

SNS COLLEGE OF ALLIED HEALTH SCIENCE
Affiliated to The Tamil Nadu Dr. M.G.R Medical University, Chennai



DEPARTMENT OF PHYSICIAN ASSISTANT

COURSE NAME : PHARMACOLOGY

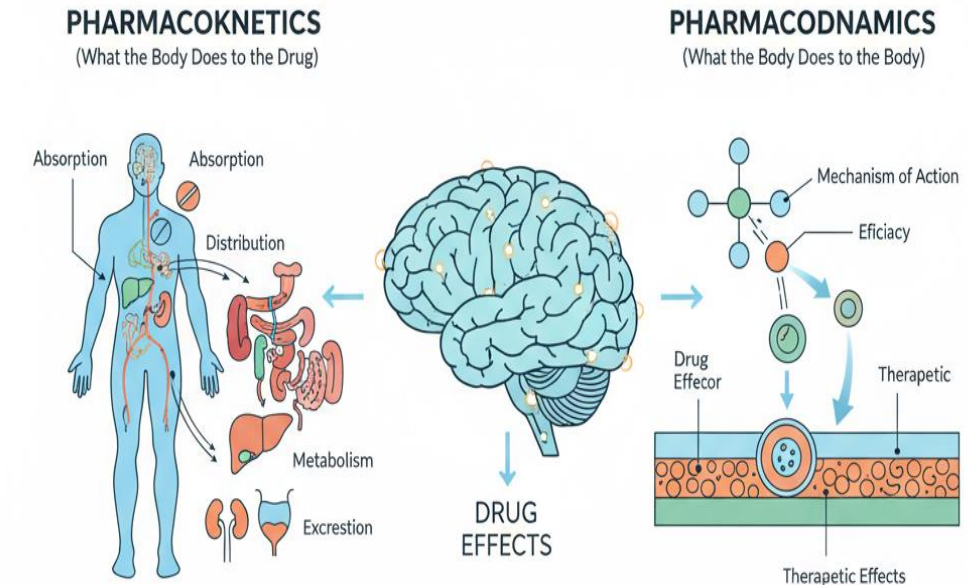
UNIT : BASIC DRUG EFFECT

TOPIC : BASIC DRUG EFFECTS

FACULTY NAME : Ms. SINEKA M

INTRODUCTION (Define)

- Drug effects refer to the physiological and biochemical changes produced in the body by drugs.
- Understanding these effects involves two fundamental pharmacological disciplines:
Pharmacokinetics and Pharmacodynamics.

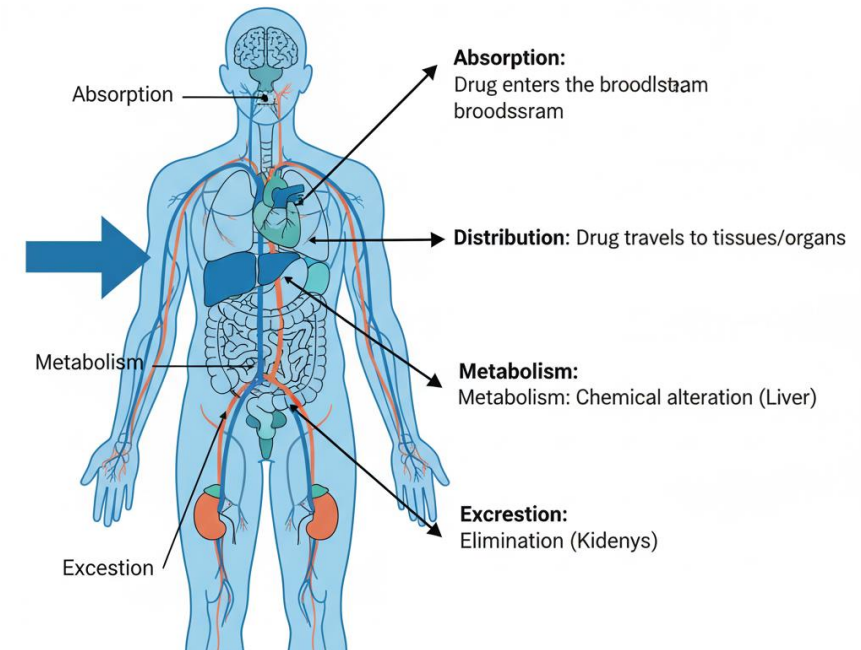


PHARMACOKINETICS (Empathy)

