

TRANSDERMAL ROUTE: Highly lipid-soluble drugs can be applied over the skin for prolonged absorption, e.g. nitroglycerin ointment in angina pectoris. Adhesive units, iontophoresis, and jet injection are some forms of transdermal drug delivery. Adhesive units: Adhesive patches of different sizes and shapes are made to suit the area of application. Site of the application is the chest, abdomen, upper arm, back, or mastoid region, e.g. hyoscine, nitroglycerin fentanyl, estrogen, testosterone transdermal patches.

ADVANTAGES: Duration of action is prolonged. Provide constant plasma levels. Patient compliance is good. **Inunction:** In this route of administration the drug is rubbed into the skin and it gets absorbed to produce systemic effects. **Iontophoresis:** In this procedure, galvanic current is used for bringing about the penetration of lipid insoluble drugs into the deeper tissues where its action is required, e.g. salicylates, fluoride iontophoresis is used in the treatment of dental hypersensitivity.

Jet injection: As absorption of the drug occurs across the layers of the skin, **TRANSMUCOSAL:** Drug is absorbed across the mucous membranes. It includes sublingual, nasal, and rectal routes. **Sublingual:** Here, the tablet or pellet containing the drug is placed under the tongue. It dissolves and the drug is absorbed across the sublingual mucosa, e.g. Nitroglycerin, nifedipine, buprenorphine.

ADVANTAGES: Absorption is rapid - within minutes the drug reaches the circulation. First pass metabolism is avoided. After the desired effect is obtained, the drug can be spat out to avoid unwanted effects.

DISADVANTAGES: Buccal ulceration can occur. **Nasal:** Drugs can be administered through the nasal route. e.g. Oxytocin spray, oxymetazoline, budesonide for allergic rhinitis. **Rectal:** Rectum has a rich blood supply and drugs can cross the rectal mucosa to be absorbed for systemic effect.

Drugs absorbed from the upper part of the rectum are carried by the superior hemorrhoidal vein to the portal circulation. e.g. indomethacin, chlorpromazine, diazepam can be given rectally.

6. Route of administration: route of administration may modify the pharmacodynamic response. e.g. Mgso₄ given orally is a purgative, in IV it causes CNS depression and has anticonvulsive effects. applied topically it reduces local edema.

7. Genetic factor: the enzyme production is genetically controlled. The response of the drugs differs according to the metabolizing enzymes. A. Acetylation of drugs: the rate of drug acetylation differs among individuals people may be fast or slow acetylators.e.g. INH, sulfonamides, and hydralazine.

B.G6PD deficiency: primaquine, sulphones, and quinolones can cause hemolysis in such people.

8. Dose: it is interesting to know the response of the drug, the dose is increased the response also increased till the maximum reached .incase some drugs further increase the drug response is lowered. e.g. Myasthenia gravis, neostigmine enhance the muscle power in therapeutic doses in higher doses it produces muscle paralysis.

9. Diseases: the presence of certain diseases can influence drug responses,e.g. Malabsorption -drugs are poorly absorbed, liver diseases rate of metabolism reduced.

10. Repeated dosing: Can result in cumulation, tolerance, tachyphylaxis. Cumulation: Drugs like digoxin which are slowly eliminated may cumulate resulting in toxicity. Tolerance: Tolerance is defined as the capacity of the body to become less responsive to a substance. A lethal dose of Morphine is 250 mg, an addict can tolerate morphine in gm.

Tachyphylaxis: is the rapid development of tolerance. when some drugs are administered repeatedly at short intervals, tolerance develops rapidly and is known as tachyphylaxis or acute tolerance.

11. Psychological factor: the doctor-patient relationship as well as the nursing care influence the response to a large extent by acting on the patient's psychology. The patient's confidence in the doctor may itself be sufficient to relieve suffering, particularly the psychosomatic disorder. placebo is the inert dosage form with no biological activity but only resembles the actual preparation in appearance.