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⊙ Objectives

At the end of this sessions students should be able to:

- List and discuss common routes of drug administration
- Explain the absorption pattern of common routes of drug administration.
- Describe various dosage forms and their absorption pattern

- Discuss noveldrug deliv ery systems like transdermal drug delivery etc…

⊙PHARMACOKINETICS

- ⊙ The quantitative study of drug movement in, through and out of the body(Effect of Body on Drug, fate of drug).
- ⊙ Pharmacokinetic processes include
- Absorption of drug
- Distribution of drug
- Metabolism of drug
- Excretion of drug

Pharmacokinetics is significant for

- Route of drug administration
- Dose of drug
- Latency of onset
- Time of peak action
- Duration of action
- Frequency of drug administration

- Routes of drug administration

Factors governing choice of route

- Physical and chemical properties of drug
- Site of desired action

- Rate and extent of absorption of drug from different routes
- Effect of digestive juices and first pass metabolism.
- Rapidity with which the response is desired
- Condition of the patient

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PHARMACOKINETICS II
DRUG ABSORPTION

⊙ Objectives

- Discuss factors affecting drug absorption
- Emphasize factors influencing bioavailability and bioequivalence
- Explain the concept of Henderson Hasselbach equation.

⊙DRUG ABSORPTION

Absorption is the movement of drug from its site of administration into the blood stream.

Factors affecting drug absorption:

⊙ Aqueous solubility(transport across membrane)

- Effect of pH
- Area of absorbing surface
- Vascularity of the absorbing surface
- Route of administration

Pharmacological implications of Henderson Hasselbach's equation:

Most drugs are weak electrolytes, that is, their ionization is pH dependant.

- Weakly acidic drugs which form salts with cations (example: sodium phenobarbitone, sodium sulphadiazine ,potassium penicillin V) ionise more at alkaline pH.
- Weakly basic drugs which form salts with anions(example:

atropine sulphate, ephedrine hydrochloride, chloroquine phosphate) ionize more at acidic ph.

- Ions being lipid insoluble do not diffuse across a biological membrane.
- Acidic drug example aspirin(pK_a =3.5) are largely unionized at acidic gastric pH and are absorbed from the stomach.

- Basic drugs like atropine(pK_a =10) are largely unionized and absorbed only when they reach small intestine.
- Acidic drug are ionized more in alkaline urine – do not diffuse in the kidney and are excreted faster. Accordingly, basic drugs

are excreted faster if urine is acidified. This principle is used in treatment of drug overdose.

- Bioavailability
- It is a measure of the fraction of administered dose of a drug that reaches the systemic circulation in the unchanged form.
- Bioavailability of a drug injected intravenously(IV) is 100%.
- Calculated from comparing plasma level of a drug after a particular route of administration with plasma drug level achieved by IV injection.

Factors that influence bioavailability of a drug

- First pass hepatic metabolism
- Solubility of a drug
- Chemical stability
- Nature of drug formulation.

Bioavailibility variation assumes practical significance for drugs with low safety margin (digoxin) or where dosage needs precise control.