts in the epithelial cells that make up the skin or the lining of internal organs, such as the lung, liver, or breast; most breast cancers are carcinomas

Carcinoma in situ: a cancer that involves only the cells in which it began and has not spread to nearby tissues¹⁰

Case control: a type of epidemiology study design in which persons with and without a disease (or exposure of interest) are studied to identify factors associated with the disease¹⁰

Cell differentiation: a process by which immature/ unspecialized cells become mature/specialized, i.e. have a specific function¹⁰

Cell proliferation: an increase in the number of cells as a result of cell division¹⁰

Cell: the basic unit of all living things; each cell contains essential components enclosed by a membrane¹⁰

Chemical: a substance that either occurs in nature or is created by a chemical reaction; chemicals can be naturally occurring (such as penicillin or lead) or can be made by people (such as pesticides DDT and Alar, or flame retardants)⁷

Chemoprevention: the use of dietary substances and/or drugs to delay the development of cancer or stop it from coming back¹⁰

Chemotherapy: treatment of diseases, particularly cancer, with chemical agents/drugs¹⁰

Chromatin: mass of genetic material (DNA and proteins) compacted in the cell nucleus; it forms chromosomes¹⁰

Chromosome: a long strand of DNA that contains hundreds to thousands of genes which carry hereditary information; there are 46 chromosomes in each cell of the human body, except reproductive cells (egg and sperm) that contain only 23 chromosomes¹⁰

Clinical trial: a type of research study that uses volunteers to test new methods of screening, prevention, diagnosis or treatment of a disease; also called a clinical study¹⁰

Cohort: a collection or sampling of individuals who share a common characteristic (e.g., the same age group) or experience (e.g., employment in a particular industry during a specified period)¹⁰

Complementary and alternative medicine: forms of treatment that are used in addition (complementary) or instead of (alternative) standard medical treatments; examples include dietary supplements, mega-dose vitamins, herbal preparations, special teas, acupuncture, massage therapy, spiritual healing, and meditation.¹⁰

Confidence interval (CI): a measure of the reliability of a statistical parameter (for example a population mean); reported as \pm some number or as a numerical range. The CI is reported for a specified confidence level, most commonly 90%, 95% or 99%¹⁰ (a 95% CI, for example, would mean that 95% of the time the calculated confidence interval – or range of values – would contain the true value)

Confidence level: reflects the certainty that the statistic being presented is accurate; reported as a percentage, e.g., 90%, 95% or 99%¹⁰

Confounding variable: a variable that is associated with the independent (measured) and dependent (outcome) variables in a statistical analysis and can lead to a false conclusion about a cause and effect relationship; for example, risk of breast cancer increases with age, so if two groups are compared to evaluate risk of breast cancer in relation to a certain environmental exposure, and the distribution of age is not similar between the groups, then any findings might be driven by the age difference rather than the exposure of interest (so age would be a confounding variable in a study of the relationship between an environmental exposure and breast cancer)

Congeners: two or more things that are similar or closely related in structure, function or origin; chemical compounds similar in structure and effect¹⁰

Corticosteroids / Corticosterone: a hormone of the adrenal cortex, which is located above the kidney; it influences carbohydrate, potassium and sodium metabolism; it is essential for normal absorption of glucose, the formation of glycogen in the liver and tissues, and the normal utilization of carbohydrates by the tissues¹⁰

Cotinine: a major metabolite of nicotine found in blood and urine; currently regarded as the best biomarker for exposure of nonsmokers to environmental tobacco smoke¹⁰

Critical period: a time in the early stages of an organism's life during which it displays a heightened sensitivity to certain environmental stimuli or toxic exposures; the organism develops in particular ways due to exposures at this time¹⁰

Cross sectional: a type of epidemiology study design in which a randomly selected sample of persons from a community, industry or population are studied to assess the factors associated with the incidence or prevalence of a disease/condition¹⁰

Cultural diet: a diet given to offspring in utero and throughout their lifespan¹⁰

Cutaneous breast cancer: cancer that has spread from the breast to the skin¹⁰

Cytotoxic therapy: drug treatment that is designed to inhibit the proliferation of cells or to selectively destroy abnormal cells, particularly cancer cells¹⁰

DBP: dibutyl phthalate, a plasticizer used in most plastics, as well as adhesives, printing inks, and cosmetics; a suspected endocrine disruptor that can interfere with hormone function, child development, and fertility⁹

DCIS (ductal carcinoma in situ or intraductal carcinoma): a non-invasive, pre-cancerous condition in which abnormal cells are found in the lining of a breast duct; the abnormal cells have not spread outside the duct to other tissues in the breast. DCIS may become invasive cancer and spread to other tissues; at this time, it is not known how to predict which lesions will become invasive¹⁰

DDT (Dichloro-Diphenyl-Trichloroethane): the first modern pesticide; banned in the U.S. in the early 1970s because of its persistence and toxicity in the environment¹⁰

Dermal: relating to the skin (epidermis)¹⁰

DES (diethylstilbestrol): an artificial estrogen used in the past to prevent miscarriage; daughters of women who took DES have a higher risk of vaginal, cervical, and breast cancers as well as other health problems¹⁰

DEXA Scan: a DEXA (Dual Energy X-ray Absorptiometry) scan is the most commonly used test for measuring bone mineral density. It is one of the most accurate ways to diagnose osteopenia or osteoporosis¹⁰

