

# PHARMACOLOGY



AGE 0-4  
AMOXICILIN

4-12  
RITALIN

12-18  
APPETITE  
SUPPRESSANTS

18-24  
NO-DOZ

24-38  
PROZAC

38-65  
VIAGRA

65 —  
EVERYTHING  
ELSE





- *What is a Drug?*

- *A chemical sub. Of known structure, other than nutrients or essential dietary ingredients, which, when administered to a living organism, produces a biologic effect*

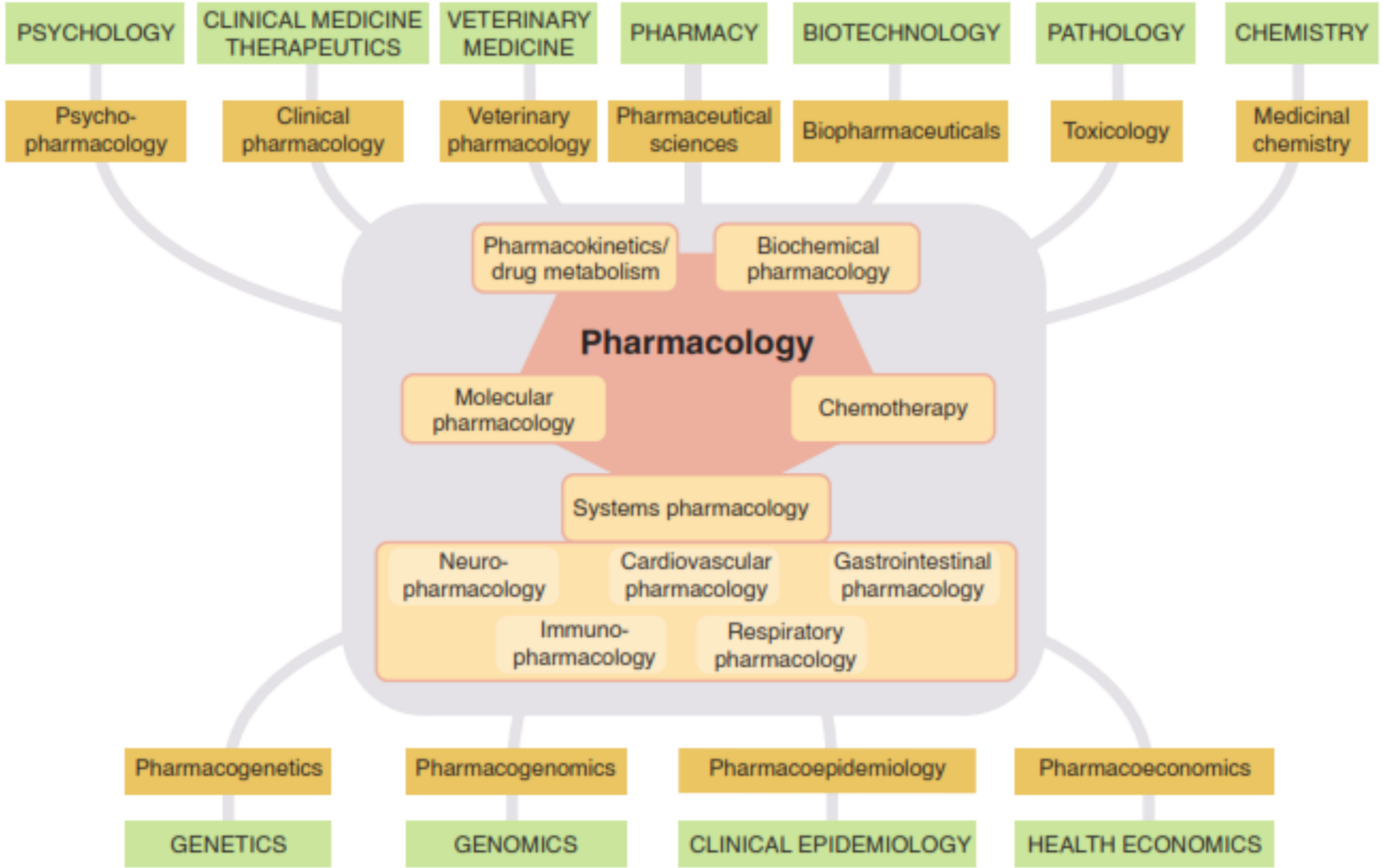
- *Medicine*

- *A chemical preparation, which usually, contains one or more drugs, given intentionally to have a therapeutic effect*

