



GLOSSARY

adenoma: benign **epithelial** tumor affecting a gland

aneuploidy: abnormal number of chromosomes in a cell, either too many or too few

antigen: molecule able to produce an immune response (induction of antibodies)

anti-oncogene: gene that prevents cell transformation, and so tumor formation

apoptosis: cell suicide (programmed cell death)

bacterium: a rapidly multiplying micro-organism, generally single-cell, and having no nucleus

biopsy: the removal of a small sample of healthy or tumor tissue for diagnostic purposes

carcinogenesis: all the steps that lead to the formation of cancer

carcinogenic: a physical or chemical agent is said to be carcinogenic when exposure to that agent results in an increased occurrence of cancer

carcinoma: cancer of **epithelial** cells

cell differentiation: process by which a cell becomes specialized

cell line: population of cells of a particular type able to divide indefinitely in culture

checkpoint: a specific time during the cell division cycle when the division process can be regulated according to the state of the cell and its environment

clonal rearrangement: chromosomal rearrangement found in all the cells of a population

clone: cell population (or organism) formed by repeated division of a single original cell. If the cells belonging to the same clone proliferate faster or die less often than the other cells in a population, they will gradually become predominant because they have a *proliferative advantage*: *clonal expansion* then takes place

to clone (a gene): to produce multiple copies by repeated replication (duplication) cycles

clonogenicity: a test to evaluate *cell transformation* under unfavorable conditions, in very low concentrations or on a support that prevents cell adhesion

control pathway: see **checkpoint**

co-protease: factor necessary for the enzymatic degradation activity of a protein

cyclins: proteins involved in the regulation of the cell division cycle

cytogenetic: based on the study of the structure of chromosomes

deletion: loss of genetic material, from a **nucleotide** to a chromosome segment

dicentric: said of a chromosome with two centromeres (constrictions) resulting from cleavage of two chromosomes at one end and their subsequent re-association

endoreduplication: duplication of DNA without separation of chromosomes in daughter cells

enzyme: protein that catalyzes a biochemical reaction

epidemiology: the science of the relationships between pathologies and various factors liable to influence their prevalence, distribution or evolution

epithelial: related to the layers of cells covering an external surface or lining a cavity

fibroblast: cell of conjunctive tissue synthesizing protein fibers (collagen) and numerous basic substances. It multiplies readily in cell culture

gamete: male or female reproductive cell

gene amplification: a large increase in the number of copies of one or more genes. *In vivo* this happens during the carcinogenic transformation of cells or in response to a treatment toxic for the cell

genotoxic: toxic toward genes by causing DNA damage

genotype: the whole set of an individual's genes

germ-cell line: the progeny of cells responsible for the production of **gametes**

hematopoiesis: generation of blood cells in the bone marrow

hemocyte: red blood cell

hemopathy: disease of the blood

hormone: substance released by a gland directly into the blood, which transports it to a target organ where it acts

hypodiploidy: the property of diploid cells, which possess two sets of homologous chromosomes and so two copies of each gene, that have lost one or more chromosomes;

hypotetraploidy: the property of cells with four sets of homologous chromosomes and so four copies of each gene, that have lost one or more chromosomes

immortalization: acquisition by eukaryotic cells (cells with a nucleus) of the ability to multiply indefinitely *in vitro*. A fundamental characteristic of cancer cells

inversion: the turning back to front of a DNA **sequence** of ranging length

in vitro: (Latin for «in glass» with reference to analyses originally performed in glass containers) the conditions of any biological investigation carried out in a laboratory outside a living organism, as distinct from *in vivo* («in living matter»)

kinase: enzyme that transfers phosphate groups (**phosphorylation**) onto proteins (this enzyme is then called protein kinase), or lipids (lipid kinase)

lethality: ability to cause death

lymphocyte: a white blood cell that produces an immune response when it is activated by a foreign molecule (antigen)

macrophage: a white blood cell specialized in the capture, ingestion and digestion of particles (phagocytosis)

malignancy: said of tumors or tumoral cells that are invasive and (or) capable of metastasis

metabolism: the chemical processes that take place in living cells



metabolite: organic substance formed or involved in **metabolism** (synthesis or degradation)

mutagenesis: the introduction of **mutations** into DNA

mutagenic: that increases the incidence of **mutations**

mutant: cell or organism whose genetic material has undergone one or more **mutation(s)**

mutation: transmissible alteration of the genetic message by modification of a **sequence** of **nucleotides** in the DNA;

point mutation: alteration limited to a single **nucleotide**

necrosis: massive cell death causing inflammation

neuroblastoma: tumor affecting the neuroblasts, embryonic nerve cells that will later form neurones

nucleic acid: polymer made up of a chain of **nucleotides**. There are two types: RNA and DNA

nucleotide: compound made up of a base (purine or pyrimidine), a sugar and a phosphate group

oligonucleotide: short segment of DNA composed of **nucleotides**

oncogene: gene that favors cell transformation and therefore one of the many genes that contribute to the formation of cancerous tumors. **Mutant** form of a normal gene (**proto-oncogene**) involved in the control of cell growth or division

oncology: the study of cancerous tumors

phenotype: apparent characters of an individual resulting from the expression of all its genes

phosphorylate: to transfer a phosphate group onto a substrate (protein or lipid)

polymerase: enzyme that catalyzes the synthesis of **sequenced** macromolecules such as DNA (DNA polymerase) and RNA (RNA polymerase)

polyploidy: the property of a cell that contains more than two sets of homologous chromosomes; **triploidy:** three sets of homologous chromosomes and so three copies of each gene; **tetraploidy:** four sets of homologous chromosomes and so four copies of each gene

primary (cell): a cell that has not been modified (**immortalization** by a virus, carcinogenesis, etc.)

proto-oncogene: see **oncogene**

radiolysis: decomposition of matter by ionizing radiation

restriction enzyme: protein that can cleave a DNA molecule at well-defined sites corresponding to a particular **sequence** of **nucleotides**

sarcoma: cancer of conjunctive tissue (skin, bone, etc.)

senescence: impaired state of certain cells once a certain number of cell divisions have taken place (aging)

sequencing: determination of the order of the **nucleotides** (**sequences**) in biological polymers (DNA, RNA, proteins)

stem cell: cell that can carry on dividing indefinitely and give birth to daughter cells that are able to undergo **differentiation**

stochastic: said of a process comprising one or more random variables

strain: set of individuals presenting the same **genotype**

survival factor: molecule triggering intracellular reactions that favor survival

therapeutic exeresis: ablation of pathological tissue in the course of medical treatment

transcript: messenger RNA derived from the copy of one strand of the DNA molecule (**transcription**)

transcription: the process that allows the synthesis of a molecule of RNA from a DNA template via a mechanism involving base complementarity and protein synthesis

transcription activation: activation of the expression of genes

transcription factor: any protein involved in the initiation or control of gene expression

transcription repressor: protein that inhibits gene expression

transfection: introduction of foreign genetic material (viral, in particular) into a cell

transgenic: said of a cell incorporating one or more foreign genes, or an organism all of whose cells contain this or these genes and which can transmit them to its offspring

translocation: transfer, sometimes reciprocal, of a fragment from one chromosome to another following cleavage of both chromosomes

tumor suppressor gene (or anti-oncogene): gene that counteracts the transformation of a healthy cell into a cancer cell

tumorigenicity: ability of transformed cells to induce the formation of tumors when they are injected into animals of the same **strain** or into nude mice, which are devoid of immune defenses

wild: displaying no **mutation** in the genes studied

yeast: microscopic single-cell organism that normally reproduces asexually by budding (asymmetric mitosis); but which can also reproduce sexually