



SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES



Coimbatore -641035

COURSE NAME : PHARMACOLOGY(ER20-21 T)

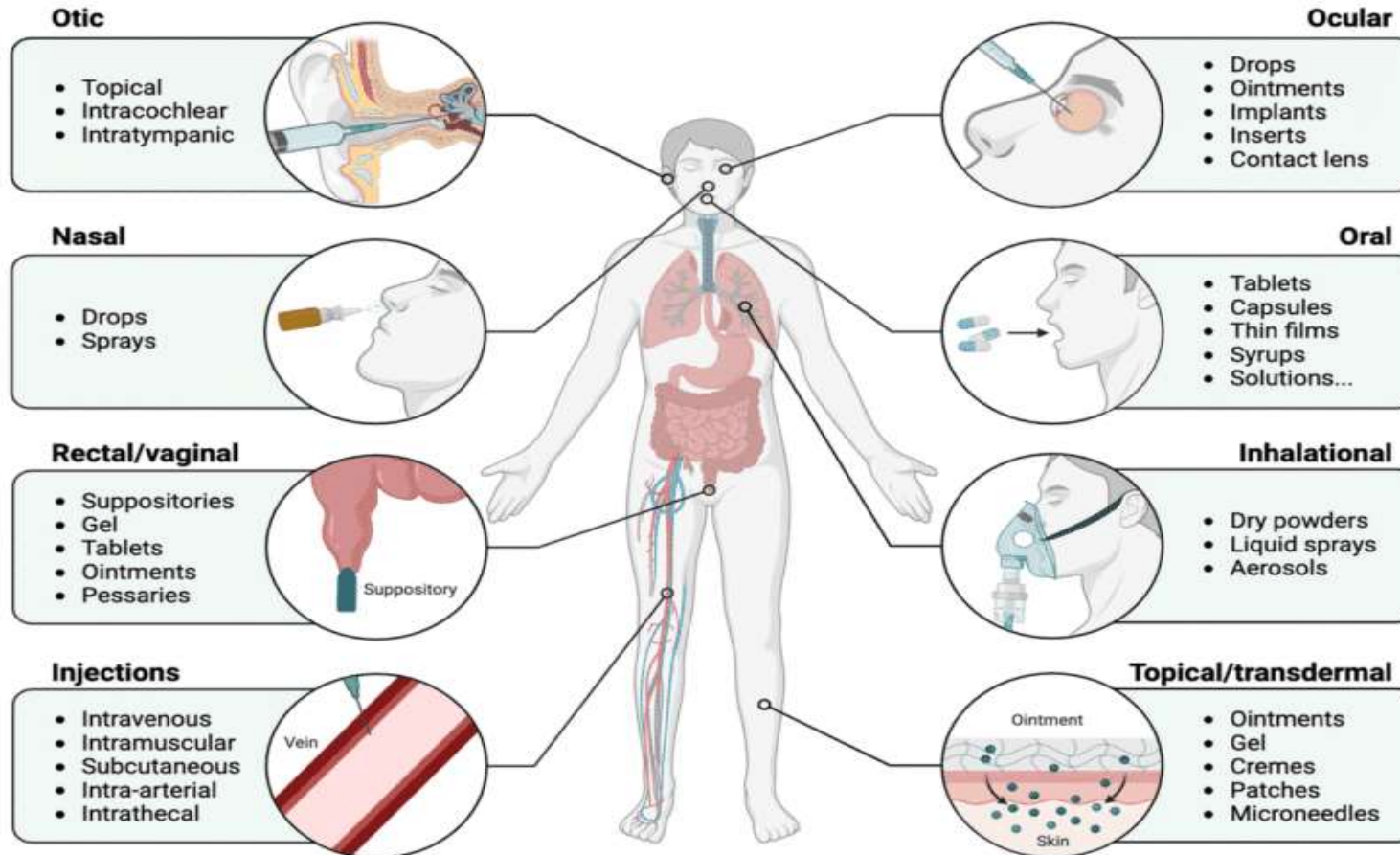
YEAR : DPHARM-II YEAR

TOPIC 2 : ROUTES OF DRUG ADMINISTRATION

DESIGN THINKING IN ROUTES OF DRUG ADMINISTRATION

- **Empathize:** Deeply understand the user or patient's challenges, needs, and experiences. This involves engaging with patients, caregivers, and healthcare providers to uncover pain points, preferences, and unmet needs related to drug administration methods.
- **Define:** Reframe the problem based on insights from the empathize phase and establish clear context. This involves synthesizing data to pinpoint the core issue, such as defining the need for a more convenient, painless, or targeted drug delivery route.
- **Ideate:** Brainstorm and explore a wide range of ideas and potential solutions, including innovative routes or delivery mechanisms.
- **Prototype:** Simulate and build delivery devices or methods to enhance patient compliance and effectiveness.

Drug Administration Routes



PATHWAYS TO ROUTES OF DRUG ADMINISTRATION

❖ Local Routes

Topical
Deeper Tissues
Arterial Supply

❖ Systemic Routes

Oral
Sublingual/Buccal
Rectal
Cutaneous
Inhalation
Nasal
Parenteral

INTRODUCTION

Routes of drug administration

Enteral

Drug administration involves any part of the gastrointestinal tract (enteric system)

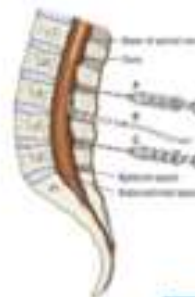
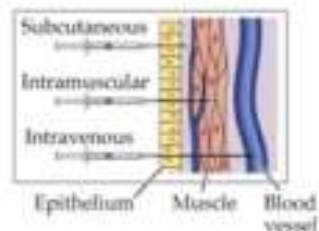
- oral
- sublingual
- rectal



Parenteral

Drug is administered in a manner that avoids the gastrointestinal tract (i.e. injection)

