

# **Drug**

# **Medicine**

**Active ingredient + Excipient**

**Every medicine is a drug, but not every drug is a medicine**

# Pharmaceutical Biochemistry

- studies how molecules in the body interact with drugs
- to develop better drugs and treatments for a range of diseases and conditions
- for understanding the causes of adverse drug reactions and toxicity, and informing the development of better drug delivery systems

## **Pharmacokinetics**

Study of the movement of drugs within biological systems or body; deals with the absorption, distribution, metabolism, and excretion of drugs

**“What the body does to the drug” or “the effects of the body on the drug”**

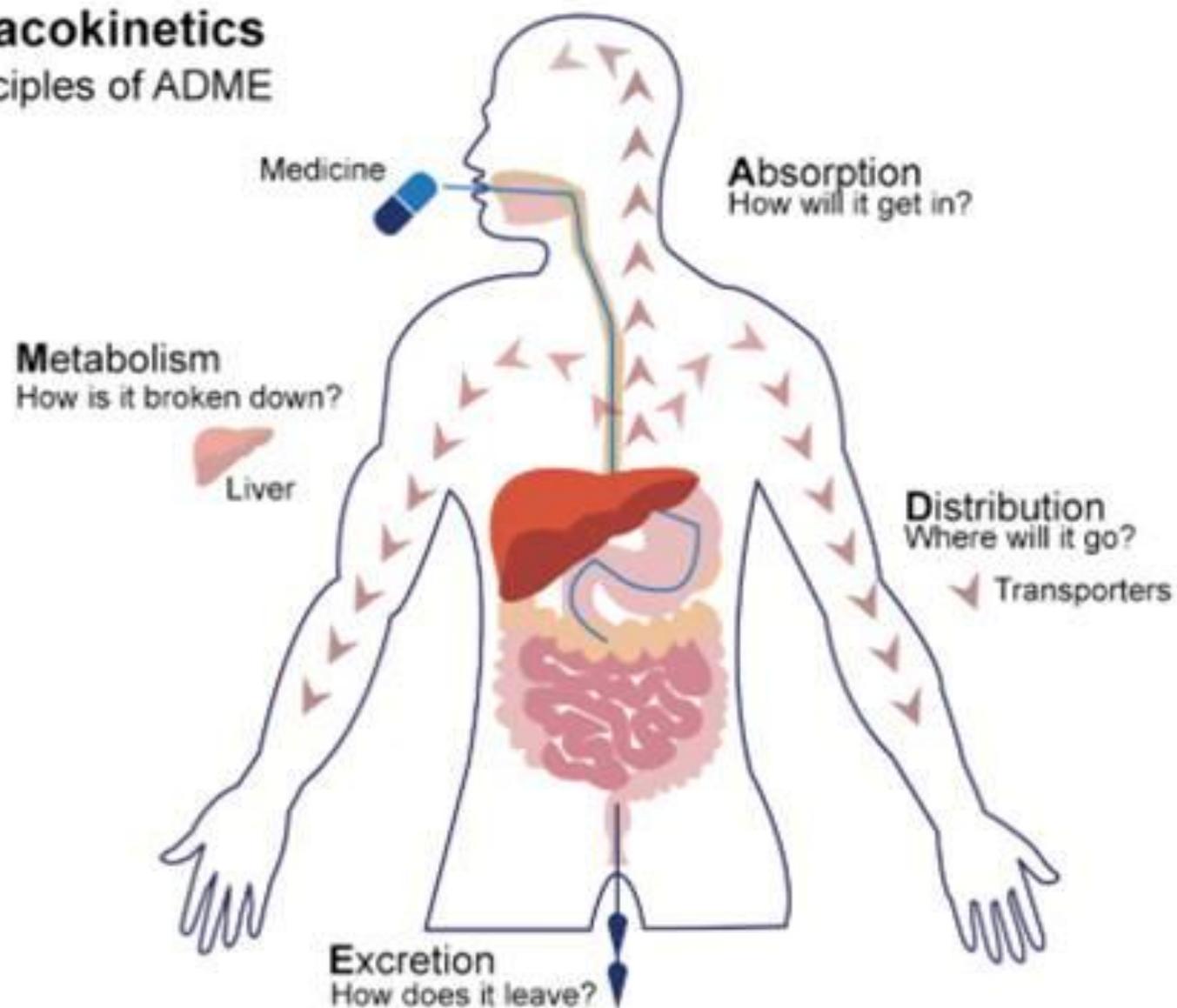
## **Pharmacodynamics**

Study of the action of drug and the biochemical and physiological effects produced by the drug action.

