



# PHARMACOLOGY



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**“Right medication to the right patient to the right route of administration to the right time”**

**Right medication:** Check the medication that is given is the one that actually ordered.

**Right Dosage:** Check that the order is appropriate for the patient too much or too little dose can cause issues for the patient.

**Right time:** Ensure that two dosages are not stacking up on one another.

**Right route:** It is important that the route is appropriate.

**Right patient:** Use 3 national identifiers to ensure the right patient according to their unit record number (URN):

1. Ask the patient name
2. Verify their date of birth.
3. Check the patient history.

**Right documentation:** Check the documents of the medication including the time, dosage and route.

**Routes of drug administration:** Routes of drug administration is the path by which a drug, fluid, poison or other substance is brought into contact with the body.

The route of Administration is determined by:

- Physio-chemical characteristics of the drug.
- Speed in which the drug is absorbed/released.
- The need to bypass hepatic metabolism and achieve high concentration at particular sites.

**Factor governing choice of route:**

**Drug characteristics:** The drug must have a very specific size, shape, atomic configuration and electrical charge to be able to interact with the receptor.

**Ease of Administration:**

- **Site of action:** Site of action is the location of a drug where it produce pharmacological effect.
- **Onset of action:** When the drug start its action to the body.
- **Duration of action:** The duration of action of a drug is, the length of time that particular drug is effective.
- **Quantity of drug administered:** What amount of drug taken at any one time.

## Commonly used routes of drug administration:

**IV (intravenous):** Intravenous therapy is a medical technique that delivers a liquid directly into a person's vein. it is used for rehydration solutions or to provide nutrition in those who cannot consume food or water by mouth.

**IM (intramuscular):** An intramuscular injection delivers medication into muscle.

**SC (Subcutaneous):** Subcutaneous means under the skin. it is administered as a bolus into the sub cutis, the layer of skin directly below the dermis and epidermis, collectively referred to as the cutis.

## Some routes of drug administration:

**Systemic route:** Systemic administration is a route of administration of medication, nutrition or other substance into the circulatory system so that the entire body is affected.

It is two types:

1. Enteral route.
2. Parenteral route.

**Enteral route:** drug placed directly in the GI tract.

- Sublingual -placed under the tongue.
- Oral= swallowing
- Rectal= absorption through the rectum.

**Sublingual route:** This drug placed under the tongue.

### Advantages of sublingual route:

1. Economical.
2. Quick termination.
3. First pass avoided.
4. Drug absorption is quick.
5. Can be self-administered.

### Disadvantages of sublingual route:

1. Unpalatable drugs not given
2. Bitter drugs not given
3. Irritation of oral mucosa occurs sometime.
4. Large quantities not given.
5. Few drugs are absorbed.

**Oral route:** Where a substance is taken through the mouth.

**Advantages of oral route:**

1. Safe
2. Convenient
3. Economical
4. Usually good absorption
5. Can be self-administered.

**Disadvantages of oral route:**

1. Slow action.
2. Slow absorption.
3. Irritable and unpalatable drugs can't give.
4. Some drugs destroyed by first pass effect.

**Rectal route:** Rectal administration uses the rectum as a route of administration for medication and other fluids, which are absorbed by the rectum's blood vessels, and flow into the body's circulatory system.

**Advantages of rectal route:**

1. Used in children
2. Little or no first pass effect.
3. Used in vomiting/unconscious.
4. Higher concentration rapidly achieved.

**Disadvantages of rectal route:**

1. Inconvenient.
2. Absorption is slow and erratic.
3. Irritation/inflammation of rectal mucosa occurs.

**Parenteral route:** Parenteral route of drug administration means administering the drug through the routes that bypass the digestive tract, by injections.

The most commonly used parenteral routes of administration are subcutaneous, intravenous, intramuscular, and intradermal injections.

- Subcutaneous (under the skin)
- Intramuscular (in a muscle)
- Intravenous (in a vein)
- Intradermal (in the dermal area).

**Intravenous (IV):** Intravenous therapy is a medical technique that delivers a liquid directly into a person's vein. It is used for rehydration solutions or to provide nutrition in those who cannot consume food or water by mouth.

**Advantages of intravenous route:**

1. Bioavailability 100%.
2. First-pass avoided.
3. Desired blood concentration achieved.

**Disadvantages of intravenous route:**

1. Expensive and less convenient.
2. Danger of infection.
3. Irritation and cellulitis.

**Intramuscular (IM):** An intramuscular injection delivers medication into a muscle

**Advantages of intramuscular route:**

1. Absorption reasonably uniform.
2. Rapid onset of action.
3. First pass and gastric factors avoided.

**Disadvantages of intramuscular route:**

1. Only up to 10ml drug given
2. Local pain, abscess, and infection can occur
3. Expensive
4. Nerve damage.

**Subcutaneous route (SC):** Subcutaneous means under the skin. It is administered as a bolus into the sub cutis, the layer of skin directly below the dermis and epidermis, collectively referred to as the cutis.

**Advantages of subcutaneous route:**

1. Self-administration is possible.
2. Depot can be inserted into subcutaneous route.
3. It is hygienic.

**Disadvantages of subcutaneous route:**

1. Slow absorption, not suitable for emergency.
2. Suitable only for non-irritant drugs.
3. It might lead to abscess formation.

**Inhalation:** Administration within the respiratory tract by inhaling orally or nasally for local or systemic effect.

**Advantages of inhalation route:**

1. Avoidance of systemic adverse effects
2. Vasodilation improves.
3. Lower cost

**Disadvantages of inhalation route:**

1. Limitation of medication
2. Higher cost

**Topical:** This refers to external application of the drug to the surface for localized action.

**Dose form for topical administration include:**

**Skin:**

- Creams.
- Ointments.
- Lotions.
- Gels.
- Disks.
- Transdermal patches.

**Eye or ear:**

- Solutions
- Suspensions
- Ointments

**Nose and lungs:**

- Sprays
- Powders.

**Time release preparation:** Time-release drugs use a special technology to release small amounts of the medication into a person's system over a long period of time. This is also referred to as sustained release, extended release, or controlled release.

**Time of onset of action:**

- Intravenous 30-60sec.
- Intraosseous 30-60sec.
- Endotracheal 2-3min.
- Inhalation 2-3 min.
- Sublingual 3-5min.
- Intramuscular 10-20min.
- Subcutaneous 15-30min.
- Rectal 5-30min
- Ingestion 30-90min.
- Transdermal (topical) variable (min).