- Subcutaneous
- Intramuscular
- Intravenous
- Intrathecal



Topical

Topical drugs are applied directly on epithelial surfaces

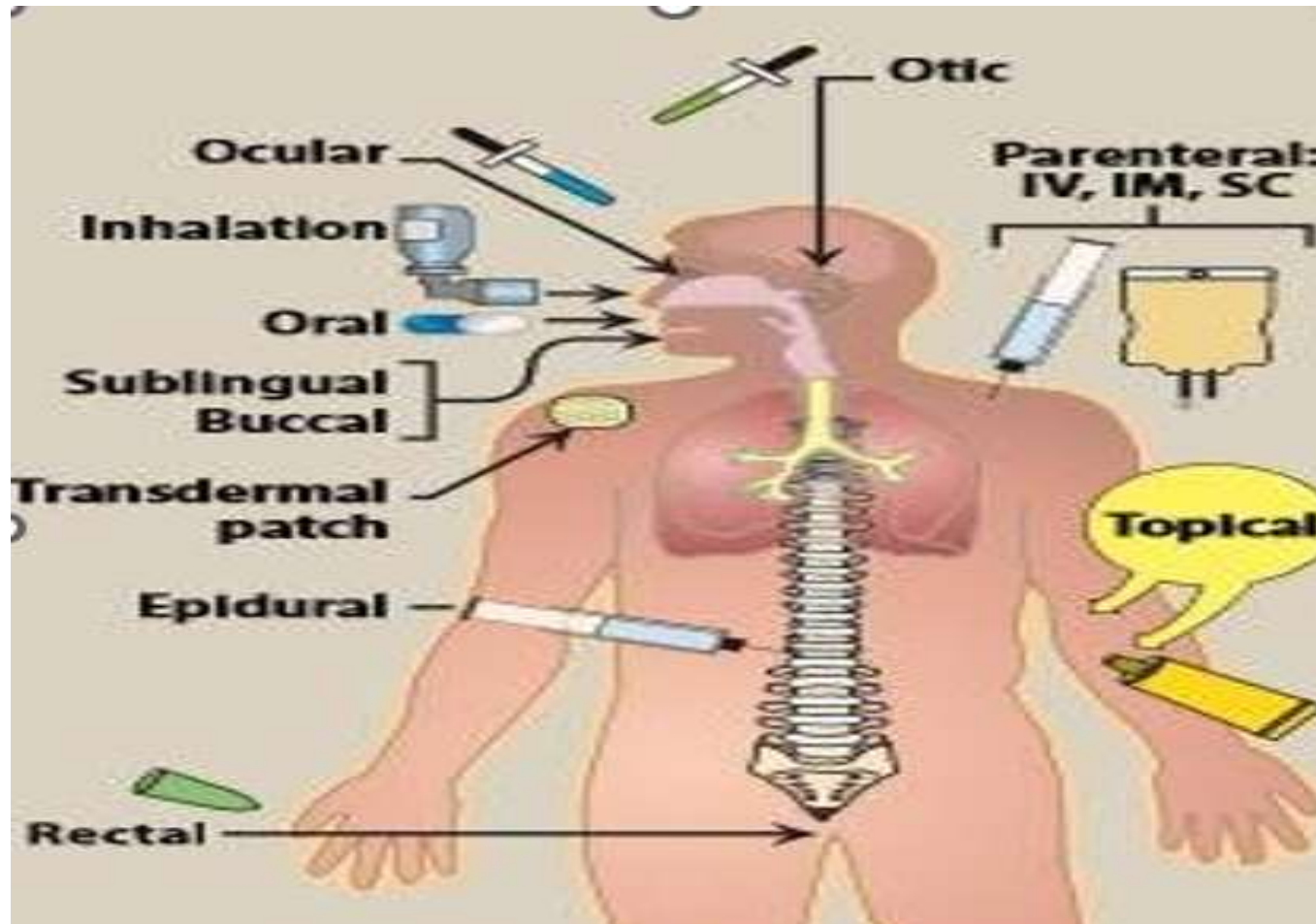
- skin
- cornea
- nasal



Inhalation

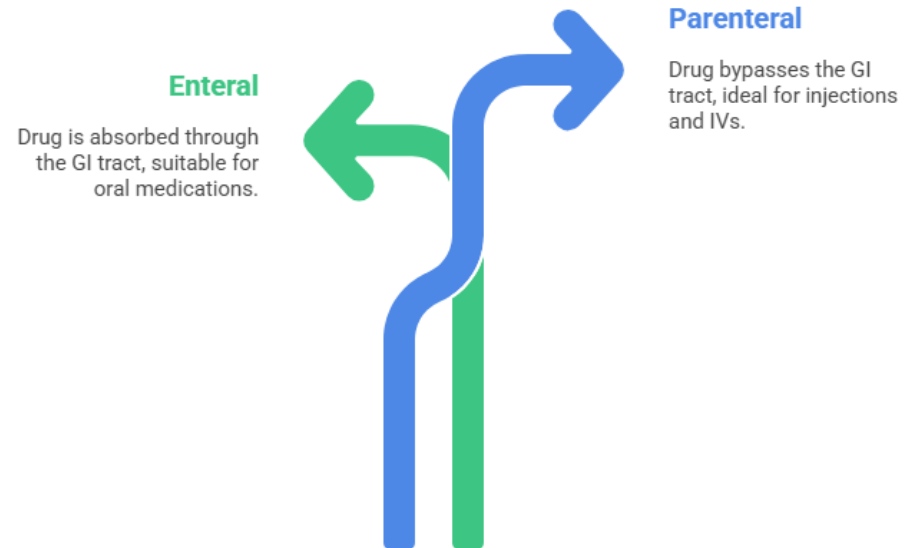


INTRODUCTION

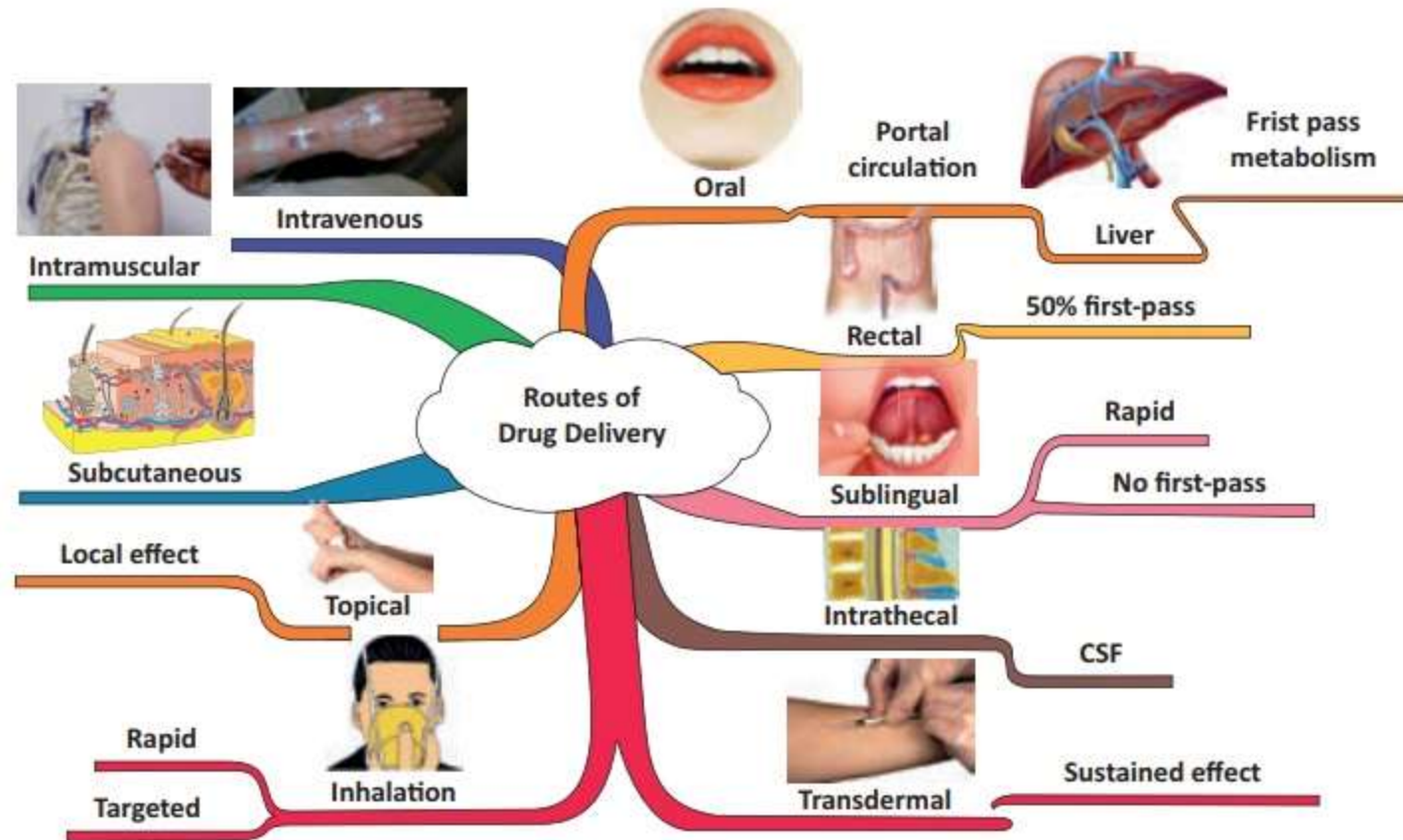


INTRODUCTION

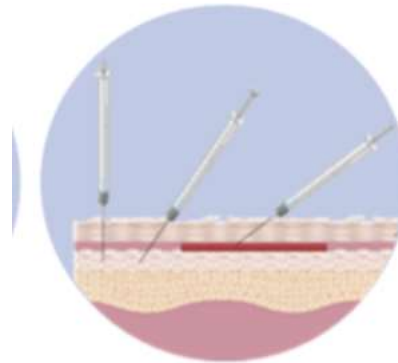
Which drug administration route should be used?



DRUG DELIVERY



LOCAL ROUTES



PARENTERAL

Intramuscular injection
Subcutaneous injection
Intravenous injection
Intradermal injection
