MEDICINAL CHEMISTRY-I – BP402T

-
- UNIT: 1
- CLASS: 9

TOPIC: PRODRUGS

PRODRUGS:

Prodrugs are designed to improve the permeability and oral absorption of the parent drugs

- They are inactive drug analogs with better pharmacokinetics properties (eg.oral bioavailibity, BBB penetration).
- They are more lipid soluble than the parent drug and should be rapidly converted to the parent compound during absorption from the gut wall, liver or site of action.
- A prodrug may be used to improve how selectively the drug interacts with cells or processes that are not its intended target.
- This reduces adverse or unintended effects of a drug, especially important in treatments like chemotherapy, which can have severe unintended and undesirable side effects.
- **Eg: 1. Pivampicillin, the pivalate ester prodrug of ampicillin.**
- **2. Valacyclovir—a l-valyl ester prodrug of acyclovir.**
- **3. Methyl dopa--- prodrug of methyl dopamine.**

SOFT DRUGS:

Prodrugs are designed in such a way that the active drug is generated by the major metabolic pathway.

- Prodrugs might effectively eliminate some toxicities by protecting the drug from unwanted degradations particularly those occurring in GIT prior to and during absorption or possibly during the first passage through the liver.
- The application of soft drugs is necessary to overcome and to improve

a.) Pharmacokinetic insuffiencies
b.) Transportability and
c.) Site specificity

The soft drugs are defined as **therapeutically beneficial agents characterized by a predictable and controllable *in-vivo* metabolism to non-toxic moieties, after they achieve their therapeutic role.**

- The site specific delivery via chemical modification involves the design of a soft drug from an inactive metabolite.
- The designed drug is then transformed by facile and predicted routes of metabolism ultimately resulting in the delivery of the active drug at the expected sites of action.
- **Eg: Local delivery of steroids, drugs acting on specific areas in the eye, brain and testes.**
- The concept of 'soft drug' may also be applied to develop selective and safer ocular drug delivery systems for the treatment of Glaucoma, Occular inflammation and infections.

TARGETED DRUGS:

Targeted drugs area latent forms of bioactive substances prepared by associating them with carriers capable of transporting the drug from the site of application selectively to their target cells.

- The chief objective of synthesizing or preparing targeted drugs is to ensure specific interaction of drugs with their targets and this minimizes adverse reactions that might result from their association with non target sites as well.
- The main carrier systems used to prepare targeted drugs are

a.) Macromolecular: albumin, monoclonal antibodies, glycoproteins

b.) Cellular: resealed erythrocytes and fibroblasts.

c.) Synthetic: synthetic polymers such as cyclodextrin polymers and methacrylamide polymers and liposomes.

- Targeted drugs are used as latent chemotherapeutic agents, especially in cancer and infectious diseases such as those caused by protozoa and viruses.
- In targeted antineoplastic agents, the most promising carriers seem to be proteins such as antibodies, peptide harmones and glycoproteins.
- **Eg: Primaquine, Estramustine and Prednimustine**