SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai
Approved by Pharmacy Council of India, New Delhi. Coimbatore -641035

COURSE NAME : PHARMACOLOGY(ER20-21 T)

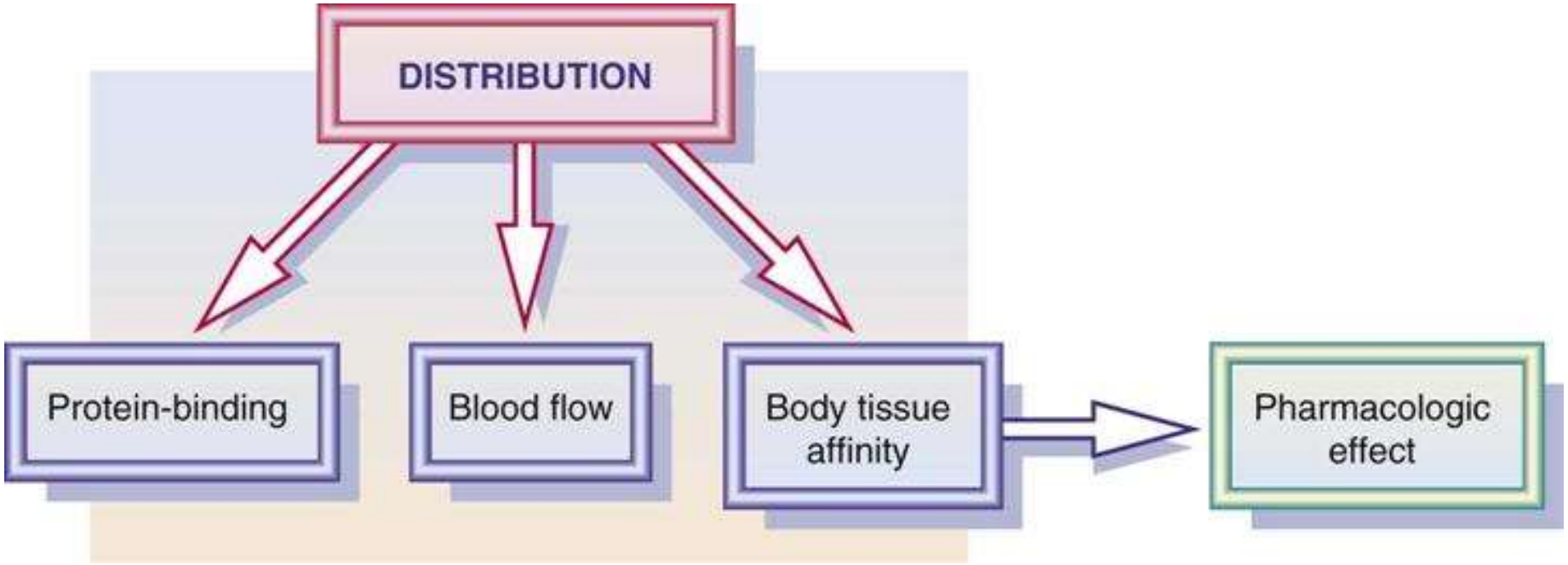
YEAR : DPHARM-II YEAR

TOPIC 4 : PHARMACOKINETICS (DISTRIBUTION)

