Drug Absorption & Elimination

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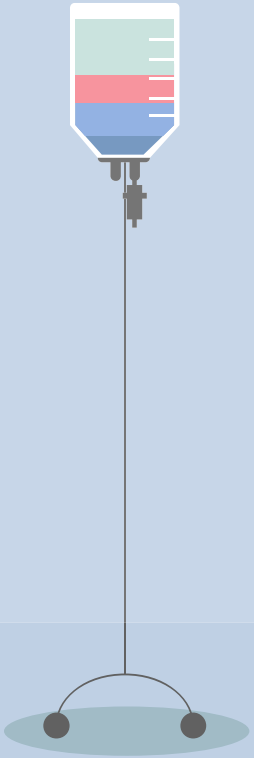

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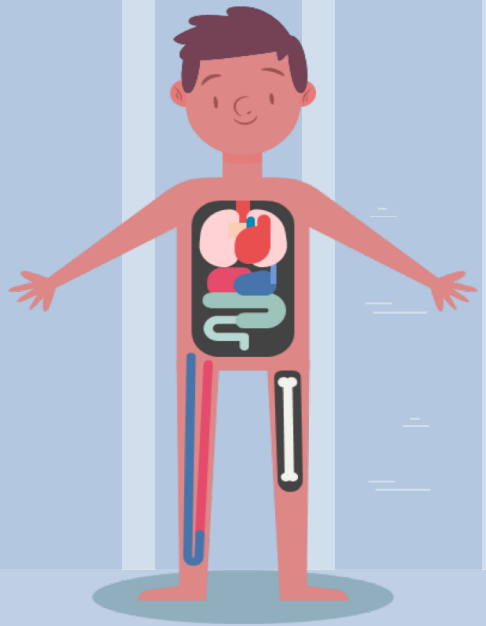
Introduction

Drug absorption is a pharmacokinetic parameter that refers to the way a drug is absorbed from a pharmaceutical formulation into the bloodstream.

The most important principle in pharmacokinetics theory is drug absorption which is defined as the transportation of the unmetabolized drug from the site of administration to the body circulation system.

Most drugs are weak organic acids or bases, existing in non-ionized and ionized forms in an aqueous environment.



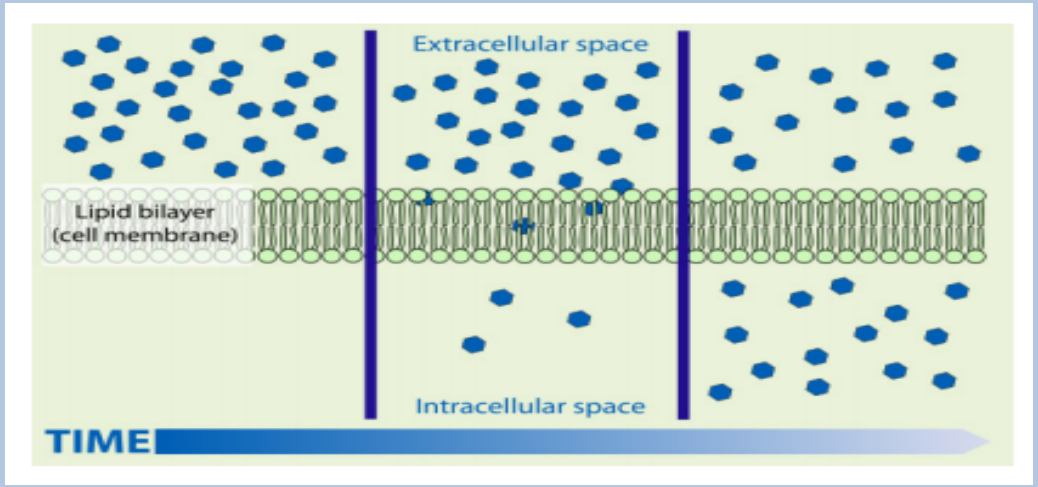
Mechanism of drug absorption

Passive diffusion (Non-ionic diffusion):

- It is involves the crossing of a pharmaceutical substance across a cell membrane from an area of high drug concentration, such as in the gastrointestinal tract, to an area of low drug concentration, such as in the blood.

