

Al-Mustaqbal University College
Department of Pharmacy
4th stage
Practical Pharmacology II
Lab: 1



ROUTES OF DRUG ADMINISTRATION

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Definition

- The route of administration is the **way** through which the **dosage form** is administered into the **body** for treatment of various diseases and disorders.
- **Various** routes of administrations play a marked role in the **bioavailability** of the active drug in the body.

Classification

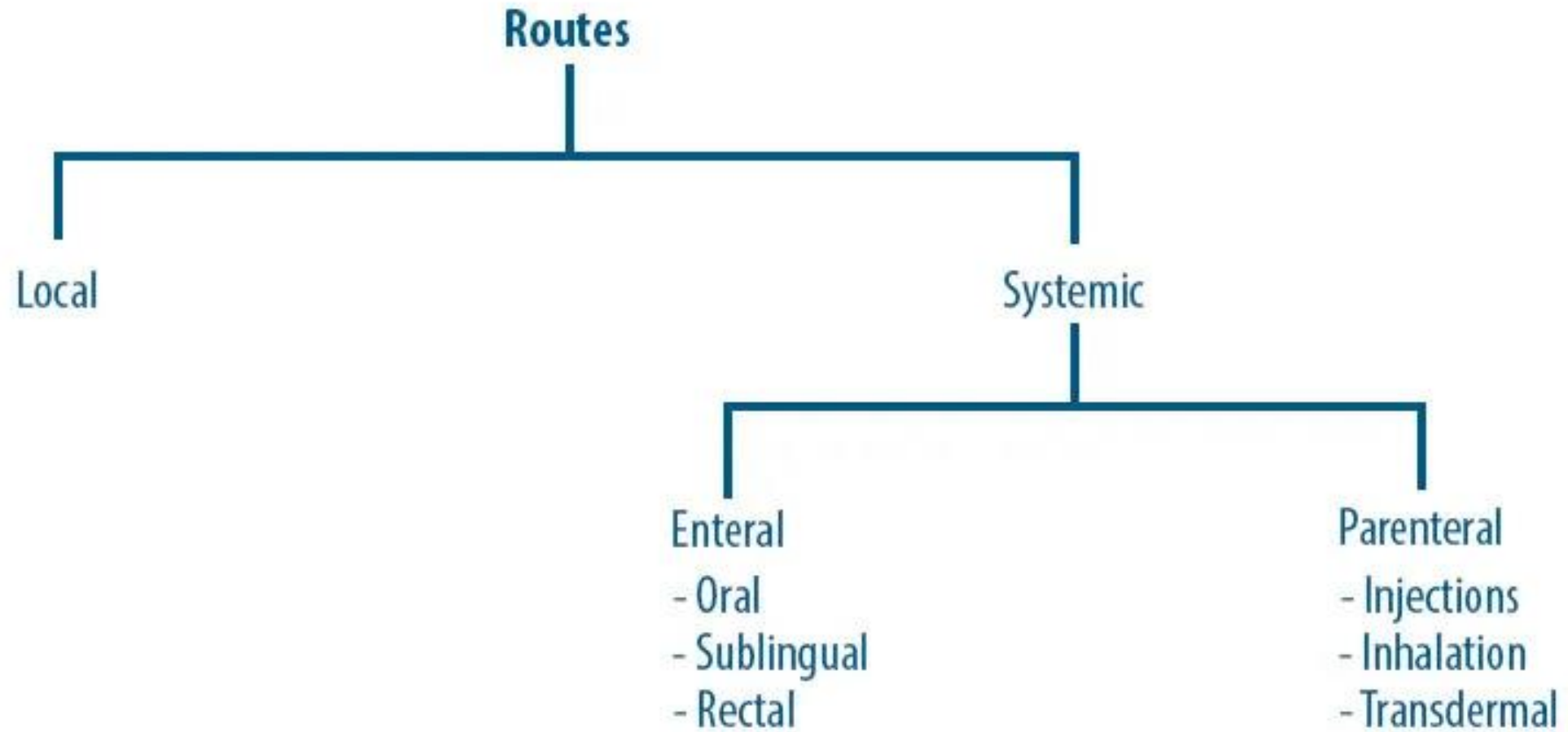
- The various routes of administration are classified into the following categories:-

1. Systemic Route

| A) Enteral route | (b) Parenteral route |
|-------------------------|-----------------------------|
| 1. Oral | 1. Intravascular |
| 2. Sublingual | 2. Intramuscular |
| 3. Rectum | 3. Subcutaneous |
| | 4. Inhalation |

2. Local Route

Systemic Route



Oral Route

Oral Route: -

- In this route the drug is placed in the mouth and Swallowed.
- It is also called per oral (p.o.)