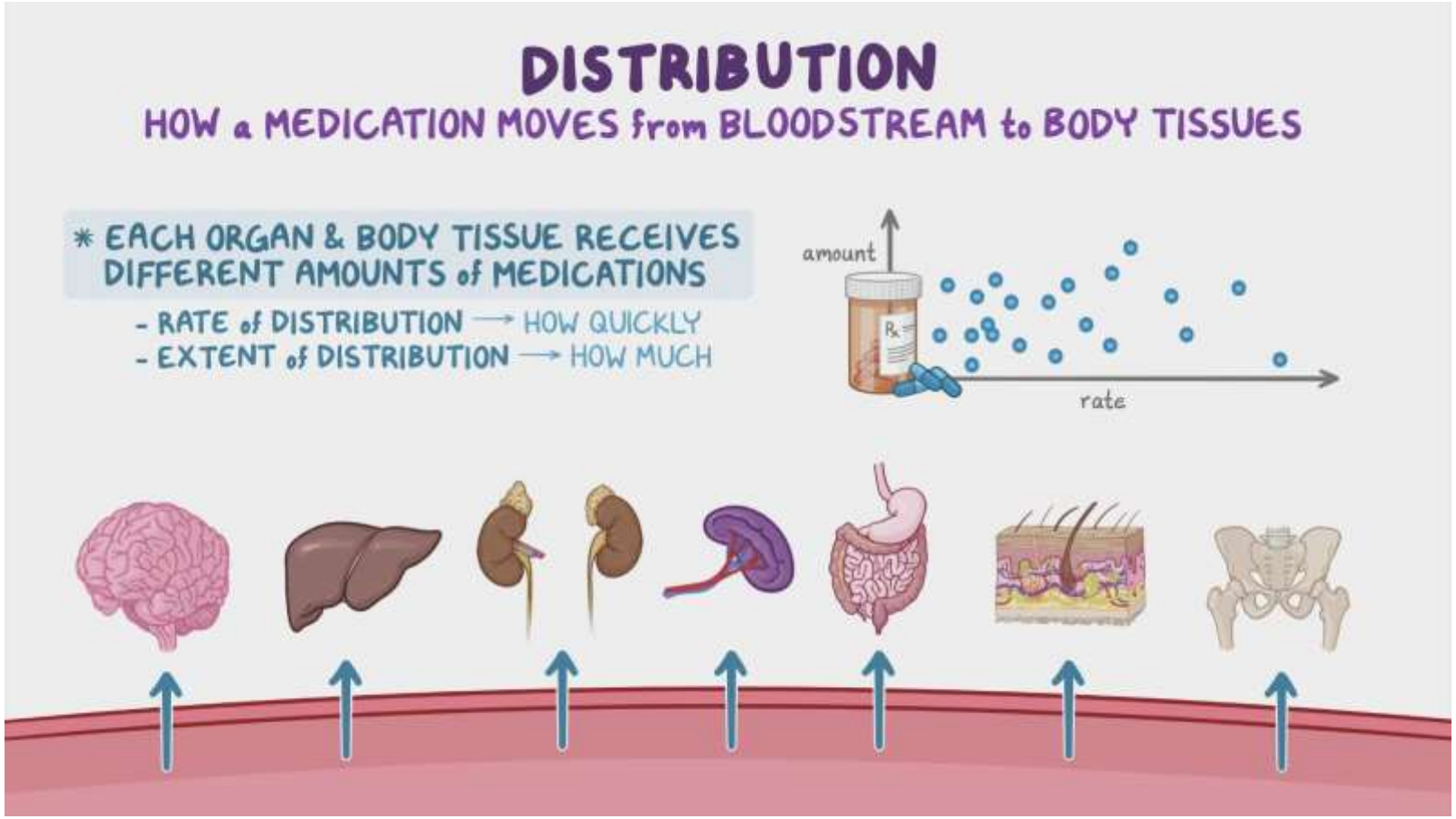
DESIGN THINKING IN DRUG DISTRIBUTION

- **Empathize:** Deeply understand the user or patient's challenges, needs, and experiences related to drug distribution in the body.
- **Define:** Reframe the problem based on insights from the empathize phase and establish clear context.
- **Ideate:** Brainstorm and explore a wide range of ideas and potential solutions, including innovative formulations or carriers that enhance selective distribution.
- **Prototype:** Simulate and build drug delivery prototypes to improve tissue-specific distribution and patient outcomes.