Local injection

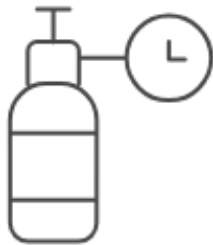


TOPICAL

Epidermic
Instillation
Irrigation

TOPICAL ROUTES

Topical Drug Administration



Description

The drug is applied directly to the skin or mucous membranes.



Advantages

Localized effect, minimizes systemic absorption, and easy to administer.



Disadvantages

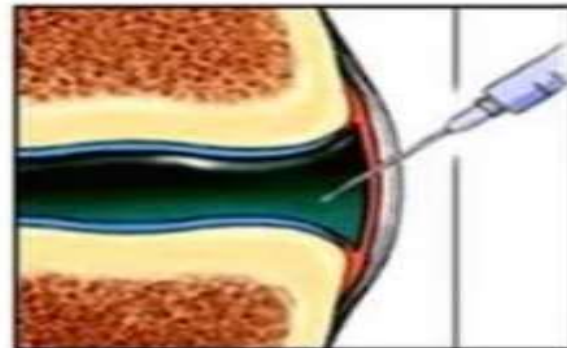
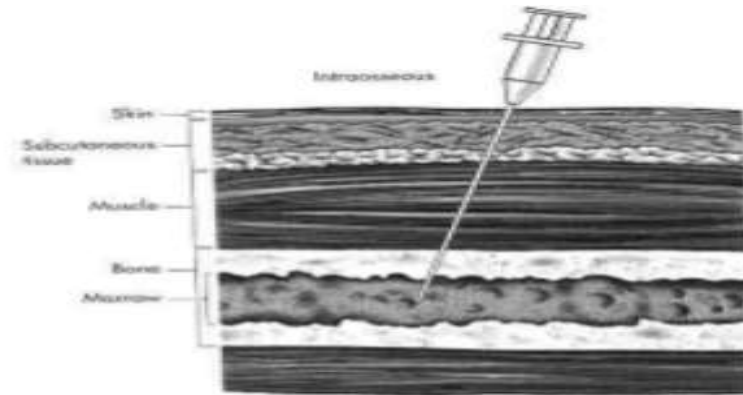
Limited to drugs that can penetrate the skin or mucous membranes, can cause local irritation, and absorption can be variable.



