Introduction to pharmacology

جامعة ساوة

كلية التقنيات الصحية والطبية

قسم تقنيات التخدير

المرحلة الثانية

المحاضرة الاولى

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Introduction

- **Pharmacology:** is the study of drugs and their actions on the body It has included study of sources of drugs, which is :

1. Natural

a. Plant (morphine, atropine, digoxin)

b. Animal (Cortisone, heparin, insulin)

c. Microorganism (penicillin, erythromycin)

2. Synthetics

aspirin, paracetamol, ciprofloxacin.

3. Semisynthetic

Amoxicillin, clarithromycin.

- Two main parts of pharmacology:
  a. Pharmacokinetics (what the body does to the drug).
  b. Pharmacodynamics (what the drug does to the body).

Drug nomenclature

- Chemical Name: Describes the drug’s chemical structure N-(4-hydroxyphenyl)acetamide
- Generic Name: Official, non-proprietary name (paracetamol).
- Brand Name: Commercial name given by the pharmaceutical company

(panadol, tylenol , adol).

Brand Name

Generic Name

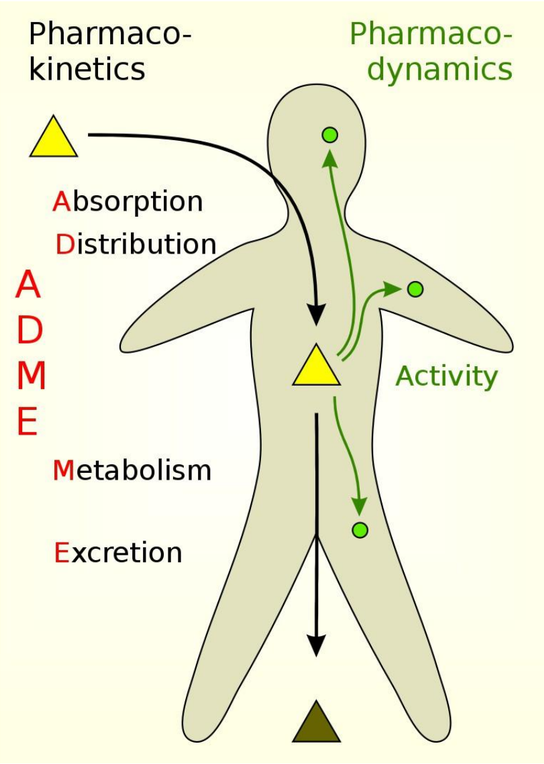
Pharmacokinetics

Pharmacokinetics : Pharmacokinetics refers to what the body does to a drug, they determine the onset, intensity, and the duration of drug action:

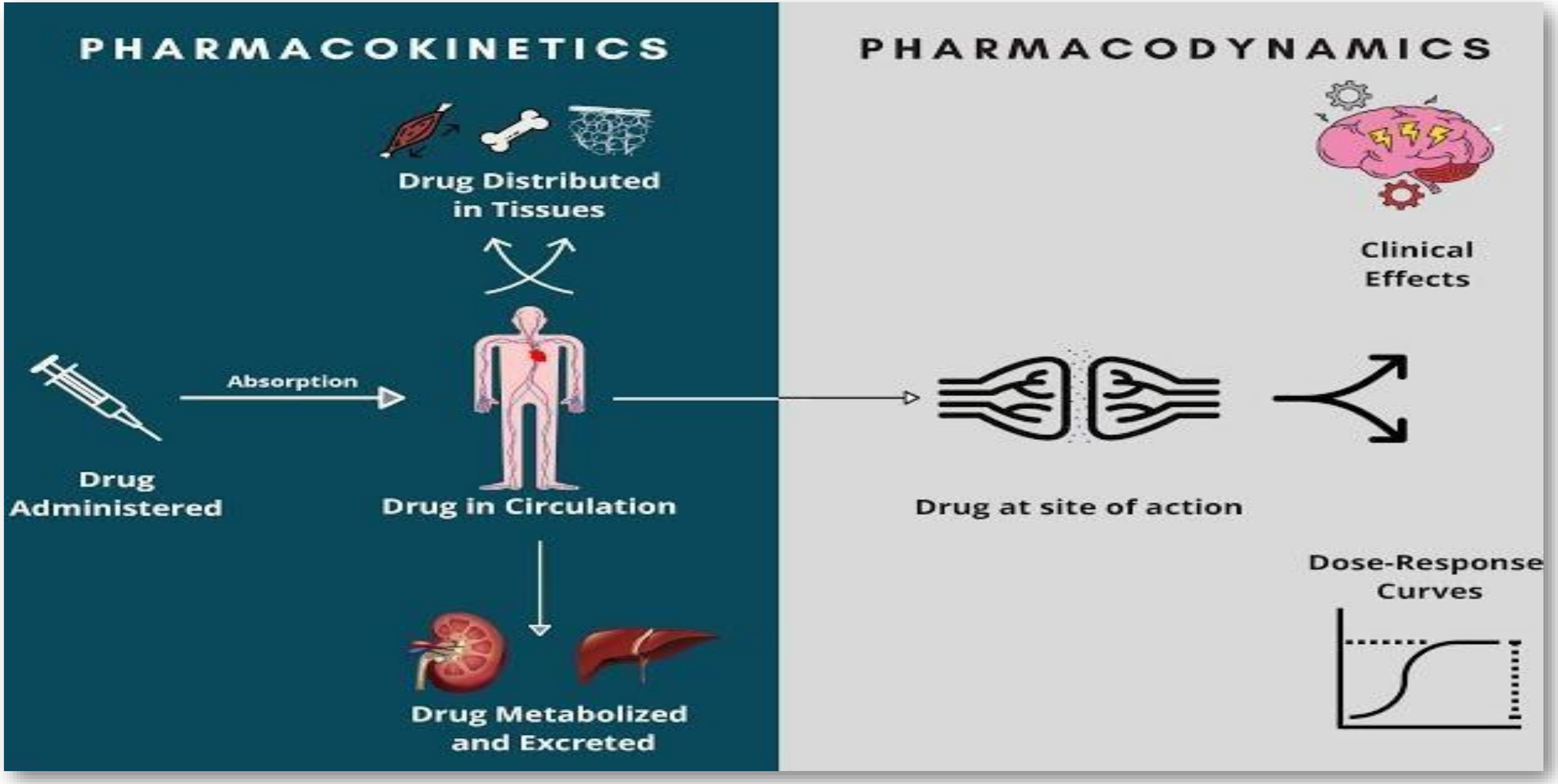
- ➢**Absorption.**
- ➢**Distribution.**
- ➢**Metabolism.**
- ➢**Elimination.**

Helps us know:

1. **How quickly drug acts.**
2. **How long drug stays in body.**
3. **Correct dose to use safely.**



Introduction



:Pharmacokinetics

Note:

Knowledge of pharmacokinetics helps in choosing:

1. the route of administration (oral, injection, etc.),
2. the right dose,
3. how often the drug is given,
4. and the duration of treatment.