Differentiation (cellular development): in cancer, differentiated tumor cells resemble normal cells and tend to grow slower than undifferentiated or poorly differentiated tumor cells which lack the structure and function of normal cells and grow faster¹⁰

Dioxin (TCDD): a highly toxic and persistent compound produced as a result of industrial processes such as paper bleaching or herbicide and pesticide manufacturing¹⁰

DMBA (dimethyl benz(a)anthracene): an experimental carcinogen, not found in nature, synthesized in the lab to be used as a test carcinogen. DMBA serves as a model carcinogen for the class of polycyclic aromatic hydrocarbons (PAHs), which include many carcinogens; DMBA-generated breast cancer in the lab closely mimics tissue changes found in human breast cancer¹⁰

DNA (deoxyribonucleic acid): the material inside the cell that carries genetic information and is passed on from one generation to the next¹⁰

DNA adduct: a segment of DNA bound to a cancer-causing chemical, causing DNA damage; sometimes used as biomarkers of effect in research¹⁰

Dose: the dose of a chemical is the amount of that chemical that comes into contact with a living organism or some part of that living organism (e.g., the liver); used in sense of exposure¹¹

Dose dependent: when the effect of a chemotherapeutic agent or environmental toxin/chemical is proportionate to the treatment or exposure dose, respectively¹⁰

Dose limiting (side effects): drug reaction(s) that prevent(s) administration of the drug at a higher dosage¹⁰

Dose rate: the rate at which a drug or toxin is administered over a given period of time¹⁰

Double blinded: a type of clinical study in which neither the medical/research staff nor the study participants know whether individual participants are receiving the study treatment or placebo¹⁰

Ductal extension: measured as the distance from the midpoint of the lymph node to the leading edge of the ductal tree¹⁰

Ductal tree: refers to the branch-like formation of the mammary gland ducts¹⁰

Eligibility (or inclusion) criteria: requirements that must be met for an individual to be included in a research study; examples include age or type and stage of cancer¹⁰

Endocrine Disruptor (xenoestrogens): naturally occurring compounds or synthetic substances that may mimic or interfere with the function of hormones in the body. Endocrine disruptors may turn on, shut off, or modify signals that hormones carry, which may affect the normal functions of tissues and organs. Many of these substances have been linked with developmental, reproductive, neural, and immune issues, as well as other adverse health effects. Some research suggests that these substances adversely affect human health in similar ways, resulting in reduced fertility and increased occurrence or faster development of some diseases, including obesity, diabetes, endometriosis, and some cancers⁷

Endocrine system: a system of glands and cells that make hormones that are released directly into the blood and travel to tissues and organs all over the body. The endocrine system controls growth, sexual development, sleep, hunger, and the way the body uses food⁷

Endocrine therapy: treatment that adds, blocks or removes hormones in order to slow or stop the growth of certain cancers (such as breast or prostate); also called hormone therapy, hormonal therapy or hormone treatment¹⁰

Endocrinology: the study of the anatomic, physiologic and pathologic characteristics of the endocrine system and the treatment of endocrine problems¹⁰

Endogenous: originating or produced within the organism or one of its parts. (The opposite is exogenous.)¹⁰

Endometrium: the layer of tissue that lines the uterus¹⁰

Endothelial: a type of cell found in the lining of blood vessels, lymph nodes and the heart¹⁰

Enterohepatic circulation: refers to the circulation of bile from the liver (where it is produced) to the small intestine (where it aids in the digestion of fats and other substances) and then back to the liver¹⁰

Environment: a range of things, including the air we breathe, the food we eat, the water we drink, and things we touch and put on our skin. Environments can be natural or human-made (e.g., the built environment)⁷

Environmental justice: the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies⁶

Enzyme: a substance produced by a living organism that catalyzes or speeds up chemical reactions in the body¹⁰

Epidemiology: the study of the patterns of diseases in human populations and the factors that influence the incidence, severity, frequency and mortality of diseases¹⁰

Epigenetic: modifications to the structure of the DNA, which result in changes in gene expression (the organism's phenotype)¹⁰; transient modifications can change rapidly during the life span of a cell or organism, while transgenerational epigenetic inheritance involves heritage of modifications through multiple generations³

Epithelial cells: cells arranged in one or more layers that form part of a covering or lining of a body surface, such as the skin or inside of an organ; these cells usually adhere to each other along their edges and surfaces¹⁰

Epithelium: membranous tissue composed of one or more layers of cells (epithelial cells), forming the covering of most internal and external surfaces of the body as well as the lining of blood vessels, body cavities, glands and organs¹⁰

ER negative cancer: breast cancer cells that do not have the estrogen receptor; these ER-negative tumors do not need estrogen to grow and usually do not respond to hormone (anti-estrogen) therapy¹⁰

ER positive cancer: breast cancer cells that have the estrogen receptor; these ER-positive tumors need estrogen to grow and usually do respond to hormone (anti-estrogen) therapy that blocks ER function and subsequent tumor growth¹⁰

Etiology: origin or cause(s) as in the cause(s) of a disease or abnormal condition; factors which produce or predispose toward a certain disease or disorder¹⁰

Estradiol: the most potent naturally occurring human form of the hormone estrogen; it is critical to sexual and reproductive functioning and bone structure¹⁰

Estrogens: the family of hormones that promote the development of female sex characteristics¹⁰