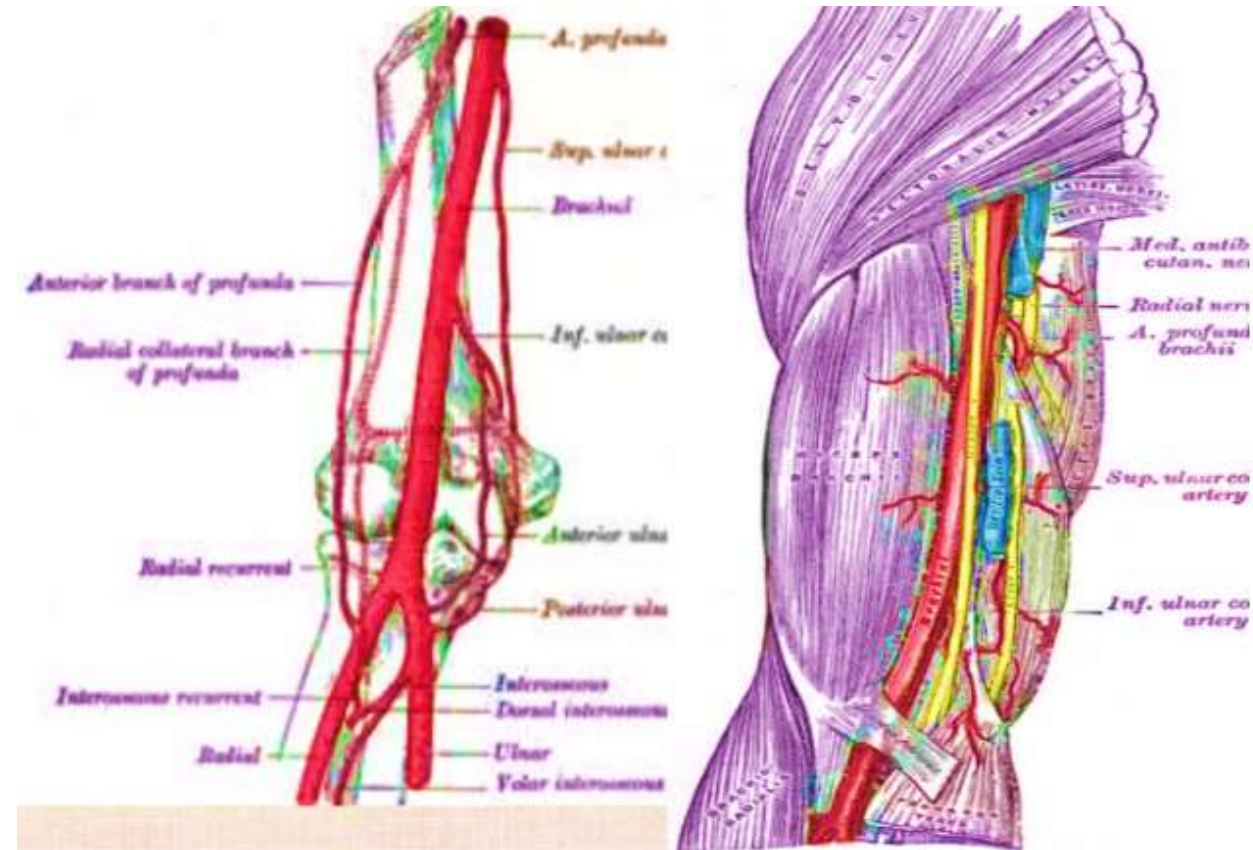
Examples

Creams, ointments, patches.