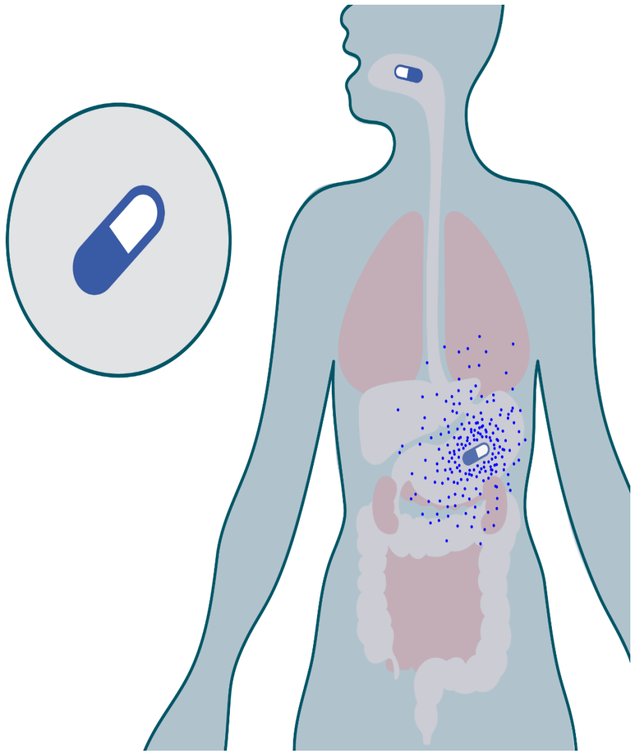
Absorption

Absorption = drug movement from site of administration → into the blood.

Depends on:

1. **Route (oral, IV, IM, inhalation, etc.).**
2. **Drug form (tablet, liquid, injection).**
3. **Food in stomach (can slow or speed).**

Example: IV drugs have no absorption step → act very fast.



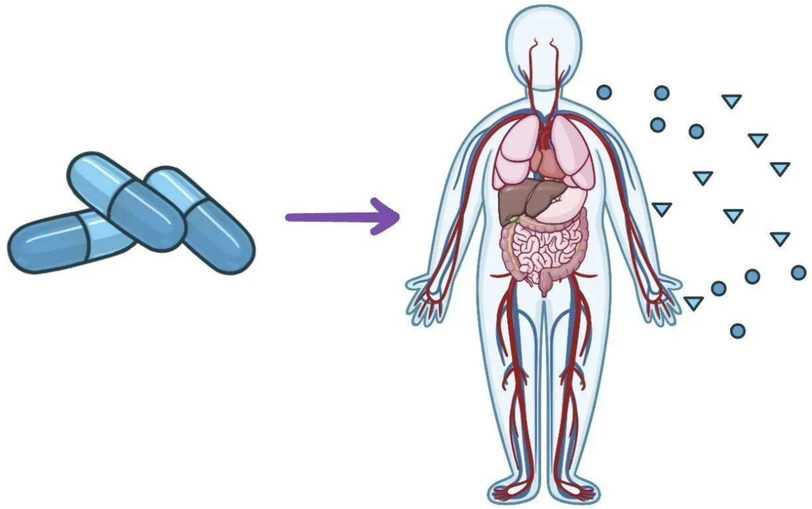
Distribution

Distribution = drug movement from blood to body tissues.

Factors effect distribution:

1. **Blood flow to organs (high flow = faster drug reach).**
2. **Binding to plasma proteins (albumin).**
3. **Fat solubility (lipid-soluble drugs may stay longer in fat tissue).**

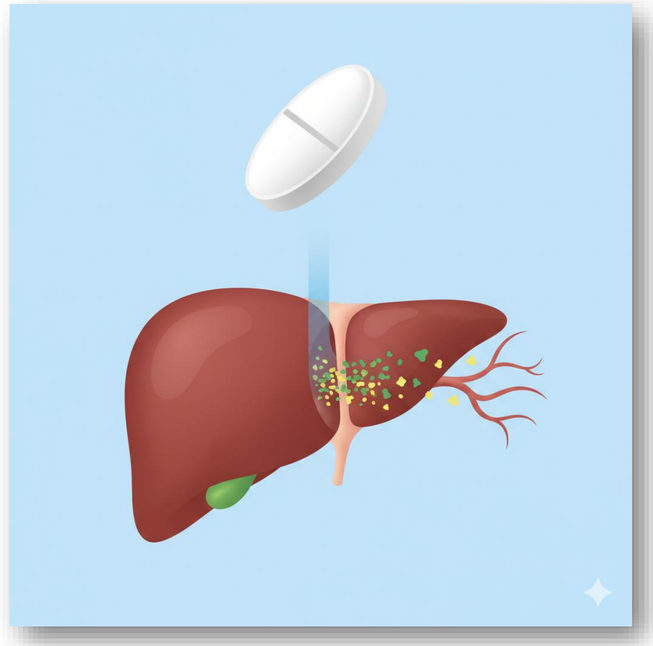
Example: Anaesthetic gases quickly reach the brain because of high blood flow.