Estrogen receptor (ER): protein normally found in mammary cells to which estrogens attach and thereby exert their biological function¹⁰

Estrone: the weaker form of the hormone estrogen that is secreted by the ovaries and stored in fatty tissues¹⁰

Estrus cycle: the recurring physiologic changes that are induced by reproductive hormones in most female mammals; linked with periods of fertility¹⁰

ETS (environmental tobacco smoke): ambient smoke produced by persons smoking cigarettes; also known as second-hand smoke¹⁰

Exclusion criteria: eligibility criteria used to exclude individuals from participating in a study, often because a pre-existing condition puts the individual at-risk in the study protocol or the condition potentially interferes with the study outcome¹⁰

Excretion: the process of eliminating waste products of metabolism and other non-useful materials from an organism¹⁰

Exogenous: originating from or produced outside of the organism¹⁰

Experimental design: a type of research study design that alters a risk factor or exposure

Exposure: contact of an organism to a biologic, chemical or physical agent¹⁰

Exposure assessment: the science that documents how an individual or population comes into contact with and absorbs into the body a risk factor, such as a toxic chemical; focuses on sources and concentrations of the chemical or physical agent(s) in the environment, exposure pathways and probable internal dose¹⁰

Exposure pathway: probable routes by which hazardous substances move through the environment and come into contact with people or other living organisms¹⁰; for example, breathing contaminated air from a nearby industrial facility could be an exposure pathway

Exposure: contact with substances, such as chemicals or small particles, by ingestion (swallowing food or liquids), breathing, or through contact with the skin or eyes. Exposures can also include harmful rays such as unfiltered sun or x-rays⁷

Extracellular: outside the cell(s)¹⁰

Familial cancers: cancers that occur in families in which a mutated gene, associated with an elevated risk of developing a particular cancer(s), is passed on from one generation to the next. (BRCA1 and BRCA2 genes are examples: If a woman inherits one of these genes, she has a higher risk of developing breast and/or ovarian cancer.)¹⁰

Family history: a record of an individual's current and past illnesses and those of her/his grandparents, parents, aunts/uncles, siblings, children and other family members; can be used by geneticists and genetic counselors to assess risk for certain diseases¹⁰

Fatty acids: building blocks of fat, essential for cell energy and growth. Saturated fatty acids: found in animal fats and tropical oils (palm and coconut); can raise the levels of LDL (bad) cholesterol¹⁰

Fetal programming: an early stimulus or environmental insult operating at a critical or sensitive period of prenatal development that results in a long term change in the structure or function of the organism¹⁰

Fibrocystic breast disease: non-cancerous breast tissue build-up; although, some types of fibrocystic breast tissue changes can lead to an increased risk for breast cancer¹⁰; currently, more commonly referred to as fibrocystic breast condition

Fine needle aspiration (FNA): the removal of fluid or tissue with a needle for examination under a microscope; can help make a diagnosis or rule out cancer; also called needle biopsy¹⁰

FISH (fluorescent in situ hybridization): a laboratory technique used to determine the presence/amount of a certain gene in a cell¹⁰; FISH testing can be used to see if cells have extra copies of the HER2 gene, which can stimulate the growth of breast cancer cells

Focus group: a qualitative research technique in which an experienced moderator leads about 8-10 participants through a semi-structured discussion on a select topic¹⁰

Gavage: administration of a liquid or semi-liquid through a tube, inserted in the nose and passed down the throat and into the stomach¹⁰

Gene knockout: a laboratory term used to describe a type of mouse or cells whose DNA sequence has been intentionally deleted or inactivated for research purposes¹⁰

Genetic counseling: a general process in which a trained genetic counselor documents generations of an individual's family history (pedigree) to assess their or their off-springs' risk of a select disease(s)/disorder(s); based on the family history, the pros/cons of genetic testing may be discussed and/or the results interpreted¹⁰

Genetic markers: alterations in DNA that may indicate an increased risk of developing a specific disease or disorder¹⁰

Genes: pieces of DNA, or heredity units, which are passed from parents to their children; genes contain the information for making specialized proteins that are responsible for specific traits, such as eye color, height, etc. ¹⁰

Genetic polymorphisms: the existence of many forms of DNA sequences at a particular location of a chromosome within the population. Also genetic variation that results in different types of individuals among the members of a single species¹⁰

Genetic susceptibility: an inherited increased risk of developing a certain disease or disorder¹⁰

Genetic testing: analysis of DNA to look for genetic alteration(s) that may indicate an increased risk for developing a disease(s) or disorder¹⁰

Genome: the complete genetic material of an organism¹⁰

Genomics: the comprehensive study of whole sets of genes and their interactions¹⁰

Genotype: the genetic makeup/constitution of an organism; distinguished from its physical appearance (phenotype) ¹⁰

GenX: a chemical that belongs to a class of highly fluorinated chemicals called PFASs, which are persistent in the environment, have widespread human exposure, and evidence of toxicity that includes hormone disruption, cancer, reduced immune function, and developmental problems in offspring; GenX is currently being used in place of PFOA, which is a PFAS that was voluntarily phased out in the U.S. ¹⁶

Germline mutation: a gene mutation, present in the egg or sperm, which can be passed from parent to a child¹⁰

Glucocorticoids: a general classification of adrenal cortical hormones; primarily active in protecting against stress and in affecting protein and carbohydrate metabolism¹⁰

