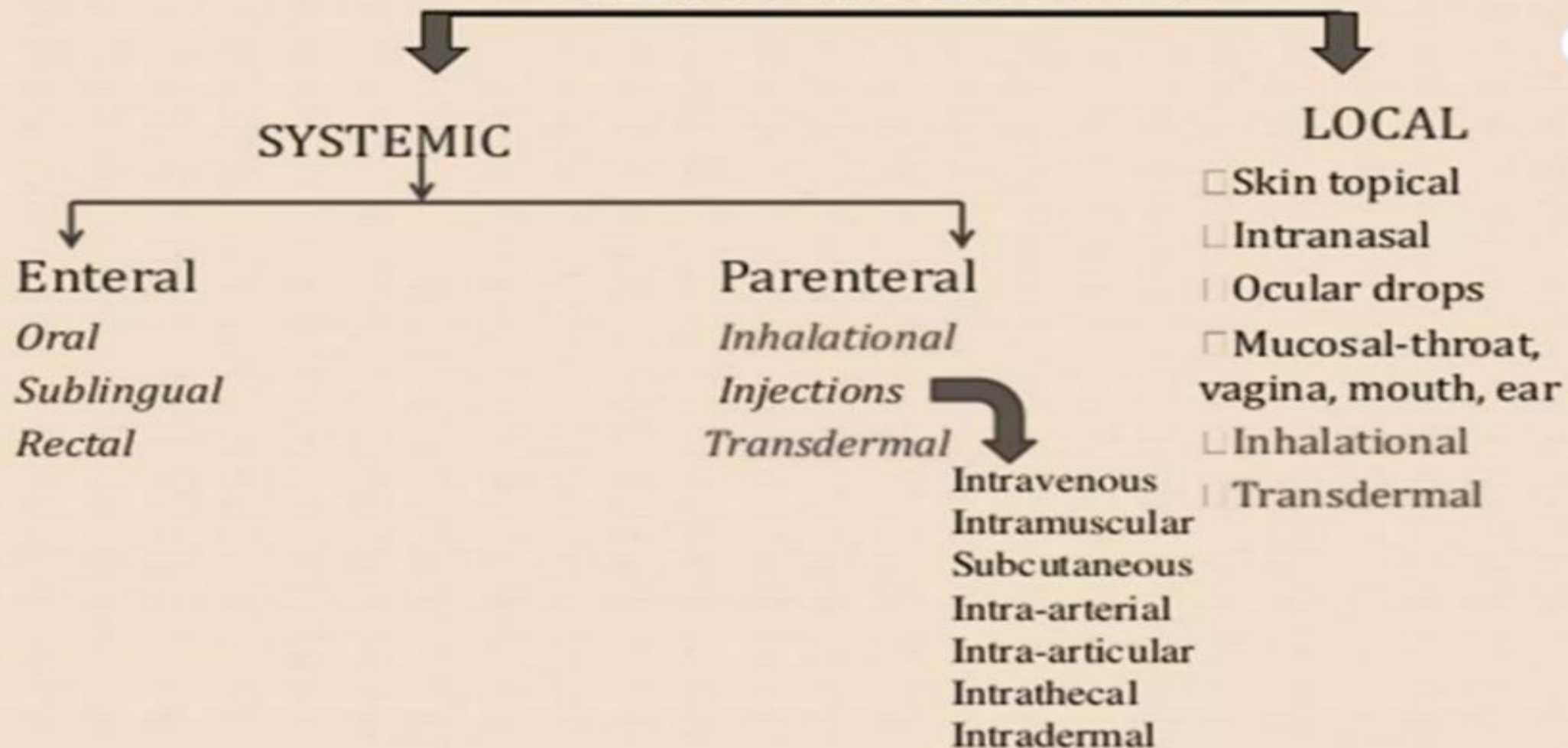


ROUTE OF DRUG ADMINISTRATION

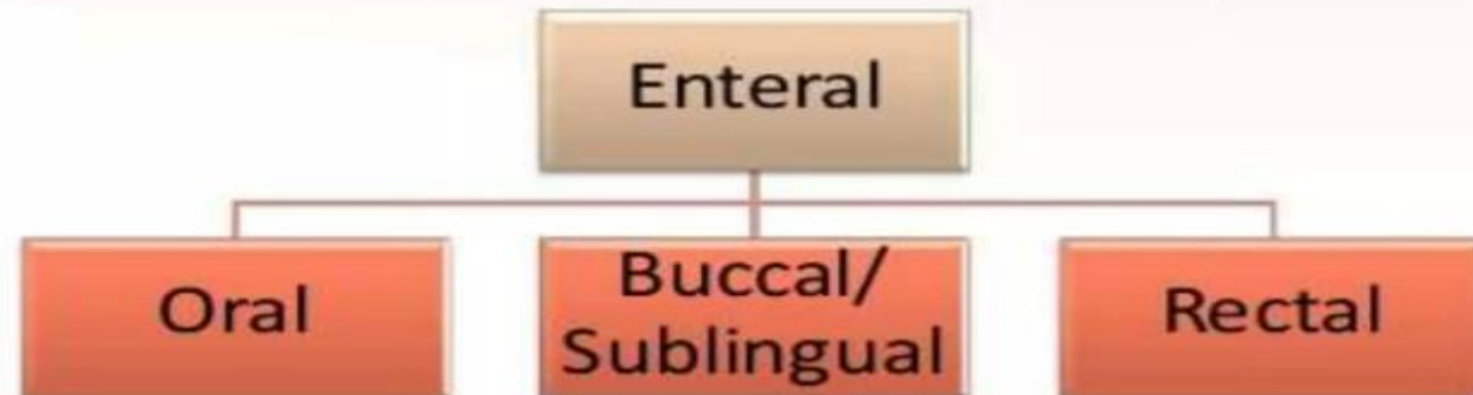
CLASSIFICATION



Enteral Routes



- Definition:
When drug is placed directly in the GI tract.





ORAL ROUTE

- Oral refers to two methods of administration:
- Applying topically to the mouth
- Swallowing for absorption along the gastrointestinal (GI) tract into systemic circulation
- po (from the Latin per os) is the abbreviation used to indicate oral route of medication administration



Advantages :

- Most commonly preferred and used route of drug administration.
- Convenient - can be self-administered, pain free, easy to take.
- It does not require any special skills.
- Absorption - takes place along the whole length of the GI tract .
- Cheap - compared to most other parenteral or topical routes.

Disadvantages :

- It can not be used in case of unconscious and in-cooperative patients.
- Sometimes inefficient - only part of the drug may be absorbed.
- First-pass effect - drugs absorbed orally are initially transported to the liver via the portal vein .
- irritation to gastric mucosa - nausea and vomiting.
- Certain drugs like insulin undergo degradation in GI tract to avoid this degradation by digestive juices it cannot be given by oral route.
- Onset of action of drugs takes 3 – 4hrs so cannot be used in medical emergency.
- unpleasant taste of some drugs.

2. Buccal/sublingual route

Drugs are taken as smaller tablets which are held in the mouth(buccal) or under the tongue (sublingual)

sublingual

buccal



Advantages

- Having drug stability. Economical.
- Quick termination.
- FIRST-PASS effect is avoided.
- drug absorption is quick.

Disadvantages

- it is inconvenient to patient.
- Unpalatable & bitter taste of drugs may result in poor patient compliances.
- Irritation of oral mucosa.
- Large quantities not given, may lead to toxicity.
- Few drugs are absorbed.

3. Rectal route

- * This route of administration is useful.
- * In case of unconscious patients and children.
- * If patient is nauseous or vomiting to oral route then this route is having more advantages.
- * There is easy to terminate exposure at any time and whenever necessary.
- * This route is good for drugs which affects the bowels such as laxatives, while the drugs which are irritating are contraindicated by this route.



