

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

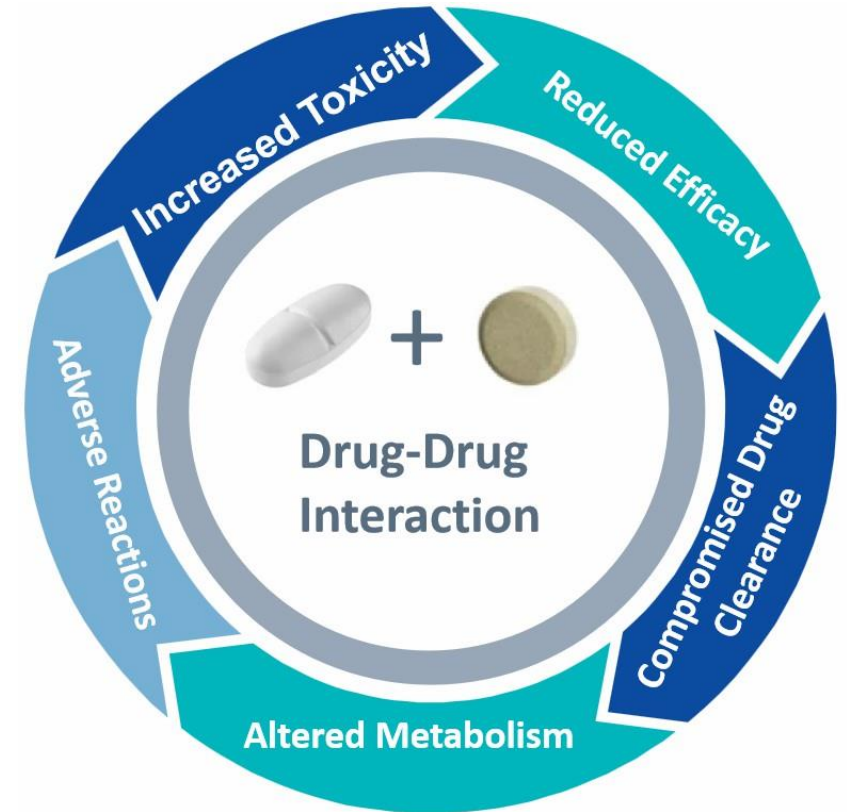
UNIT : BASIC DRUG EFFECT

TOPIC : DRUG INTERACTION

FACULTY NAME : Ms. SINEKA M

INTRODUCTION (Define)

- Drug Interaction occurs when two drugs are given together.
- One drug's effects are potentiated or diminished by another at pharmacokinetic or pharmacodynamic levels.