- *Pharmacology?????*

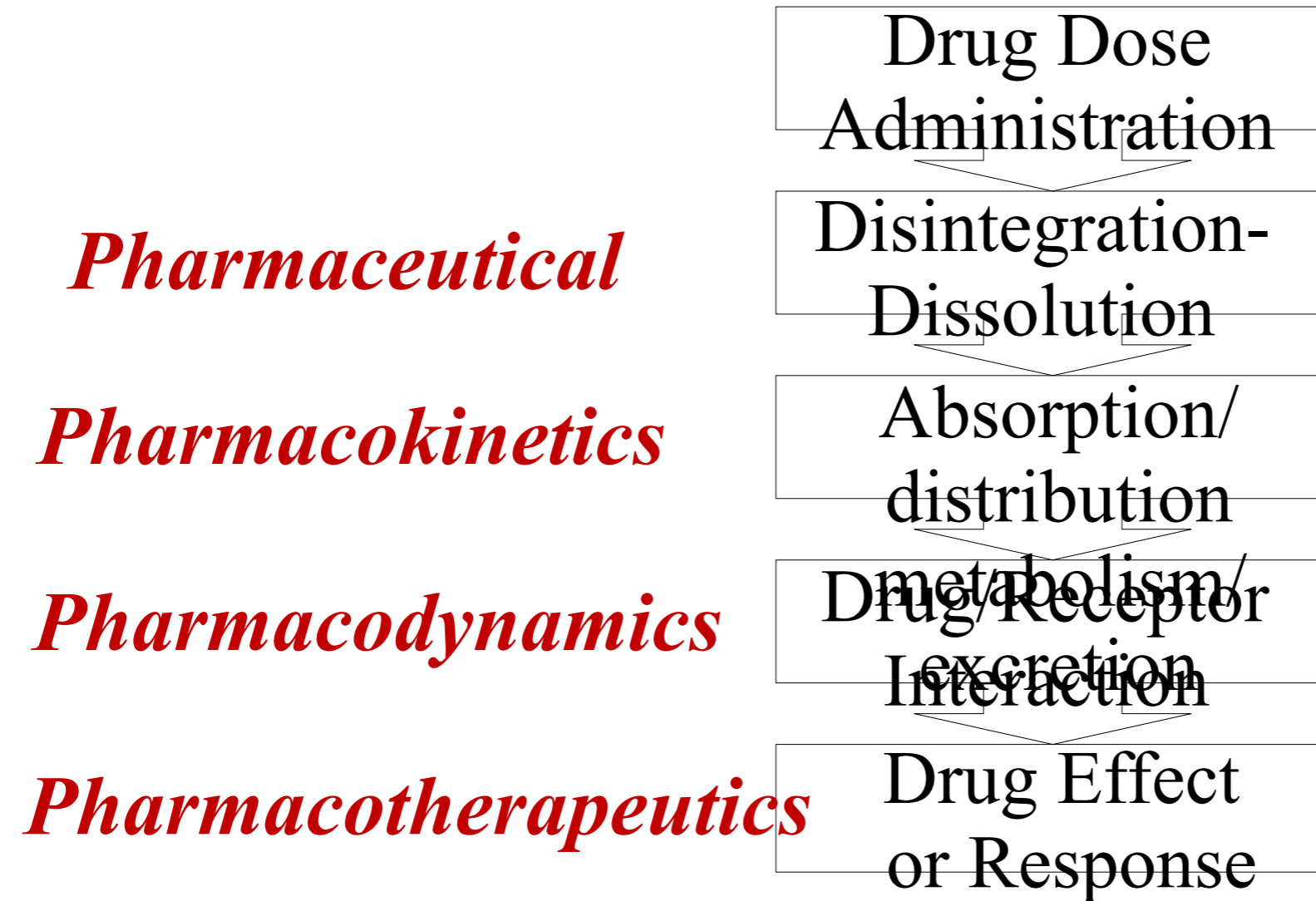
- *The study of the effects of drugs on the function of living systems*