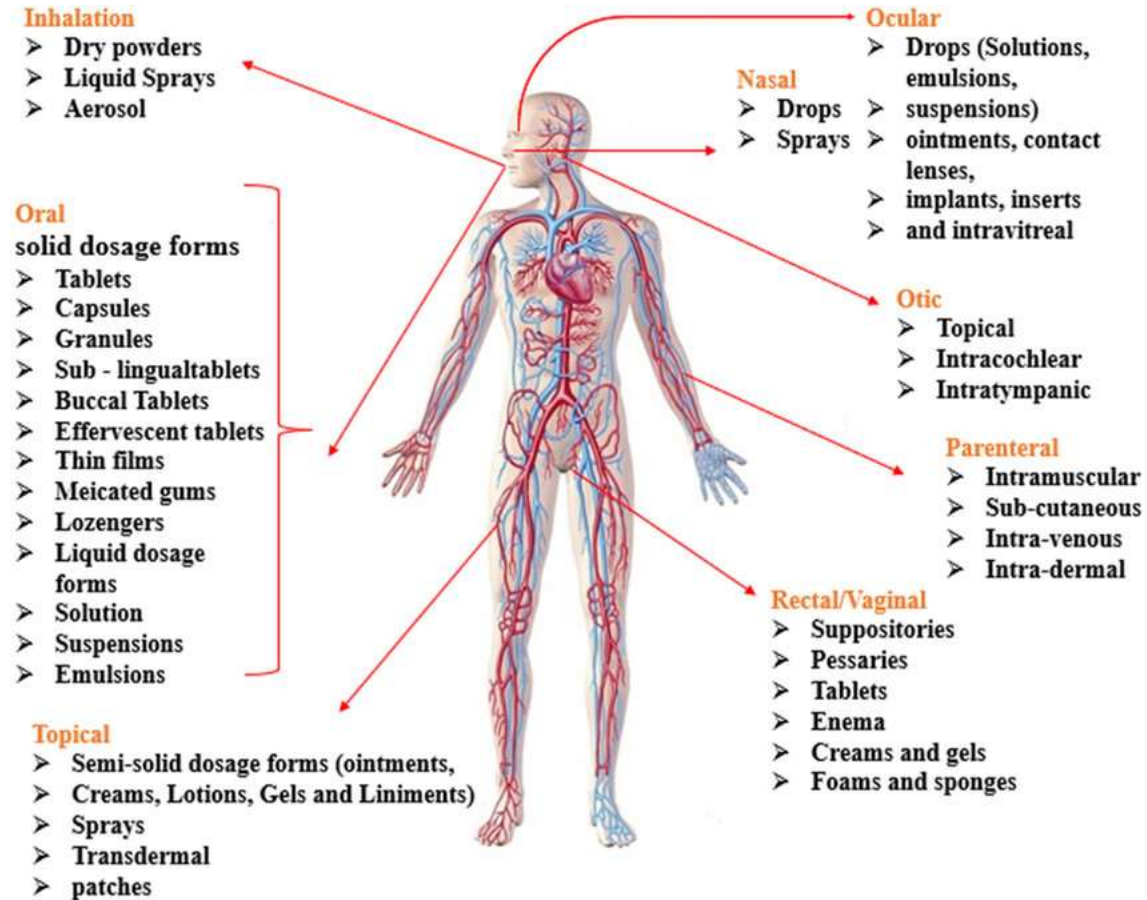
DEEPER TISSUES



ARTERIAL SUPPLY

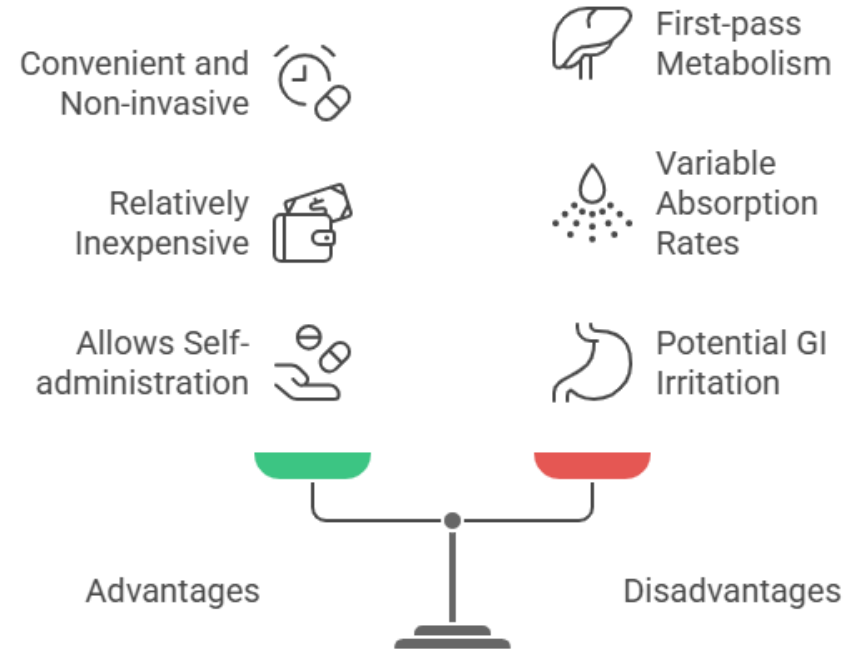


SYSTEMIC ROUTES

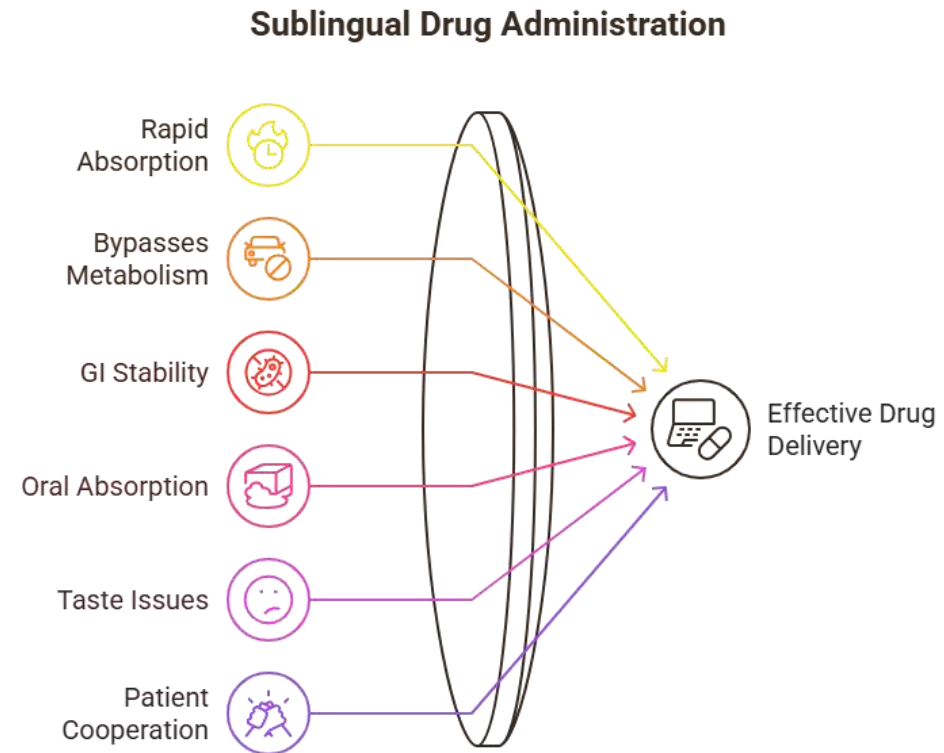


ORAL ROUTE

Weighing Oral Drug Administration Pros and Cons



SUBLINGUAL (S.L.) OR BUCCAL



RECTAL

Rectal drug administration

Pros



Bypasses metabolism



