

Routes of drug administration

الشيء الثاني في الفارماكولوجيا 1

- **1-Enteral route:** It is the administration of the drug in any part of the GIT. It is divided into:
 - **A- Oral route:** It is the most commonly used.
 - Advantages:
 - 1- Safe & painless
 - 2- Convenient.
 - 3- Economical.
 - 4- Not need sterilization or assistance of other persons.

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- Disadvantages:
- Drugs may cause irritation to mucosa of stomach.
- Destruction of some drugs by gastric acid & enzymes (e.g. insulin, oxytocin).
- Absorption of drugs may be irregular in the presence of food or other drugs.

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- Cannot be used in cases of unconscious and uncooperative patients & is not useful in presence of vomiting or diarrhea.
- Not suitable for emergency.
- Certain drugs are not absorbed (polar drugs e.g. aminoglycoside antibiotics).

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- * Dosage forms that used orally are either solid or liquid:
 - a- Solid dosage forms include tablets (ordinary, chewable, sublingual, lozenges, effervescent, enteric coated), capsule (hard, soft), powder & granules.
 - Liquid dosage forms include (Syrup, elixir, suspension, emulsion & solution).

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- **B- Rectal route:**

- Advantages:

- 1- It is suitable for children.

- 2- It is suitable for drugs irritant to stomach.

- 3- It is suitable for drugs destroyed by GIT

enzymes or presence of disease in the lower part of GIT.

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- Disadvantages:
 - 1- Inconvenient.
 - 2- Absorption is low, irregular, & incomplete.
 - 3- Some drugs may cause irritation to rectal mucosa.
- * Dosage forms that used are (Suppositories are solid & enemas are liquid forms).

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- **2-Parenteral route:** It is the introduction of drug outside the GIT.
- **A-Injection:**
- There are different types of injection that give different rate of absorption
- Advantages:

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- 1- Suitable for unconscious patients & patients with vomiting.
- 2- Suitable for emergency cases (drugs are directly go to blood).
- 3- Suitable for drugs irritant to GIT or not absorbed through GIT.
- 4- Response is accurately measurable (e.g blood pressure) & titration of the dose with the response is possible

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- Disadvantages:
- 1- Need sterilization (to avoid infection) & skilled person.
- 2- May cause local irritation or necrosis
- 3- Serious side effects when given in large dose or quickly.

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- **Intravenous injection (I.V):**
- Advantages:
 1. Provide highly effective & predictable blood concentration of the dose.
 2. Small amount or large amount of drug can be used by infusion.

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- Disadvantages:
- 1-Some drugs are toxic if given quickly.
- 2-Only solutions can be used.
- 3-Local venous thrombosis is liable to occur.
- Generally I.V injection is the most hazardous route, vital organs e.g heart, brain get exposed to high concentration of drug.

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- **Intramuscular (I.M):** It is easier than I.V, oily solution can be given to delay the absorption, the volume of injection is limited (less than 5 ml).
- **Subcutaneously (S.C):** It is acceptable for self administration (e.g insulin). The disadvantages are poor absorption in peripheral failure & repeated injections at one site can cause lipoatrophy, resulting in erratic absorption. Small volume (1 ml) only can be used.

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- **Intradermal (I.D):** It is the injection of very small volume (0.1 ml) of the drug between the dermis & epidermis e.g BCG vaccination.
- **Intraarticular inj.:** It is the injection of the drug in the joints.
- **Intrathecal inj.:** Drug is injected into the spinal subarachnoid space, in case of CNS infection, or to