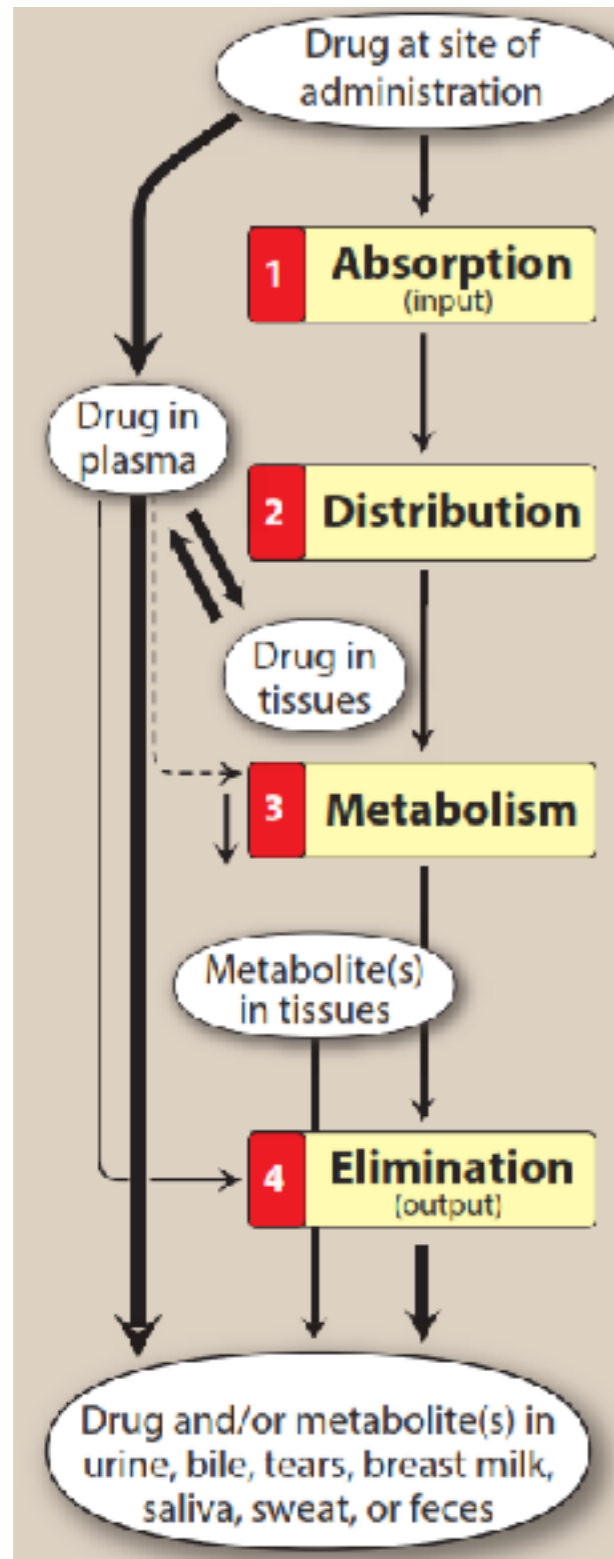
# *General Concepts*





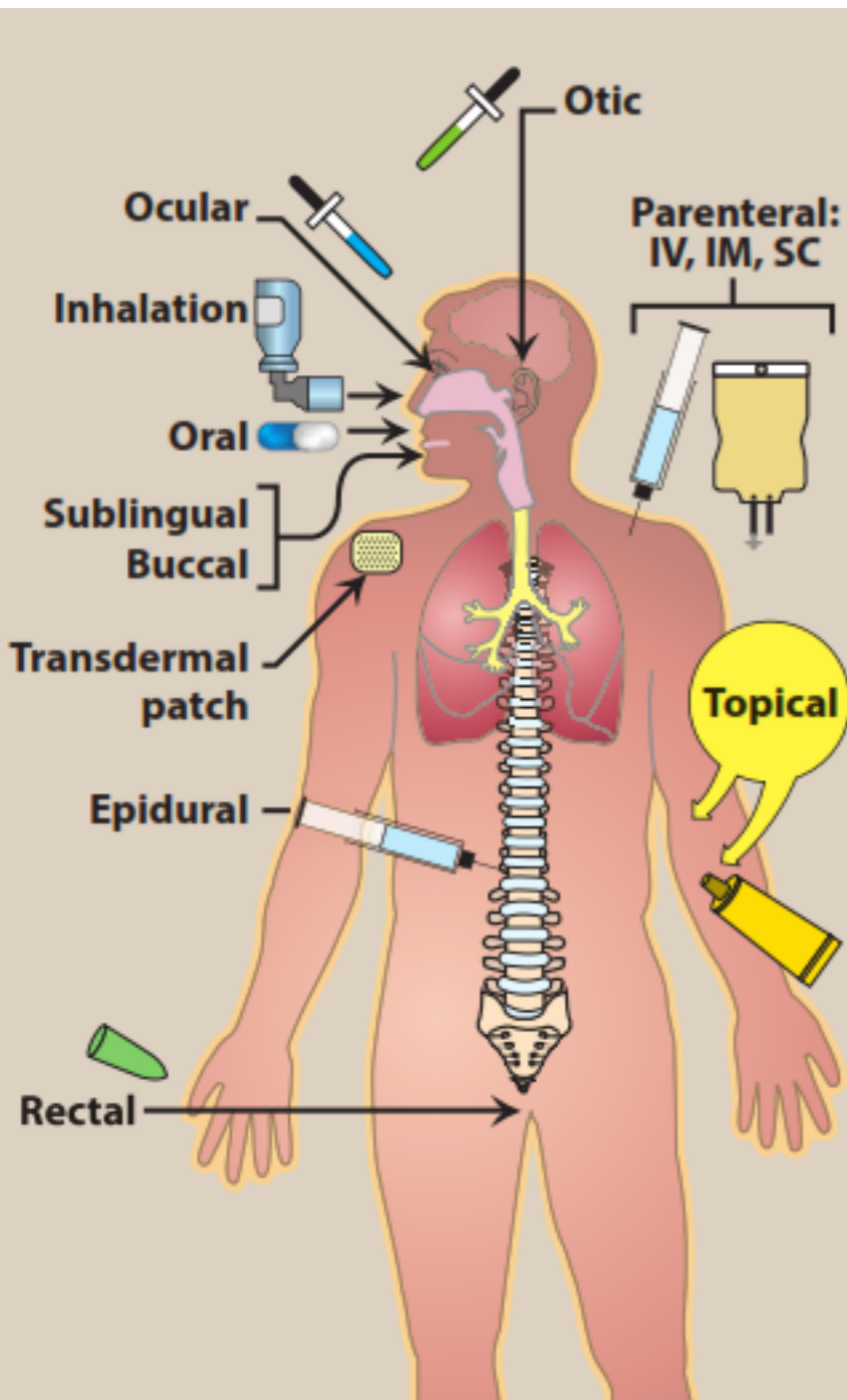
# *Pharmacokinetics*

*What the body does to a drug*





# *Routes of Drug Administration*



## *1-Enteral*

### *I- Oral*

*a- Enteric-coated preparations*

*b- Extended-release preparations*

### *II- Sublingual*

## *2- Parenteral*

*I- Intravenous (IV)*

*II- Intramuscular (IM)*

*III- Subcutaneous (SC)*

## *3- Other*

*I- oral inhalation*

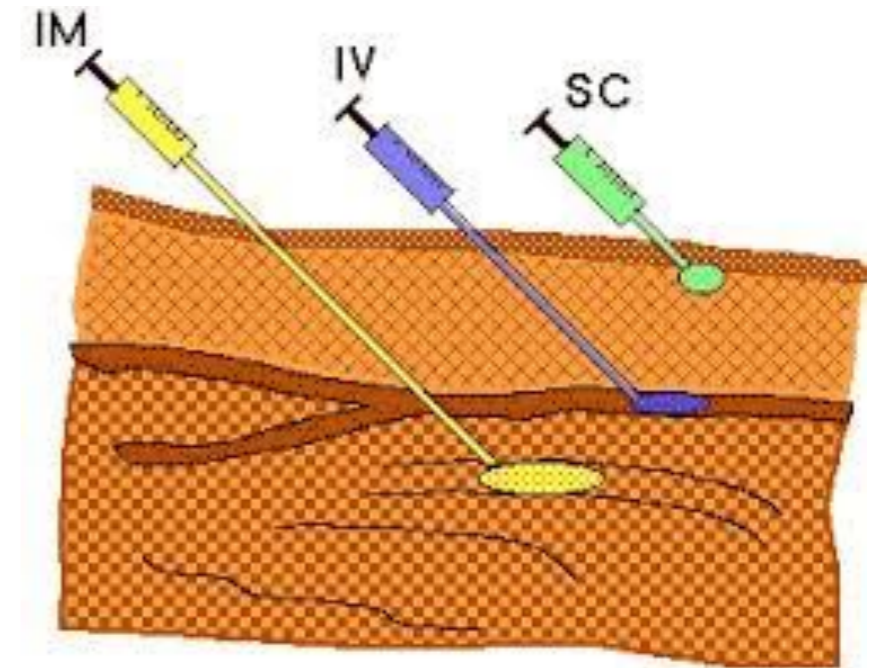
*II- nasal inhalation*

*III- intrathecal / intraventricular*

*IV- topical*

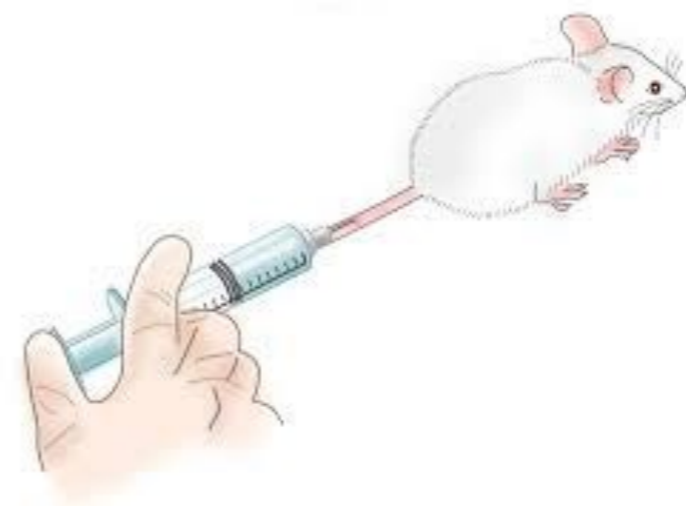
# *Parenteral Administration:*

- a- Intravenous administration*
- b- Intramuscular administration*
- c- Subcutaneous administration*