Examples:-

- The example of dosage forms which are used by oral route include

1. Tablet
2. Capsules
3. Syrups etc.



Advantages of Oral Route

1. Convenient

- Can be self-administered, pain-free, & easy to take

1. Absorption

- Takes place along the whole length of GIT

1. Cheap

- Compared to most other parenteral routes

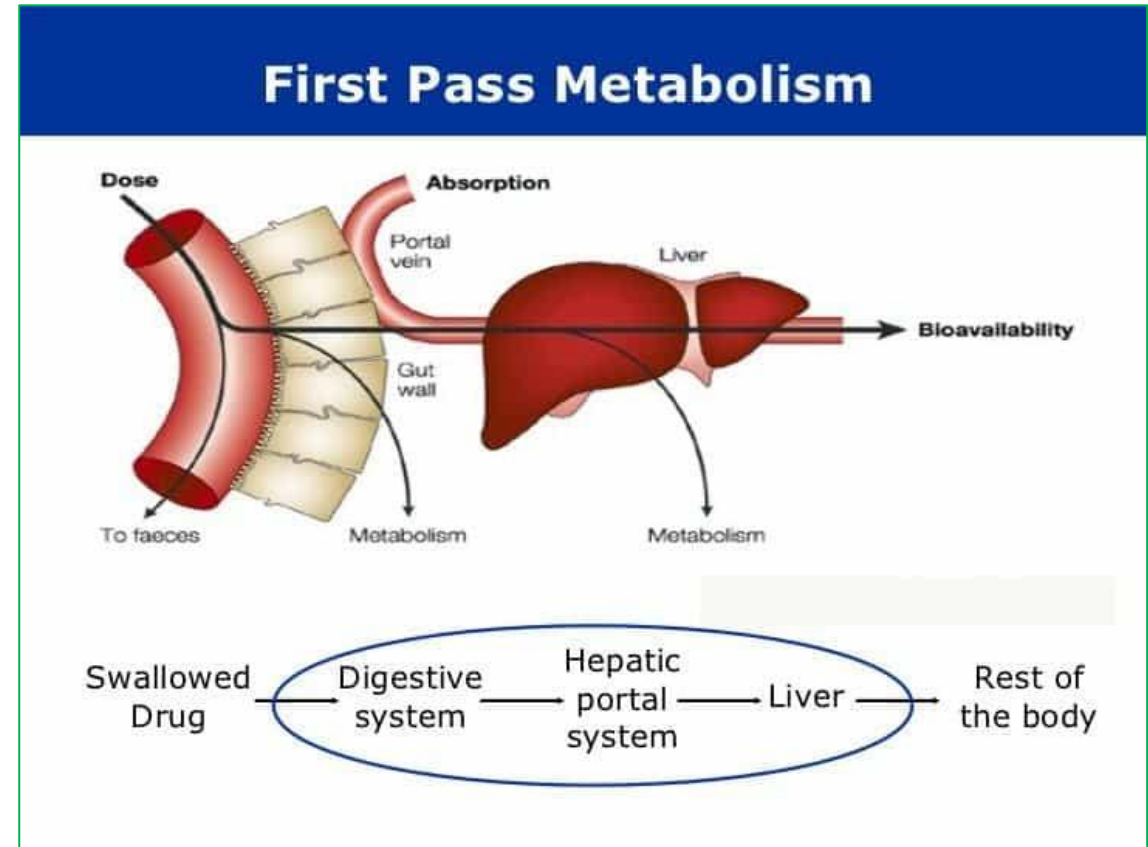
Disadvantages of Oral Route

- 1. Sometimes inefficient** - only part of the drug may be absorbed
- 2. First-pass effect** - drugs absorbed orally are initially transported to the liver via the portal vein
- 3. Irritation to gastric mucosa** – nausea and vomiting
- 4. Destruction of drugs** by gastric acid and digestive juices
- 5. Effect too slow** for emergencies
- 6. Unpleasant taste** of some drugs
- 7. Unable to use** in unconscious patient