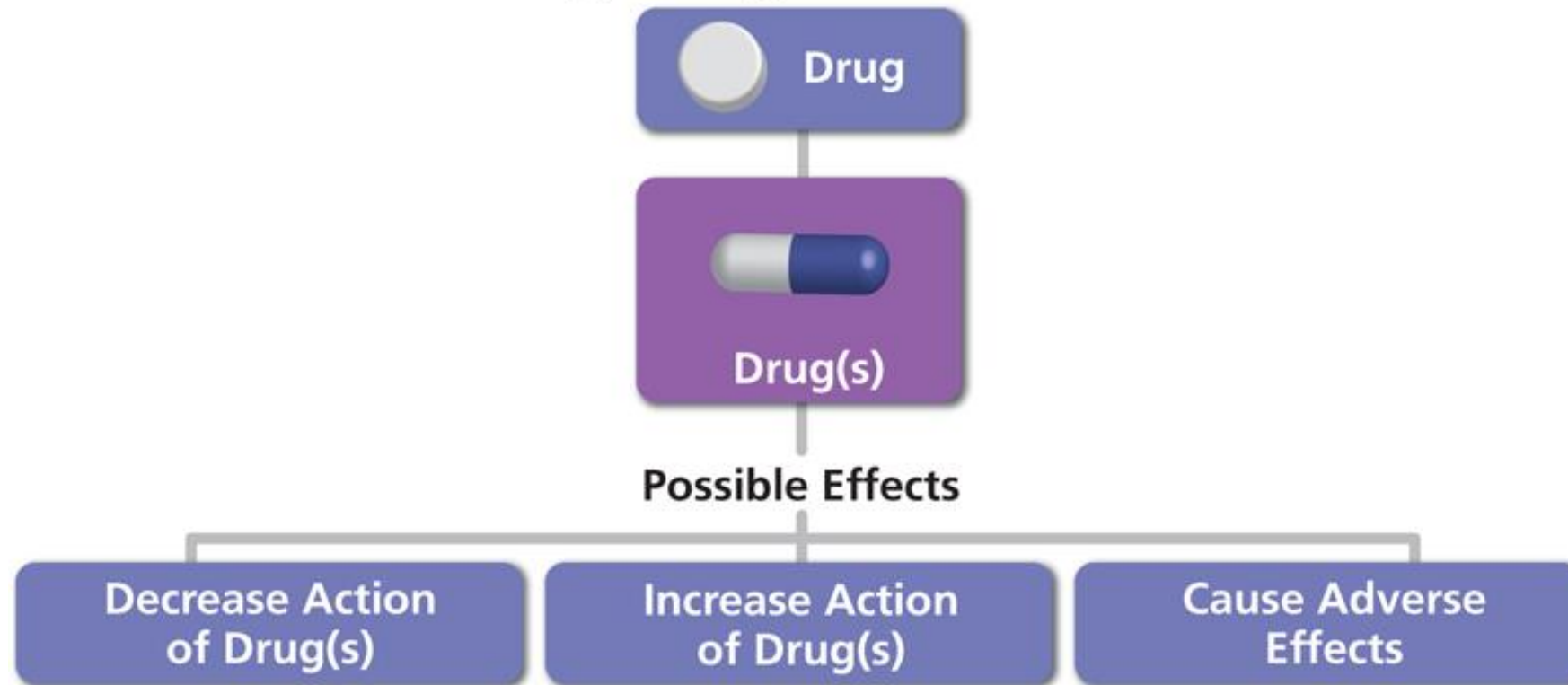


CLASSIFICATION

- These interactions can lead to increased or decreased drug efficacy, unexpected side effects, or even life-threatening adverse events.
- Drug interactions can occur through various mechanisms, broadly classified as pharmacokinetic and pharmacodynamic interactions.