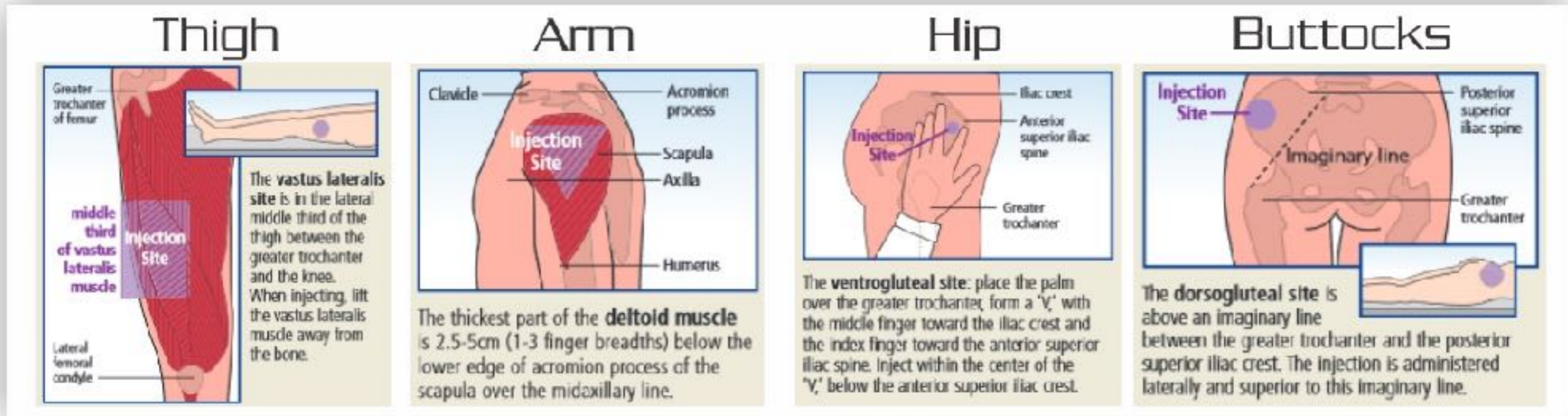


## *a- Intravenous administration*



- I- Advantages
- II- Disadvantages

## *b- Intramuscular administration*

