#  Practical Genetics Study of Cancer

 **Cancer**, known medically as a [malignant](/wiki/Malignancy) [neoplasm](/wiki/Neoplasm), is a broad group of various [diseases](/wiki/Disease), all involving unregulated cell growth. In cancer, [cells](/wiki/Cell_%28biology%29) divide and grow uncontrollably, forming malignant tumors, and invade nearby parts of the body. Cancer may also [spread](/wiki/Metastasis) to more distant parts of the body through the [lymphatic system](/wiki/Lymph) or [bloodstream](/wiki/Blood).

 Not all tumors are cancerous. [Benign tumors](/wiki/Benign_tumor) do not grow uncontrollably, do not invade neighboring tissues, and do not spread throughout the body.

Determining what causes cancer is complex. Many things are known to increase the risk of cancer, including :- Exposure to chemicals, [tobacco](/wiki/Tobacco) use, certain [infections](/wiki/Infection), [radiation](/wiki/Radiation), lack of physical activity, [obesity](/wiki/Obesity), and environmental pollutants. Those can directly damage genes or combine with existing genetic faults within cells to cause the disease.

Cancer can be detected in a number of ways, including the presence of certain [signs and symptoms](/wiki/Cancer_symptoms), [screening tests](/wiki/Cancer_screening), or [medical imaging](/wiki/Medical_imaging). Once a possible tumors detected it is diagnosed by [microscopic examination](/wiki/Histology) of a [tissue sample](/wiki/Biopsy).

### Cancer is usually treated with [chemotherapy](/wiki/Chemotherapy), [radiation therapy](/wiki/Radiation_therapy) and [surgery](/wiki/Surgery).

### Cancers are classified by the [type of cell](/wiki/List_of_distinct_cell_types_in_the_adult_human_body) that the tumor cells resemble and is therefore presumed to be the origin of the tumor. These types include:

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| 1. [Carcinoma](/wiki/Carcinoma): Cancers derived from [epithelial](/wiki/Epithelium) cells. This group includes many of the most common cancers, include nearly all those developing in the [breast](/wiki/Breast_cancer), [prostate](/wiki/Prostate_cancer), [lung](/wiki/Lung_cancer), [pancreas](/wiki/Pancreas), and [colon](/wiki/Colorectal_cancer).
2. [Sarcoma](/wiki/Sarcoma): Cancers arising from [connective tissue](/wiki/Connective_tissue) (i.e. [bone](/wiki/Bone), [cartilage](/wiki/Cartilage))
3. [Lymphoma](/wiki/Lymphoma) and [leukemia](/wiki/Leukemia): These two classes of cancer arise from hematopoietic ([blood](/wiki/Blood)-forming) cells that leave the bone marrow and tend to mature in the lymph nodes and blood respectively.
4. [Germ cell tumor](/wiki/Germ_cell_tumor): Cancers derived from [pluripotent](/wiki/Pluripotent) cells, most often presenting in the [testicle](/wiki/Testicular_cancer) or the [ovary](/wiki/Ovarian_cancer) .
5. [Blastoma](/wiki/Blastoma): Cancers derived from immature "precursor" cells or embryonic tissue.
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### Metastasis

[Symptoms of metastasis](/wiki/Symptoms_of_metastasis) are due to the spread of cancer to other locations in the body. They can include enlarged [lymph nodes](/wiki/Lymph_node) (which can be felt or sometimes seen under the skin and are typically hard), [hepatomegaly](/wiki/Hepatomegaly) (enlarged liver) or [splenomegaly](/wiki/Splenomegaly) (enlarged spleen) .



### Fig.(1):- Cancer metastasis

**Heredity** Approximately five to ten percent of cancers are entirely hereditary. Cancers are caused by a series of mutations. Each mutation alters the behavior of the cell Cancer is fundamentally a disease of failure of regulation of tissue growth. In order for a normal cell to [transform](/wiki/Malignant_transformation) into a cancer cell, the [genes](/wiki/Genes) which regulate cell growth and differentiation must be altered.

 The affected genes are divided into two broad categories.

1. [Protooncogen](/wiki/Oncogene) are genes which normally promote cell growth .The mutated form called Oncogene that leading to cancer.
2. [Tumor suppressor genes](/wiki/Tumor_suppressor_gene) are genes which inhibit cell division.

Changes in *many* genes are required to transform a normal cell into a cancer cell. Genetic changes can occur at different levels and by different mechanisms. The gain or loss of an entire [chromosome](/wiki/Chromosome) can occur through errors in [mitosis](/wiki/Mitosis), more Common are mutations.

 

 **Fig (2):- The genes involved in carcinogenesis.**

  **Fig(3) The differences between Normal cell and Cancer cell**