Metabolism

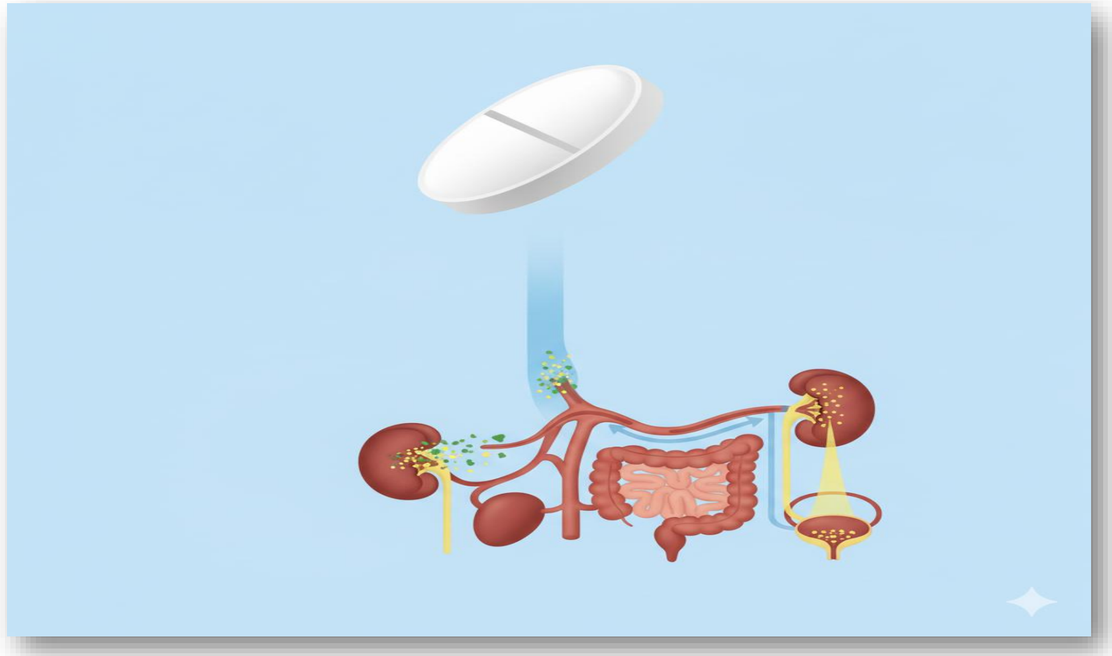
- Metabolism = chemical change of drug in body, mainly in the liver.
- **Purpose:** make drugs easier to remove.
- Some drugs become active metabolites after metabolism.
- Liver enzymes (like Cytochrome P450) play major role.

Example: Codeine is metabolized to morphine (active form).