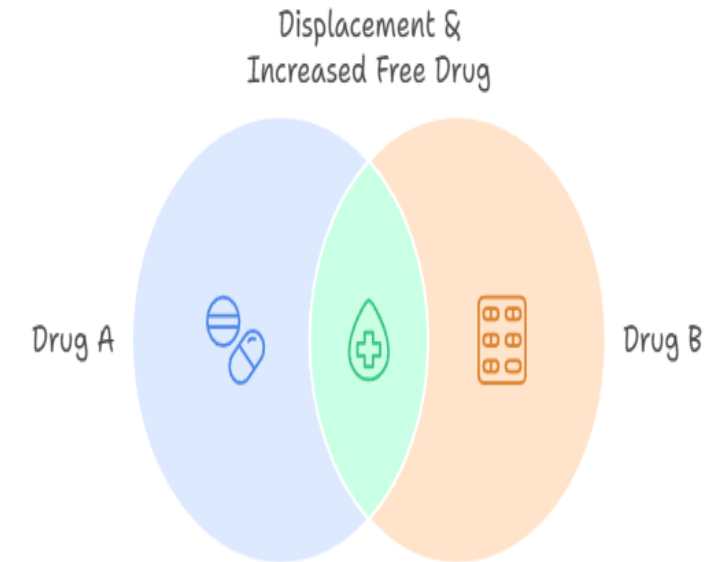
Drug-Drug Interaction



PHARMACOKINETIC INTERACTIONS

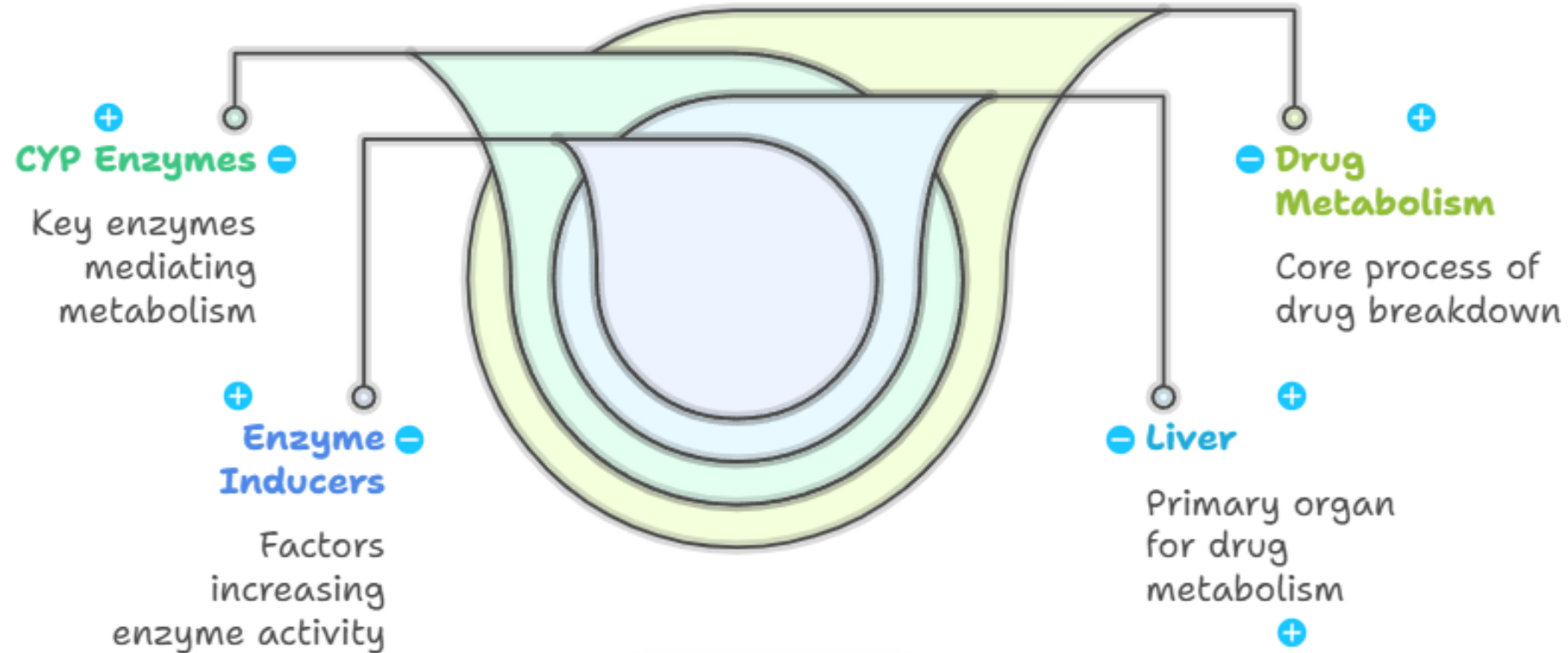
- Pharmacokinetic interactions affect the **absorption, distribution, metabolism, and excretion** (ADME) of a drug.
- **Absorption:** One drug can affect the absorption of another by altering gastric pH, gastrointestinal motility, or forming complexes that reduce absorption.
- For example, antacids can increase gastric pH, reducing the absorption of weakly acidic drugs like ketoconazole.

- **Distribution:** Drug distribution can be affected by competition for plasma protein binding sites.
- If two drugs compete for the same binding site, the free concentration of one or both drugs can increase, potentially leading to enhanced effects or toxicity.

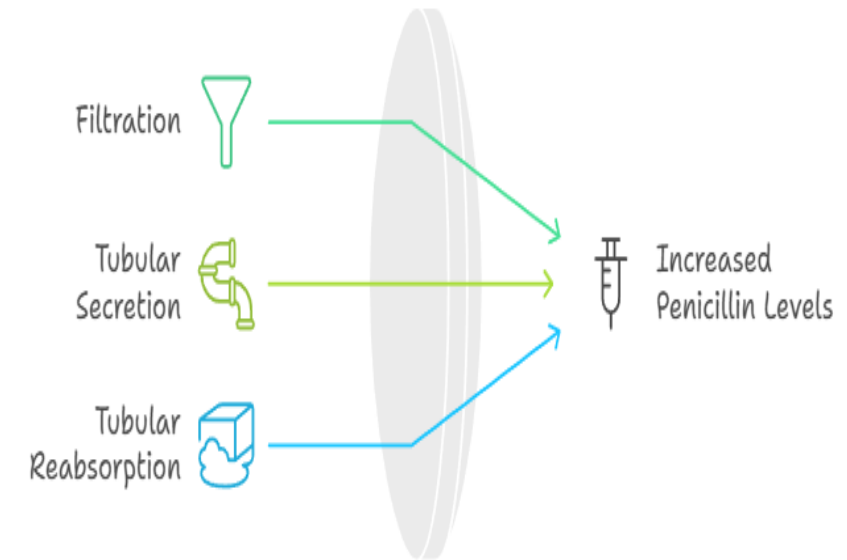


- **Metabolism:** Drug metabolism is primarily mediated by enzymes in the liver, particularly the cytochrome P450 (CYP) enzyme system.
- Drugs can act as inducers or inhibitors of these enzymes, altering the metabolism of other drugs.
- Enzyme inducers increase the activity of CYP enzymes, leading to faster metabolism and decreased drug levels.

