

Introduction

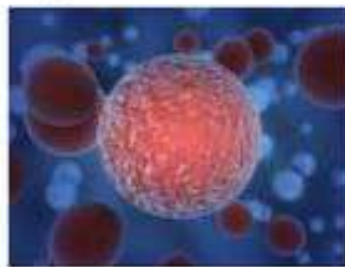
Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body.

Not all tumors are cancerous; benign tumors do not spread to other parts of the body. Possible signs and symptoms include a lump, abnormal bleeding, prolonged cough, unexplained weight loss and a change in bowel movements. While these symptoms may indicate cancer, they may have other causes.

Over 100 types of cancers affect humans.

These diseases are characterized by a cellular malfunction. Healthy cells are programmed to 'know what to do and when to do it'. Cancerous cells do not have this programming and therefore replicate and grow out of control.

Cancerous cells in together are called **Neoplasm**.



Cancer :

Is one of the most dreaded diseases of human beings and is a major cause of death all over the world.

More than a million Indians suffer from cancer and a large number of them die from it annually.

- **Contact Inhibition** : It is a property of normal cell by virtue of which contact with other cells inhibits their uncontrolled growth.
- Cancer cells appear to have lost this property. As a result of this, cancerous cells just continue to divide giving rise to masses of cells called **tumors**.

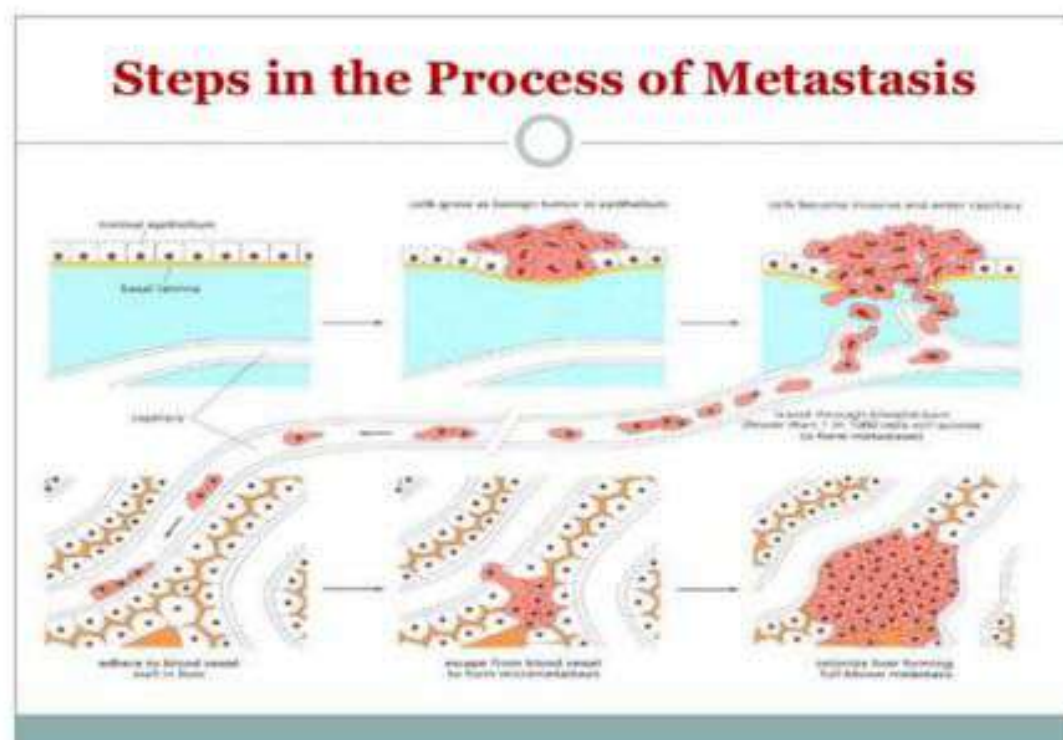
Tumors :

There are two main classifications of tumors.

- **benign tumor**
- **malignant tumor**

- *Benign Tumor* : Is a tumor that does not invade its surrounding tissue or spread around the body & and cause little damage.
- *Malignant Tumor* : Is a tumor that may invade its surrounding tissue or spread around the body.

