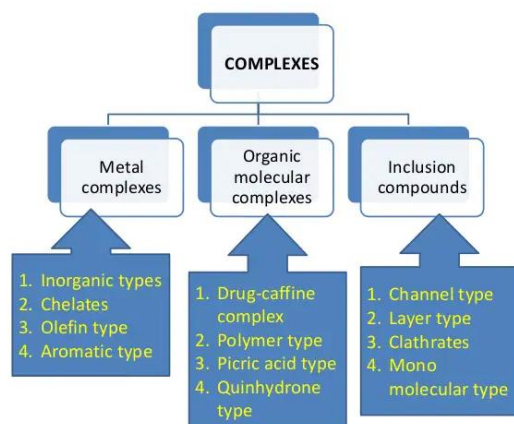


COMPLEXATION AND PROTEIN BINDING

COMPLEXATION :

DEFINATION: Complexation is the process of complex formation that is the process of characterization the covalent or non-covalent interactions between two or more compounds.

CLASSIFICATION OF COMPLEXATION :



1) METAL ION OR CO-ORDINATION COMPLEXES

A) INORGANIC COMPLEXES:

In Inorganic metal complexes, ligands provides only one site for binding with metals. **EX** - Carbohydrates, fats, protein, nucleic acid, urea .

B) CHELATES : Chelates are a group of metal ion complexes in which substances provides two or more dinars group to combined with metal ion.

EX- Ethylene diamine.

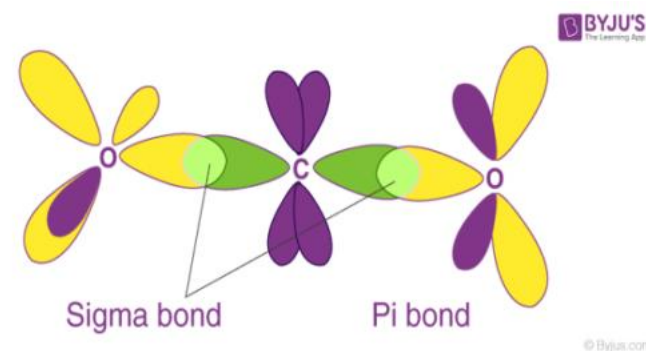
C) OLEFIN TYPE : These are used as catalyst in the manufacturing of the bulk drugs and analysis of drugs.

Ex - Unsaturated hydrocarbons

D) Aromatic type :

a) **Pie complex** – ($\pi = \text{Cd}$)

Ex – Aromatic bases (benzene , toluene and xylene) form π -bond complexes with metal ions like Ag by Lewis acid base reaction.

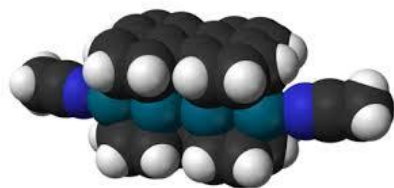


b) **Sigma complex** : Sigma bond complexes involve in the formation of a sigma bond between ion and carbon of aromatic ring.

COMPLEXATION AND PROTEIN BINDING



c) Sandwich Complexes: They are relatively stable complexes involving in the delocalized covalent bond between the d-orbital of transition metal and a molecular orbit of the aromatic ring.



2) ORGANIC MOLECULAR COMPLEX

A) Quinhydrone type : ($C_{12}H_{10}O_4$) The molecular complex of this type of is obtained by mixing alcoholic solutions of equimolar quantities of hydroquinone and

benzoquinone EX – benzene ,hydrogen , Quinone.

B) Picric acid: ($C_6H_3N_3O_7$)It is pale yellow, odorless crystal that is slightly soluble in water. EX- Bateson Picrate.

C) Caffeine and other drug complexes :

($C_8H_{10}N_4O_2$) A number of acidic drugs are known to form complexes with caffeine. Drugs such as benzocaine, procaine and tetra Caine form complexes with caffeine.

D) Polymer type:

Many pharmaceutical additives such as polyethylene glycols(PEGs) , carboxymethyl cellulose(CMC) contain nucleophilic oxygen.

3) Inclusion or occlusion compounds :

A) lattice type :

Channel lattice complexes provides a mean of separation of optical isomers.