Drug Metabolism Process



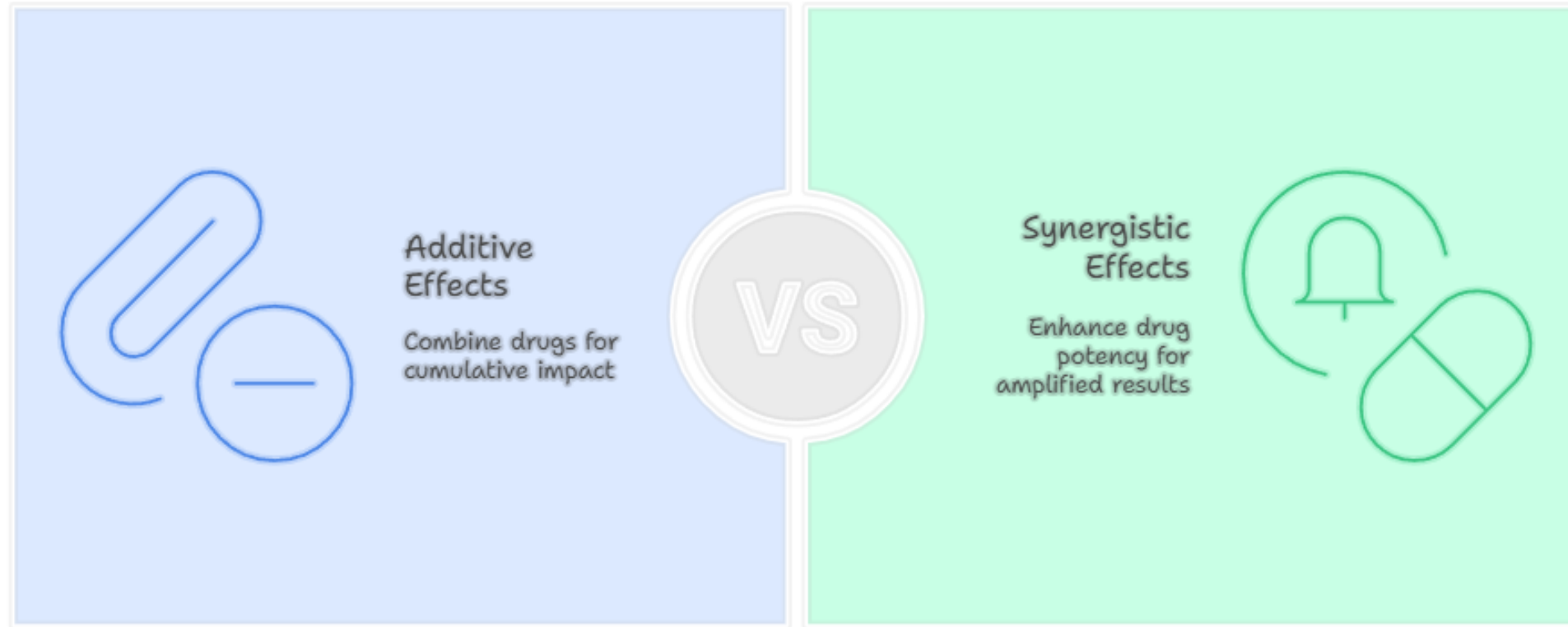
- **Excretion:** Drug excretion can be affected by changes in renal blood flow, glomerular filtration, tubular secretion, or tubular reabsorption.
- For example, probenecid can inhibit the tubular secretion of penicillin, increasing penicillin levels in the body.