Oral Route

First-pass effect:-

- This is an effect which occurs with the **oral route** of administration.
- The first-pass effect is the term used for the **hepatic metabolism** of a **drug**.
- When the drug is **absorbed** from the gut and **delivered** to the liver via **portal circulation**.
- The **greater** the first-pass effect, the **less** the agent will **reach the systemic circulation**.



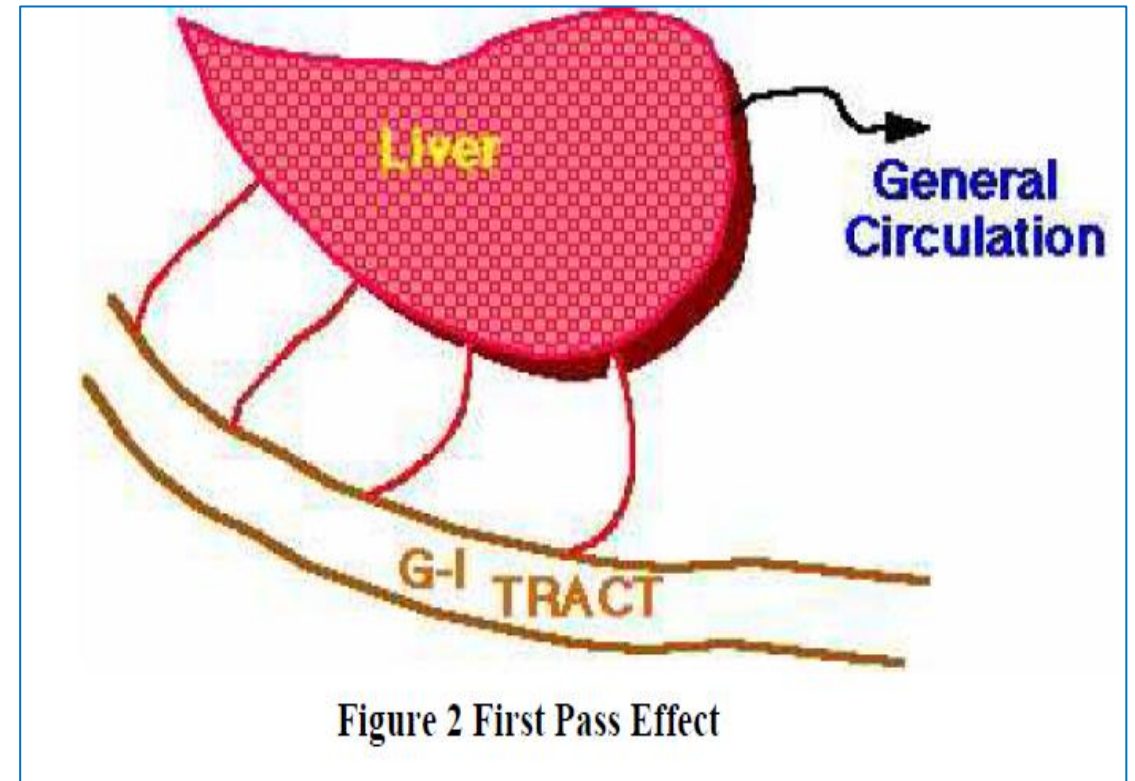
Oral Route

First-pass effect:-

• **Examples** of drugs which undergo marked First Pass Effect:-

1. Nitrate
2. Imipramine
3. Lidocaine
4. Beta blocker (Propranolol)
5. Morphine

NIL By Mouth



Sublingual Route

- In this route the drug is placed **under the tongue** without the use of **water**.
- When it is placed under the tongue it **disintegrates** there and then **absorption** occurs in the **mouth**.
- The tablets are **small in size** and is to be used through the sublingual route.
- Example of Sublingual tablet is **Nitroglycerine** tablets



Sublingual & Buccal Route

- In this route the drug is kept in the **buccal cavity**.
- where it **disintegrates** and **absorption** occurs in the **mouth**.