- Absorption of 90% of drugs.

- Passive diffusion does not involve a carrier and does not require energy.



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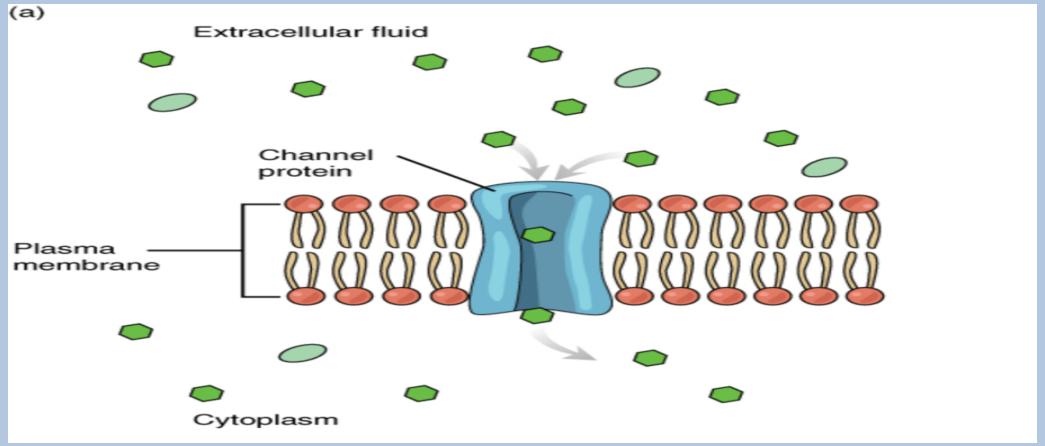
Facilitated Passive Diffusion:

- This refers to the passage of certain drugs across cell membranes according to the concentration gradient, but in association with specific substrate molecules which attach the drug molecule and diffuse across the membrane.

- Limited importance in the absorption of drugs, e.g: entry of glucose into RBCs & intestinal absorption of Vitamins B1 , B2

- This does not require energy.



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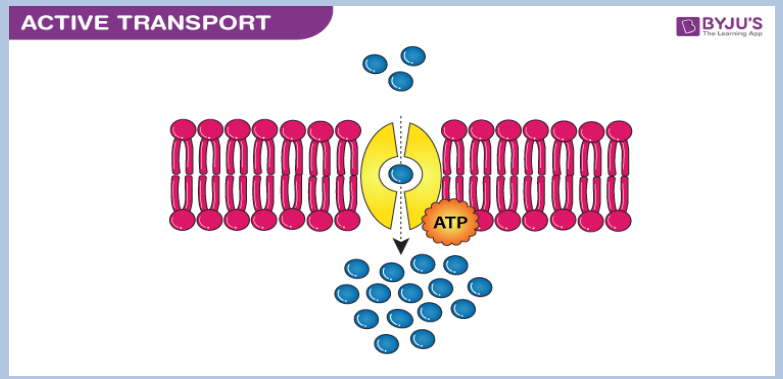
Active Transport:

- This mode of drug entry involves specific carrier protein
- It is requires energy to facilitate the transport of drug molecules against a concentration gradient, which usually occurs at specific sites in the small intestine.
- Active transport is energy-dependent and is driven by the hydrolysis of Adenosine Tri-phosphate (ATP) into Adenosine Di-phosphate (ADP).



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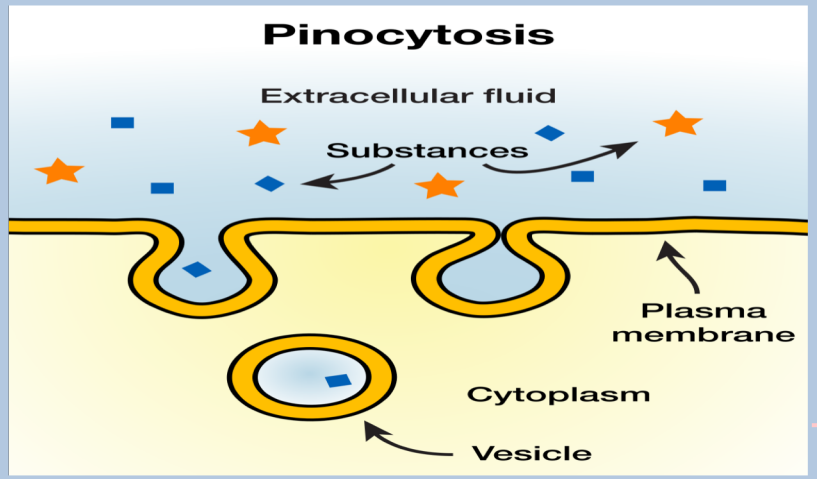
Endocytosis:

