Pharmacokinetics

Pharmacokinetics is the quantitative study of drug movement in, through and out of the body. The intensity of response is related to concentration of the drug at the site of action, which in turn is dependent on its pharmacokinetic properties.
.All pharmacokinetic processes involve transport of the drug across biological membranes.

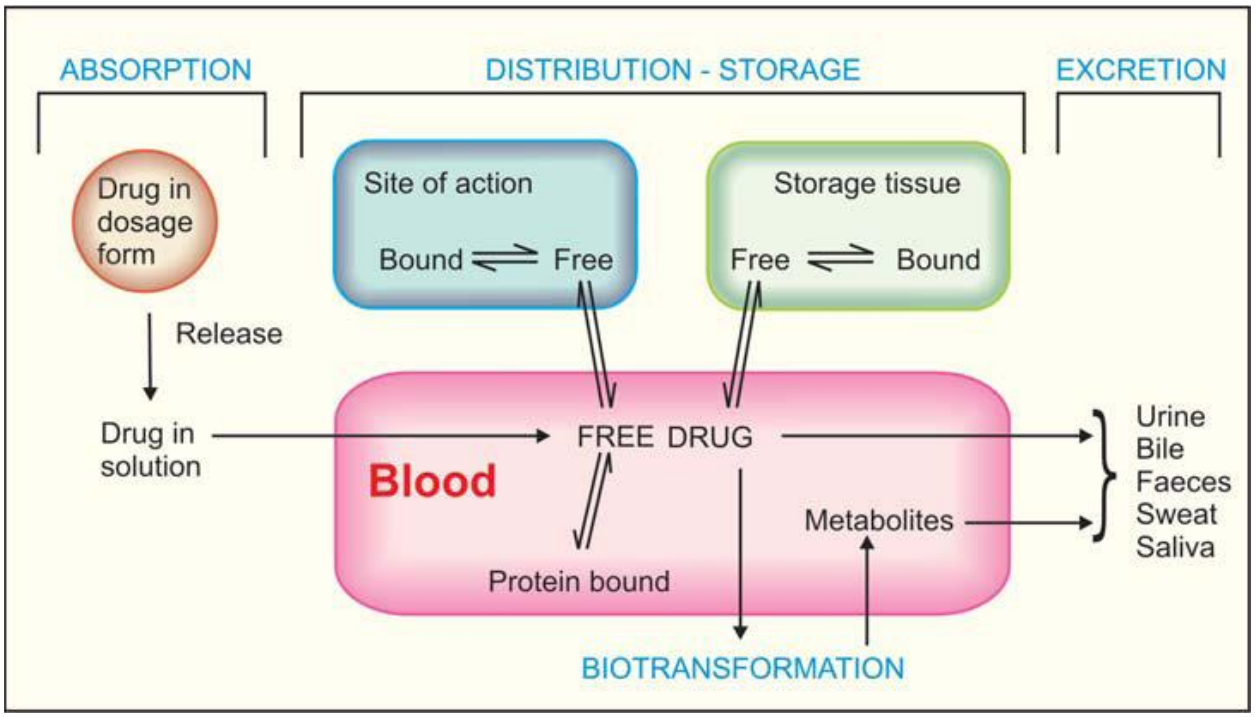

Fig: Schematic depiction of pharmacokinetic processes

Absorption is movement of the drug from its site of administration into the circulation. Not only the fraction of the administered dose that gets absorbed, but also the rate of absorption is important. Except when given i.v., the drug has to cross biological membranes; absorption is governed by the above described principles. Other factors affecting absorption are:

Aqueous solubility Drugs given in solid form must dissolve in the aqueous biophase before they are absorbed. For poorly water soluble drugs (aspirin, griseofulvin) rate of dissolution governs rate of absorption. Obviously, a drug given as watery solution is absorbed faster than when the same is given in solid form or as oily solution.

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Area of absorbing surface Larger it is, faster is the absorption.

***Vascularity** of the absorbing surface* Blood circulation removes the drug from the site of absorption and maintains the concentration gradient across the absorbing surface. Increased blood flow hastens drug absorption

Route of administration This affects drug absorption,because each route has its own peculiarities.

Oral The effective barrier to orally administered drugs is the epithelial lining of the gastrointestinal tract,which is lipoidal. Nonionized lipid soluble drugs, e.g. ethanol are readily absorbed from stomach as well as intestine at rates proportional to their lipid : water partition coefficient. Acidic drugs, e.g. salicylates, barbiturates, etc. are predominantly unionized in the acid gastric juice and are absorbed from stomach, while basic drugs, e.g. morphine, quinine, etc. are largely ionized and are absorbed only on reaching the duodenum.

Subcutaneous and Intramuscular

By these routes the drug is deposited directly in the vicinity of the capillaries. Lipid soluble drugs pass readily across the whole surface of the capillary endothelium. Capillaries having large paracellular spaces do not obstruct absorption of even large lipid insoluble molecules or ions. Very large molecules are absorbed through lymphatics. Thus, many drugs not absorbed orally are absorbed parenterally. Absorption from s.c.site is slower than that from i.m. site, but both are generally faster and more consistent/ predictable than oral absorption.

Topical sites (skin, cornea, mucous membranes) Systemic absorption after topical application depends primarily on lipid solubility of drugs.However, only few drugs significantly penetrate intact skin. Hyoscine, fentanyl, GTN, nicotine, testosterone, and estradiol have been used in this manner. Corticosteroids applied over extensive areas can produce systemic effects and pituitary-adrenal suppression. Absorption can be promoted by rubbing the drug incorporated in an olegenous base or by use of occlusive dressing which increases hydration of the skin.