- Pharmacokinetics is the study of **"what the body does to the drug"**.
- Pharmacokinetics describes the movement and processing of drugs, including **absorption, distribution, metabolism, and excretion.**

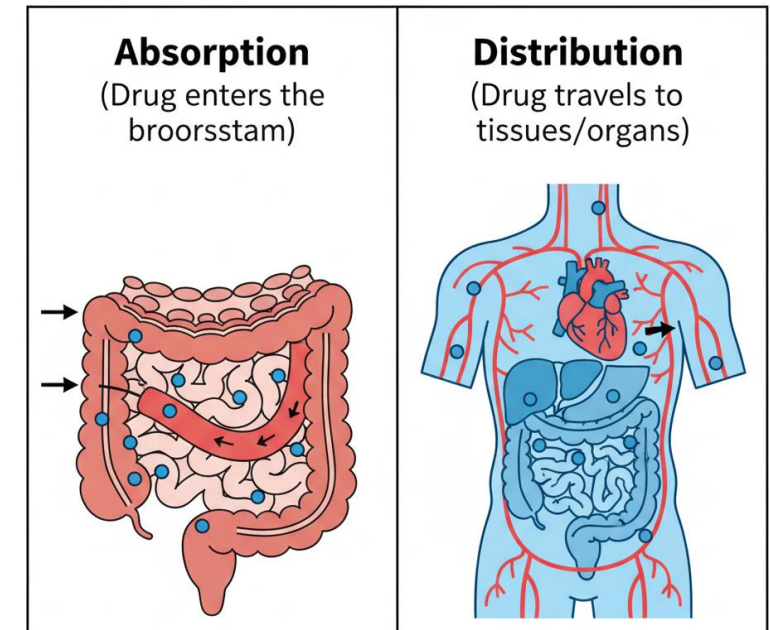
PHARMACOKINETICS

(What the Body Does to the Drug)



- **Absorption:** The process by which a drug enters the bloodstream from its administration site.
- **Distribution:** The drug travels from the bloodstream to the body's tissues and organs.

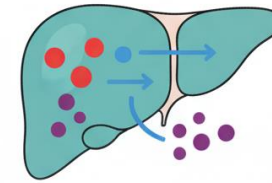
ABSORPTION & DISTRIBUTION



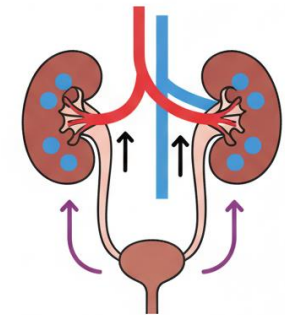
- **Metabolism:** The body chemically alters the drug, usually in the liver, to prepare it for excretion.
- **Excretion:** The drug and its metabolites are eliminated from the body, primarily through the kidneys.

Metabolism & Excretion

METABLISM (Chemical Alteration - Liver)



EXCRETION (Elimination - Kidneys)

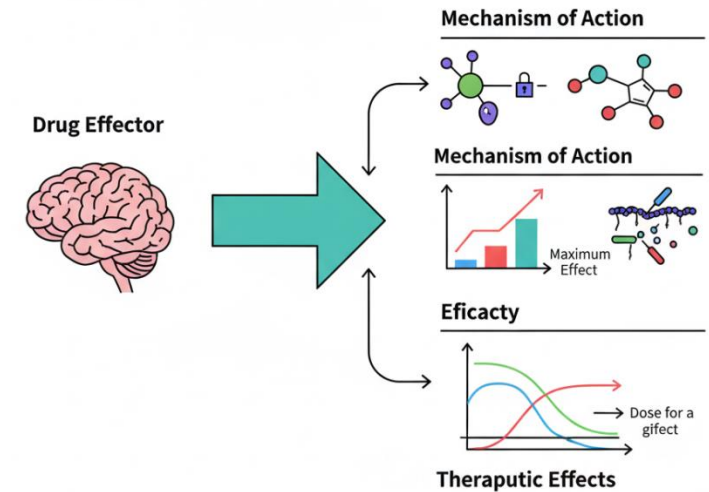


PHARMACODYNAMICS (Ideate)

- Pharmacodynamics is the study of **"what the drug does to the body"**.
- Pharmacodynamics explores how drugs interact with their molecular targets (receptors, enzymes, ion channels, transporters) to produce specific effects.

