33.1.3.4. Chlorambucil

Chlorambucil is a nitrogen mustard alkylating agent used as an antineoplastic agent for treating many malignant and non-malignant diseases.

Molecular Formula: $C_{14}H_{19}Cl_2NO_2$

IUPAC Nomenclature: 4-{4-[bis(2-chloroethyl)amino]phenyl}butanoic acid

Properties: Chlorambucil occurs as white to pale beige crystalline or granular powder with a slight odour. It is insoluble in water; soluble in benzene and ether; and readily soluble in acid or alkali.

Uses: Chlorambucil is used in the treatment of chronic lymphatic leukaemia, childhood minimal-change nephrotic syndrome, and malignant lymphomas including lymphosarcoma, giant follicular lymphoma, Hodgkin's disease, non-Hodgkin's lymphomas, and Waldenström's Macroglobulinemia.

Stability and Storage Conditions: Chlorambucil is sensitive to light and heat, thus should be stored in a refrigerator at 2-8°C temperature in tightly-closed light-resistant containers.

Type of Pharmaceutical Formulation: Tablets.

Brand Names: Leykeran and Chloramax.

33.1.3.5. Cisplatin

Cisplatin is a platinum-based chemotherapy drug used for the treatment of various types of cancers, such as sarcomas, some carcinomas (**e.g.,** small cell lung cancer, and ovarian cancer), lymphomas, and germ cell tumours.

Molecular Formula: $Cl_2H_4N_2Pt$

IUPAC Nomenclature: dichloroplatinumdiamine

Properties: Cisplatin occurs as deep yellow solid. It is soluble in dimethylformamide; and insoluble in most of the common solvents.

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Uses: Cisplatin is used for the treatment of metastatic testicular tumours, metastatic ovarian tumours, and advanced bladder cancer.

Stability and Storage Conditions: **Cisplatin lyophilised powder** should be stored under refrigeration at 2-8°C temperature away from light. **Cisplatin solutions** should be stored above freezing and below 25°C temperature away from light. Its **reconstituted solution** should be stored at room temperature and protected from light.

Type of Pharmaceutical Formulation: Injections.

Brand Names: Platinex, Cisteen, Oncoplatin, Cytoplatin, and Blastolem.

33.1.3.6. Cyclophosphamide

Cyclophosphamide is a precursor of alkylating nitrogen mustard antineoplastic and immunosuppressive agent. It should be activated in the liver to form the active aldophosphamide.

Molecular Formula: $C_7H_{15}Cl_2N_2O_2P$

IUPAC Nomenclature: 2-[bis(2-chloroethyl)amino]-1,3,2λ^5-oxazaphosphinan-2-one

Properties: Cyclophosphamide occurs as fine white crystalline powder with no odour and a slightly bitter taste. It is slightly soluble in benzene and carbon tetrachloride; and very slightly soluble in ether and acetone.

Uses: Cyclophosphamide is used in the treatment of malignant lymphomas, multiple myeloma, leukaemia, mycosis fungoides, neuroblastoma, adenocarcinoma of the ovary, retinoblastoma, and carcinoma of the breast. It is also used in biopsy-proven minimal change nephrotic syndrome in paediatrics.

Stability and Storage Conditions: Cyclophosphamide turns dark on exposure to light. It is also sensitive to oxidation and moisture, thus should be stored in tightly-closed containers at 2-32°C temperature.

Types of Pharmaceutical Formulations: Tablet, capsule, and injection.

Brand Names: Cycloxan, Cyphos, Endoxan-N, Oncophos, and Oncomide.

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