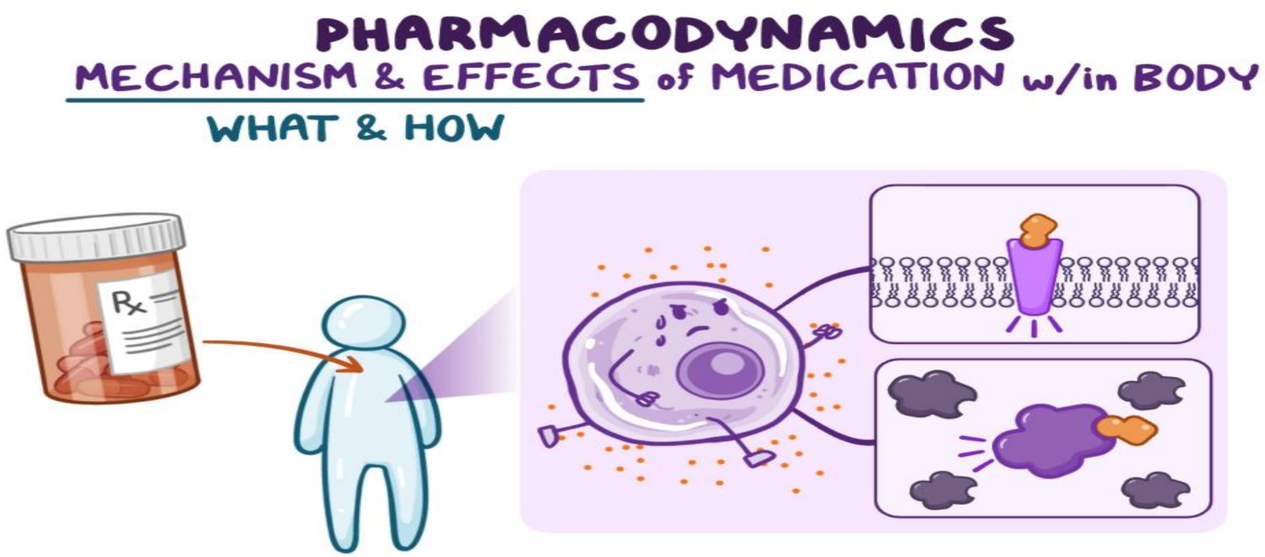
Excretion

- Excretion = removal of drug from body.
- Main organ: kidneys (urine).
- Other ways: bile, lungs (anesthetic gases), sweat, breast milk.
- Impaired kidney function → drug stays longer, risk of toxicity.
- Example: Inhaled anesthetics are partly excreted by lungs.



Pharmacodynamics

- Pharmacodynamics = “what the drug does to the body”
- Focus on drug–receptor interaction.
- Receptor = special protein in cell that drug binds to.
- Binding leads to changes in cell function → therapeutic or side effects.
- Example: Morphine binds to opioid receptors → pain relief.

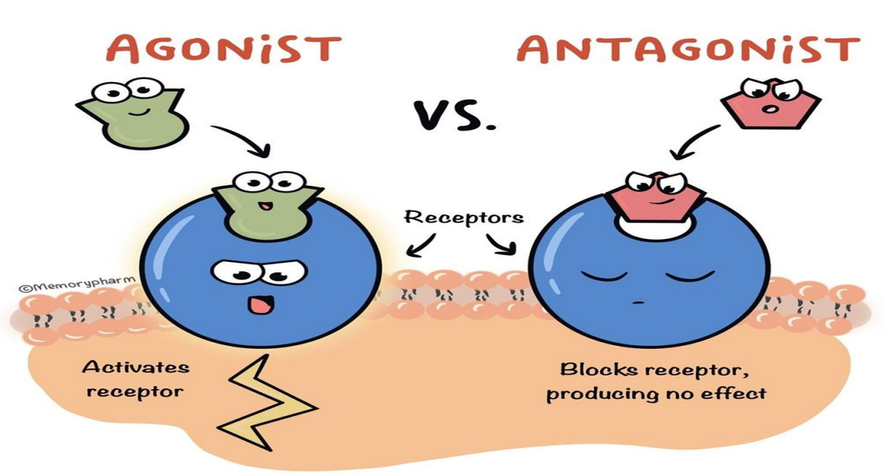


Efficacy and Potency

- Efficacy = maximum effect a drug can produce (how strong effect is).
- Potency = how much drug dose is needed for effect.
- High potency = small dose needed.
- High efficacy = strong effect, even if dose is large.
- Example: Fentanyl is more potent than morphine.

Agonists and Antagonists

- Agonist = drug activates receptor → produces response.
- Example: Insulin acts as an agonist at insulin receptors.
- **Action:** Helps body cells take up glucose from the blood → lowers blood sugar.
- Antagonist = drug blocks receptor → prevents response.
- Example:Caffeine (antagonist of adenosine receptors → keeps you awake).



THANK YOU