ROUTES OF DRUG ADMINISTRATION

Lab. 1

❖**Routes can be classified based *on where the target of action.***

❖**Action may be :**

- **Enteral (systemic action, but delivered through the gastrointestinal tract),**

- **Parenteral (systemic action, but delivered by routes other than the GI tract),**

- **Topical (local) and other routes.**

A-Enteral

1-Oral

2-Sublingual / Buccal

3-Rectal

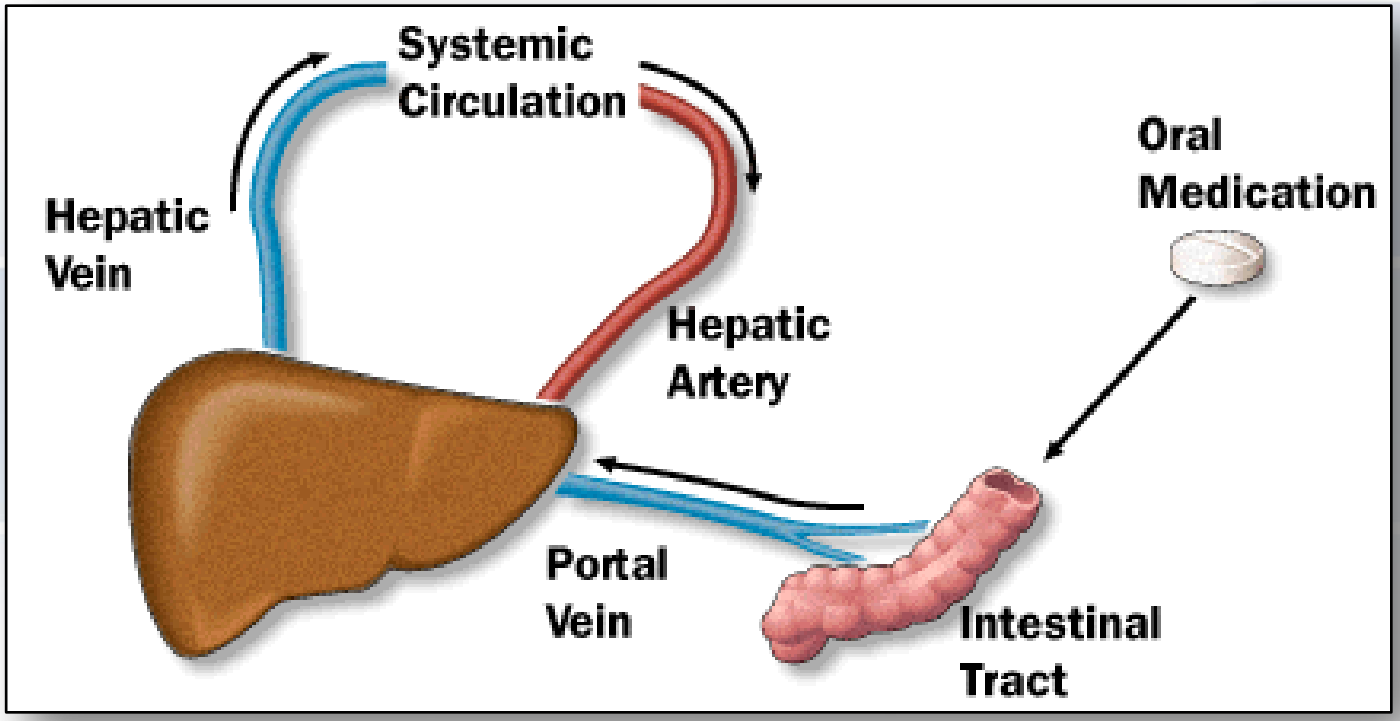
Oral (through the mouth)

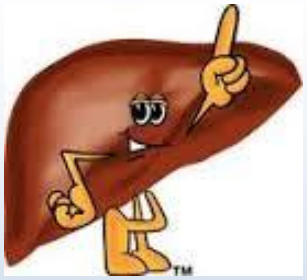
Advantages

- Safe
- Most common
- Convenient
- Economical route of administration

Disadvantages

- Limited absorption of some drugs
- Food may affect absorption
- Drugs may be metabolized before systemic absorption (First-pass effect)


Systemic
Circulation
Hepatic
Vein
Hepatic
Artery
Oral
Medication
Portal
Vein
Intestinal
Tract



Sublingual(under the tongue) / Buccal (between the cheek and gums/gingiva)

Advantages

- Bypasses first-pass effect
- Bypasses destruction by stomach acid
- Drug stability maintained because the pH of saliva relatively neutral
- May cause immediate pharmacological Effects

Disadvantages

- Limited to certain types of drugs
- Limited to drugs that can be taken in small doses
- May lose part of the drug dose if swallowed