Useful for swallowing issues



Local or systemic effects



Cons

Variable absorption



Discomfort



Embarrassment

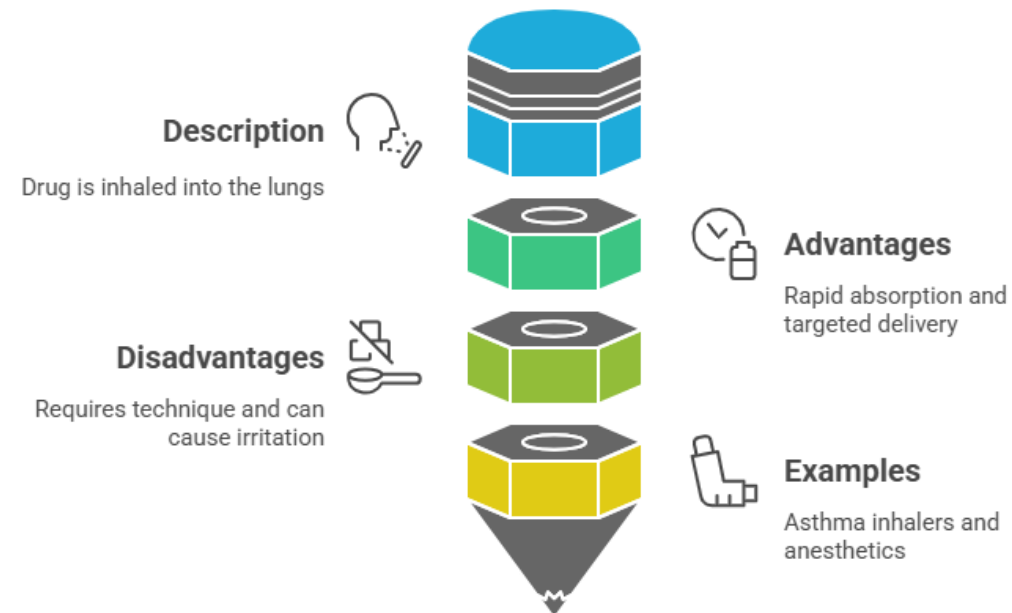


Rectal irritation

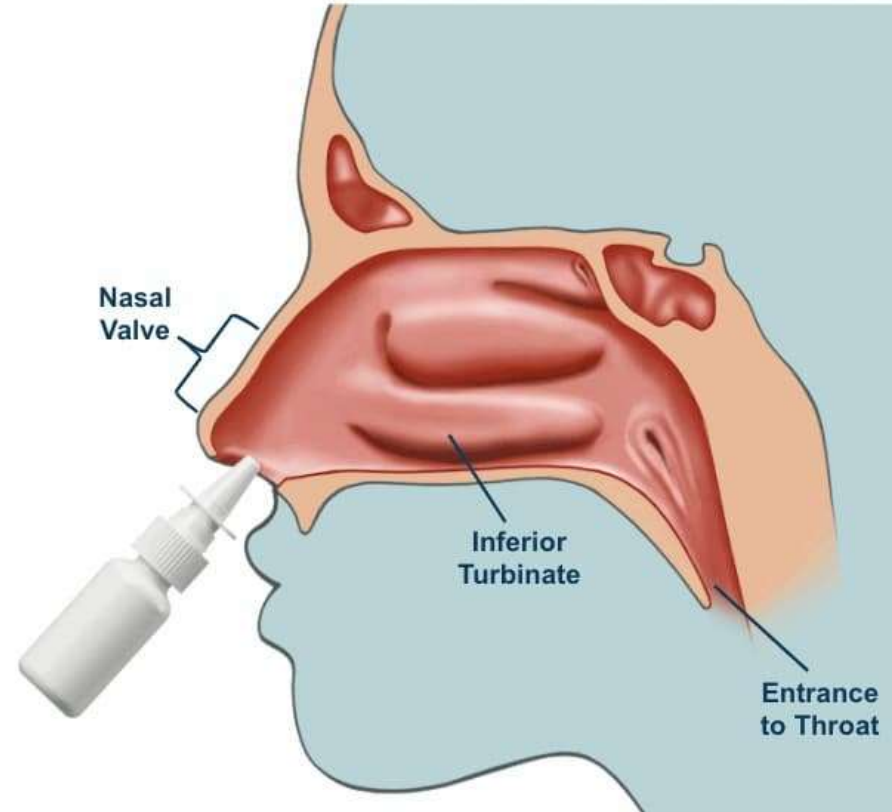


INHALATION

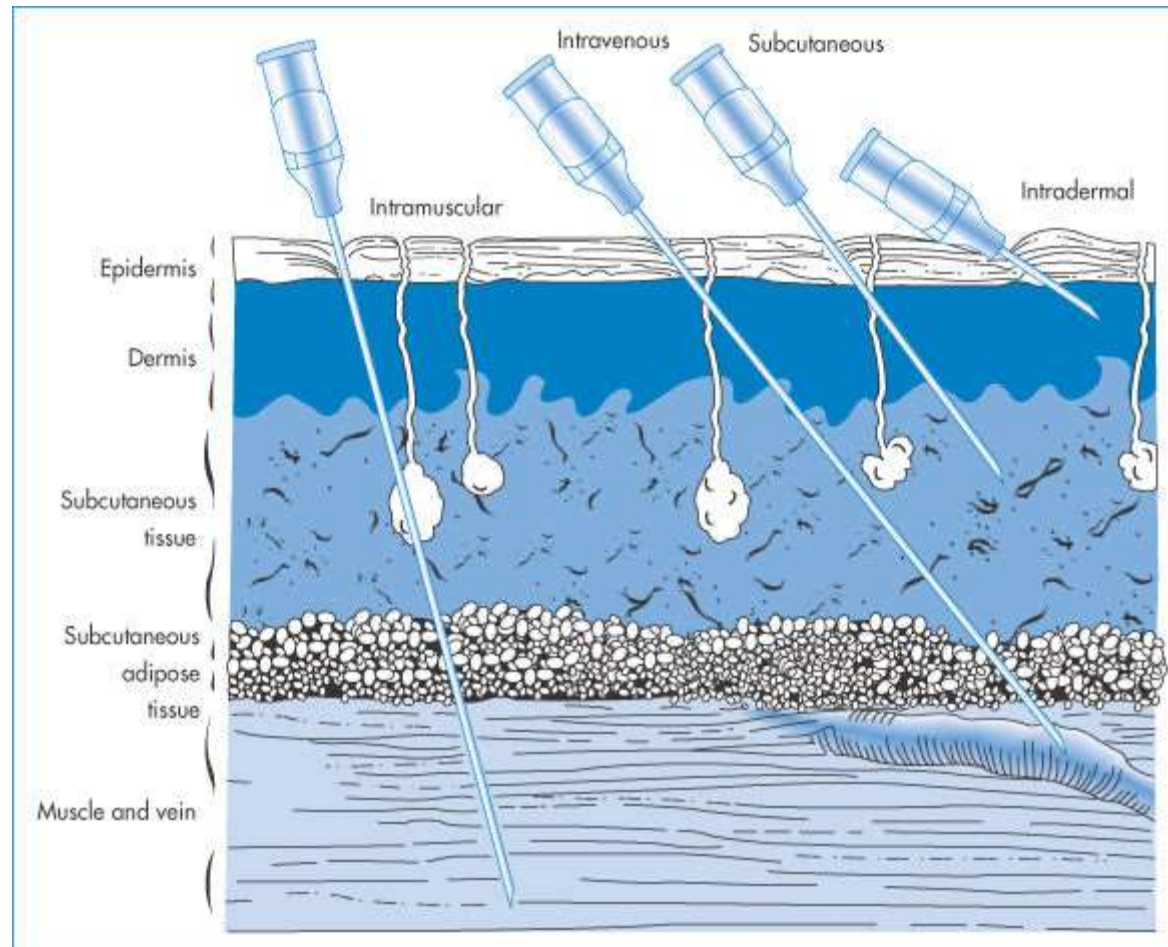
Inhalation Route Overview



NASAL

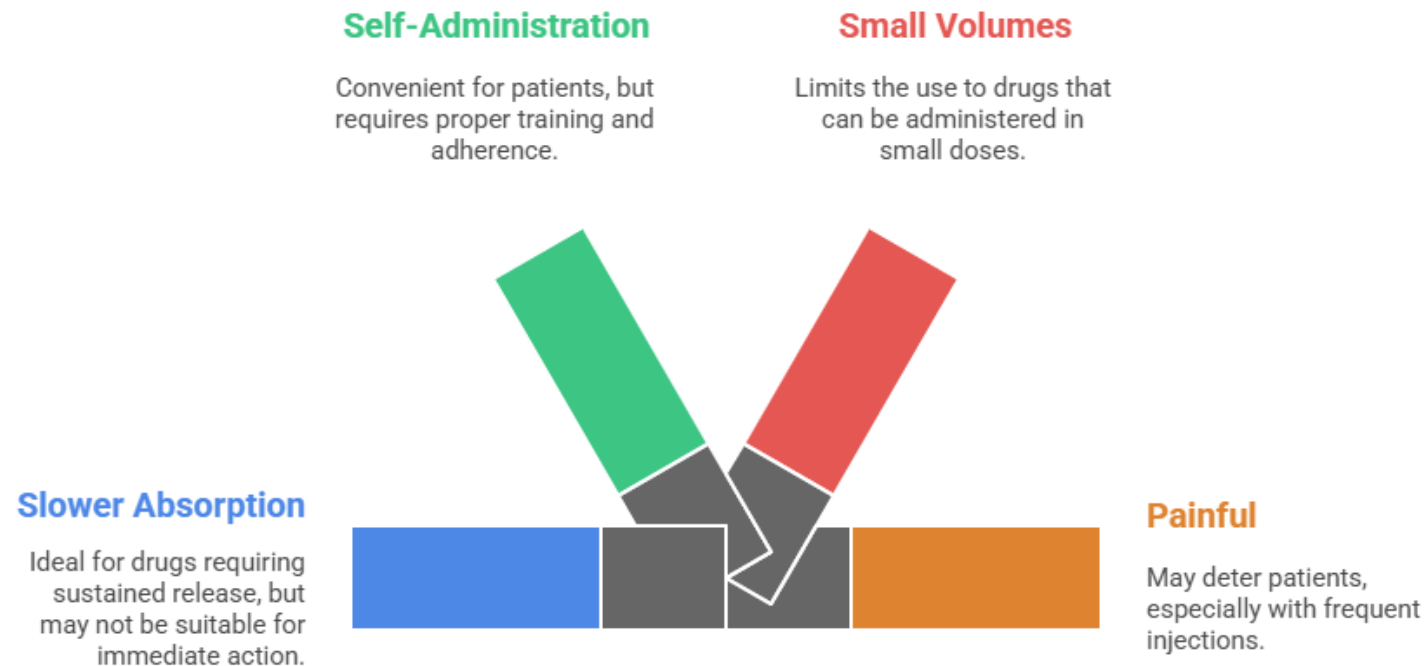