B)Lattice type :

Layer type of complex is the is the type of inclusion compounds in which guest molecules is diffused between the layer of carbon atoms, to form a alternate guest and host molecules.

COMPLEXATION AND PROTEIN BINDING

C) Clathrates :

The clathrates are compounds that crystallize in the form of a cage like lattices in which the coordinating compounds is entrapped.

D) Monomolecular type:

Monomolecular inclusion complexes provides entrapment of guest molecules into the cage like structure formed from a single host molecules.

E) Macromolecular type

The atoms are arranged in three dimensions to produce cages and channels in which the guest molecules are entrapped.

APPLICATION OF COMPLEXATION :

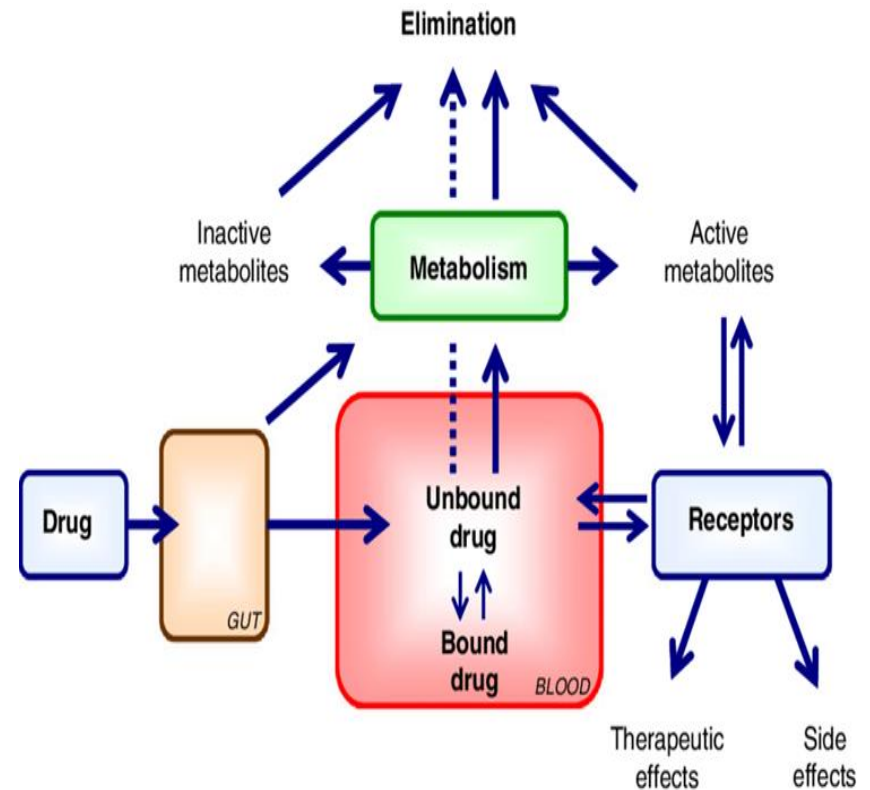
COMPLEXATION –Applications in pharmacy

- Physical state
- Volatility
- Solid state Stability
- Chemical stability
- Solubility
- Dissolution

- Partition coefficient
- Absorption & bioavailability
- Reduced toxicity
- Antidote in metal poisoning
- Drug action through metal poisoning
- Antibacterial activity

PROTEIN BINDING :

- 1) protein binding refers to the degree to which medications attach to proteins within the blood.
- 2) drug's efficiency may be affected by the degree to which it binds.



1) Elimination – It means the act, process, or an instance of eliminating or discharging.

COMPLEXATION AND PROTEIN BINDING

2) Inactive Metabolites – When a metabolite of a drug produces no therapeutic effect it is considered an inactive metabolite.

3) Active Metabolites – When a drug is metabolized by the body into a modified form which continues to produce effects in the body.

4) Metabolism – The metabolic breakdown of drugs by living organisms, usually through specialized enzymatic systems.

5) Drug – A chemical substance used to treat, cure, prevent, or diagnose a disease or to promote well-being.

6) Receptors – Receptors are large molecules usually proteins, that interact with and mediate the action of drugs.

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