PARENTERAL ROUTES

Parenteral administration is the route where a drug in the form of solution or suspension is injected in the body with help of hollow needle and a syringe/injection or in some cases in the vapour or fine droplets drugs are inhaled in the respiratory tract (inhalation).

- The term parenteral comes from Greek words:

Para - meaning outside

Enteron - meaning the intestine

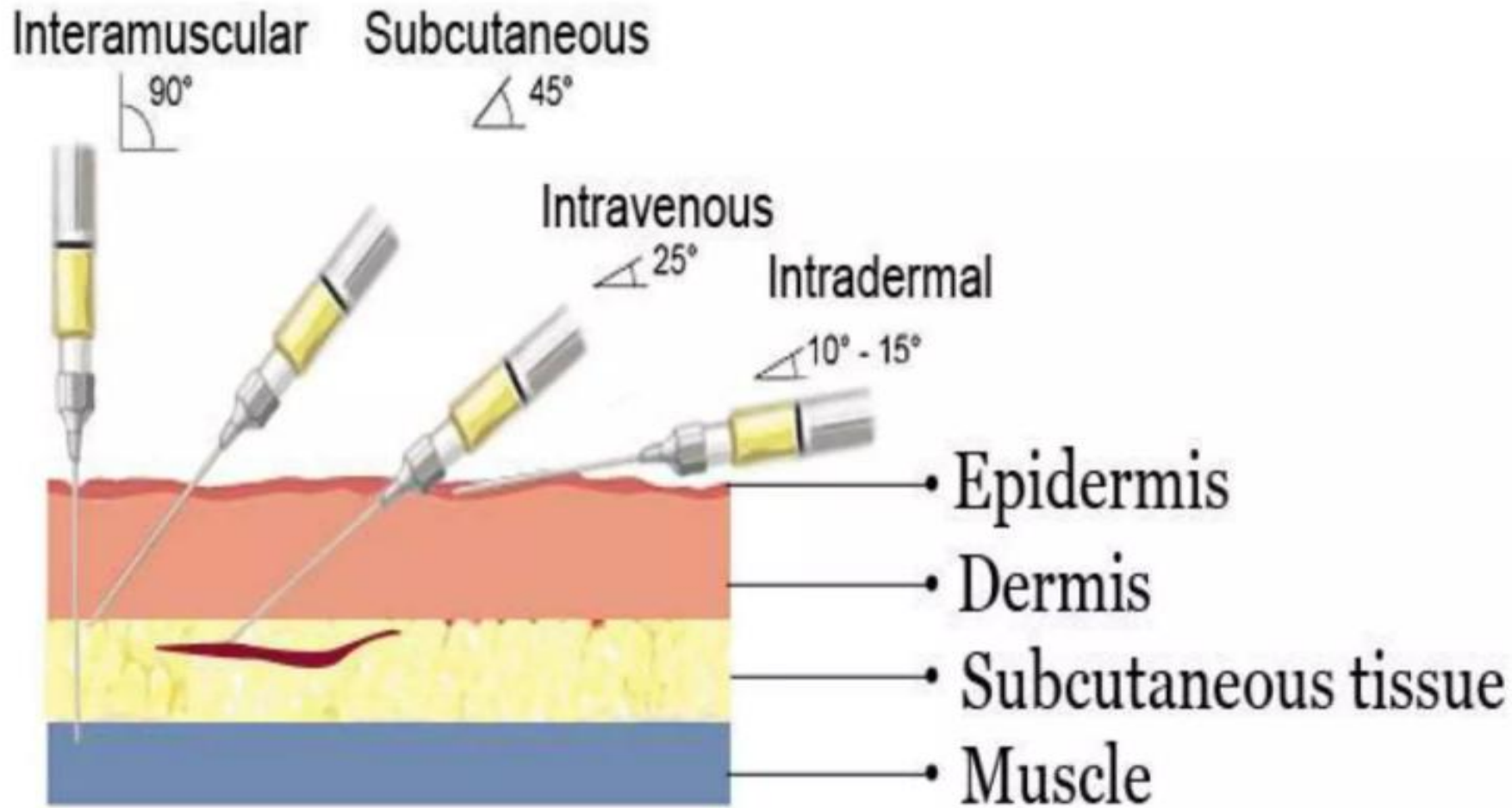
- This route of administration bypasses the alimentary canal.