Buccal Route

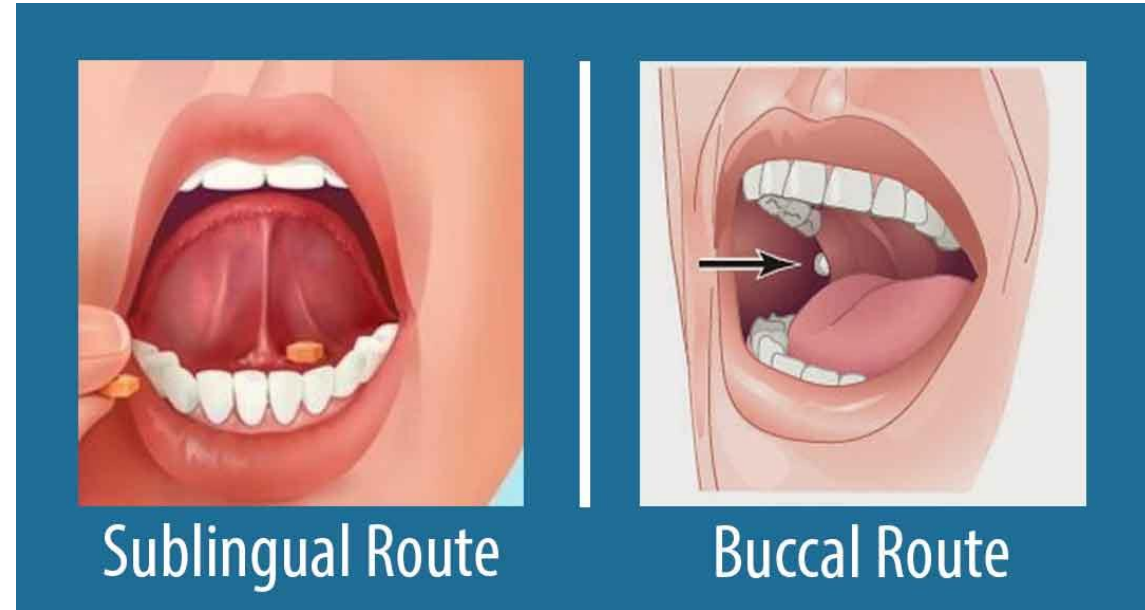
Advantages

1. Rapid absorption:

2. Drug stability: -

✓ As in this route the drug does **not** go to the **stomach**, so it is **not destroyed** by the enzymes and acids.

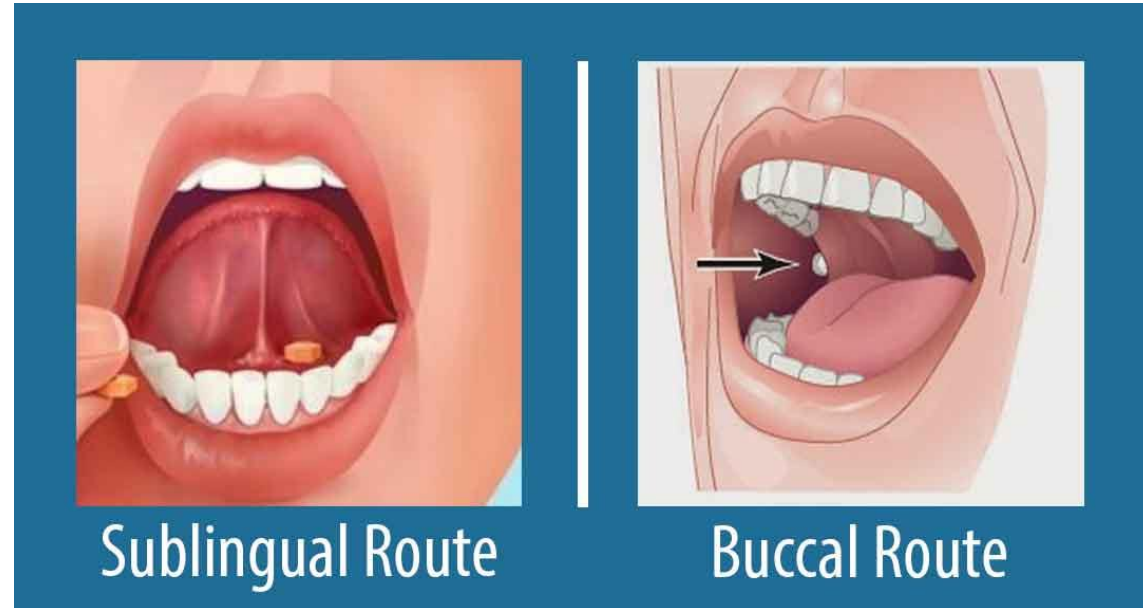
4. Avoid the **first-pass** effect.