**“What the drug does to the body” or “the effects of a drug on the body”**

# Pharmacokinetics

The principles of ADME



**Absorption:** Absorption is defined as the process by which a drug proceeds from the site of administration to the site of measurement (usually blood, plasma or serum).

**Distribution:** Distribution is the process of reversible transfer of drug to and from the site of measurement (usually blood or plasma).

**Metabolism:** Metabolism is the process of a conversion of one chemical species to another chemical species. Or chemical modification of drug.

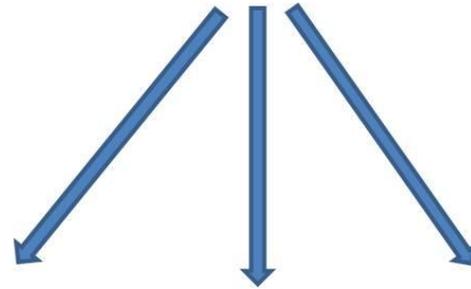
**Excretion:** Excretion is defined as a process by which drug (chemically unchanged or altered form) is removed irreversibly from the body.

## **Route of Drug administration**

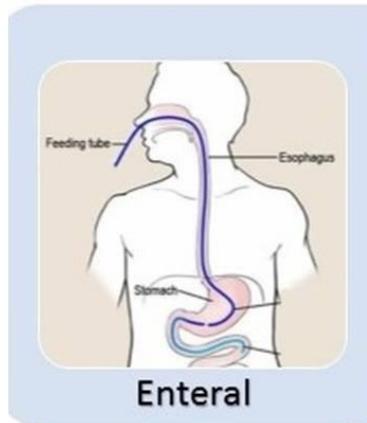
**A route of administration is a path by which a drug is taken into the body**

**Routes of administration are generally classified by the location at which the substance is applied.**

## **Routes of drug administration**

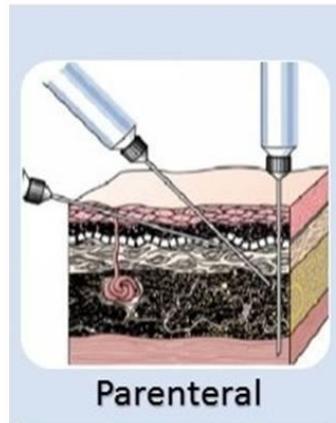


### **Enteral**



oral  
sublingual  
rectal

### **Parenteral**



intravenous (IV)  
intramuscular (IM)  
subcutaneous (SC)

### **Others**



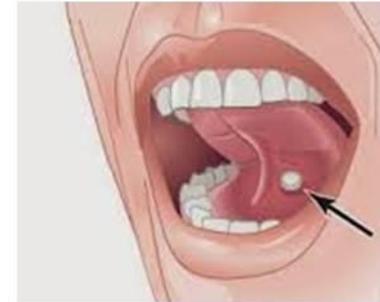
inhalation  
topical  
intrathecal  
Transdermal etc.

# Enteral

oral (through the mouth)



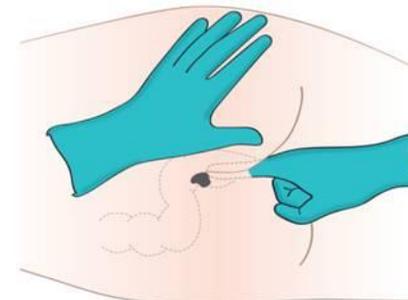
sublingual (under the tongue)



buccal (between the cheek and gums)



rectal (into the rectum)