PHARMACODYNAMICS

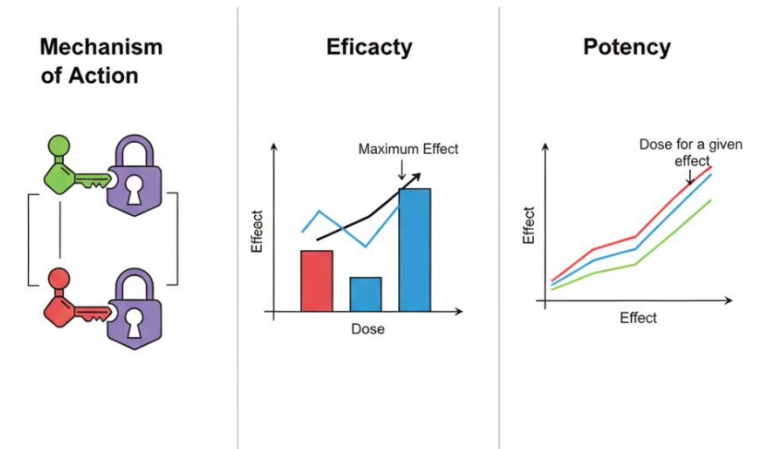
(What the Drug Does to the Body)



- **Mechanism of action:** How a drug causes its effect, e.g., binding to a receptor, inhibiting an enzyme, or modulating an ion channel.
- **Efficacy:** Maximum effect a drug can produce.
- **Potency:** Dose required for a given effect

MECHANISM OF ACTION, EFFICACY, POTENCY

What the drug does to the body



- **Stimulation:** Increases the activity of specialized cells
- **Depression:** Selectively reduces the activity of specialized cells
- **Irritation:** A non-selective and often toxic effect on cells.

DRUG ACTIONS

Stimulation, Depression, Irritation



STIMULATION
(Increases Activity)



DEPRESSION
(Reduces Activity)



IRRITATION
(Non-selective, Toxic Effect)

- **Replacement:** The use of natural hormones or metabolites to correct a deficiency
- **Cytotoxic Action:** The **toxic effect** on foreign cells or cancer cells without significantly harming the host cells.

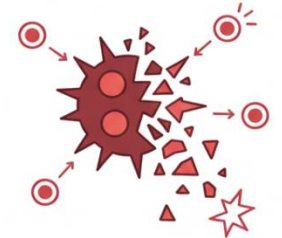
DRUG ACTIONS

Replacement & Cytotoxic Action

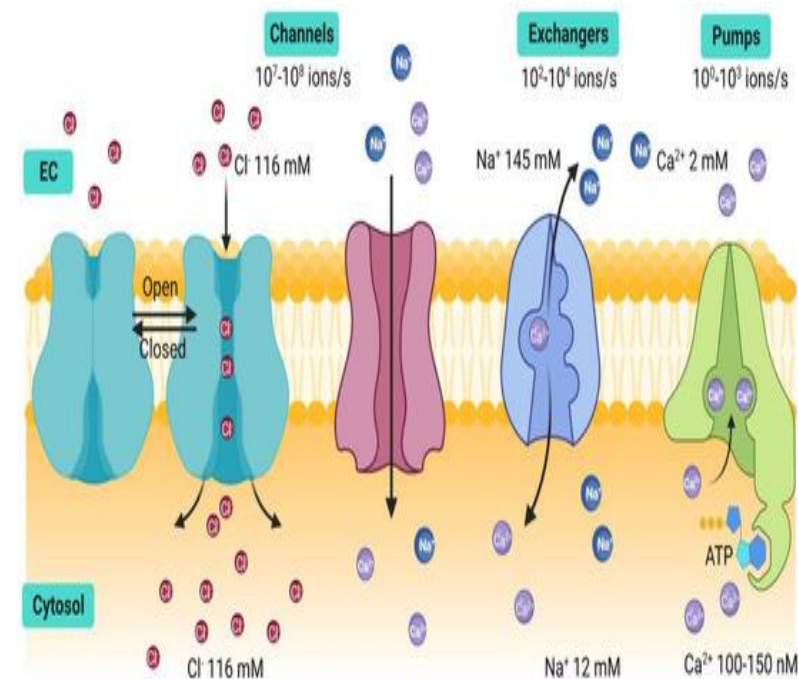
REPLACEMENT
(Correcting Deficiency)