Buccal Route

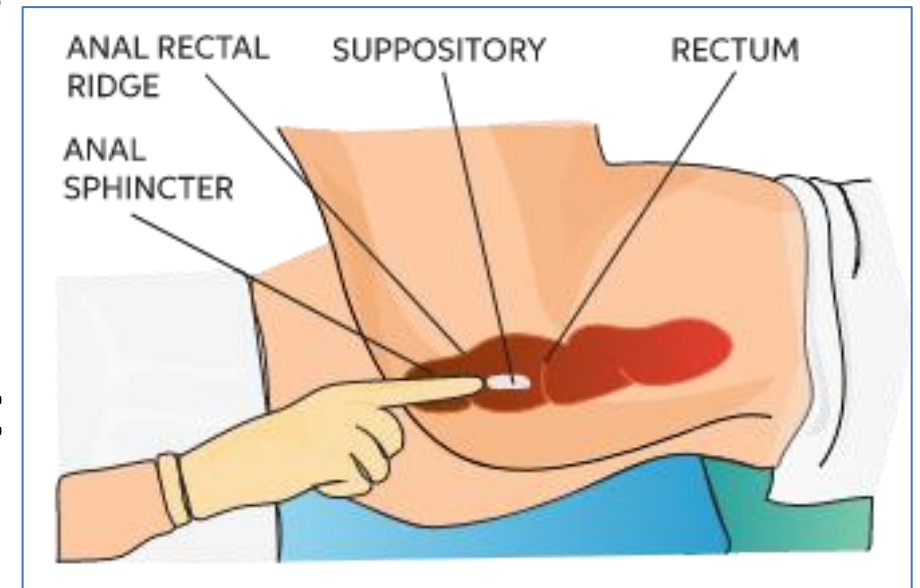
Disadvantages

1. May be **Inconvenient**
2. Only **small Doses**
3. **Unpleasant taste** of some drugs:
 - ✓ The drugs having unpleasant taste can cause problem because the drug is kept in the mouth.