INJECTABLES

- I. INTRAVENOUS
- II. INTRAMUSCULAR
- III. SUBCUTANEOUS
- IV. INTRA-ARTERIAL
- V. INTRA-ARTICULAR
- VI. INTRATHECAL
- VII. INTRADERMAL

☐ **INHALATION** - Absorption through the lungs

Types of Parenteral Routes of Administration



source : wikipedia.org

INTRAVENOUS

Drug is directly injected into the veins.

ADVANTAGES

- BIOAVAILABILITY 100%(rapid action).
- Desired blood concentrations achieved.
- Large quantities can be administered (saline solution).
- Irritating and hypertonic solutions can be administered.
- Vomiting & diarrhea.
- Emergency situations.
- Gastric manipulation avoided



DISADVANTAGES

- It may cause Irritation.
- Speed of the drug entering into the vein should be controlled.
- Repeated injections not always feasible.
- Less safe .
- technical assistance required.
- Danger of infection.
- Expensive.
- Less convenient and painful.

INTRAMUSCULAR ROUTE

The drug is injected into the muscle tissues.

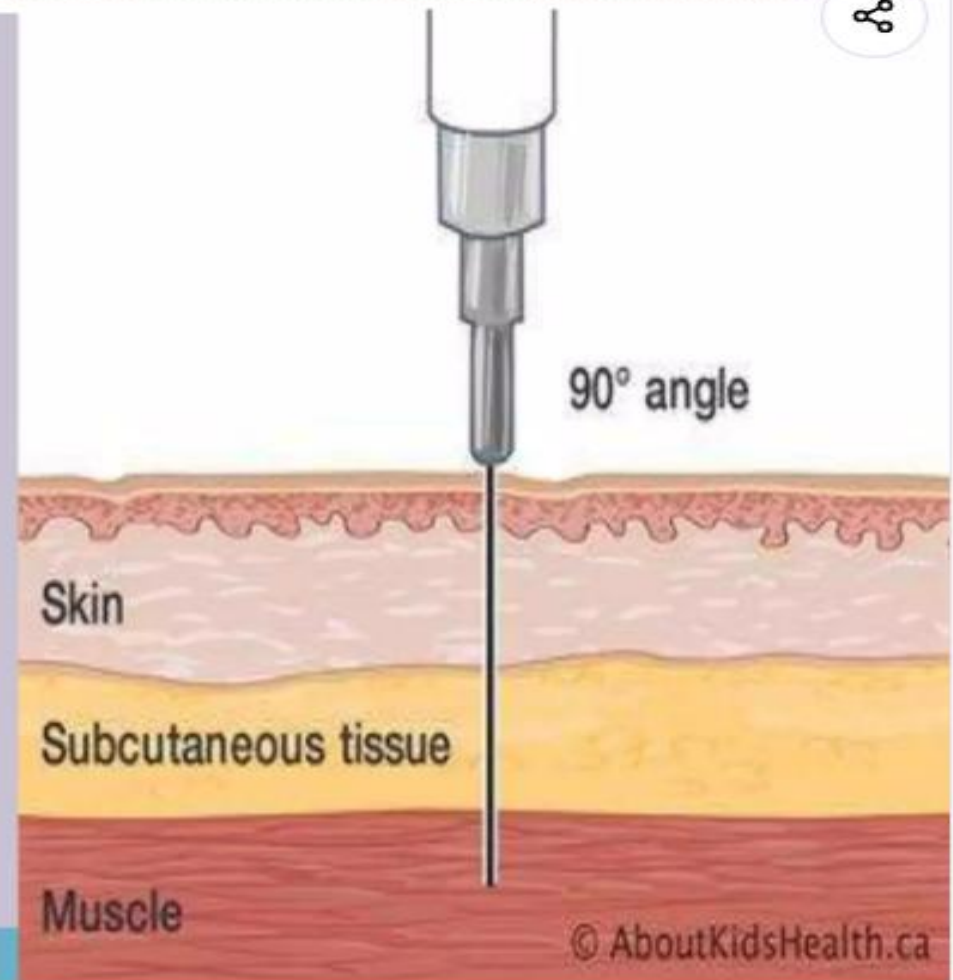
Advantages :