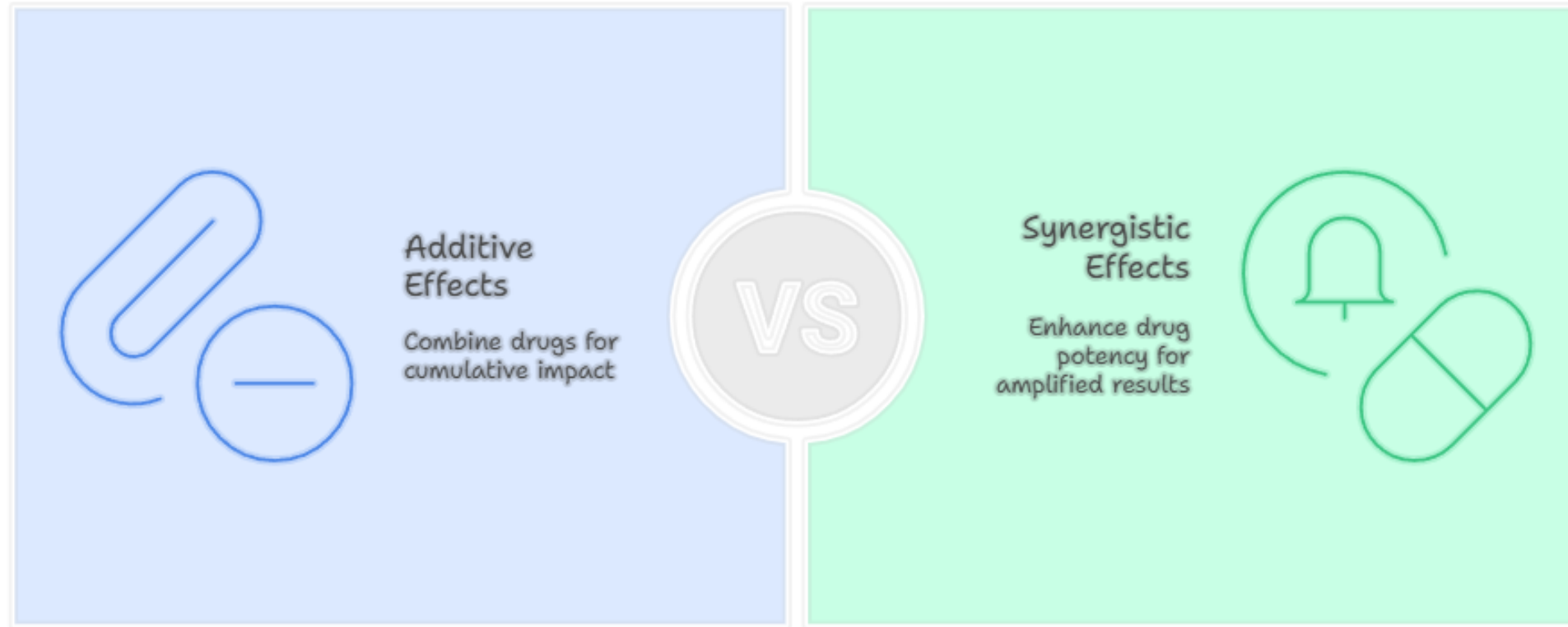
PHARMACODYNAMIC INTERACTIONS



- Pharmacodynamic interactions occur when two or more drugs have additive, synergistic, or antagonistic effects on the same receptor or physiological system.
- **Additive Effects:** Additive effects occur when the combined effect of two drugs is equal to the sum of their individual effects.
- For example, combining two sedatives can result in excessive sedation.