Glucose: sugar, a source of energy; formed during digestion and the metabolism of carbohydrates in the body¹⁰

Gonadotropins: hormones secreted by the pituitary gland; capable of promoting gonadal (ovaries and testes) growth and function¹⁰

H and E: a specific immunohistochemical stain in which two types of dyes, hematoxylin and eosin, are used to stain normal and pathologic structures in a cross-section of the mammary gland¹⁰

Habitus: the physical characteristics of a person¹⁰

Herbicide: a chemical that destroys plants and weeds¹⁰

Histology: the science concerned with fine cell structures, tissues and organs in relation to their function¹⁰

Homeostasis: the property of a living organism to regulate its internal environment so as to maintain a stable, constant condition, i.e., equilibrium¹⁰

Hormonal profile: analysis of a substance (generally serum) to determine the levels of hormones like progesterone, testosterone, β -estradiol, cortisol, DHEA-S and melatonin¹⁰

Hormone: a chemical substance produced and secreted by an endocrine (ductless) gland; transmitted by the blood to another tissue on which it has a specific effect¹⁰

Hydrolysis: a chemical reaction in which water is used to break down the chemical bonds of a substance; the reverse of neutralization¹⁰

Hyperplasia: when cells in an organ are growing faster than normal¹⁰

Hyperplastic: relating to hyperplasia; the state of having an increase in number of normal cells in a tissue or organ¹⁰

Hypothalamic-pituitary-adrenal axis: a complex, multi-directional pathway between the hypothalamus of the brain, the pituitary gland and the adrenal gland; controls reactions to stress and regulates various body processes including digestion, the immune system, mood, sexuality and energy usage¹⁰

Hypothesis: a best estimation, based on scientific knowledge and assumptions, of the results of an experiment; it usually describes the anticipated relationship among variables in an experiment. A scientific hypothesis must be 1) testable and 2) falsifiable¹⁰

Immunohistochemistry: analytical methods based on dyes and antibodies, used to locate and identify markers in cancer tissues¹⁰

Implementation science: the study of methods to promote the integration of research findings and evidence into healthcare policy and practice¹²

Imprinting: events during gestation and/or early postnatal stages that may have long-term consequences for health¹⁰

In situ cancer: early stage cancer that has not spread¹⁰

In utero: in the uterus; typically refers to events that occur in the womb before birth¹⁰

In vitro: in an artificial environment; refers to a process that is studied in a test tube or culture medium¹⁰

In vivo: studies conducted within a living organism¹⁰

Incidence rate: the number of people who develop a disease divided by the number of people at risk of developing the disease in a specific time period¹⁰

Indolent: non-invasive or slow growing¹⁰

Infiltrating ductal carcinoma (IDC): the most common type of breast cancer; the cancer begins in the milk ducts and invades other tissues.

Inguinal: relating to the groin¹⁰

Inhibitor: a drug or compound that slows or blocks biological, chemical or enzymatic action¹⁰

Initiated cell: a cell which has undergone genetic changes leading to cancer after an environmental or chemical insult¹⁰

Inorganic contaminants: mineral-based compounds such as metals, nitrates, and asbestos, which are naturally-occurring in some water, but can also enter water through human activities¹⁰

Insulin resistance: a condition in which the body produces insulin but does not use it properly¹⁰

Insulin: a hormone secreted by the pancreas; essential for metabolism and regulation of blood sugar; causes liver and muscle cells to take in glucose and store it in the form of glycogen; causes fat cells to take in blood lipids and turn them into triglycerides¹⁰

Insulin-like growth factor (IGF): a hormone, with other growth-promoting factors, that plays a role in the development of the mammary gland and other bodily structures; also known as somatomedin¹⁰

Internal (absorbed) dose: the amount of an environmental agent or chemotherapeutic agent absorbed by the organism and available to undergo metabolism, transport, storage and/or elimination¹⁰

Intraductal Proliferation (IDP): benign lesions in mammary ducts¹⁰

Invasive lobular carcinoma (ILC): breast cancer that originates in the milk glands and spreads into surrounding tissues; accounts for 10-15% of all breast cancers¹⁰

Ionizing radiation: high-energy waves; kills and/or retards cell development and causes gene mutations and chromosome breaks; a known cause of breast cancer¹⁰

Irradiation: the use of high-energy radiation to kill cancer cells¹⁰

Isoflavones: substances found in soy products that can act as weak estrogens; currently being studied for their prophylactic properties (i.e., ability to prevent disease)¹⁰

Isoform: a protein that has the same function as another protein but which is encoded by a different gene and may have small differences in its sequence¹⁰

Laser capture microdissection (LCM): a method for isolating pure cells from specific microscopic regions of tissue sections; useful for collecting selected cells for DNA, RNA and/or protein analyses; does not alter or damage the morphology or chemistry of the collected sample or surrounding cells¹⁰

Latency: time between exposure to a pathogenic organism, chemical agent or radiation, and the onset of disease¹⁰

Leptin: a hormone produced by adipose (fat) tissue which has a role in body weight regulation, blood cell development, blood vessel formation and immune function; plays a central role in fat metabolism and helps to control appetite via the brain's hypothalamus¹⁰

Leukocytes: also called white blood cells; type of cells that fight infection¹⁰

Limit of detection: the smallest amount (concentration) that can be detected with reasonable certainty using a specific analytical procedure¹⁰