- This type of drug delivery transport s drug of extra large size across the cell membrane
- It is involves absorption of fluid or particles following their encapsulation by a cell. The membrane of the cells closes in around the pharmacological substance and fuses to form a complete vesicle, which later detaches and moves into the inside of the cell.
- This process also requires energy to occur.



Factors affecting drug absorption

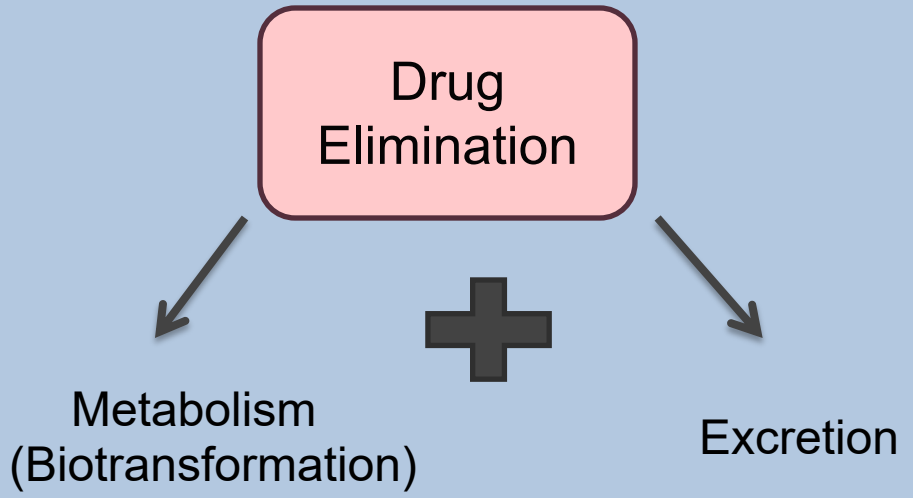
Drug specific factors affecting the drug absorption

- Physicochemical properties of drug
- Dissolution rate
- Particle Size

Patient-specific factors affecting the drug absorption

- Age
- Critically ill patients

Drug Elimination



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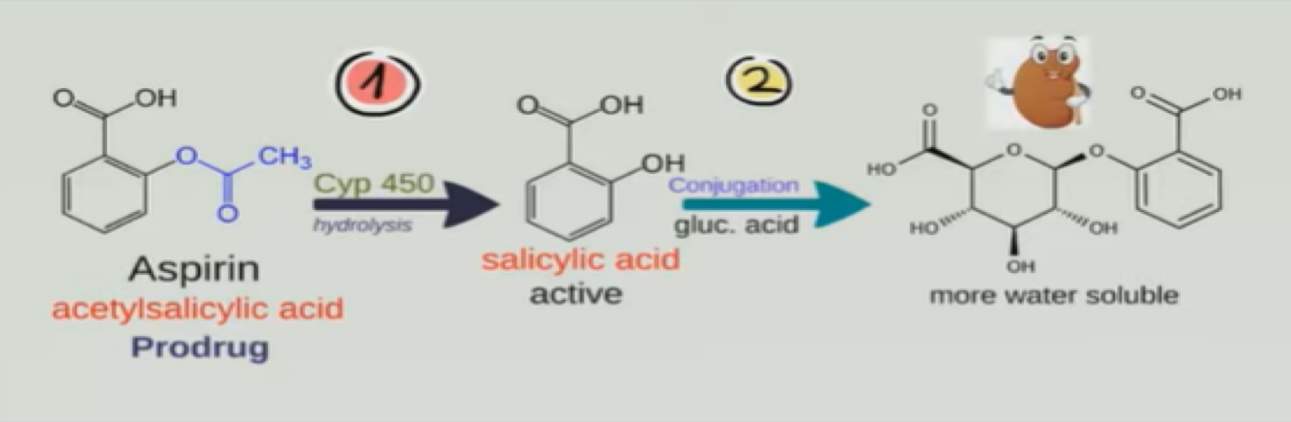
Drug Metabolism (biotransformation)