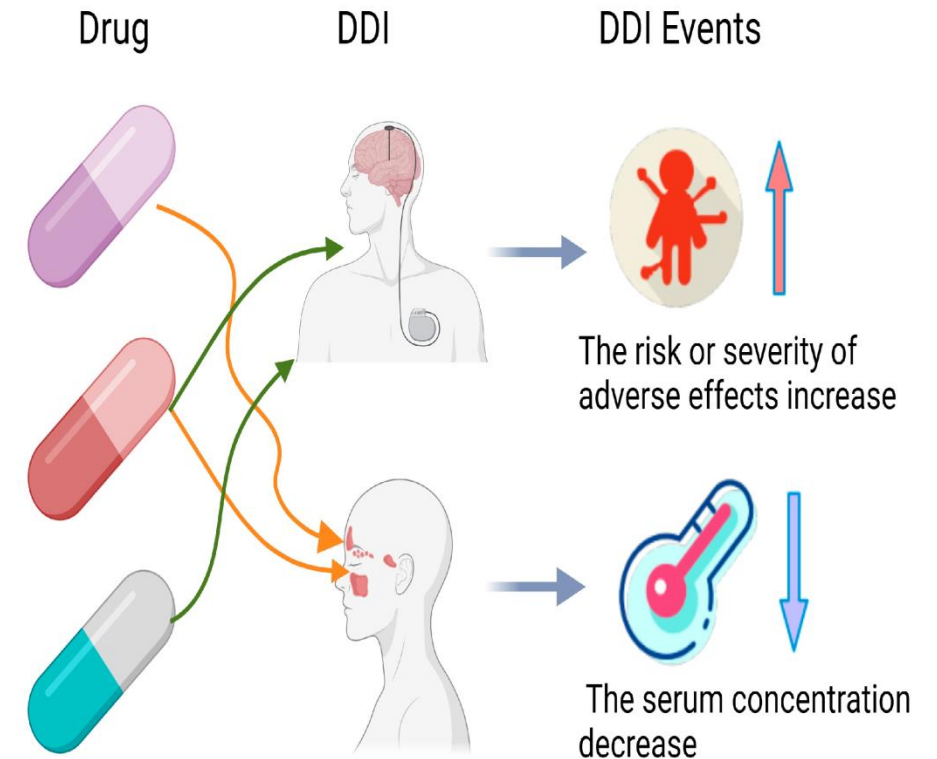


- **Synergistic Effects:** Synergistic effects occur when the combined effect of two drugs is greater than the sum of their individual effects.
- For example, alcohol and benzodiazepines have a synergistic effect on central nervous system depression.
- **Antagonistic Effects:** Antagonistic effects occur when one drug reduces or blocks the effect of another drug.
- For example, naloxone is an opioid antagonist that can reverse the effects of opioid overdose.

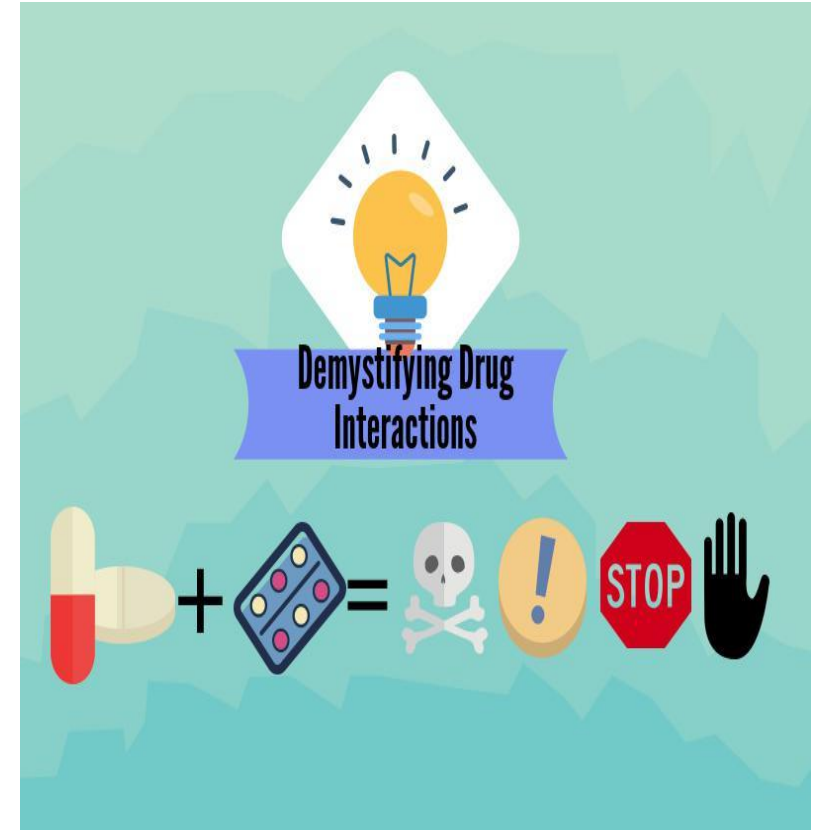


Clinical Significance of Drug Interactions

- **Reduced Drug Efficacy:** Drug interactions can decrease the effectiveness of a drug, leading to treatment failure.
- **Increased Drug Toxicity:** Drug interactions can increase the levels of a drug, leading to toxicity and adverse effects.