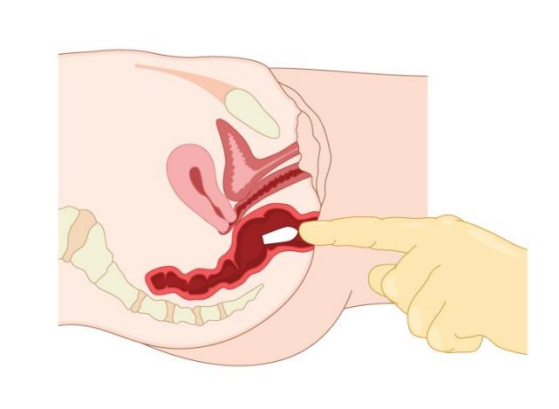
Rectal (into the rectum)

Advantages

- Partially bypasses first-pass effect
- Bypasses destruction by stomach acid
- Ideal if drug causes vomiting
- Ideal in patients who are vomiting, or comatose

Disadvantages

- Drugs may irritate the rectal mucosa
- Not a well-accepted route.

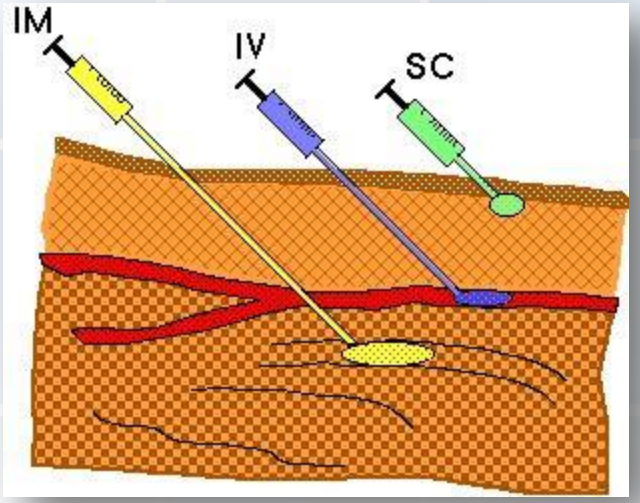


B-Parenteral

1-Intravenous (IV)

2-Intramuscular (IM)

3-Subcutaneous (SC)



Injections act rapidly, with onset of action in 15–30 seconds for IV, 10–20 minutes for IM, and 15–30 minutes for SC. They also have essentially 100% bioavailability, and can be used for drugs that are poorly absorbed or ineffective when given orally.

1-Intravenous (IV)

Advantages

- Can have immediate effects
- Ideal if dosed in large volumes
- Suitable for irritating substances
- Valuable in emergency situations
- Ideal for high-molecular-weight proteins and peptide drugs

Disadvantages

- Unsuitable for oily or poorly absorbed substances
- Bolus injection may result in adverse effects
- Most substances must be slowly injected
- Strict aseptic techniques needed

2-Intramuscular (IM)

Depends on drug diluents:
Aqueous solution: prompt absorption
Depot preparations: slow and sustained absorption

Advantages

- Suitable if drug volume is moderate
- Suitable for oily vehicles and certain irritating substances
- Preferable to intravenous if patient must self administer

Disadvantages

- Affects certain lab tests (creatine kinase)
- Can be painful
- Can cause intramuscular hemorrhage

3-Subcutaneous (SC)

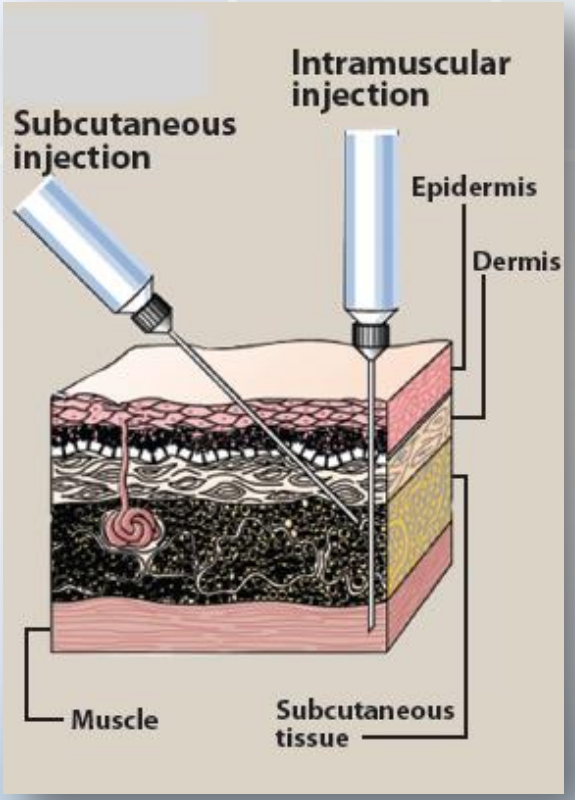
Depends on drug diluents:
Aqueous solution: prompt absorption
Depot preparations: slow and sustained absorption

Advantages

- Suitable for slow-release drugs
- Ideal for some poorly soluble Suspensions

Disadvantages

- Pain or necrosis if drug is irritating
- Unsuitable for drugs administered in large volumes