It is Chemical modification of drugs or foreign compounds (xenobiotics) in the body

Drug metabolism pathways

Phase1 :Oxidation ,Reduction , Hydrolysis
Phase 2 :(Conjugation) Glucuronic acid, acetic acid, Glycin



Factors of affecting drug metabolism

Factors of affecting drug elimination (Metabolism)

1. **Age**
2. **Genetic abnormality**
3. **State of healthy**
4. **Hepatic microsomal enzyme inducers**

- ✓ Carbamazipine
- ✓ Phenytoin
- ✓ Rifampicin

5. **Hepatic microsomal enzyme inhibitors**

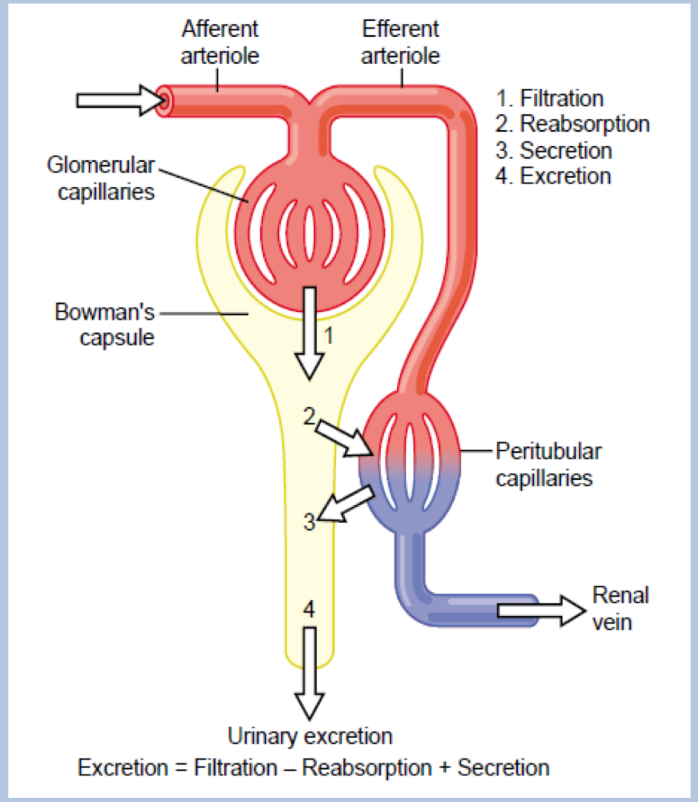
- ✓ Grape fruit
- ✓ Ciprofloxacin

Drug Excretion:

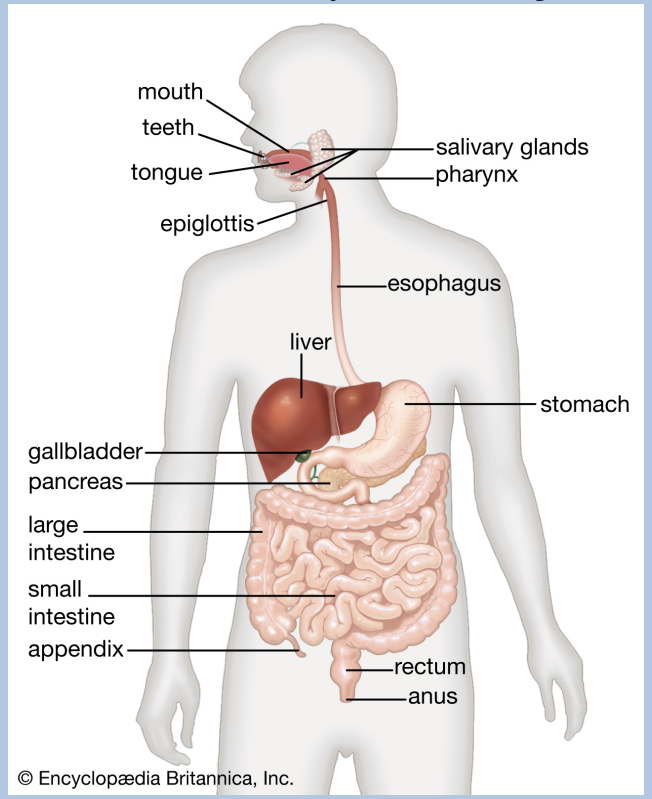
Aiming to eliminate metabolic wastes and other non-useful materials from the body.

