

Cancer Biology Glossary

allele One alternative among different versions of a gene that may be defined by the phenotype that it creates, by the protein it encodes, or by its nucleotide sequence.

amplicon A defined stretch of DNA that undergoes amplification.

amplification Genetic mechanism by which the copy number of a gene is increased above its normal level in the diploid genome.

anaphase The third subphase of mitosis, during which the paired chromatids are segregated to the two opposite poles of the cell.

antibody A soluble protein produced by plasma cells of the immune system that is capable of recognizing and binding particular antigens with high specificity. Also called an **immunoglobulin**.

antigen A molecule or portion of a molecule that can be specifically recognized and bound by an antibody, or that causes the production of an antibody.

B cells Lymphocytes that develop in the bone marrow and are involved in the humoral immune response. B cells that have become plasma cells secrete antibodies.

benign Describing a growth that is confined to a specific site within a tissue and gives no evidence of invading adjacent tissue.

bioinformatics The science of using computational methods for analyzing biological information, notably complex sets of biological data.

biomarker A measurable property or parameter of a cell, tissue or organism that provides information about the biological state of the entity being analyzed; biomarkers can be used for stratification of disease subtypes and, in the clinic, for disease diagnosis or prognosis.

BRCA1 and BRCA2 The BRCA1 and BRCA2 genes encode the BRCA1 and BRCA2 proteins. These two proteins are part of a protein complex that includes several other proteins. This protein complex is involved in repairing DNA damage. Mutations in BRCA1 or BRCA2 which cause these proteins to be non-functional can predispose cells to become cancerous. The BRCA1 and BRCA2 genes are tumor suppressors.

cancer (1) A clinical condition that is manifested by the presence of one or another type of neoplastic growth. (2) A malignant tumor.

carcinogen An agent that contributes to the formation of a tumor.

carcinogenic Capable of causing or contributing to the causation of cancer.

cell cycle The sequence of changes in a cell from the moment when it is created by cell division, continuing through a period in which its contents including chromosomal DNA are doubled, and ending with the subsequent cell division and formation of daughter cells.

cell cycle clock A network of signaling proteins in the nucleus that regulate and orchestrate progression of the cell through the cell cycle.

checkpoint A control mechanism that ensures that the next step in the cell cycle does not proceed until a series of preconditions have been fulfilled including the completion of all previous steps.

cyclin A protein that associates with a cyclin-dependent kinase and serves as a regulatory subunit of this kinase by activating its catalytic activity and directing it to appropriate substrates.

cyclin-dependent kinase A type of serine/threonine kinase deployed by the cell cycle machinery that depends on an associated cyclin protein for proper functioning.

ELISA Enzyme Linked Immunosorbent Assay. A plate-based assay technique designed for detecting and quantifying substances such as peptides, proteins, antibodies and hormones.

gatekeeper A gene that operates to hinder cell multiplication or to further cell differentiation or cell death and in this way prevents the appearance of populations of neoplastic cells.

gene amplification An increase in the number of copies of a gene normally present in the diploid genome.

genome An organism's complete set of DNA, including nuclear DNA (chromosomes), mitochondrial DNA and chloroplast DNA (in plants).

HER2 The abbreviation for human epidermal growth factor receptor 2. The HER2 gene encodes the HER2 protein, a transmembrane tyrosine kinase receptor involved in cell growth. HER2 is over-expressed on, and involved in the growth of, some cancer cells. The HER2 gene is a proto-oncogene.

intercalation Insertion of one molecule between two other molecules; intercalation in DNA involves insertion of a planar molecule between two adjacent base pairs.

kinase An enzyme that covalently attaches phosphate groups to substrate molecules, often proteins.

leukocyte A non-pigmented white blood cell such as a lymphocyte, monocyte, macrophage, neutrophil or mast cell.

lymphocyte A class of leukocytes that mediate the immune response, encompassing B cells, T cells, and NK cells and derivatives thereof.

malignant Describing a growth that shows evidence of being locally invasive and possibly metastatic.

metaphase The second subphase of mitosis, during which chromosomes complete condensation and attach to the mitotic spindle as the nuclear membrane disappears; chromosomes are now readily seen in the light microscope.

metastasis A malignant growth forming at one site in the body, the cells of which derive from a malignancy elsewhere in the body. (2) The process leading to the formation of metastases.

mitosis (1) Cell division, composed of the four steps of prophase metaphase, anaphase and telophase. (2) More properly, the process by which a single cell separates its complement of chromosomes into two equal sets in preparation for the division of the cell into two daughter cells achieved by cytokinesis.

mutagen An agent that induces a mutation.

mutation A change in the genotype of a species that may involve an alteration in the nucleotide sequence of a DNA segment, the arrangement of a segment within a chromosome, the number of copies of a segment, the physical structure of a chromosome, or even the number of copies of a structurally normal chromosome.

oncogene A gene that has the potential to cause cancer (if mutated).

p53 (also **TP53**, for tumor protein p53) The name of the gene that encodes the p53 protein. The p53 protein regulates the cell cycle and hence the p53/TP53 gene functions as a tumor suppressor. The p53 gene is the most frequently mutated gene in human cancer cells. Because p53 is essential for regulating DNA repair and cell division, it has been nicknamed the "guardian of the genome."

patient stratification The ability to stratify, or group, patients based on specific characteristics of their disease. Stratification based on the specific characteristics of a patient's cancer type, is the first step toward personalized cancer treatment. Traditional stratification of cancer patients is based on histopathology, the examination of the tumor tissue. Cancer medicine is rapidly moving toward stratification based on the molecular makeup of the tumor as well as on the specific biomarkers found in the patient.

polymerase chain reaction (PCR) A method widely used in molecular biology to make many copies of a specific DNA segment.

prognosis A prediction about the future clinical course of a disease.

prophase The first subphase of mitosis, in which chromosomes begin to condense and centrosomes begin to assemble.

proto-oncogene A normal cellular gene that, upon alteration by DNA-damaging agents or viral genomes, can acquire the ability to function as an oncogene.

T cell A class of lymphocytes that develops largely in the thymus and are involved in the cell-mediated immune response.

telophase The fourth subphase of mitosis, during which chromosomes de-condense and the nuclear membrane reassembles.

transformation The process of converting a normal cell into a cell having some or many of the attributes of a cancer cell.

tumor suppressor gene A gene whose partial or complete inactivation leads to an increased likelihood of cancer development.

tumorigenesis The process of forming a tumor, often involving a succession of biological steps.

References:

Most definitions were found in:

The Biology of Cancer, 2nd ed., Robert A. Weinberg, Garland Science, 2014.

Others were found in <https://www.vocabulary.com/dictionary>