Linear dose response: a type of response in which the risk of disease changes at the same rate as the exposure; as the exposure increases, the disease risk increases proportionately¹⁰

Lipids: a broad group of naturally occurring molecules that includes fats and fat-soluble vitamins (such as vitamins A, D, E and K)¹⁰

Lipophilic: ability of a chemical compound to dissolve in fats, oils, lipids and non-polar solvents¹⁰

Lobular carcinoma in situ (LCIS): a non-cancerous overgrowth of cells in breast lobules/milk glands; may increase chances for developing breast cancer in the future¹⁰

Local cancer: a non-invasive cancer that is entirely confined to the original organ¹⁰

Locally advanced cancer: cancer that has spread to other parts of the breast and nearby lymph nodes¹⁰

Low dose: an external or internal exposure that falls within the range estimated to typically occur in humans; dose lower than those used in standard testing/particular context

Lymph node: a small bean-shaped structure that is part of the body's immune system; lymph nodes filter substances that travel through the lymphatic fluid, and they contain lymphocytes (white blood cells) that help the body fight infection and disease; clusters of lymph nodes are found in the neck, axilla (underarm), chest, abdomen, and groin⁴

Lymphatic system: tissues and organs that produce, store and carry leukocytes (otherwise known as white blood cells) that fight infection; system includes the bone marrow, spleen, thymus, lymph nodes and a network of thin tubules that carry lymph (a fluid that contains white blood cells) to all the tissues in the body¹⁰

Lymphomas: cancers that begin in cells of the lymphatic (immune) system; Hodgkins and non-Hodgkins are the two major categories of lymphoma¹⁰

Macrophage: a type of white blood cell that helps remove bacteria, viruses and abnormal cells¹⁰

Malignant tumor: a cancerous growth that can invade and destroy nearby tissue and spread to other parts of the body¹⁰

Mammary gland: an organ in female mammals that produces milk to feed offspring. In humans, the mammary glands are located in breasts⁷

Mammary whole mount preparation: a procedure in which one or more rat mammary glands are removed, defatted, specially stained, and mounted for examination; allows for examination of the whole mammary¹⁰

Mass-spectrometry: a laboratory technique for separating ions (atoms or groups of atoms with a positive or negative charge) based on their mass-to-charge ratios; a state of the art analytical technique used to measure biomarkers¹⁰ (See Biomarker)

Maximum contaminant level goal: the level of a contaminant at which there would be no known or anticipated risk to human health; not a legally enforceable standard¹⁰

Melanoma: a form of skin cancer that begins in melanocytes (cells that make the pigment melanin); usually begins in a mole¹⁰

Maximum contaminant level: the highest level of a contaminant that U.S. EPA allows in public drinking water; a legally enforceable standard¹⁰

Menarche: the first menstrual period¹⁰

Menstruation: the blood flow from the uterus that happens about every 28 days in women of childbearing age who are not pregnant. Commonly called a woman's period⁷

Metabolic processes: the organic processes (in a cell or organism) that are necessary for life¹⁰

Metabolic syndrome: a cluster of conditions, including obesity around the waist, blood fat disorders, insulin resistance and high blood pressure, that raise the risk of diabetes, heart disease, and stroke¹⁰

Metabolism /digestion: a chain of energy-producing chemical reactions in the body; all energy and material transformations that occur within living cells. These processes are the basis of life, allowing cells to grow and reproduce, maintain their structures, and respond to their environments¹⁰

Metabolite: intermediate or end products of metabolism¹⁰

Metabolome: the collection of all metabolites in a biological organism; considered the compilation of an organism's gene expression¹⁰

Metabolomics: the systematic study of the total metabolite pool (the metabolome) using sophisticated analytical technologies, such as nuclear magnetic resonance profiling¹⁰

Metalloestrogen: inorganic xenoestrogens that can activate oestrogen receptor-alpha and affect gene expression¹⁷

Metalloproteinases (or metalloproteases): enzymes which use a metal in the catalytic mechanism; some are involved in cancer progression¹⁰

Metaplasia: abnormal change in cell appearance¹⁰

Metastasis (plural: Metastases): the spread of cancer from one part of the body to another¹⁰

Mitogen: a chemical that stimulates cell division/growth¹⁰

Molecule: is made up of two or more atoms. Biological molecules (such as proteins and DNA) are made up of thousands of atoms¹⁰

Morphogenesis: differentiation and growth of tissues and organs during development¹⁰

Morphology: pertaining to the shape and form (structure) of an organ, tissue, etc. ¹⁰

Mortality rate: the number of deaths in a given population over a specified period of time¹⁰

Multifactorial: referring to multiple factors. Multifactorial disorders result from mutations in multiple genes and frequently involve exposures to environmental chemicals¹⁰

Multigenic trait: closest definition is Multifactorial: having characters or a mode of inheritance dependent on a number of genes at different loci/positions on a chromosome¹

Multivariate analysis: analysis of more than one statistical variable at a time; distinguished from univariate analyses¹⁰

Mutation: an alteration in a gene that can result in a damaged, lost or displaced gene; it can be minor, deleterious, or have no effect on cell function¹⁰

Neoplasia: abnormal (can be benign or cancerous) growth of cells¹⁰

Nucleus: the most prominent component of a cell containing hereditary information (chromosomes)¹⁰

