CHEMOTHERAPY

BY,
Ms. Ekta S Patel

Intro:

- In chemotherapy, antineoplastic agents are used in an attempt to destroy tumor cells by interfering with cellular functions and reproduction.

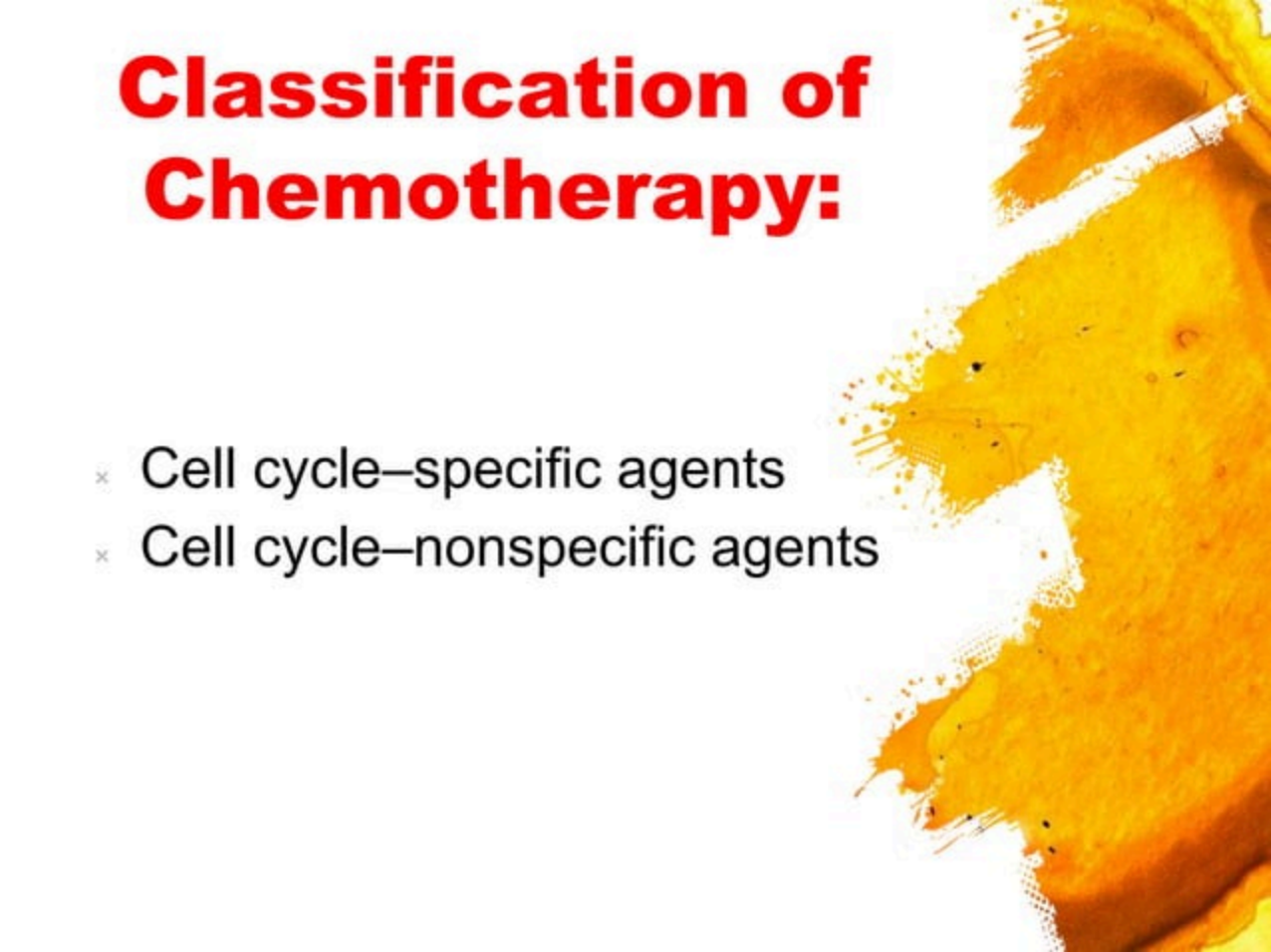
- Chemotherapy is used primarily to treat systemic disease rather than lesions that are localized.

- Chemotherapy may be combined with surgery or radiation therapy, or both, to reduce tumor size preoperatively, to destroy any remaining tumor cells postoperatively, or to treat some forms of leukemia.

- The goals of chemotherapy;
  - Cure,
  - Control,
  - Palliation

Classification of Chemotherapy:

- Cell cycle–specific agents
- Cell cycle–nonspecific agents



- Certain chemotherapeutic agents (cell cycle–specific drugs) destroy cells actively reproducing by means of the cell cycle.
- Many of these agents are specific to certain phases of the cell cycle.
- Most affect cells in the S phase by interfering with DNA and RNA synthesis.

- Others, such as the vinca or plant alkaloids, are specific to the M phase, where they halt mitotic spindle formation.

- Chemotherapeutic agents that act independently of the cell cycle phases are termed cell cycle–nonspecific agents.
- These agents usually have a prolonged effect on cells, leading to cellular damage or death.
- Many treatment plans combine cell cycle–specific and cell cycle–nonspecific agents to increase the number of vulnerable tumor cells killed during a treatment period.