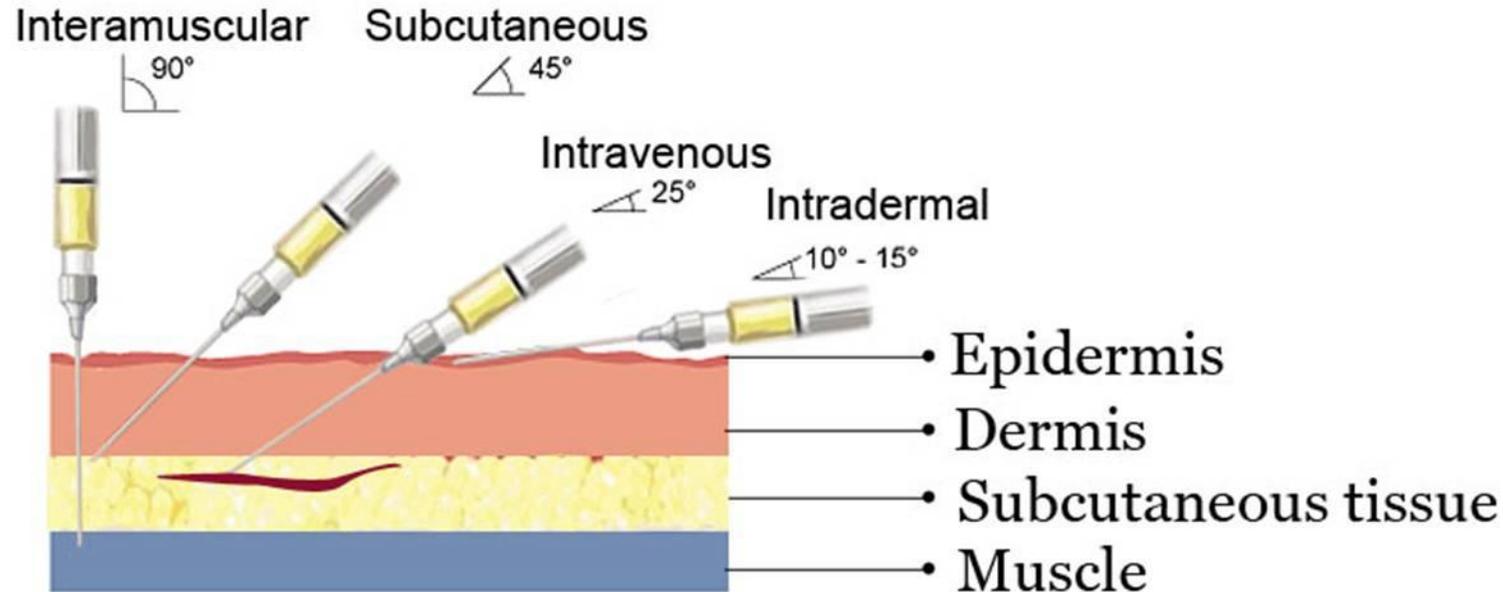
# Parenteral

intradermal (into the dermis)  
e.g. BCG vaccine for tuberculosis

subcutaneous (under the skin). e.g. insulin.

intravenous (into a vein), e.g. many drugs, total parenteral nutrition

intramuscular (into a muscle), e.g. many vaccines, antibiotics, and long-term psychoactive agents.



# Others

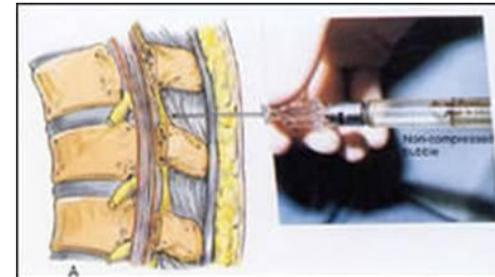
[inhalation](#) (directly pass into lungs), e.g. drugs for asthma or chronic obstructive pulmonary disease (Volatile drugs and gases such as salbutamol aerosols and nebulization )



[topical](#) (to body surfaces such as skin and mucous membranes)



[intrathecal](#) (into the spinal canal)  
e.g. spinal [anesthesia](#) and [chemotherapy](#)



[transdermal](#) (diffusion through the intact skin for systemic rather than topical distribution),  
e.g. [transdermal patches](#) such as [nitroglycerine](#) for treatment of [angina pectoris](#).



# Reasons for Selecting a Particular Route of Administration

- **Drug properties**
  - Physical - solid, liquid, and gas
  - Chemical - solubility, pH, and irritant properties
- **Site of desired action**
  - Localized and approachable
  - Generalized and non-approachable
- **Rate and extent of absorption**
- **Effect of digestive juices and first pass metabolism**
- **Rapidity of the desired response**
- **Requirement of accurate dose**
- **Patient condition and compliance**