Metastasis : cells actively divide and grow they also starve the normal cells by competing for vital nutrients. Cells sloughed from such tumors reach distant sites through blood, and wherever they get lodged in the body, they start a new tumor there. This property called ***metastasis*** .



Causes of Cancer

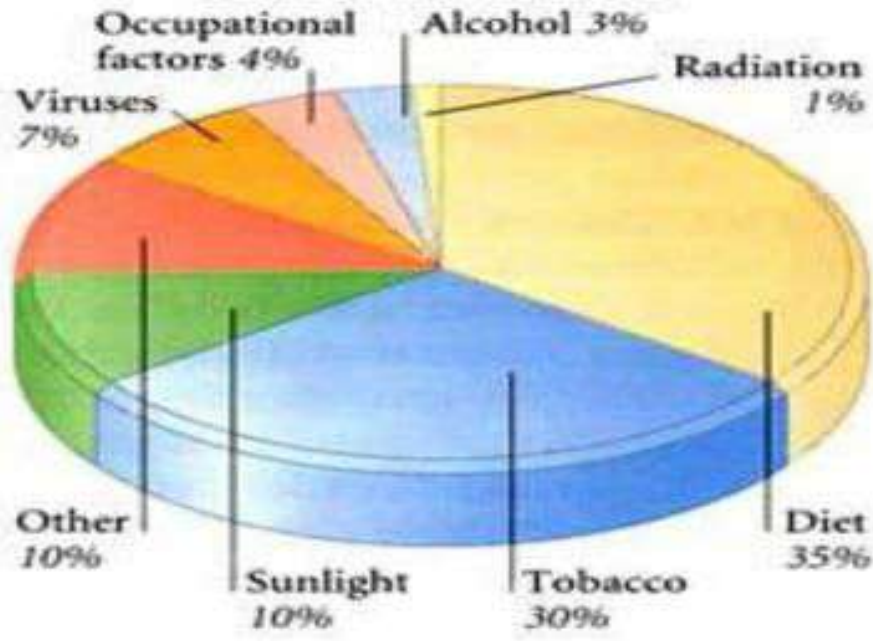
Transformation of normal cells into cancerous neoplastic cells may be induced by physical, chemical or biological agents . These agents are called **carcinogens**.

- ✚ ***Ionising radiations*** :- like X-rays and gamma rays &
- ✚ ***non-ionizing radiations*** :- like UV cause DNA damage leading to neoplastic transformation.

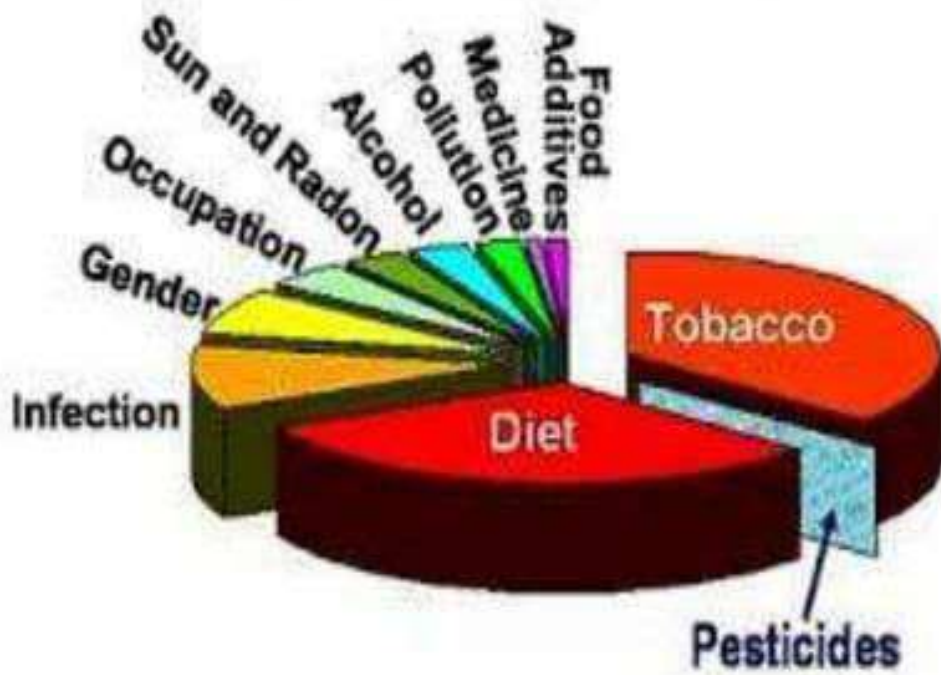
The chemical carcinogens present in tobacco smoke have been identified as a major cause of lung cancer.