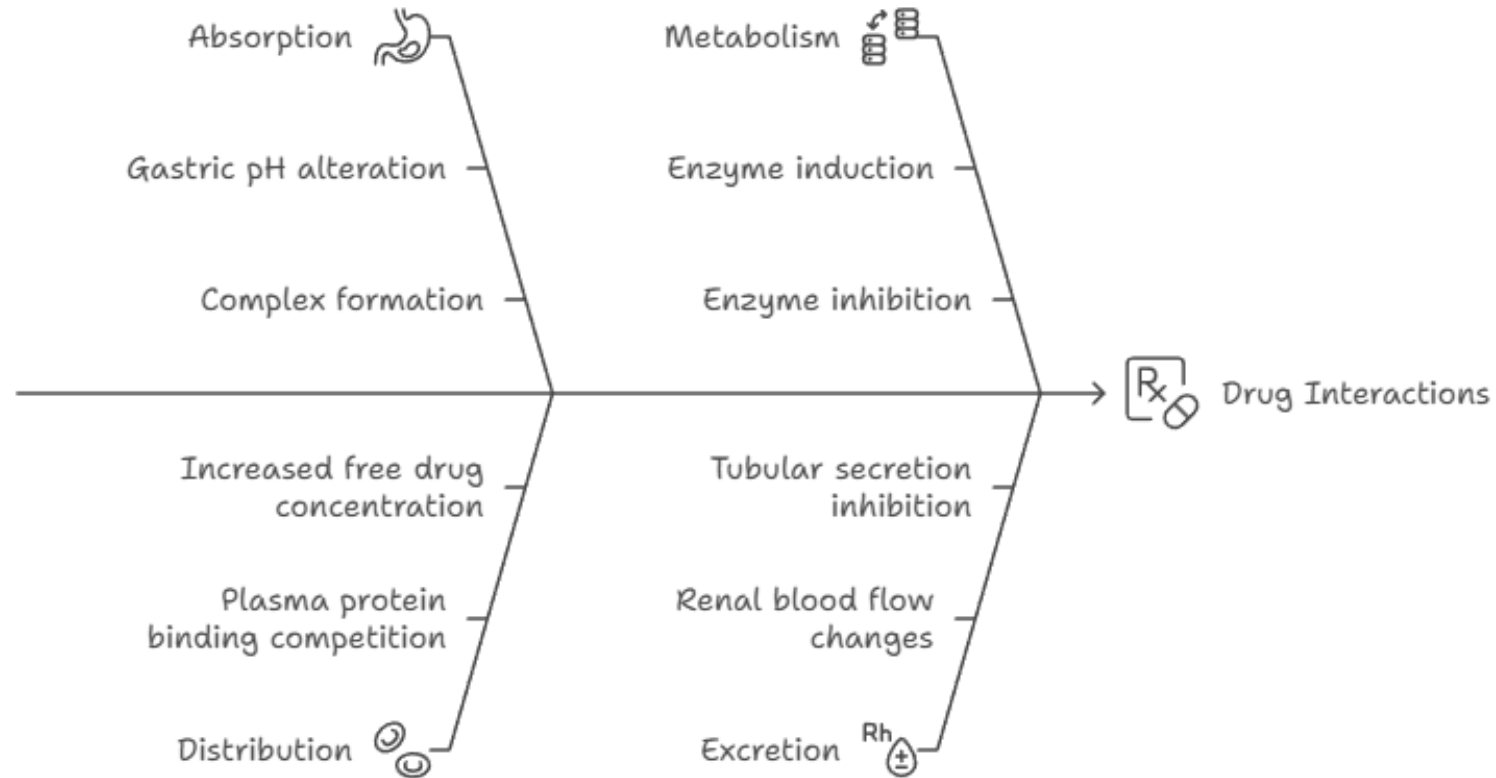


- **Unexpected Side Effects:** Drug interactions can cause unexpected side effects that are not typically associated with either drug alone.
- **Hospitalization:** Severe drug interactions can lead to hospitalization and increased healthcare costs.
- **Death:** In rare cases, drug interactions can be fatal.



SUMMARY

Mechanisms of Drug Interactions



References

- KD Tripathi Essentials of Medical Pharmacology
- <https://my.clevelandclinic.org/health/articles/drug-interactions>
- <https://hivinfo.nih.gov/understanding-hiv/fact-sheets/what-drug-interaction>
- <https://www.mdpi.com/2079-9292/13/15/2935>