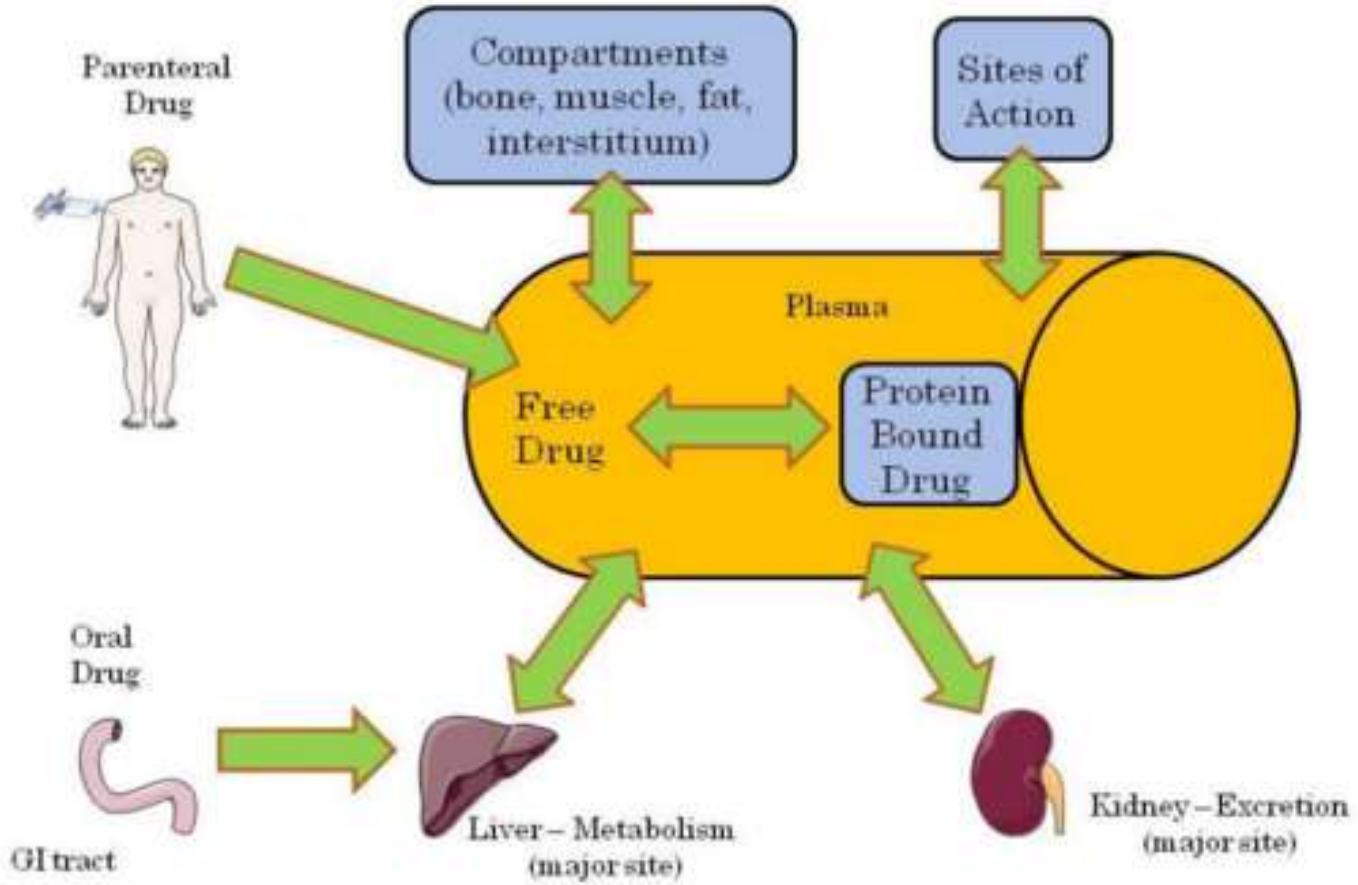
MINDMAP


DISTRIBUTION
Protein-binding
Blood flow
Body tissue affinity
Pharmacologic effect