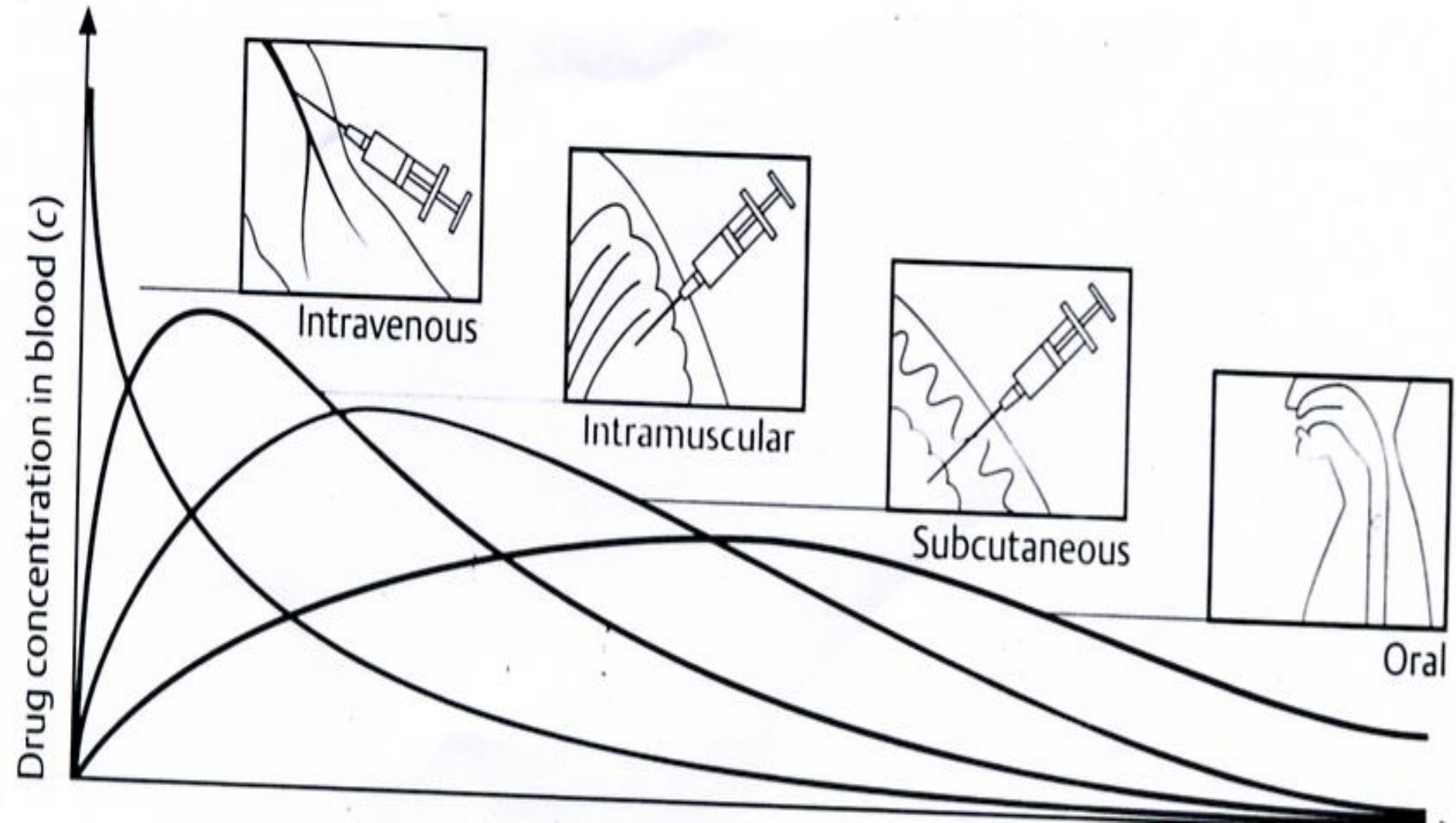
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- **Intra arterial inj** : it is used in cancer chemotherapy.
- **Intraperitoneal inj**: It is used in animals for laboratories experiments.
- **Intracardiac inj**: Such as injection of adrenaline in cardiac muscle in treatment of cardiac arrest.

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- Dosage forms of injection are either ampoule (single dose of sterile solution or suspension) or vial (contain powder to be dissolved by distilled water & it is single or multi dose preparation).

Parenteral routes & time course of drug concentration



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- **B-Inhalation:**

The drug is absorbed through the lung. The surface area of the lungs is very large, allowing quick absorption of drugs, which pass directly to systemic circulation avoiding the first pass effect.

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- Disadvantages:
- Special apparatus is needed.
- The drug must be nonirritant.
- Obstructed bronchi may cause therapy failure.

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- **C- Topical route**
- For local effect; the drug is given to (skin, eye, anal canal, rectum, and vagina).
- Advantage: Provision of high local concentration without systemic effect.

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- Disadvantages: Absorption can occur, especially when there is tissue destruction so that systemic side effects result e.g. adrenal steroids & neomycin to the skin, atropine to the eye. Ocular administration of Beta blockers may cause systemic effects & such eye drops are contraindicated for patients with asthma.