Classification of Chemotherapy Agent :

- Alkylating Agents
- Plant Alkaloids
- Antitumor Antibiotics
- Antimetabolites
- Topoisomerase Inhibitors
- Miscellaneous Antineoplastics

1. Alkylating Agents

- Alkylating agents are most active in the resting phase of the cell.
- These types of drugs are cell-cycle non-specific.

- There are several types of alkylating agents used in chemotherapy treatments:

1. Melphalan
2. Busulfan.
3. Carboplatin, Cisplatin, and Oxaliplatin.

2. Plant Alkaloids

- Plant alkaloids are chemotherapy treatments derived made from **certain types of plants.**
- The vinca alkaloids are made from the periwinkle plant (catharanthus rosea)..
- The taxanes are made from the bark of the Pacific Yew tree (taxus).

- The plant alkaloids are cell-cycle specific.
- This means they attack the cells during various phases of division.

- Vincristine, Vinblastine

3. Antitumor Antibiotics

- Antitumor antibiotics are chemo treatments made from natural products produced by species of the soil fungus Streptomycin.
- These drugs act during multiple phases of the cell cycle and are considered cell-cycle specific.

- Doxorubicin, Daunorubicin,
- Mitomycin and Bleomycin.

4. Antimetabolites

- Antimetabolites are types of chemotherapy treatments that are very similar to normal substances within the cell.
- When the cells incorporate these substances into the cellular metabolism, they are unable to divide.

- Antimetabolites are cell-cycle specific.
- They attack cells at very specific phases in the cycle.
- Antimetabolites are classified according to the substances with which they interfere.

- Methotrexate.
- 5-Fluorouracil,
- Cytarabine,
- Gemcitabine.

5. Topoisomerase Inhibitors

- Toposiomerase inhibitors are types of chemotherapy drugs that interfere with the action of topoisomerase enzymes (topoisomerase I and II).
- During the process of chemo treatments, topoisomerase enzymes control the manipulation of the structure of DNA necessary for replication.

- Ironotecan, topotecan
- etoposide, etoposide phosphate, teniposide

6. Miscellaneous Antineoplastics

- Several useful types of chemotherapy drugs are unique:

- Ribonucleotide reductase inhibitor: Hydroxyurea.
- Adrenocortical steroid inhibitor: Mitotane
- Enzymes: Asparaginase and Pegaspargase.
- Antimicrotubule agent: Estramustine
- Retinoids: Bexarotene, Isotretinoin, Tretinoin (ATRA)

Immunotherapy

Immunotherapy is a medical term defined as the "treatment of disease by inducing, enhancing, or suppressing an immune response".

Tow types of immunotherapy:

- Activation immunotherapies
- Suppression immunotherapies

Activation immunotherapies:

Immunotherapies designed to elicit or amplify an immune response

Suppression immunotherapies:

Immunotherapies that reduce or suppress are classified as suppression immunotherapies.

- **Cell based Immunotherapies** are proven to be effective for some cancers. Immune effector cells such as lymphocytes, macrophages, dendritic cells, natural killer cells (NK Cell), cytotoxic T lymphocytes (CTL), etc., work together to defend the body against cancer by targeting abnormal antigens expressed on the surface of the tumor due to mutation.


gene
therapy

Definition of gene therapy

- " Novel approach to treat, cure or ultimately prevent a disease by changing the expression of a person's genes"

STEPS IN GENE THERAPY:

- 1. Identification of the defective gene.
- 2. Cloning of normal healthy gene.
- 3. Identification of target cell / tissue / organ.
- 4. Insertion of the normal functional gene into the host DNA.

Gene Therapy Approaches:

- Two ways to deliver genes: 1. Ex vivo approach
- 2. In vivo approach

1. Ex vivo approach:

- Target cells are removed from the body and grown in vitro.
- The gene is then introduced into the cultured cells.
- These cells are then re-introduced into the same individual
- Examples: Fibroblast cells, Hematopoietic cells.

2. In vivo approach: (Direct Gene Transfer)

- Cloned therapeutic gene is introduced directly into the affected tissue, without removing cells from the body.
- Specially designed vehicles are needed.
- Examples are: Lungs, Brain


STOMAL
THERAPY

- Stomal therapy nurses are registered nurses who have undertaken further education enabling them to provide specialised care for people undergoing surgery that involves the formation of a stoma.

- A stoma is a surgically created opening on the body that allows for the passage of waste.
- A stoma may be temporary or permanent.

- Types of stomas include colostomy, ileostomy and ileal conduit (or urinary diversion).

SERVICES

- Pre-operative education, counselling and siting of all patients undergoing surgery that may potentially involve the formation of a stoma.
- Post-operative education to promote independence in stoma care.
- Ongoing outpatient support for people living with a stoma including intervention, travel advice, revision/management of stoma supplies,

- Liaison with external/community health care providers to ensure ongoing support if required
- Consultation for management of fistulae and large wounds
- Assistance and support for patients that have long term drain tubes or fistulae

ADDITIONAL SERVICES

- Colostomy irrigation education
- Assistance with management of faecal incontinence/post operative bowel dysfunction
- Stoma/wound care education for Peter Mac staff

- Support for PEG service (percutaneous endoscopic gastrostomy feeding tubes) including advice about skin care at site, tube changes and/or removals and attendance at the multidisciplinary PEG clinic weekly