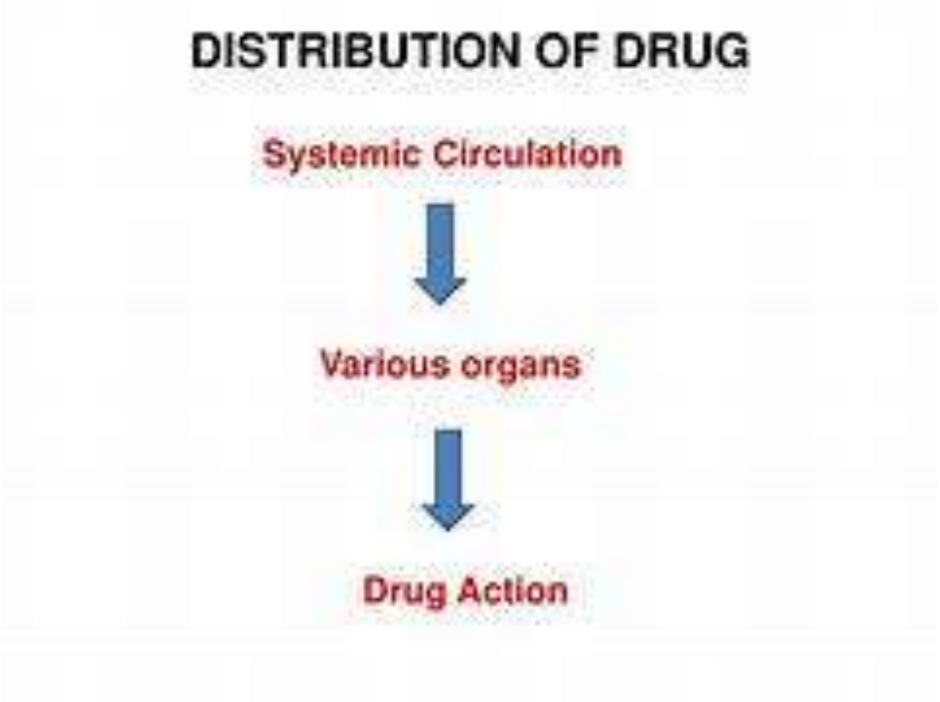
DISTRIBUTION



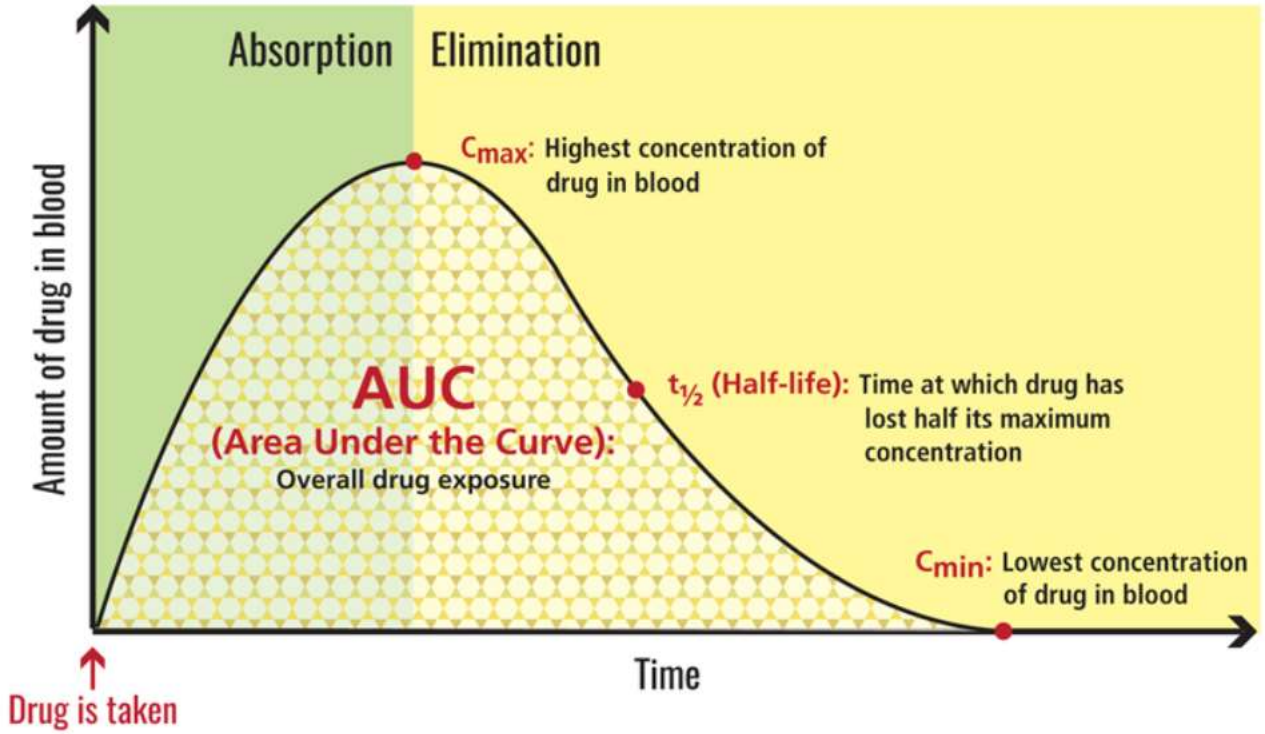
IMPORTANCE OF DRUG DISTRIBUTION

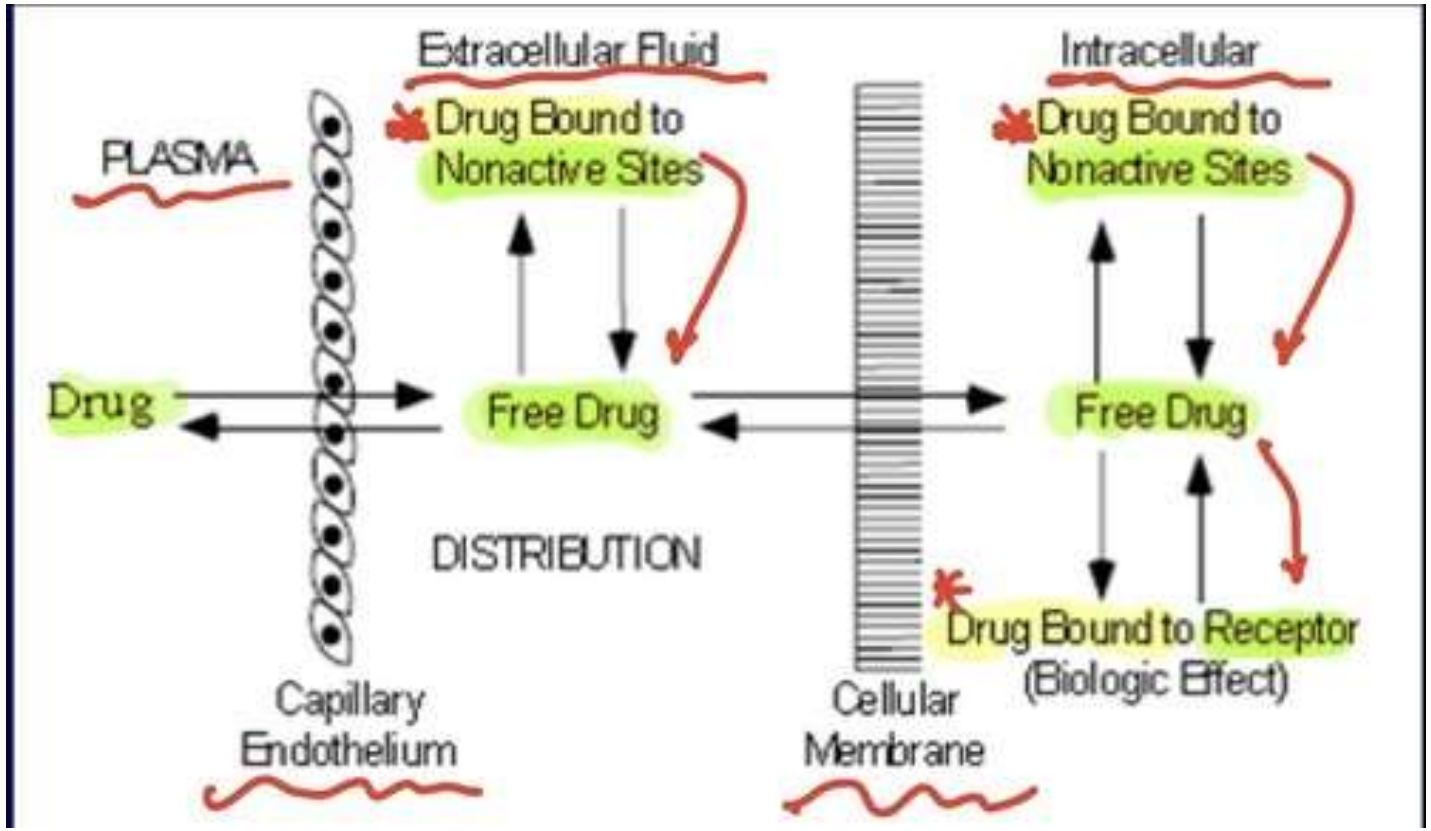


