

33.1. ANTI-NEOPLASTIC DRUGS

33.1.1. Introduction

Cancer is a disease characterised by abnormal and uncontrolled cell division attacking the surrounding tissues and organs, and also the distant body parts by circulating with blood and lymph.

Cancer types are classified into the following categories:

- 1) **Carcinoma:** This type of cancer starts in the skin or in tissues lining the internal organs. There are many sub-types of carcinoma, like adenocarcinoma, basal cell carcinoma, squamous cell carcinoma, and transitional cell carcinoma.
- 2) **Sarcoma:** This type of cancer starts in the bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissue.
- 3) **Leukaemia:** This type of cancer starts in the blood-forming tissues (i.e., the bone marrow) and produces numerous abnormal blood cells.
- 4) **Lymphoma and Myeloma:** This type of cancer starts in the cells of the immune system.
- 5) **Central Nervous System Cancers:** This type of cancer starts in the brain and spinal cord tissues.

Antineoplastic or anticancer drugs are used for treating malignancies or cancerous growths. Either these drugs are used alone (chemotherapy) or in combination with surgery or radiation therapy.

33.1.2. Classification

Antineoplastic drugs are classified into the following classes:

1) Alkylating Agents	
Nitrogen mustards	Mechlorethamine (Mustine HCl), Cyclophosphamide, Ifosfamide, Chlorambucil, and Melphalan
Ethylenimine	Thio-TEPA
Alkyl sulfonate	Busulfan
Nitrosoureas	Carmustine (BCNU) and Lomustine (CCNU)
Triazine	Dacarbazine (DTIC)
2) Antimetabolites	
Folate antagonist	Methotrexate (Mtx)
Purine antagonist	6-Mercaptopurine (6-MP), 6-Thioguanine (6-TG), and Azathioprine
Pyrimidine antagonist	5-Fluorouracil (5-FU) and Cytarabine (cytosine arabinoside)

1) Natural Products	
Vinca alkaloids	Vincristine (Oncovin) and Vinblastine
Taxanes	Paclitaxel and Docetaxel
Epipodophyllotoxin	Etoposide
Camptothecin analogues	Topotecan and Irinotecan
4) Antibiotics	
	Actinomycin D (Dactinomycin)
	Doxorubicin
	Daunorubicin (Rubidomycin)
	Mitoxantrone
	Bleomycin, Mitomycin C, and Mithramycin (Plicamycin)
5) Enzymes	Asparaginase (Elspar)
6) Miscellaneous	Hydroxyurea, Procarbazine, L-Asparaginase, Cisplatin Carboplatin
7) Hormones	
Glucocorticoids	Prednisolone
Estrogens	Fosfestrol and Ethinylestradiol
Antiestrogen	Tamoxifen
Antiandrogen	Flutamide
5- α reductase inhibitor	Finasteride
GnRH analogues	Naferelin and Goserelin
Progesterins	Hydroxyprogesterone acetate, etc.
8) Radioactive Isotopes	Sodium phosphate and Sodium iodide Radio gold solution

33.1.3. Individual Compounds

The following drugs are studied in detail:

- 1) Actinomycin,
- 2) Azathioprine,
- 3) Busulfan,
- 4) Chlorambucil,
- 5) Cisplatin,
- 6) Cyclophosphamide,
- 7) Daunorubicin hydrochloride,
- 8) Fluorouracil,
- 9) Mercaptopurine,
- 10) Methotrexate, and
- 11) Mitomycin.