Nulliparity: condition of having borne no children¹⁰

Obesity: refers to a range of body weight greater than what is generally considered healthy for a given height. The term also identifies a range of weights that have been shown to increase the likelihood of certain diseases and other health problems. Body mass index (BMI) is a measure used to determine childhood overweight and obesity. For children and adolescents (aged 2-19 years) in the U.S., “obesity” is defined as a BMI at or above the 95th percentile for children of the same age and sex on the Centers for Disease Control and Prevention (CDC) growth charts. Being obese is more extreme than being overweight⁷

Obesogens: chemical compounds foreign to the body that are hypothesized to disrupt the metabolism of lipids and may play a role in weight gain and obesity¹⁰

Odds ratio (OR): the ratio of the odds of a condition/event occurring in one group to the odds of it occurring in another group; $OR > 1$ indicates that the event/condition is more likely in the first group; $OR < 1$ indicates that the condition/event is less likely in the first group¹⁰

Olestra: a fat substitute that adds no fat, calories or cholesterol to products. It was created by Procter & Gamble in 1968; also known by its brand name, Olean¹⁰

Omega-3 fatty acids: type of polyunsaturated fatty acids that are derived from food; found in cold-water fish (tuna, salmon and mackerel) and in dark green leafy vegetables, flaxseed oil and some vegetable oils; capable of reducing serum cholesterol levels¹⁰

Oncogene: a gene that normally directs cell growth, but becomes altered, thereby promoting cancer growth. Gene alterations can be inherited, occur randomly, or can be caused by an environmental exposure to carcinogens¹⁰

Organic contaminants: carbon-based chemicals, such as solvents and pesticides, which enter water through cropland runoff, discharge from factories, and other means¹⁰

Organic pollutants: See Persistent organics

Organochlorines: hormonally active chemicals including dioxins, PCBs, and pesticides such as DDT¹⁵

Osteopenia: a condition where bone mineral density is lower than normal. Many doctors see it as an early indication of osteoporosis¹⁰

Osteoporosis: a disease of bones in which bone mineral density (BMD) is reduced¹⁰

Outcome measure: the endpoint being studied; may be directly quantifiable or surrogate measures may be used as an estimate or index¹⁰

Over expression: excess of a particular protein; can be caused by an increase in the number of copies of the gene being expressed or increasing the binding strength of the promoter region; may be related to cancer progression¹⁰

Overweight: refers to a range of body weight greater than what is generally considered healthy for a given height in the U.S. The term also identifies a range of weights that have been shown to increase the likelihood of certain diseases and other health problems. For children and adolescents (aged 2-19 years), “overweight” is defined as a body mass index (BMI) at or above the 85th percentile and lower than the 95th percentile for children of the same age and sex⁷

Oxidative stress: physiological stress on the body that is caused by the cumulative damage done by free radicals inadequately neutralized by antioxidants. It is associated with aging and cancer development¹⁰

PAHs: polycyclic aromatic hydrocarbons; by-products of combustion classified as possible carcinogens by the World Health Organization’s International Agency for Research on Cancer (IARC) and the U.S. EPA

Paradigm: broadly, a philosophical or theoretical framework of any kind; the theories, laws, evidence and generalizations that are used to formulate research questions and perform experiments¹⁰

Pathogen: a disease-causing organism¹⁰

Pathology: the study and diagnosis of disease through examination of organs, tissues, cells and body fluids; the study of disease processes¹⁰

PBBs (polybrominated biphenyls): industrial chemicals found in plastics used in a variety of consumer products to make them difficult to burn, i.e. used as flame retardants¹⁰

PBDE: polybrominated diphenyl ethers, a class of persistent organic pollutants that are used as flame retardants

PCBs (polychlorinated biphenyls): a group of over 200 industrial chemicals that were widely used. In 1974 all PCB production was banned in the US, but PCBs continue to be released in the environment and are found in human tissues and breast milk¹⁰

Peak Height Velocity (PHV): a point in childhood where the speed of growth is the greatest. PHV is measured in inches per year or in inches per month¹⁰

Physiological: pertaining to the normal vital processes of organisms¹⁰

Phytoestrogens: naturally occurring compounds found in plants, such as soybeans, or plant products, such as whole grain cereals, that act like weak estrogens in the body¹⁰

Perfluorooctanoic acid (PFOA): an endocrine-disrupting environmental compound that belongs to a class of compounds called per- and polyfluoroalkyl substances (PFAS); used to manufacture various non-stick consumer products, including Teflon cookware and Gore-Tex clothing¹⁰; has been linked to adverse health outcomes including cancer, reproductive and developmental issues, and effects on the immune system; also referred to as C8

Persistent Organics: see POP

Pesticide: a chemical used to destroy pests of any sort; the term includes fungicides, herbicides and insecticides¹⁰

PFAS: Per- and polyfluoroalkyl substances; a class of synthetic chemicals that are persistent in the environment and human body; used to make consumer products more stain-resistant, waterproof, and/or non-stick and added to firefighting foams; scientists are studying their toxicity

PFC (Perfluorocarbons): a group of human-made chemicals composed of carbon and fluorine only; emitted as by-products of industrial processes and also used in manufacturing¹⁰

Phenotype: any observed quality of an organism, such as its morphology, development or behavior; distinguished from genotype¹⁰