CYCTOTXIX ACTION
(Toxic Effect on Foreign/Cancer Cells)

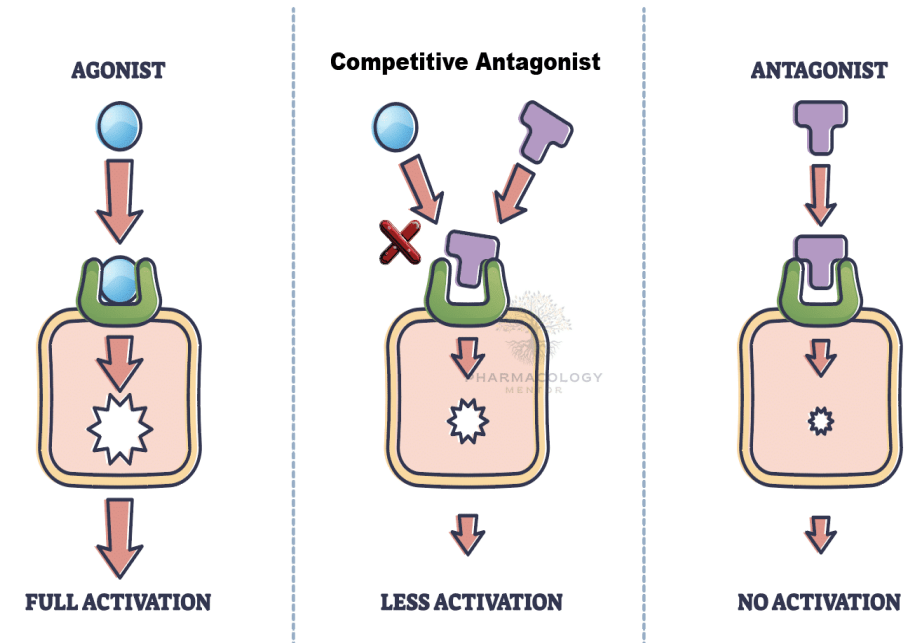


- **Ion Channels:** Drugs can modulate the **opening and closing of ion channels**, which affects the flow of ions across cell membranes and influences cellular electrical activity.
- **Transporters:** Drugs can interact with proteins that transport substances into or out of cells.



- **Receptors:** Drugs can act as **agonists** (activating receptors) or **antagonists** (blocking receptors) to either mimic or prevent the action of a natural substance in the body.
- **Enzymes:** Drugs can inhibit or induce the activity of enzymes, thereby altering the rate of a biochemical reaction.

AGONISTS VS ANTAGONISTS



DRUG EFFECTS AND SIDE EFFECTS (Prototype)

- No drug produces only one effect. The desired beneficial effect is called the **therapeutic effect**, while all other effects are considered **secondary effects**.
- These secondary effects can be either beneficial or harmful.
- Harmful effects are often referred to as **adverse effects** or **side effects**.