PARENTERAL



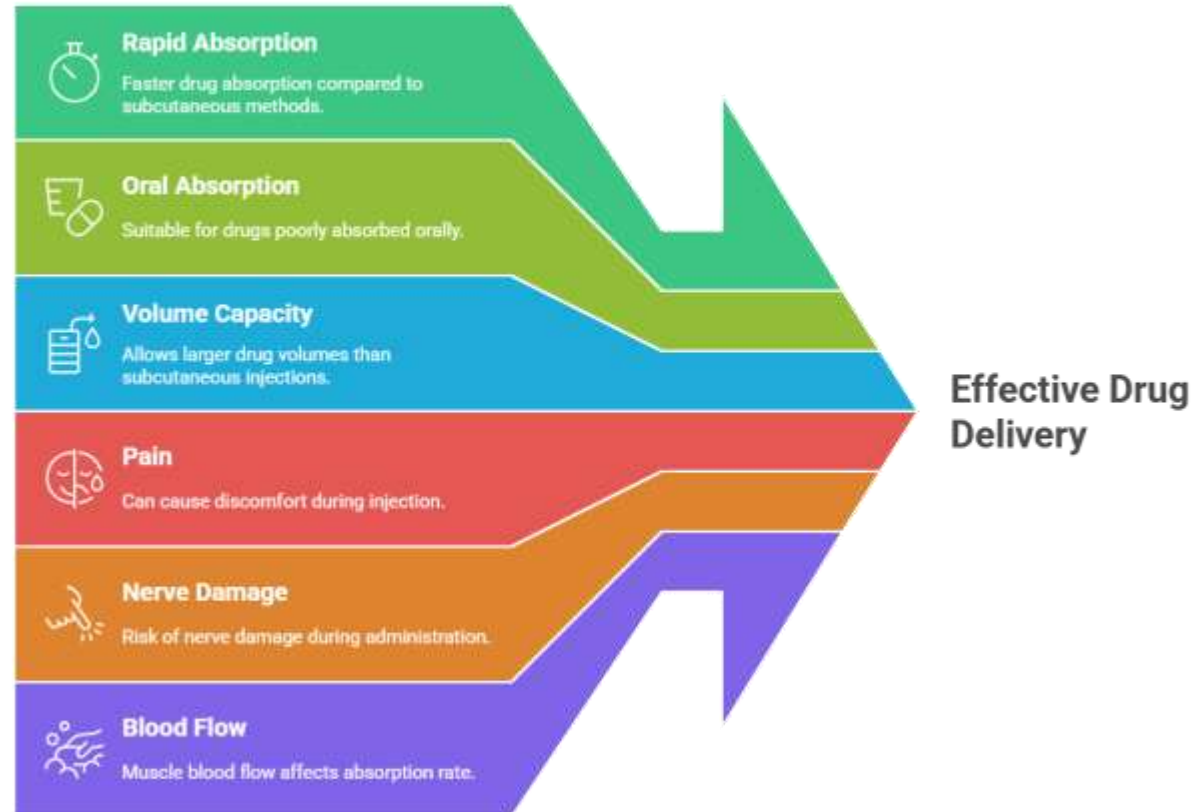
SUBCUTANEOUS (S.C.) ROUTE

Is subcutaneous administration the appropriate route for this drug?



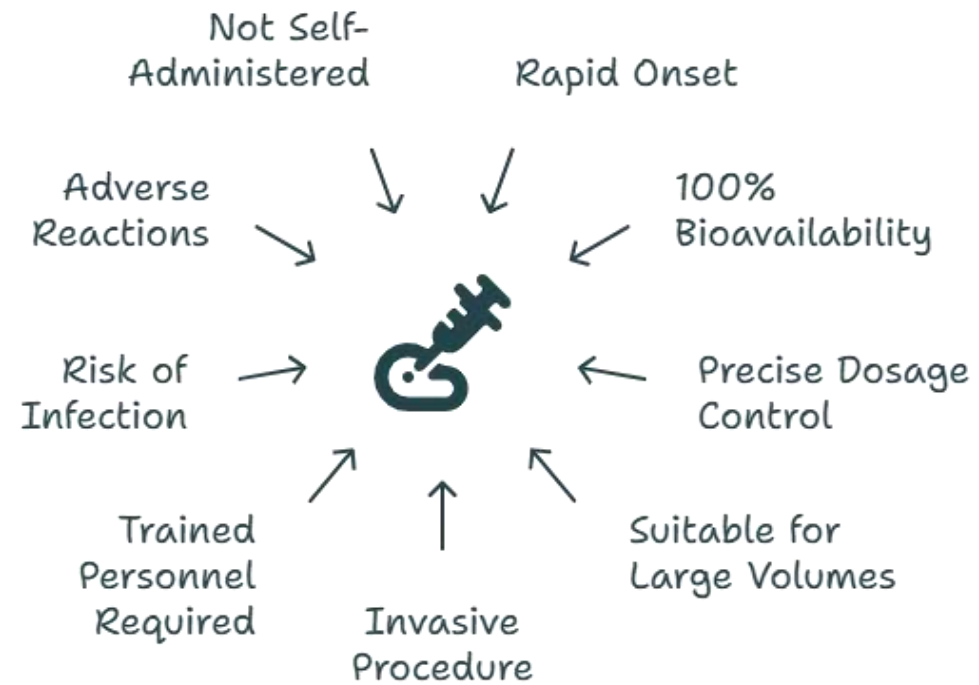
INTRAMUSCULAR (I.M.) ROUTE

Intramuscular Injection Dynamics



INTRAVENOUS (I.V.)

Understanding Intravenous Drug Administration



INTRADERMAL (I.D.)