- Cancer causing viruses called ***oncogenic viruses*** have genes called viral ***oncogenes***
- **cellular oncogenes or proto oncogenes:**
Are the normal cells which, when activated under certain conditions, could lead to oncogenic transformation of the cells.

Causes of Cancer



Causes of Cancer



Cancer detection and diagnosis

Early detection of cancers is essential as it allows the disease to be treated successfully in many cases.

- Cancer detection is based on *biopsy* and *histopathological* studies of the tissue and blood.

Techniques :-

- Radiography (use of X-rays)
- CT (computed
- Tomography)
- MRI (magnetic resonance imaging)

are very useful to detect cancers of the internal organs.



Parotid gland



A "core" sample of the gland is taken with a needle to be biopsied

Treatments of cancer

The common approaches for treatment of cancer are

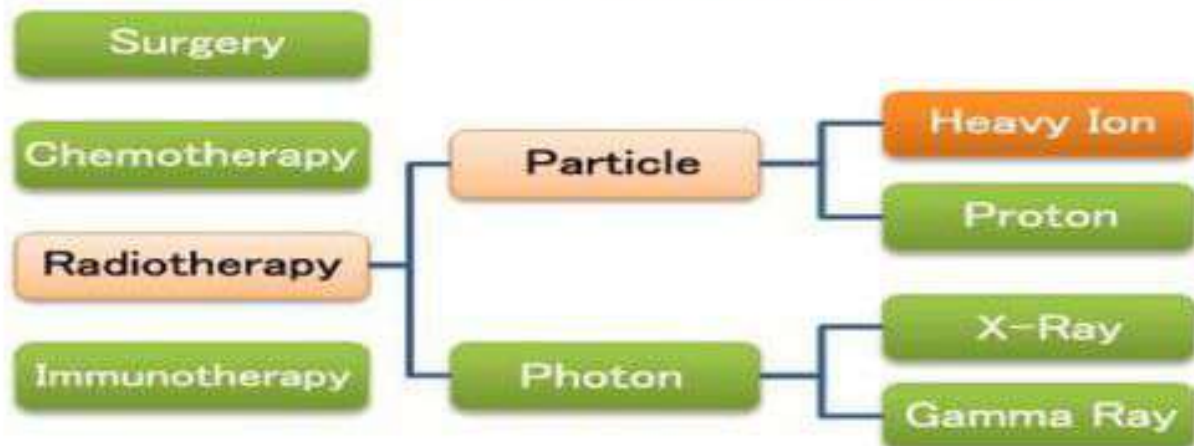
- surgery,
- radiation therapy and
- Immunotherapy



Radiation Therapy



Chemotherapy :- Several chemotherapeutic drugs are used to kill cancerous cells.



Side Effects

Some of these are specific for particular tumors . Majority of drugs have side effects like hair loss, anemia, etc.



Most cancers are treated by combination of surgery, radiotherapy and chemotherapy .Tumor cells have been shown to avoid detection and destruction by immune system. Therefore, the patients are given substances called biological response modifiers such as **α-interferon** which activate their immune system and help in destroying the tumor.

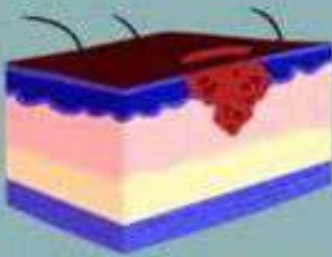
Types of cancers

There are five main types of cancers according to the type of tissue affected.

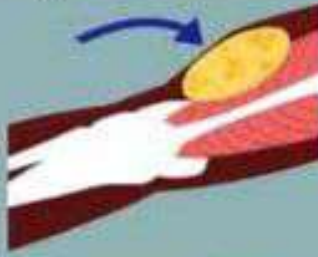
Cancers are named according to the tissue from which they arise.