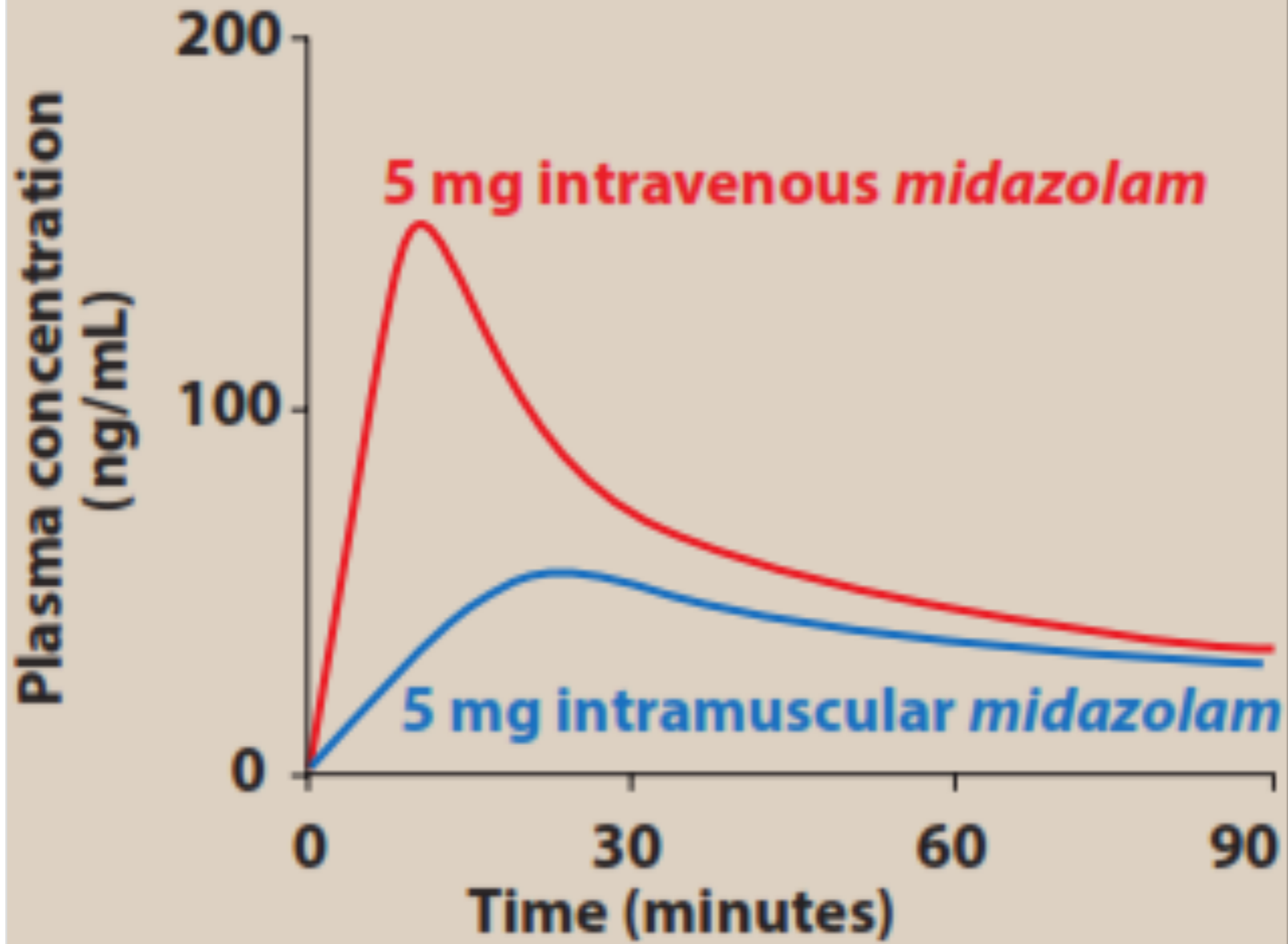


*I- aqueous solutions*

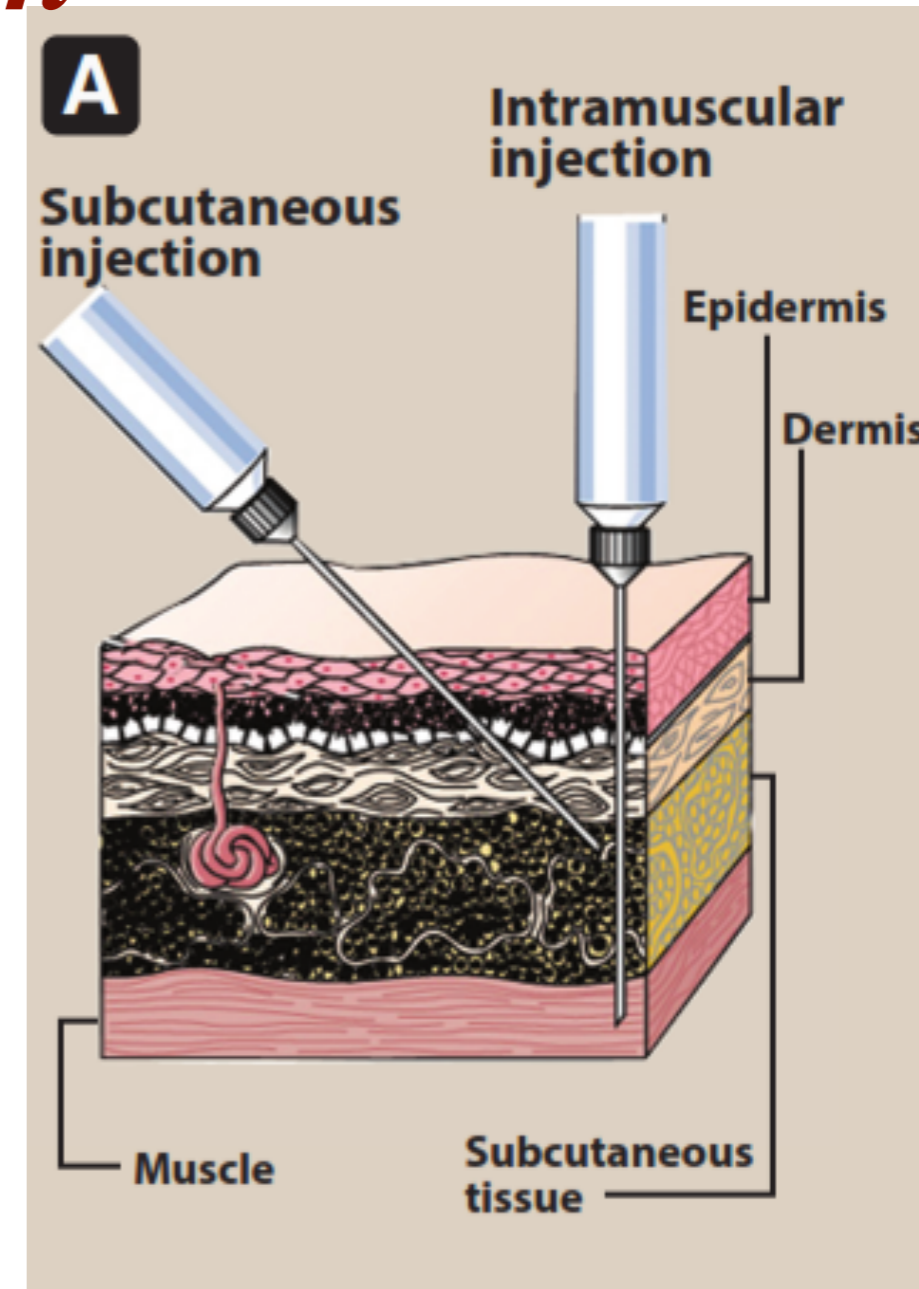
*II-specialized depot preparations*

e.g medroxyprogesterone