Intradermal injection

Pros

Diagnostic use

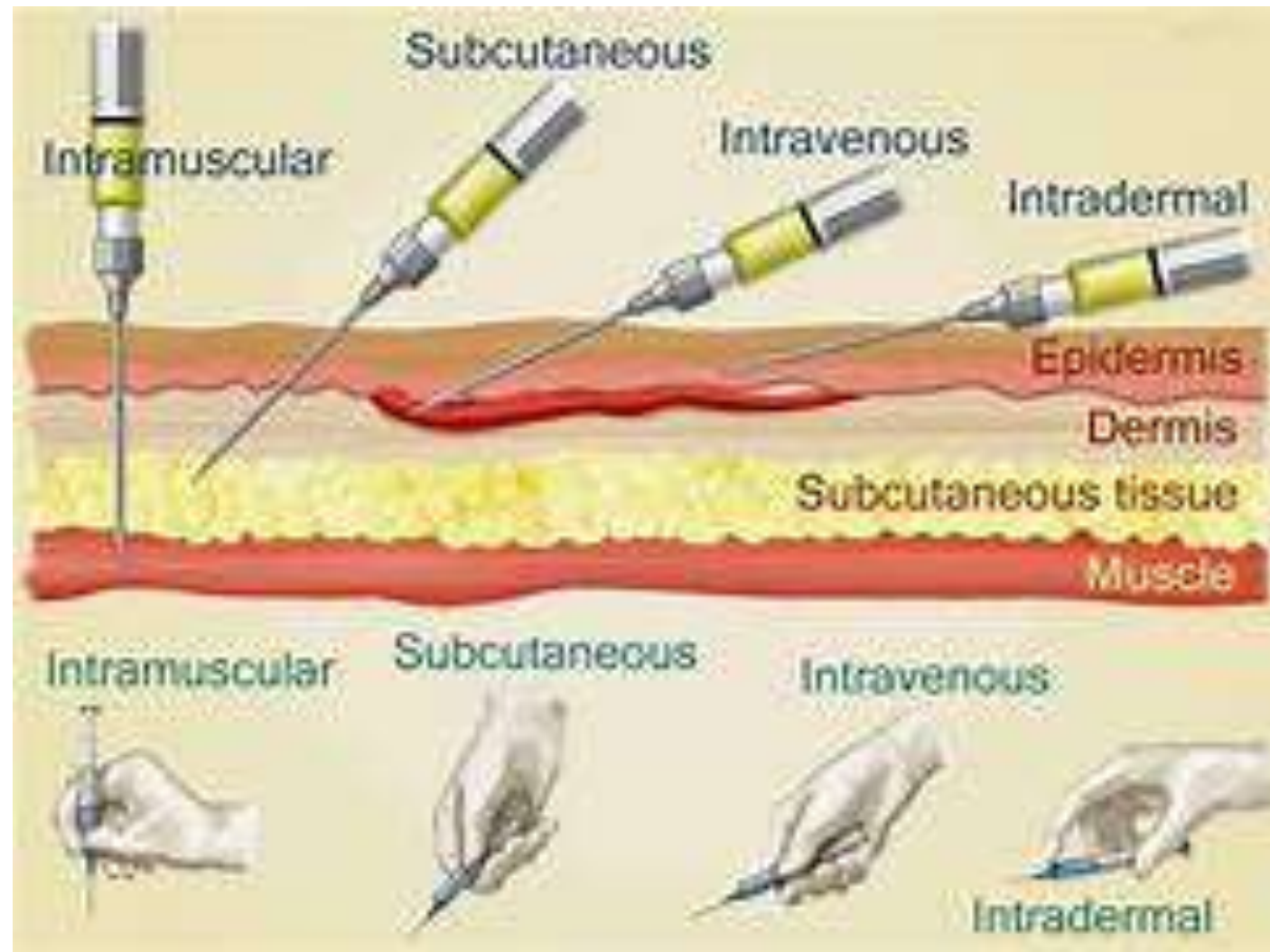
Local anesthesia

Cons

Small volumes

Slow absorption

Specialized technique



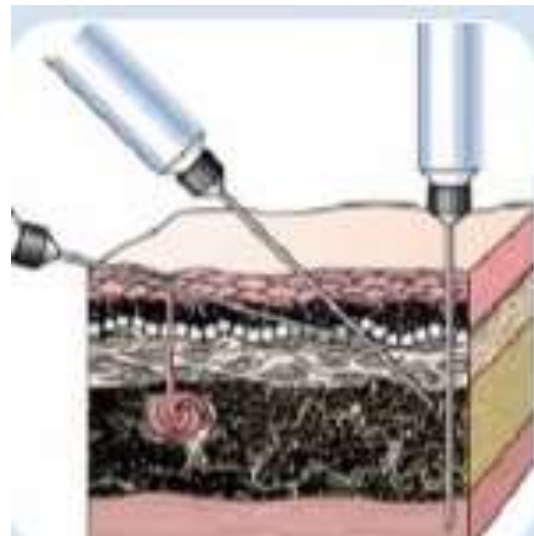
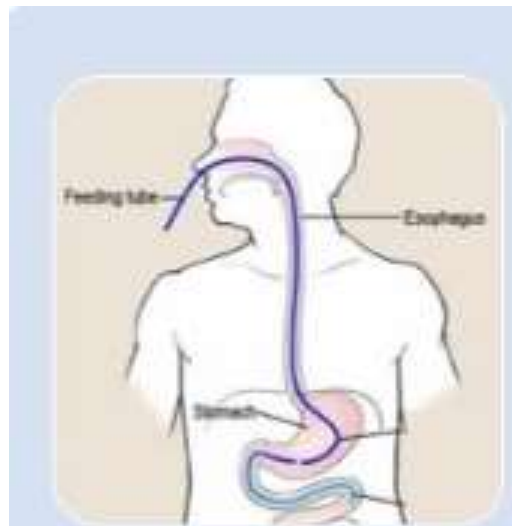
FACTORS GOVERNING CHOICE OF ROUTE

- Physical and chemical properties of the drug (solid/liquid/gas; solubility, stability, pH, irritancy).
- Site of desired action—localized and approachable or generalized and not approachable.
- Rate and extent of absorption of the drug from different routes.
- Effect of digestive juices and first pass metabolism by the liver.
- Rapidity with which the response is desired (routine treatment or emergency).
- Accuracy of dosage required (i.v. and inhalational can provide fine tuning).
- Condition of the patient (unconscious, vomiting).



CLASS ASSESSMENTS

FIND OUT THE ROUTES OF ADMINISTRATION?



SUMMARY

- Classification: Routes are categorized into local (e.g., topical, deeper tissues, arterial) for targeted action with minimal systemic absorption, and systemic (e.g., oral, parenteral, inhalation) for widespread distribution via the bloodstream, as detailed in the "Introduction, Routes of Drug Administration"
- Selection depends on drug characteristics (e.g., solubility, stability), site of action, absorption rate, first-pass metabolism, response speed, dosage precision, and patient condition, ensuring optimal therapeutic outcomes

REFERENCE

- Rang & Dale's Pharmacology, 9th Edition, Elsevier, 2019.
- Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, McGraw-Hill, 2018.
- Text book of Pharmacology by KD Tripathi