- i. Carcinoma**
- ii. Sarcoma**
- iii. Lymphoma**
- iv. Leukemia**
- v. Adenocarcinoma**

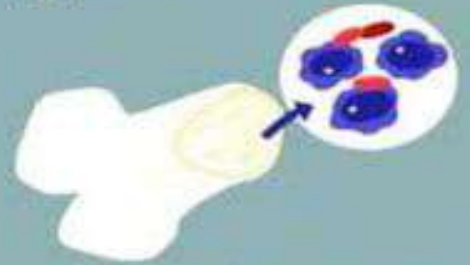
Cancers By Cell/Tissue Type



Carcinomas: Epithelial cells
(skin, body cavities, organs)



Sarcomas: Bones
and soft tissues



Myelomas: Plasma cells
(manufacture antibodies)



Leukemias: Blood cells
(originates in bone marrow)



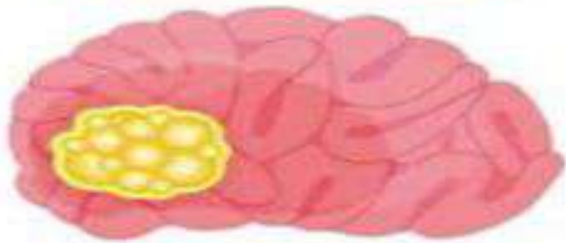
Lymphomas: Immune
system (lymph nodes, spleen,
stomach, testicles)



Mixed types: Derive from
multiple cell/tissue types

i. Carcinoma: Cancer that arise from epithelial tissue covering or lining the body organs is known as carcinoma.
EX. breast cancer, lung cancer, cancer of stomach, skin cancer. etc.

Brain Cancer



Kidney Cancer



Liver Cancer



Ovarian Cancer



ii. Sarcoma: Cancer that arises from connective tissue is called sarcoma. It include bone tumors (osteosarcoma), muscle tumors (myosarcoma), cancer of cartilage (chondrosarcoma) and cancer of adipose tissue (liposarcoma).

Different Kinds of Cancer

Some common carcinomas:

Lung
Breast (women)

Colon
Bladder
Prostate (men)

Leukemias:

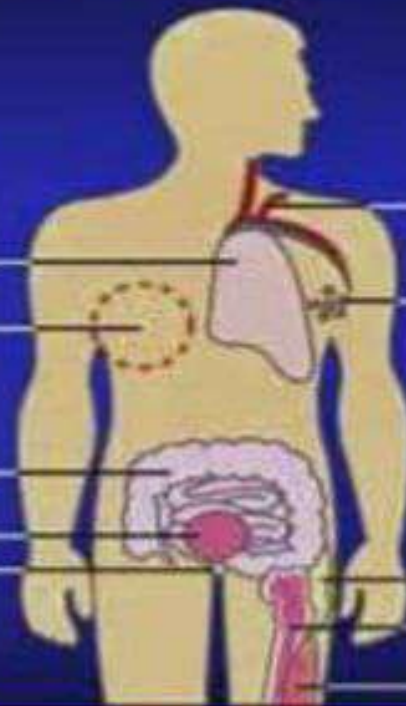
Bloodstream

Lymphomas:

Lymph nodes

Some common sarcomas:

Fat
Bone
Muscle



iii. Lymphoma: Cancer that arises from lymphatic tissue, is called lymphoma. It occurs in the lymphatic nodes, spleen and tissues of immune system.

iv. Leukemia: It is a type of **blood cancer** in which there is **excessive formation** of white blood cells (**WBCs**) or leucocytes in the bone marrow.

People suffering from leukemia have very high leucocyte count.

The blood contains millions of abnormal immature WBCs or leucocytes that are incapable of fighting infections.

**Types of leukemia ---1) monocytic leukemia,
2) lymphoblastic leukemia**

Lymphocytic leukemia (also known as lymphoid or lymphoblastic leukemia) develops in the white blood cells called lymphocytes in the bone marrow.

Myeloid leukemia (also known as myelogenous leukemia) may also start in white blood cells other than lymphocytes, as well as red blood cells and platelets

v. Adenocarcinoma: Adenocarcinoma cancer arises in thyroid, pituitary adrenal and other glandular tissues.