Phthalates: chemicals that are thought to be “endocrine disruptors,” or substances that may interfere with the body’s endocrine system and produce harmful effects in humans. Phthalates are used to make certain plastics more flexible and are in some detergents, storage containers, toys, and personal care products (like fragrance, nail polish, deodorant, hair care, and body lotion). Plastic food and drink containers, and plastic or vinyl toys, with the number 3 in the recycling triangle contain phthalates⁷

Pipet: a procedure for exact measurement of fluid¹⁰

PAH (Polycyclic aromatic hydrocarbons): formed during incomplete combustion of coal, oil, gas, wood, garbage, tobaccos and charbroiled meat. The International Agency for Research on Cancer has classified several PAH mixtures as carcinogenic to humans, including exposure to PAHs in soot, coal pitch, or emissions from coal gasification, coke production, iron and steel founding, coal-tar distillation, or household combustion of coal or wood¹⁴

Polymorphism: the quality or character of occurring in several different forms; genes can be polymorphic¹⁰

Polypeptide: a substance that contains many amino acids (the molecules that join together to form proteins)⁴

Polyunsaturated fatty acids: found mainly in fish, corn, soybean and safflower oil; may help reduce cholesterol levels. (See also Omega-3 fatty acids.)¹⁰

POP (Persistent Organic Pollutants or Pesticides): chemical substances that persist in the environment (do not biodegrade), bioaccumulate in human and animal tissue, biomagnify in food chains and pose risks of causing adverse effects to human health and the environment. POPs released in one part of the world can travel far beyond their source of origin via the atmosphere, oceans and other pathways. Health effects include cancer, damage to the nervous system, reproductive disorders and disruption of the immune system¹⁰

Postnatal: occurring after birth¹⁰

PP (Propylparaben): used as a preservative in foods, food packaging, cosmetics, perfumes, fragrances and pharmaceuticals¹⁴. The physiologic effect of propylparaben is by means of increased histamine release, and cell-mediated immunity. The chemical classification of propylparaben is Allergens⁹

Precautionary principle: the precautionary principle states that when an activity threatens harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically⁷

Precocious puberty: the onset of puberty before the age of seven in Caucasian girls and before the age of six in African American girls¹⁰

Preneoplasia: stage occurring prior to the formation of a neoplasm (an abnormal growth of tissue)¹

Prevalence: the total number of cases of a disease/ condition in a given population at a point in time¹⁰

Prevention: action taken to decrease the chance of getting a disease or condition. For example, cancer prevention includes avoiding risk factors (such as smoking, obesity, lack of exercise, and radiation exposure) and increasing protective factors (such as getting regular physical activity, staying at a healthy weight, and having a healthy diet)⁴

Progesterone: a steroid hormone secreted by the adrenal glands, brain, ovary and placenta; involved in the female menstrual cycle, embryogenesis, pregnancy and gestation; the major naturally occurring human progestogen¹⁰

Progestin: a synthetic progestogen that has some biological activity similar to progesterone¹⁰

Prospective study: a research study design that follows a cohort forward in time¹⁰

Protease: any enzyme that digests proteins by hydrolysis (reaction with water); any enzyme that reacts with water to break the peptide bonds that link amino acids together in the polypeptide chain (the chains that build proteins)¹⁰

Proteins: molecules in the cell that perform a wide variety of functions, such as protection, support, movement, transportation, and activation of the chemical reactions that sustain life (e.g., enzymes for digesting food)¹⁰

Proteomics: the study of the full set of proteins (the proteome) encoded by a genome¹⁰

Psychosocial: refers to an individual's psychological development in the context of their social environment. The term can be used to describe the unique internal mental processes that occur within the individual in response to her/his interactions with others such as parents, peers and teachers¹⁰

Puberty: a series of biological events that leads to the attainment of adult stature, maturation of the interaction of the master glands of the endocrine system with the ovaries and testes, and the ability to reproduce¹⁰

Putative: generally regarded as such, but not definite; for example, putative carcinogen¹⁰

Quantitative trait: a measurable phenotype that depends on the cumulative actions of many genes and the environment. These traits can vary among individuals, over a range, to produce a continuous distribution of phenotypes. Examples include height, weight and blood pressure⁸

Receptor: a protein inside or on the surface of the cell, capable of binding to a specific substance (such as hormones) to result in a biological change (e.g., cell growth and differentiation); example: estrogen receptor (ER)¹⁰

Reference interval: a range of laboratory values for a specific analyte determined to be normal for specific age and gender categories; provides relevant comparison information for interpreting results; the 95% reference interval is most often reported¹⁰

Refractory cancer: cancer that does not respond to treatment¹⁰

Relapse: the return of cancer after initial improvement¹⁰

Relative risk (RR): the ratio of the probability of a condition/event occurring in an exposed group versus the condition/event occurring in the control (non-exposed) group. RR=1 indicates there is no difference; RR>1 indicates the risk is greater among the exposed; and RR<1 indicates the risk is greater among the control¹⁰

Risk factor: something that increases the chance of developing a disease. Some examples of risk factors for cancer are age, a family history of certain cancers, use of tobacco products, being exposed to radiation or certain chemicals, infection with certain viruses or bacteria, and certain genetic changes⁴

Risk: probability of adverse effects caused under specified circumstances by an agent in an organism, a population, or an ecological system; expected frequency of occurrence of a harmful event arising from such an exposure¹¹

RNA (ribonucleic acid): “reads” information encoded in DNA and transfers it to a part of the cell that makes functional proteins¹⁰