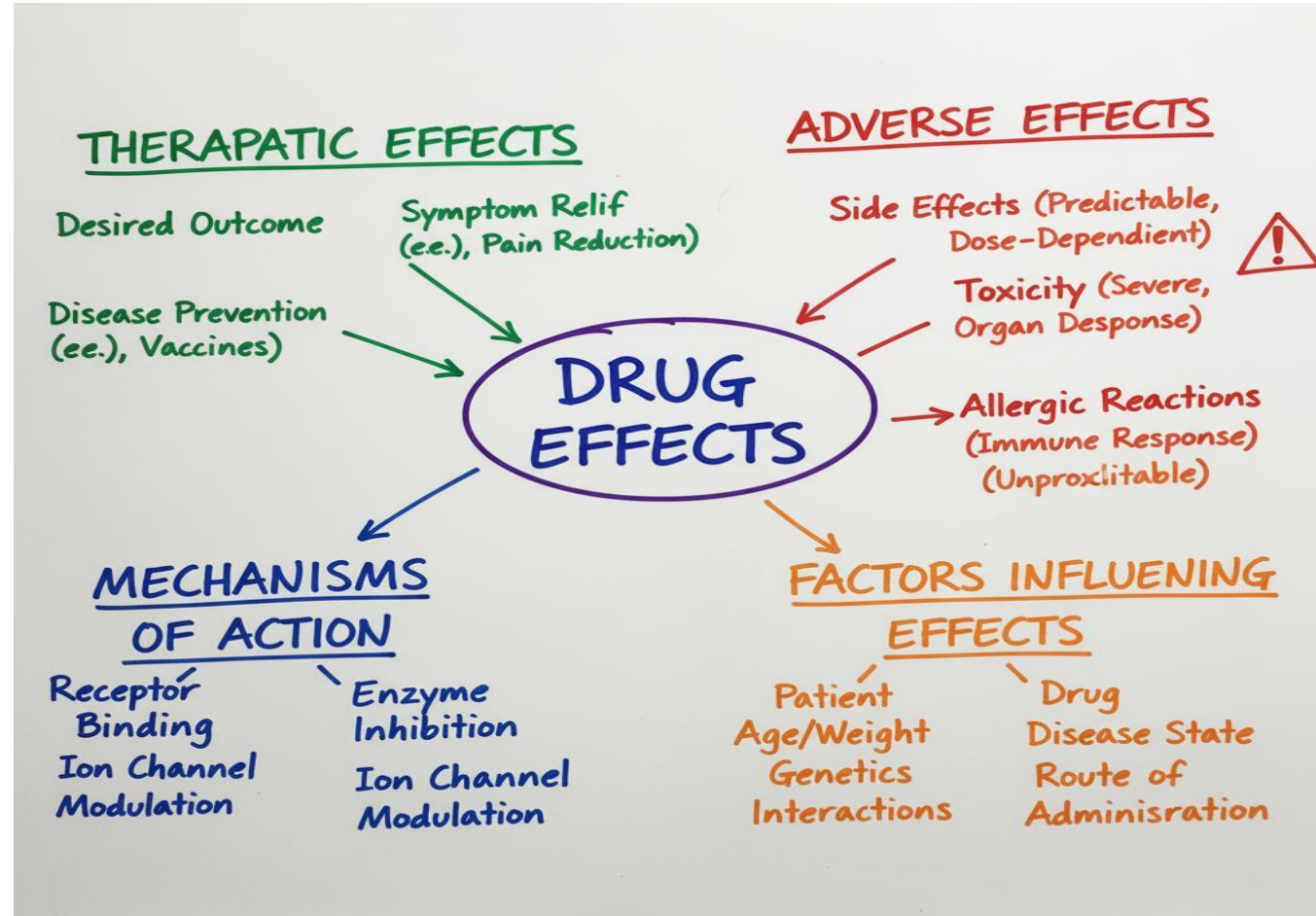


PHYSICIAN ASSISTANT ROLE (Test)

- Patient Assessment and Baseline Evaluation
- Administration and Observation
- Monitoring Drug Effects
- Therapeutic Drug Monitoring (TDM)
- Patient Education and Counselling



SUMMARY



References

- Medical Pharmacology – Padmaja Udayakumar
- <https://www.mayoclinic.org/diseases-conditions/drug-addiction/symptoms-causes/syc-20365112>
- <https://www.betterhealth.vic.gov.au/health/healthyliving/How-drugs-affect-your-body>
- <https://www.webmd.com/a-to-z-guides/drug-side-effects-explained>