- Absorption reasonably uniform.
- rapid onset of action .
- mild irritants can be given .
- suspensions and colloids can be given.

Gastric factors can be avoided

Disadvantages

- only upto 10ml drug given
- local pain and abcess
- expensive
- infection
- There may be possibility of nerve damage
- Slow absorption of some drugs.



SUBCUTANEOUS



- Injected under the skin.
- Absorption is slow, so action is prolonged.
- Only the non irritant drugs can be administered.
- **IMPLANT** :a tablet or porous capsule is inserted into the loose tissues by incision of the skin, which is then stiched up. example : certain hormonal drugs

INTRA-ARTICULAR

- administered directly into the joints.
 - injections of antibiotics and corticosteroids are administered in inflamed joint cavities by experts.
- example: hydrocortisone in rheumatoid arthritis



INTRA-ARTERIAL

- Drug is administered directly into the artery.
- Rarely used
- Anticancer drugs are given for localized effects
- Drugs used for diagnosis of peripheral vascular diseases

INTRADERMAL



- drug is injected to the skin layers (dermis)
- Small quantity should be given.
- Painful
- Mainly used for testing sensitivity to drugs.
e.g. penicillin,
ATS (anti tetanus serum)

INOCULATION :administration of vaccine (like small pox vaccine)

INHALATIONS

Drugs are administered either as aerosole systems , or in the form of vapours.

Certain drugs are sprayed in the form of droplets to give local effect .

Ex : adrenalin spray administered in bronchial asthma.





Advantages :

- Absorption of drug is rapid and easy resulting in rapid local and systemic effect of drug.
- Easy to administration

Disadvantages :

- Drugs directly enter into the left side of the heart , there is a danger of cardiac toxicity.
- Certain drugs producing local irritation may increase respiratory tract secretion.

Topical Routes of Administration

- Topical administration is the application of a drug directly to the surface of the skin
- Includes administration of drugs to any mucous membrane
- eye
- nose
- vagina
- ears
- urethra
- colon
- lungs



Advantages and Disadvantages of the Topical Route

- Local therapeutic effects
- Not well absorbed into the deeper layers of the skin or mucous membrane
- lower risk of side effects
- Transdermal route offers steady level of drug in the system
- sprays for inhalation through the nose may be for local or systemic effects



Topical Dosage Forms Dose forms for topical administration include:

- ❖ **Skin:** creams
ointments
lotions
gels
transdermal patches
disks



- ❖ **Eye or ear:** – solutions – suspensions – ointments
- ❖ **Nose and lungs:** – sprays and powders



- Transdermal absorption of drug through skin (systemic action)
 - i. stable blood levels
 - ii. no first pass metabolism
 - iii. drug must be potent or patch becomes too large



Route for administration -Time until effect-

Which drug administration route is fastest?

intravenous	30-60 seconds
intraosseous	30-60 seconds
endotracheal	2-3 minutes
inhalation	2-3 minutes
sublingual	3-5 minutes
intramuscular	10-20 minutes
subcutaneous	15-30 minutes
rectal	5-30 minutes
ingestion	30-90 minutes
transdermal (topical)	variable (minutes to hours)

- **SELECTION OF ROUTE** The ROA is determined by :

- ☐ The physical characteristics of the drug.
- ☐ The speed which the drug is absorbed and/ or released .
- ☐ the need to bypass hepatic metabolism.
 - ☐ To achieve high conc. At particular sites.
 - ☐ Accuracy of dosage.
 - ☐ Condition of the patient.