PROCESS OF DRUG DISTRIBUTION

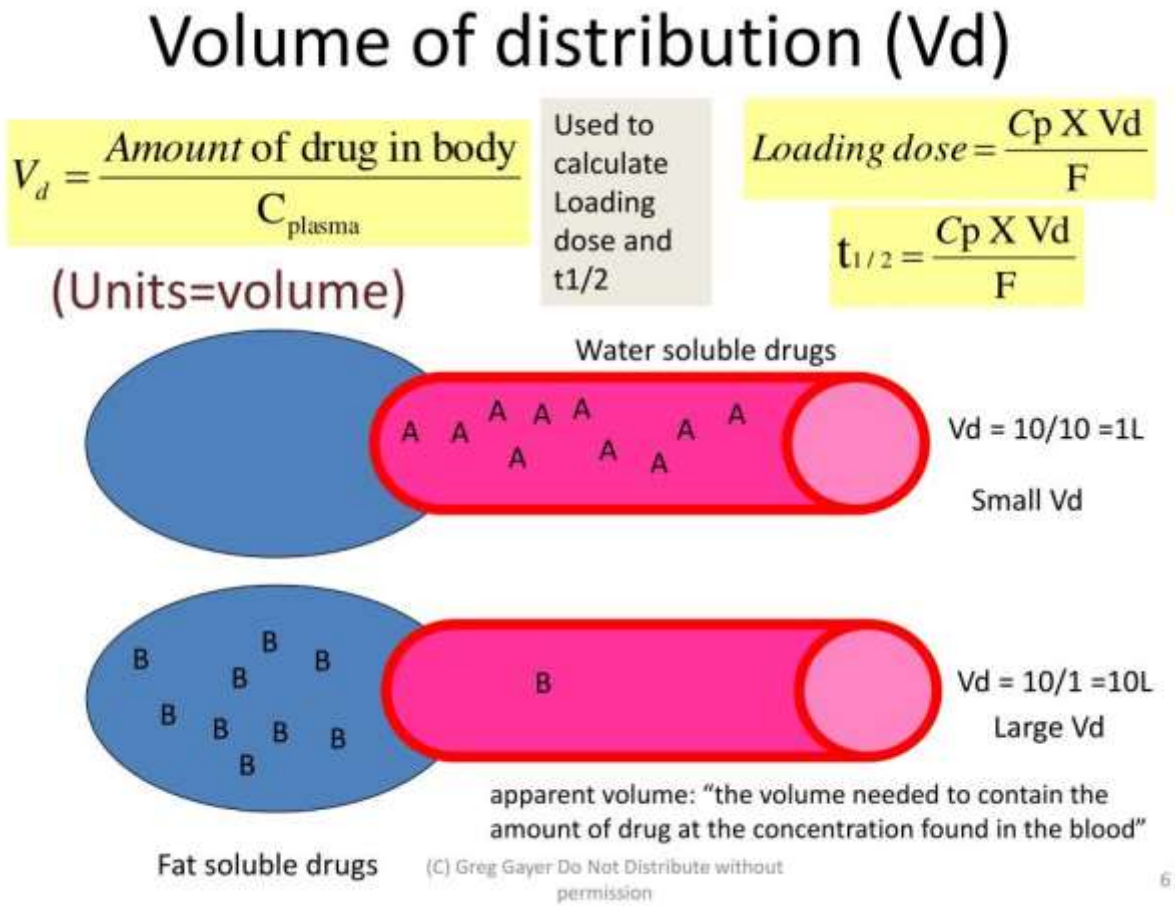


TERMINOLOGY USED IN DRUG DISTRIBUTION

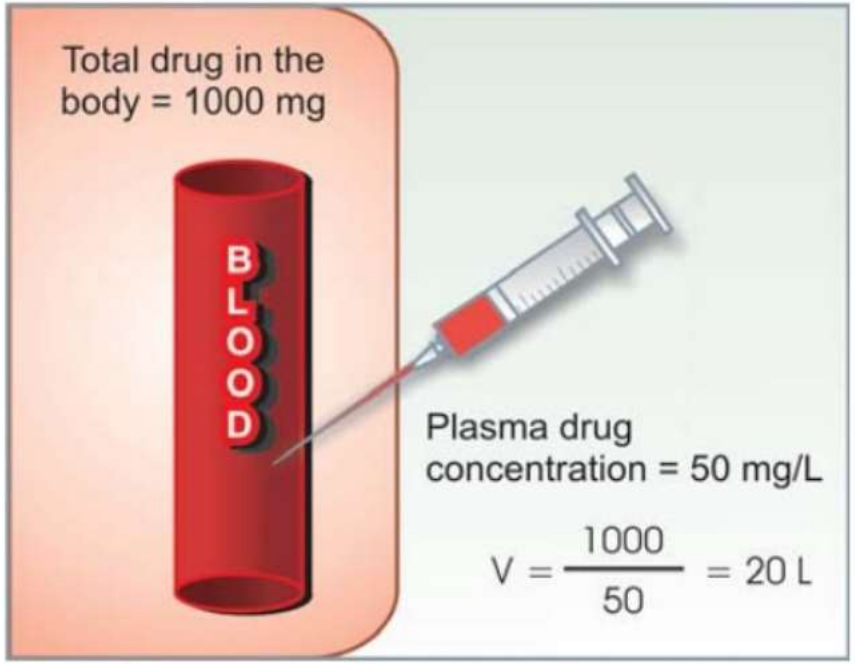



Extracellular Fluid
Intracellular
PLASMA
Drug Bound to Nonactive Sites
Drug Bound to Nonactive Sites
Drug
Free Drug
Free Drug
DISTRIBUTION
Drug Bound to Receptor (Biologic Effect)
Capillary Endothelium
Cellular Membrane