**B**

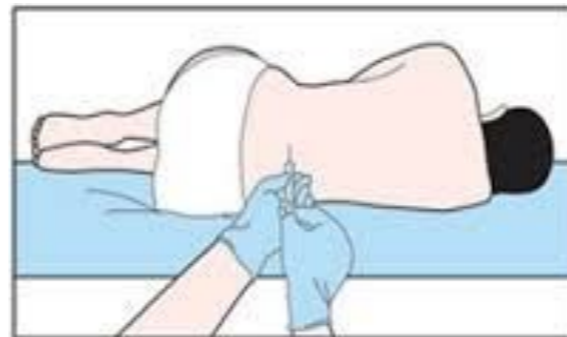


# *c-Subcutaneous administration*

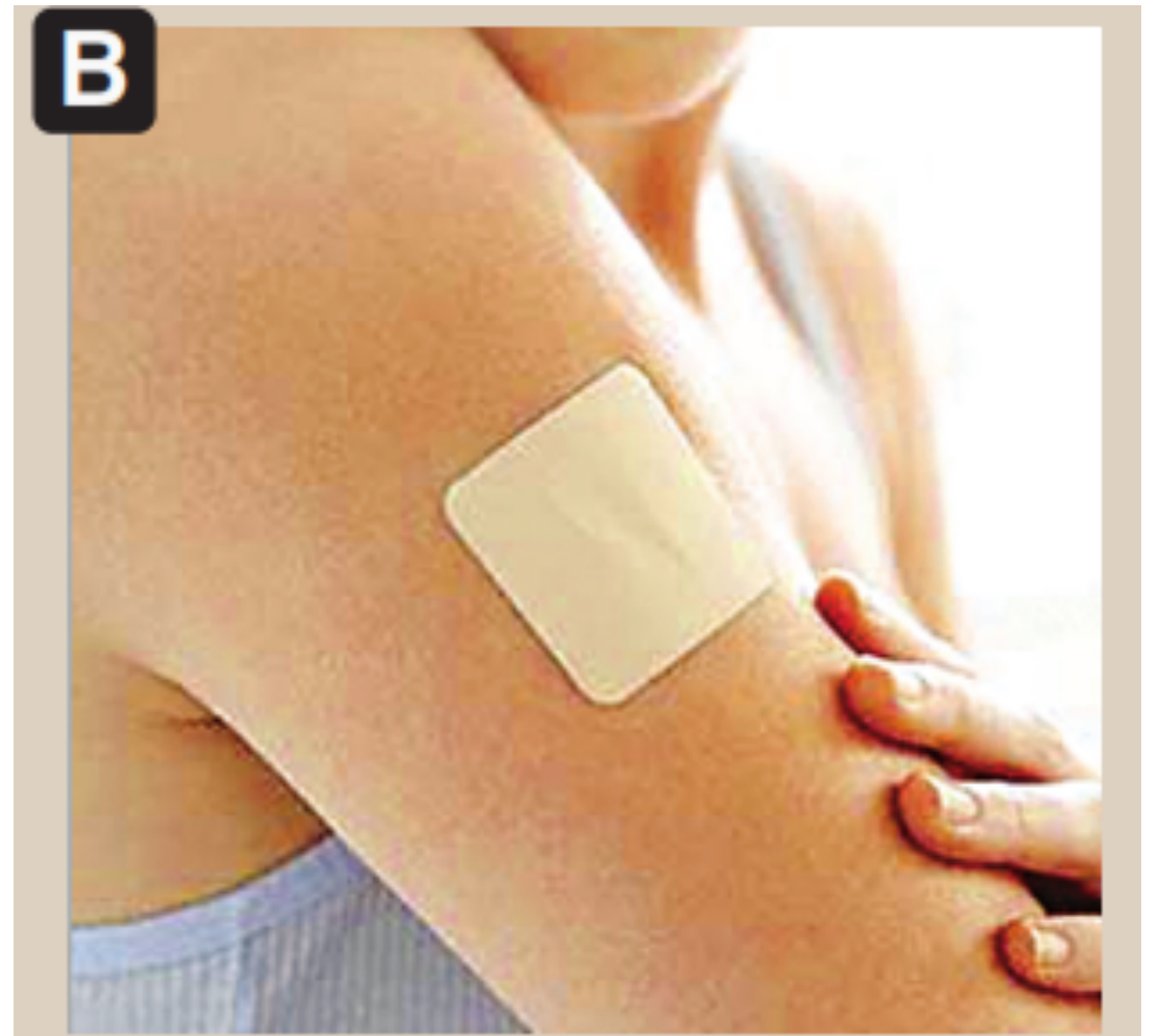
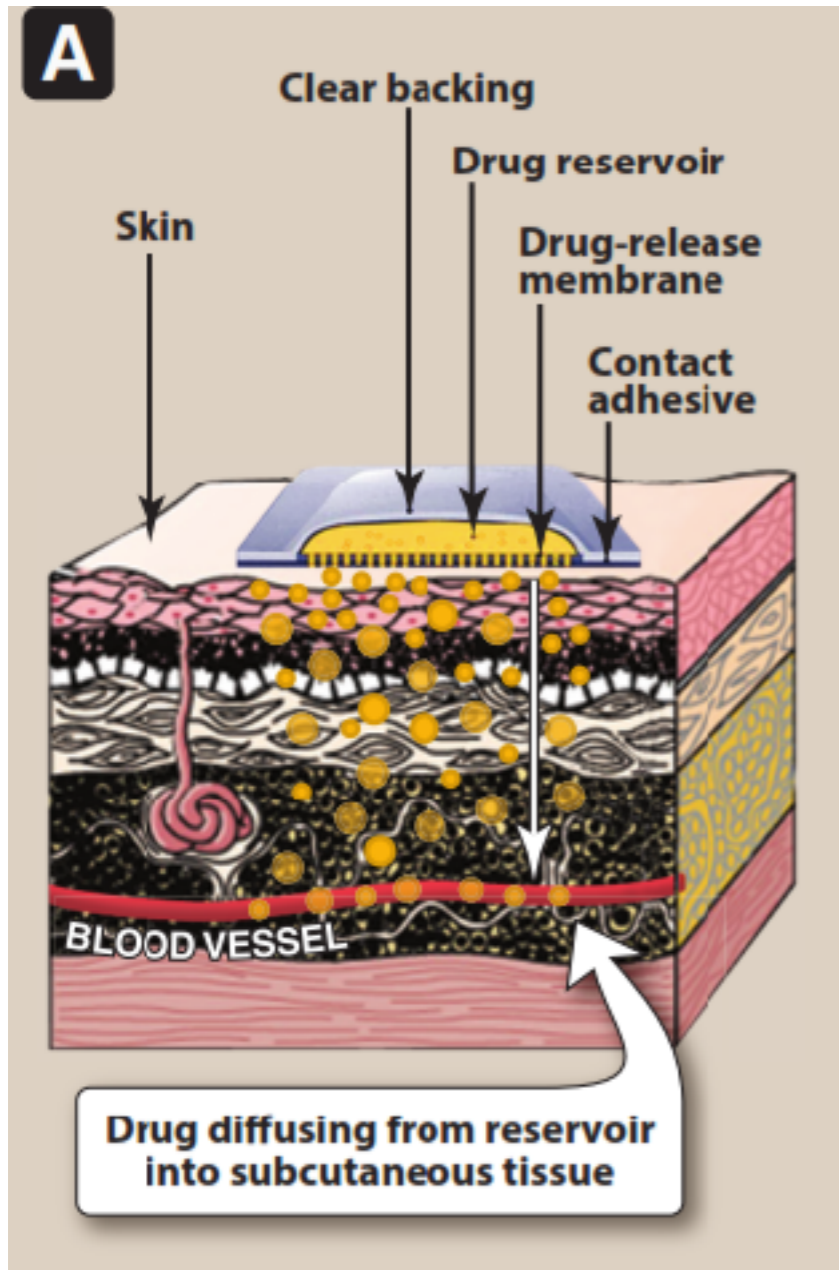