C-Other …

1-Inhalation
2-Intranasal
3-Intrathecal/Intraventricular
4-Topical
5-Transdermal

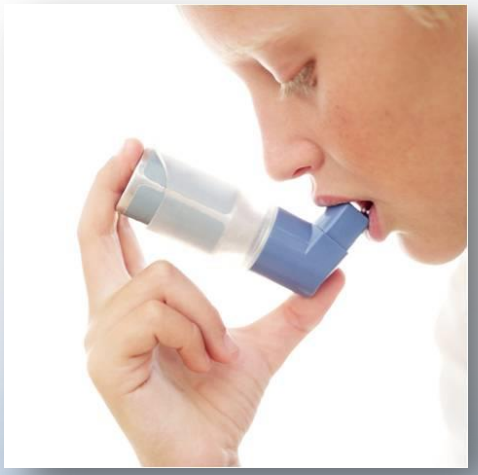
Inhalation

Advantages

- Absorption is rapid; can have immediate effects
- Ideal for gases
- Effective for patients with respiratory problems (Localized effect)
- Fewer systemic side effects

Disadvantages

- Systemic absorption may occur, which is not always desirable
- Most addictive route (drug can enter the brain quickly)
- Patient may have difficulty regulating dose
- Some patients may have difficulty using inhalers



Intranasal

Nasal administration can be used to deliver drugs for either local or systemic effect.

Advantages

- Rapid onset of action because the nasal cavity is well vascularised.
- Drug bypass first-pass hepatic metabolism.

Disadvantages

- limited volume can be sprayed into the nasal cavity.
- Continuous and frequent administration may irritate nasal epithelium.

Intrathecal/Intraventricular

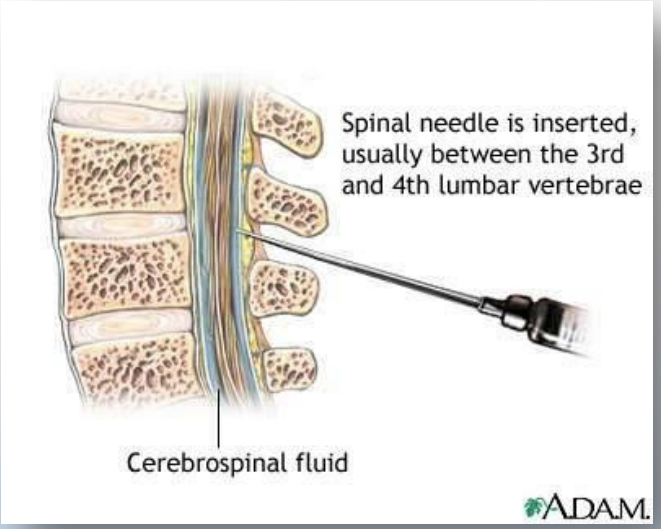
* The drugs introduced directly into the cerebrospinal fluid.

Advantages

- Drugs can bypass the blood brain barrier.
- Local effects and thus, the systemic side effects of several drugs can be avoided.

Disadvantages

- Can cause direct irritation of the meninges.



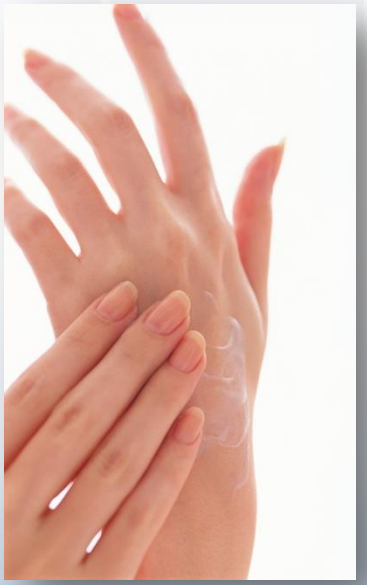
Topical

Advantages

- Easy
- Non-invasive
- Local effect

Disadvantages

- Most drugs have high molecular weight and poorly lipid soluble, so are not absorbed via skin.
- Very slow absorption.



Transdermal

Advantages

- Slow and sustained.
- Bypasses the first-pass effect.
- Convenient and painless.
- Ideal for drugs that are lipophilic, thus requiring prolonged administration.

Disadvantages

- Some patients are allergic to patches, which can cause irritation.
- Drug must be highly lipophilic.
- May cause delayed delivery of drug to site of action.
- Limited to drugs that can be taken in small daily doses.

The selection of suitable rout of administration depends on many factors:

1) The physio- chemical properties of the drug whether it is acid or base, solid, liquid or gas. (Solubility, Stability, Ph, Irritation)
2) Site of desired drug action (local, systemic).
3) Rapidity of desired response (fast or slow response).
4) Rate and extent of absorption from different routs.
5) Effect of digestive juices and first pass metabolism.
6) State of patient (conscious, vomiting).

Thank You
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Thank You!!!!