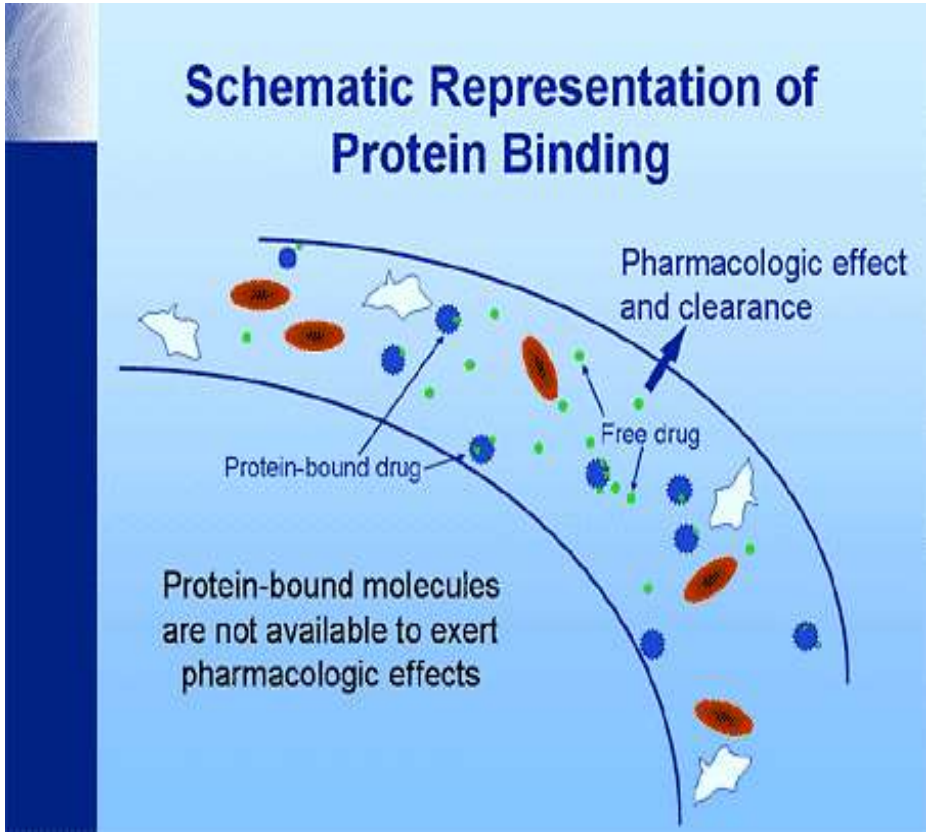
VOLUME OF DISTRIBUTION



APPARENT VOLUME OF DISTRIBUTION



PLASMA PROTEIN BINDING



REDISTRIBUTION

Redistribution of drug

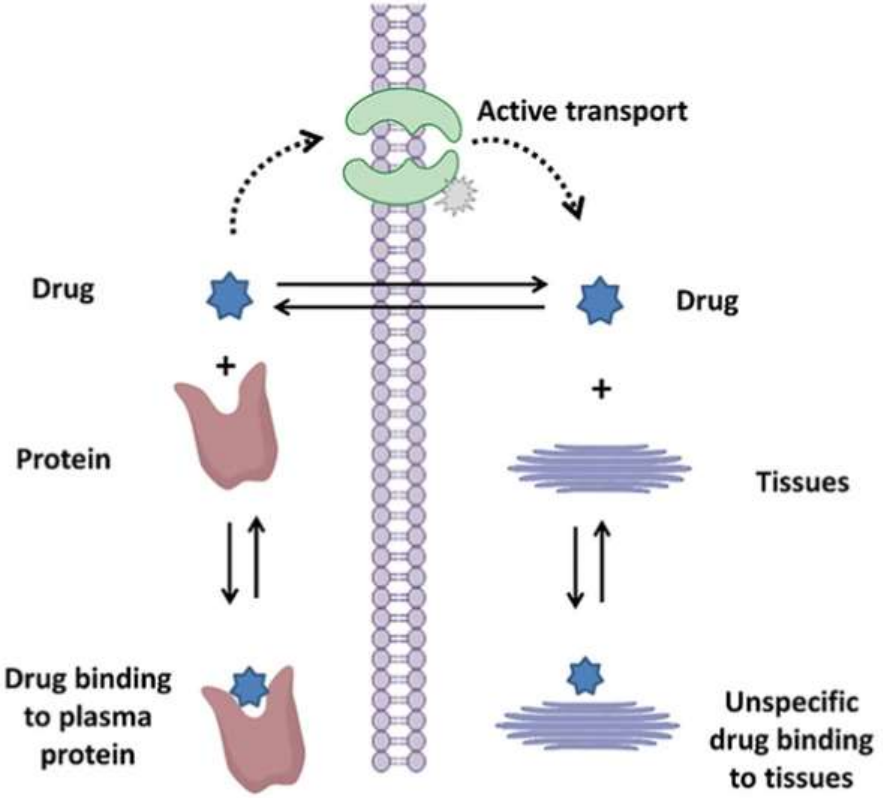