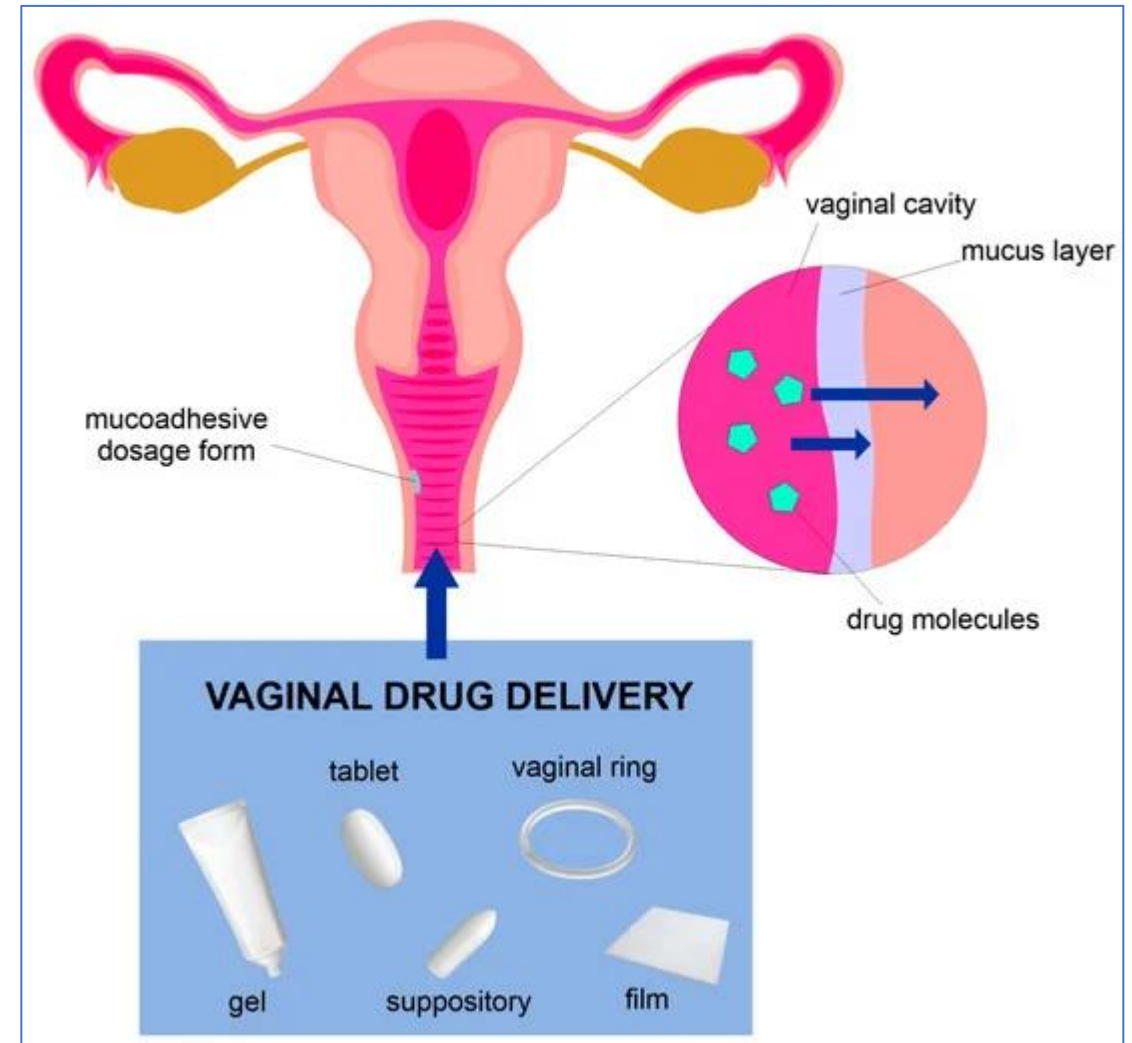
Rectal Route

- In this form, a drug is **mixed with a waxy substance** that dissolves or liquefies after it is **inserted** into the **rectum**.
- Because the **blood supply** is **rich**, the drug is readily absorbed.
- It is prescribed for people who **cannot** take a drug **orally** because they have nausea, cannot swallow, or have restrictions on eating.



Vaginal Route

- Some drugs may be administered **vaginally** to women as a solution, tablet, cream, gel, suppository, or ring.
- The drug is **slowly** absorbed through the vaginal wall.



Advantages of rectal/vaginal route

- **Advantages:**

1. **Unconscious** patient and children
2. If the patient is **nauseous** or **vomiting**

Disadvantages:

1. May cause **irritation**
2. **Absorption** may be variable

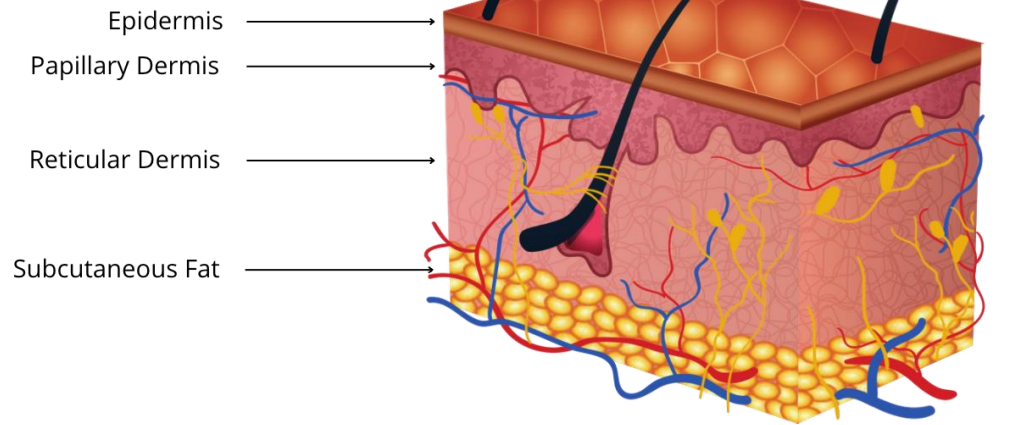
Parenteral Routes

- The drug does **not pass** through the **GIT, &** It **directly** reaches the **blood**.
- It can further be classified into two classes:-
 - 1. With injections:-** such as:
 - ✓ Intravascular
 - ✓ Intramuscular
 - ✓ Subcutaneous
 - 2. Without injections:** - such as:
 - ✓ Inhalations

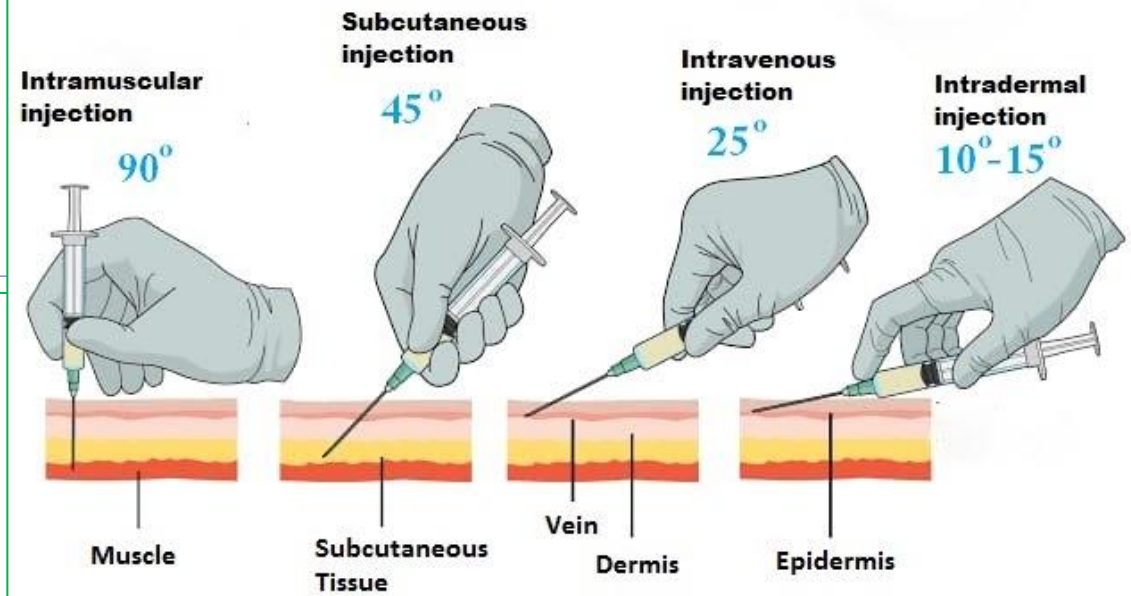
Parenteral Routes



Anatomy of the Skin



Angle for Administration of Injection



Intravascular Route

- The drug is **directly taken into the blood** with the help of injection, **absorption** phase is **bypassed**.
- **Advantages:-**
 1. Precise, accurate and almost immediate onset of action
 2. Large quantities can be given, fairly pain-free
 3. Can be given to unconscious patients
 4. Quick action
 5. Drugs having unpleasant taste can be given
- **Disadvantages:-**
 1. Pain at the site of injection
 2. Greater risk of adverse effects
 - A. High concentration attained rapidly
 - b. Risk of embolism