# *Other Routes*

- *Oral inhalation*
- *Nasal Inhalation*
- *Intrathecal / intraventricular*
- *Topical*
- *Transdermal*
- *Rectal*



# *Transdermal Patch*





ROUTE OF ADMINISTRATION	ABSORPTION PATTERN	ADVANTAGES	DISADVANTAGES
Oral	<ul style="list-style-type: none"> <li>● Variable; affected by many factors</li> </ul>	<ul style="list-style-type: none"> <li>● Safest and most common, convenient, and economical route of administration</li> </ul>	<ul style="list-style-type: none"> <li>● Limited absorption of some drugs</li> <li>● Food may affect absorption</li> <li>● Patient compliance is necessary</li> <li>● Drugs may be metabolized before systemic absorption</li> </ul>
Intravenous	<ul style="list-style-type: none"> <li>● Absorption not required</li> </ul>	<ul style="list-style-type: none"> <li>● Can have immediate effects</li> <li>● Ideal if dosed in large volumes</li> <li>● Suitable for irritating substances and complex mixtures</li> <li>● Valuable in emergency situations</li> <li>● Dosage titration permissible</li> <li>● Ideal for high molecular weight proteins and peptide drugs</li> </ul>	<ul style="list-style-type: none"> <li>● Unsuitable for oily substances</li> <li>● Bolus injection may result in adverse effects</li> <li>● Most substances must be slowly injected</li> <li>● Strict aseptic techniques needed</li> </ul>
Subcutaneous	<ul style="list-style-type: none"> <li>● Depends on drug diluents: Aqueous solution: prompt Depot preparations: slow and sustained</li> </ul>	<ul style="list-style-type: none"> <li>● Suitable for slow-release drugs</li> <li>● Ideal for some poorly soluble suspensions</li> </ul>	<ul style="list-style-type: none"> <li>● Pain or necrosis if drug is irritating</li> <li>● Unsuitable for drugs administered in large volumes</li> </ul>



ROUTE OF ADMINISTRATION	ABSORPTION PATTERN	ADVANTAGES	DISADVANTAGES
<b>Intramuscular</b>	<ul style="list-style-type: none"> <li>● Depends on drug diluents: Aqueous solution: prompt Depot preparations: slow and sustained</li> </ul>	<ul style="list-style-type: none"> <li>● Suitable if drug volume is moderate</li> <li>● Suitable for oily vehicles and certain irritating substances</li> <li>● Preferable to intravenous if patient must self-administer</li> </ul>	<ul style="list-style-type: none"> <li>● Affects certain lab tests (creatinine kinase)</li> <li>● Can be painful</li> <li>● Can cause intramuscular hemorrhage (precluded during anticoagulation therapy)</li> </ul>
<b>Transdermal (patch)</b>	<ul style="list-style-type: none"> <li>● Slow and sustained</li> </ul>	<ul style="list-style-type: none"> <li>● Bypasses the first-pass effect</li> <li>● Convenient and painless</li> <li>● Ideal for drugs that are lipophilic and have poor oral bioavailability</li> <li>● Ideal for drugs that are quickly eliminated from the body</li> </ul>	<ul style="list-style-type: none"> <li>● Some patients are allergic to patches, which can cause irritation</li> <li>● Drug must be highly lipophilic</li> <li>● May cause delayed delivery of drug to pharmacological site of action</li> <li>● Limited to drugs that can be taken in small daily doses</li> </ul>
<b>Rectal</b>	<ul style="list-style-type: none"> <li>● Erratic and variable</li> </ul>	<ul style="list-style-type: none"> <li>● Partially bypasses first-pass effect</li> <li>● Bypasses destruction by stomach acid</li> <li>● Ideal if drug causes vomiting</li> <li>● Ideal in patients who are vomiting, or comatose</li> </ul>	<ul style="list-style-type: none"> <li>● Drugs may irritate the rectal mucosa</li> <li>● Not a well-accepted route</li> </ul>





ROUTE OF ADMINISTRATION	ABSORPTION PATTERN	ADVANTAGES	DISADVANTAGES
Inhalation	<ul style="list-style-type: none"><li>● Systemic absorption may occur; this is not always desirable</li></ul>	<ul style="list-style-type: none"><li>● Absorption is rapid; can have immediate effects</li><li>● Ideal for gases</li><li>● Effective for patients with respiratory problems</li><li>● Dose can be titrated</li><li>● Localized effect to target lungs: lower doses used compared to that with oral or parenteral administration</li><li>● Fewer systemic side effects</li></ul>	<ul style="list-style-type: none"><li>● Most addictive route (drug can enter the brain quickly)</li><li>● Patient may have difficulty regulating dose</li><li>● Some patients may have difficulty using inhalers</li></ul>
Sublingual	<ul style="list-style-type: none"><li>● Depends on the drug: Few drugs (for example, <i>nitroglycerin</i>) have rapid, direct systemic absorption Most drugs erratically or incompletely absorbed</li></ul>	<ul style="list-style-type: none"><li>● Bypasses first-pass effect</li><li>● Bypasses destruction by stomach acid</li><li>● Drug stability maintained because the pH of saliva relatively neutral</li><li>● May cause immediate pharmacological effects</li></ul>	<ul style="list-style-type: none"><li>● Limited to certain types of drugs</li><li>● Limited to drugs that can be taken in small doses</li><li>● May lose part of the drug dose if swallowed</li></ul>

