

Characteristics of a Cancer Cell

1. Self-sufficiency in growth signals: cancer cells acquire an autonomous drive to proliferate - pathological mitosis - by virtue of the activation of oncogenes such as ras or myc.
2. Insensitivity to growth-inhibitory (antigrowth) signals: cancer cells inactivate tumor suppressor genes, such as Rb, that normally inhibit growth.
3. Evasion of programmed cell death (apoptosis): cancer cells suppress and inactivate genes and pathways that normally enable cells to die.
4. Limitless replication potential: cancer cells activate specific gene pathways that render them immortal even after generations of growth.
5. Sustained angiogenesis: cancer cells acquire the capacity to draw out their own supply of blood and blood vessels - tumor angiogenesis.
6. Tissue invasion and metastasis: cancer cells acquire the capacity to migrate to other organs, invade other tissues, and colonize these organs, resulting in their spread throughout the body.

Classification of Cancer according to tissue type

Based on tissue types cancers may be classified into six major categories:

1. Carcinoma

This type of cancer originates from the epithelial layer of cells that form the lining of external parts of the body or the internal linings of organs within the body.

Carcinomas, malignancies of epithelial tissue, account for 80 to 90 percent of all cancer cases since epithelial tissues are most abundantly found in the body from being present in the skin to the covering and lining of organs and internal passageways, such as the gastrointestinal tract.

Carcinomas usually affect organs or glands capable of secretion including breast, lungs, bladder, colon and prostate.

Carcinomas are of two types – adenocarcinoma and squamous cell carcinoma. Adenocarcinoma develops in an organ or gland and squamous cell carcinoma originates in squamous epithelium. Adenocarcinomas may affect mucous membranes and are first seen as a thickened plaque-like white mucosa. These are rapidly spreading cancers.

2. Sarcoma

These cancers originate in connective and supportive tissues including muscles, bones, cartilage and fat. Bone cancer is one of the sarcomas termed osteosarcoma. It affects the young most commonly. Sarcomas appear like the tissue in which they grow.

Other examples include chondrosarcoma (of the cartilage), leiomyosarcoma (smooth muscles), rhabdomyosarcoma (skeletal muscles), Mesothelial sarcoma or mesothelioma (membranous lining of body cavities), Fibrosarcoma (fibrous tissue), Angiosarcoma or hemangioendothelioma (blood vessels), Liposarcoma (adipose or fatty tissue), Glioma or astrocytoma (neurogenic connective tissue found in the brain), Myxosarcoma (primitive embryonic connective tissue) and Mesenchymous or mixed mesodermal tumor (mixed connective tissue types).

3. Myeloma

These originate in the plasma cells of bone marrow. Plasma cells are capable of producing various antibodies in response to infections. Myeloma is a type of blood cancer.

4. Leukemia

This is a group of cancers that are grouped within blood cancers. These cancers affect the bone marrow which is the site for blood cell production. When cancerous, the bone marrow begins to produce excessive immature white blood cells that fail to perform their usual actions and the patient is often prone to infection.

5. Lymphoma

These are cancers of the lymphatic system. Unlike the leukemias, which affect the blood and are called “liquid cancers”, lymphomas are “solid cancers”. These may affect lymph nodes at specific sites like stomach, brain, intestines etc. These lymphomas are referred to as extranodal lymphomas.

Lymphomas may be of two types – Hodgkin’s lymphoma and Non-Hodgkin’s lymphomas. In Hodgkin lymphoma there is characteristic presence of Reed-Sternberg cells in the tissue samples which are not present in Non-Hodgkin lymphoma.

6. Mixed types

These have two or more components of the cancer. Some of the examples include mixed mesodermal tumor, carcinosarcoma, adenosquamous carcinoma and teratocarcinoma. Blastomas are another type that involves embryonic tissues.

Carcinogen

A carcinogen is any substance, radionuclide, or radiation that promotes carcinogenesis, the formation of cancer. This may be due to the ability to damage the genome or to the disruption of cellular metabolic processes.

Examples of Carcinogens: Tobacco, Radon, Asbestos, Crispy brown foods, Formaldehyde, Ultraviolet rays, Alcohol, Processed meat, Engine exhaust, Pollution.