Secretion: production of a substance that differs in its chemical and physical properties from the cell or gland that produces the product; intended for use within the organism, not to be excreted; the product can be a solid, liquid or gaseous¹⁰

Selenium: a dietary mineral essential for chemical reactions in the brain and other parts of the body¹⁰

Sensitive subpopulation: people who may be more vulnerable to exposure to an environmental exposure, whether a biological, physical or chemical agent; commonly refers to infants and children, elderly, and people with compromised immune systems¹⁰

Sentinel lymph node: the first lymph node where cancer spreads¹⁰

Signaling: a complex system of communication that governs basic cellular activities and coordinates cell actions; errors in cellular information processing are responsible for diseases such as cancer, autoimmunity and diabetes. The ability of cells to perceive and correctly respond to their microenvironment is critical to development, tissue repair, immunity and homeostasis¹⁰

Somatic mutations: alterations in the DNA that are not transmitted to the offspring; distinguished from germ line mutations (i.e., occurring in eggs and sperm) which can be transmitted to descendants¹⁰

Somatomedin: see insulin like growth factor (IGF)

Statistical significance: based on probabilities, the observed outcome is unlikely to have occurred by chance alone; statistical evidence of a difference¹⁰

Stress: disturbance of physiologic equilibrium¹⁰

Stress hormones: such as cortisol and norepinephrine are released during periods of high stress; the hormone regulating system is known as the endocrine system¹⁰

Stromal: pertaining to the connective tissue of an organ, gland or other structure¹⁰

Susceptible/susceptibility: a term used to describe a person(s) who is more likely to develop a disease; at risk of disease¹⁰

Systematic review: a scientific investigation that focuses on a specific question and uses explicit, prespecified scientific methods to identify, select, assess, and summarize the findings of similar but separate studies¹³

T cell: a type of white blood cell that attacks damaged cells, including cancer cells¹⁰

Telomerase: an enzyme which mediates the repair or preservation of terminal sequences of chromosomes¹⁰; cancer cells typically have more telomerase than most normal cells

Target population: particular group of people selected for study, intervention, and/or education¹⁰

Terminal ductal lobular unit (TDLU): alveolar-lobular structure which forms the functional unit of the human breast; changes with hormonal events such as puberty, pregnancy and lactation¹⁰

Terminal end buds (TEBs): structures at the tips of invading primary ducts in the developing mammary gland¹⁰

Testosterone: a hormone produced primarily by the testicles that stimulates development of male sex characteristics as well as bone and muscle growth; small amounts are secreted by the ovaries in females¹⁰

Thelarche: the beginning of breast development in the female¹⁰

Threshold dose response: a type of response in which, at very low exposures, there appears to be no detectable increased risk of disease; there is a threshold below which no risk is detected¹⁰

Thyroid: The thyroid gland produces hormones that influence almost all of the metabolic processes. The thyroid gland takes iodine, found in many foods, and convert it into thyroid hormones: thyroxine (T4) and triiodothyronine (T3)¹⁰

Tissue: a group or layer of cells, such as the skin, that together performs specific functions¹⁰

Titration (Antibody titration): a procedure to determine the lowest antibody concentration needed to produce effective staining of given structures with minimal background¹⁰

Toxicology: the study of the effects of physical and chemical agents on living organisms¹⁰

Transcriptional: relating to the transfer of genetic information from one kind of nucleic acid to another; for example, from DNA to RNA¹⁰

Transgenic: referring to an organism in which new DNA has been introduced into the germ (reproductive) cells by injecting it into the nucleus of the ovum (female reproductive cell)¹⁰

TSH: thyroid-stimulating hormone (TSH) is a chemical released by the pituitary gland that triggers hormone production in the thyroid¹⁰

Tumor suppressor genes: or “cell guardians” – genes whose normal function is to prevent abnormal cells from dividing; certain mutations in tumor suppressor genes lead to cancer¹⁰

Tumor: an abnormal mass of tissue that results from uncontrolled cell division; can be benign (non-cancerous) or malignant (cancerous)¹⁰

UV: ultraviolet light¹⁰

Vascular: relating to or including blood vessels; the vascular system includes the arteries, veins and capillaries that carry blood to and from the heart¹⁰

VEGF (vascular endothelial growth factor): responsible for the growth of blood vessels¹⁰

Virus: parasitic microorganisms capable of causing disease; smaller than a single cell or bacterium, they cannot reproduce outside a living organism¹⁰

Water contaminant: anything found in water (including microorganisms, radionuclides, chemicals, minerals, etc.) which may be harmful to human health¹⁰

Whole mounts: a preparation in which a sample of tissue (e.g., the entire breast) is examined for structure, type and frequency of lesions and other measurable parameters¹⁰

Windows of susceptibility: specific time periods throughout the lifespan when exposures to environmental factors may directly or indirectly affect the risk of developing a disease, such as breast cancer. In many cases, exposure to the same factors at other time periods may have no effect. Gestation, puberty, pregnancy, lactation and post-lactation, and menopause may be time periods when individuals are particularly susceptible to environmental factors that may influence breast cancer risk⁷ and are periods of interest to BCERP

Xenobiotic: an environmental compound; outside the body¹⁰

Xenografts: a type of tissue graft in which the donor and recipient are of different species¹⁰

Zeranol: a nonsteroidal estrogen analog⁹; a synthetic estrogenic chemical given to cattle to promote growth

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