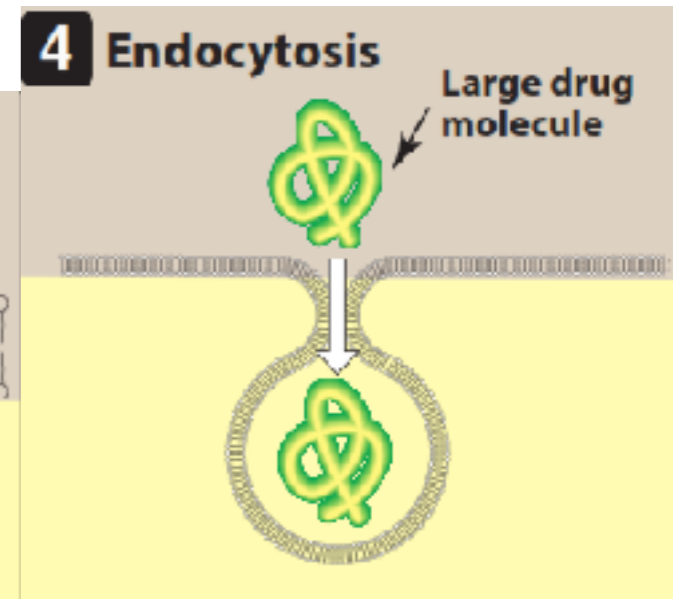
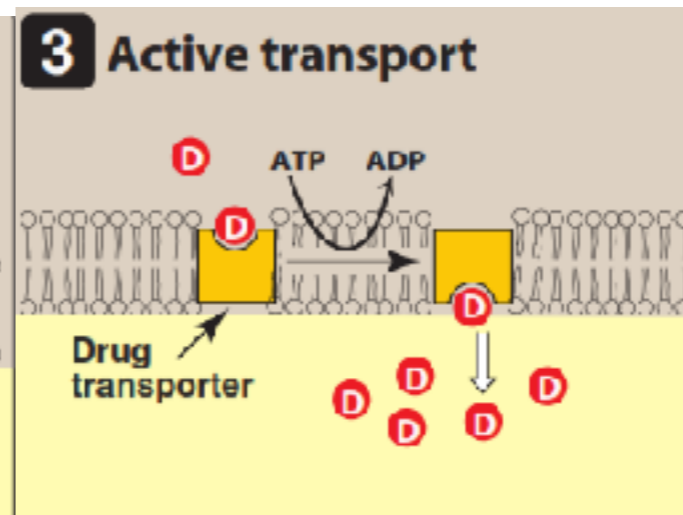
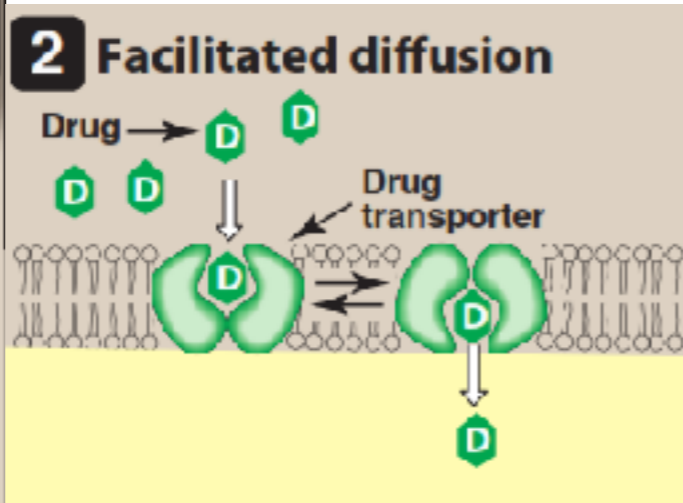
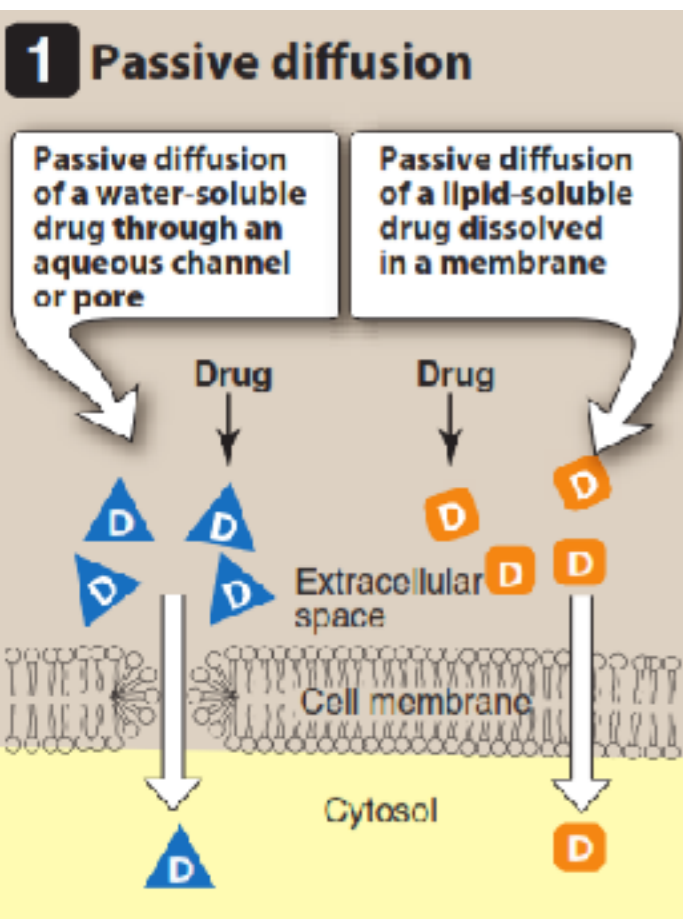


# *Absorption of Drugs*

## *(mechanisms & factors controlling)*

- *The transfer of D from site of administration to bloodstream via several mechanisms*
- *Rate & Efficiency*
- *Mechanisms of absorption of drugs from GIT*
  - ❖ *Passive diffusion*
  - ❖ *Facilitated diffusion*
  - ❖ *Active transport*
  - ❖ *Endocytosis & exocytosis*

# *Mechanisms of absorption of drugs from GIT*



# 1 Passive diffusion