Rout of Excretion

1.Renal Excretion:



2.GIT Excretion (Alimentary tract):



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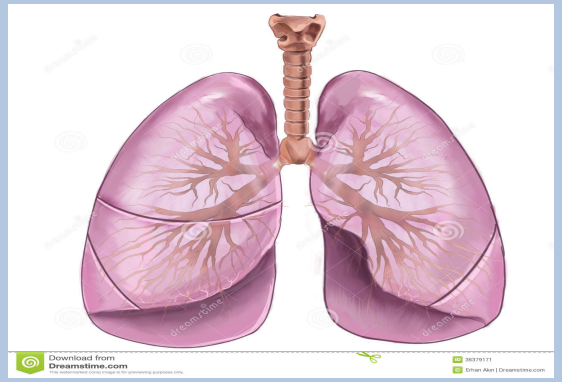
3. Pulmonary Excretion

Gases and other volatile substances such as general anesthetics that enter the body primarily through the respiratory tract can be expected to be excreted by this route.



4. Skin Excretion

Drugs excreted through skin via sweat follows pH partition hypothesis.

Compounds like benzoic acid, salicylic acid and alcohol are excreted in sweat.

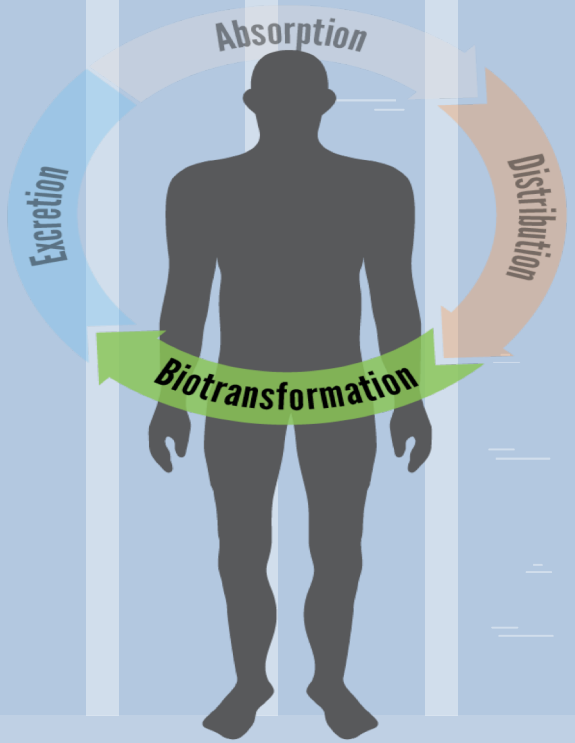
Summary

✓Absorption is a pharmacokinetic parameter that refers to the way a drug is absorbed from a pharmaceutical formulation into the bloodstream

✓Mechanism of drug absorption: Passive diffusion (Non-ionic diffusion, Facilitated Passive Diffusion, Active Transport, Endocytosis

✓Factors affecting drug absorption:
•Drug specific factors affecting the drug absorption
•Patient-specific factors affecting the drug absorption

✓Drug Elimination: Metabolism (major occur the in Liver)+ Excretion(major occur in the kidney)



REFERENCES

- https://www.ncbi.nlm.nih.gov/books/NBK557405/
- https://edu.rsc.org/download?ac=12814
- https://www.soinc.org/sites/default/files/uploaded_files/5_19_EXCRETORY_SYSTEM.pdf
- https://www.news-medical.net/health/What-is-Drug-Absorption.aspx

THANKS!