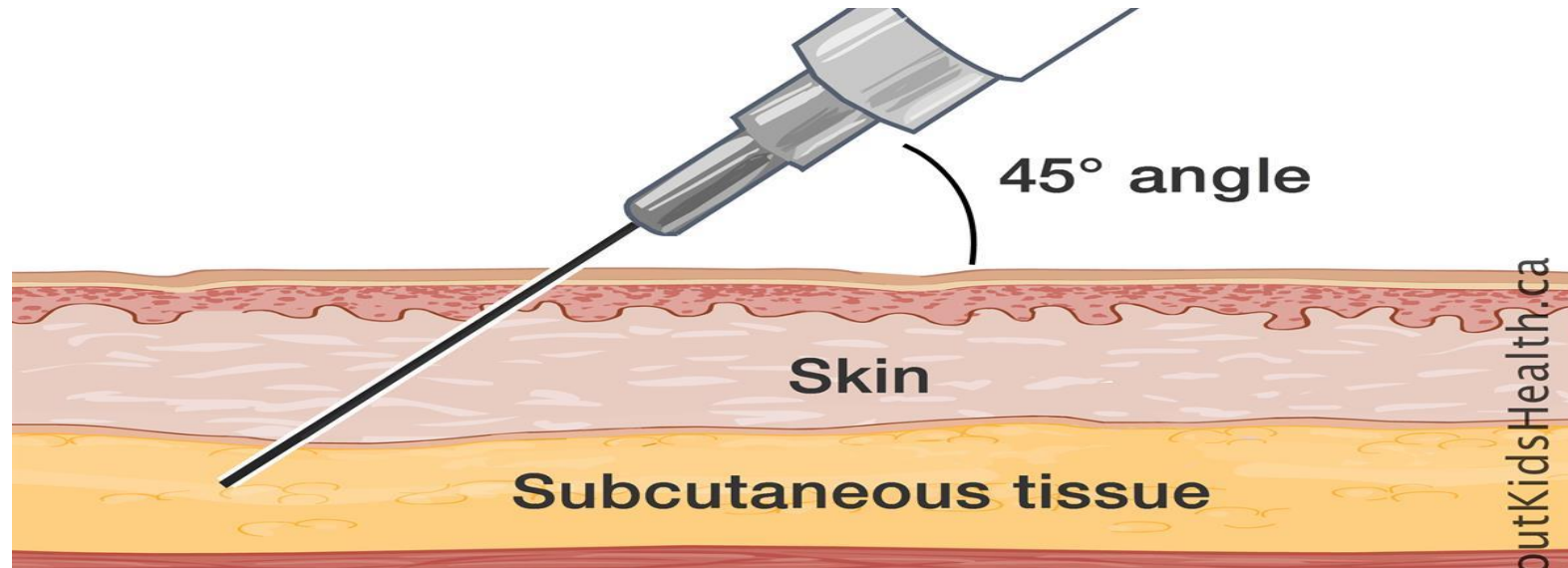
Intramuscular Route

- The drug is given into the **muscles** with the help an of injection.
- Drug once reaches the muscles, **absorbs** into the blood.
 1. Very **rapid** absorption of drugs in an aqueous solution
 2. **Depot** and slow-releasee preparations
 3. **Pain** at injection sites for certain drugs



Subcutaneous Routes

- The drug is given into the **subcutaneous** layer with the help of an injection.
- Drug once reaches the subcutaneous layer crosses the membrane and **absorbs** into the blood.



Inhalation Routes

- **Without** going to the **GIT**
- **Not** administered with the help of **injections**
- The drug is administered in the **gaseous** form.
- **Rapid** onset of action due to rapid access to the circulation
- **Pain not occurs** because the injection is not used
- Examples:- Inhalers & Aerosols



Local/Topical Routes

- The drug is applied to **the skin** and **mucous** membrane for **local action**.
- **Mucosal membranes** (eye drops, antiseptic, sunscreen, callous removal, nasal, etc.)
- **Skin**
 - ✓ Dermal: Oil or ointment (local action).
 - ✓ Transdermal: Absorption of the drug through the skin (systemic action)
 - ❖ Stable blood levels
 - ❖ No first-pass metabolism
 - ❖ Drug must be potent



Onset of Action

| Routes | Onset of Action |
|--------------------------------------|------------------------------------|
| Intravenous | 30-60 seconds |
| Intraosseous | 30-60 seconds |
| Inhalation | 2-3 minutes |
| Sublingual | 3-5 minutes |
| Intramuscular | 10-20 minutes |
| Subcutaneous | 15-30 minutes |
| Rectal minutes | 5-30 minutes |
| Oral minutes | 30-90 minutes |
| Topical/transdermal (topical) | variable (minutes to hours) |



**THANK YOU FOR
YOUR ATTENTION**

