

Cancer

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Cancer

What is cancer?

➤ Cancer is abnormal mass of tissue, the growth of which exceeds and is uncoordinated with that of the normal tissues and persists in the same excessive manner after cessation of stimuli which evoked the changes.

Or

➤ It is a disease of uncontrolled cell division, invasion and metastasis and is due to clonal expansion of a single neoplastic cell.

➤ Cancer cells are an abnormal cells of the body that undergo uncontrolled/ unlimited cell division that lead to increase the body mass.

Cancer.....

- Cancer cells does not respect usual cellular growth limit.
- They are far less adhesive with each other than normal cells
- Cancer cells produce angiogenic factors that cause the growth of new blood vessles to supply nutrition to cancer cells.

Factors responsible for cancer

1. Radiations.... Ultraviolet rays cause skin cancer, squamous cell carcinoma, basal carcinoma, malignant melanoma

X-rays.... Thyroid carcinoma and skin cancer

Nuclear fission rays: leukemia, thyroid, breast, colon, pulmonary carcinoma.

2. Chemicals: Aniline----blood cancer,

Hydrocarbons of petrol.....carcinogens

Carbon monoxide, argon cause cancer of bronchi and bladder.

High estrogen level cause breast cancer

High androgen levels cause prostate cancer

Cancer.....

Cigarette smoke cause cancer of lungs

3. Viruses

➤ RNA viruses cause AIDS related lymphoma. T cell leukemia

➤ DNA viruses

human papilloma virus cause carcinoma of cervix

Epstein Barr virus cause Burkett's lymphoma

Hepatitis B viruses cause hepato-cellular carcinoma

Cancer.....

Cell proliferation

It is a physiological process including growth, healing, repair, hypertrophy, hyperplasia and development of tumors.

Angiogenesis

The development of new blood vessels from existing blood vessels during cell proliferation.
VEGF (vascular endothelial growth factor) facilitate blood vessels growth.

Cancer.....

Cell differentiation

It is a special characteristics of cell growth and cell division which means changes in physical and functional properties of cells as they proliferate in the embryo to form the different bodily structure.

Metastasis

Transfer of a disease/pathogenic organism from one organ or part to another which is not directly connected with it.

Oncogenes are the abnormal genes that lead to the production of tumor cells.

Cancer.....

Apoptosis

It is a programmed cell death in which the cells uses specialized cellular machinery to kill itself. It is play an important role in embryogenesis, helping to shape organs, during development by eliminating cells.

There are two pathways of apoptosis:

1. **Death receptor pathway:** plasma membranes of most cells have tumor necrosis factor receptor that stimulate the binding of adaptor protein
2. **Mitochondrial pathway:** DNA damage-P53 protein-pro-apoptotic-mitochondria-release cytochrome C that lead to Apoptosis

Cancer.....

Cell cycle

It is an organized series of events that lead to the formation of two identical daughter cells. This involve the following phases:

G0 phase

G1 phase

S Phase

G2 phase

M phase

Anti-neoplastic classification.....

A. Alkylating agents

1. Nitrogen mustard

Chlorambucil

Melphalan

Cyclophosphamide

Ifosfamide

Mechlorethamine

2. Ethyleneimines and methylmelamines

Hexamethylmelamine

Thiotepa

3. Alkyl sulfonates

Busulfan

4. Nitrosoureas

Carmustine

Lomustine

Cemustine

Streptozotocin

5. Triazines

Dacarbazine

Temozolomide

Anti-neoplastic classification.....

B. Antimetabolites

1. Folic acid analog

Methotrexate

2. Pyrimidine analogs

5-Fluorouracil

Floxuridine

Cytarabine

Gemcitabine

3. Purine analogs

Mercaptopurine

Thioguanine

Fludarabine

Pentostatin

C. Vinca alkaloids

Vincristine

Vinblastine

Anti-neoplastic classification.....

D. Taxanes

- Paclitaxel
- Docetaxel

E. Epipodophylotoxins

Etoposide
Teniposide

F. Enzymes

L.asparaginase

G. Antibiotics

Bleomycin
Mitomycin
Doxorubicin
Daunorubicin
Dactinomycin

H. Hormones and antagonists

1. Androgens

Testosterone propionate
Fluoxymesterone

2. Antiandrogen-----Flutamide

Anti-neoplastic classification.....

3. Estrogens

- Diethylstilbesterol
- Ethinyl estradiol

4. Anti-estrogen

- Tamoxifen
- Anastrozole

5. Progestins

- Hydroxyprogesterone
- Medroxyprogesterone

6. Adrenocorticosteroids

- Hydrocortisone
- Prednisone

7. Gonado-tropin releasing hormone agonists

- Leuprolide
- Gosereline acetate

8. Peptide hormone inhibitor

- Octreotide

I. Miscellaneous

- Cisplatin, Procarbazine, Hydroxyurea