Highly Lipid soluble drugs: Thiopentone sodium

Organs with High blood flow: Brain, Kidney, Liver

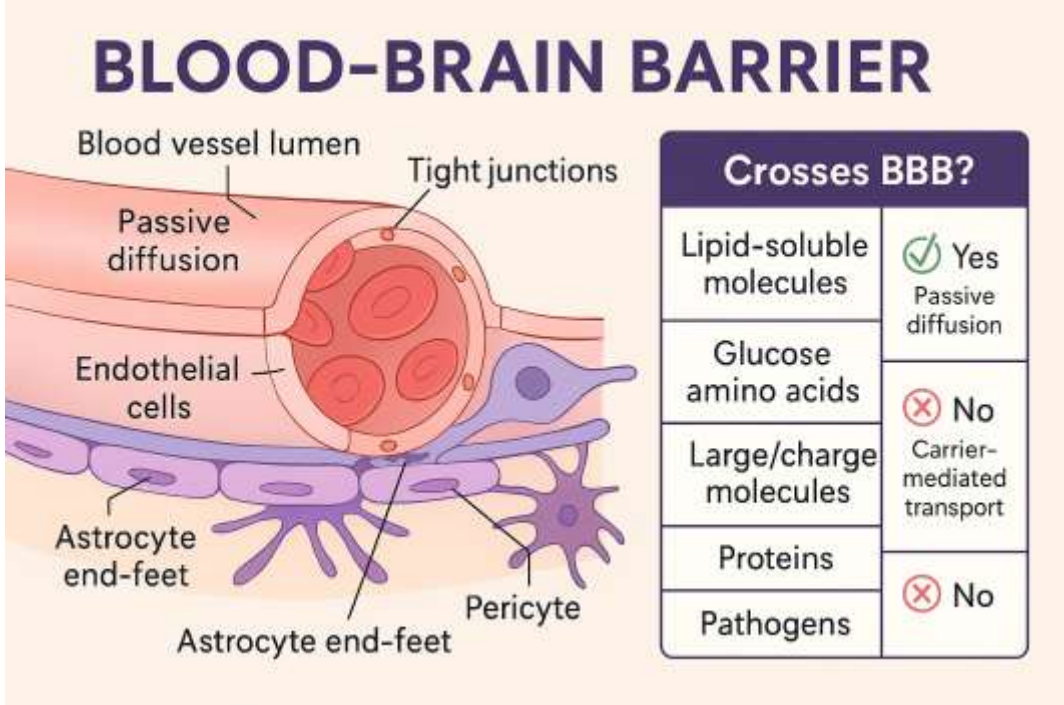
Less vascular & Bulky Tissue: Fat, Muscle

Termination of Drug Action

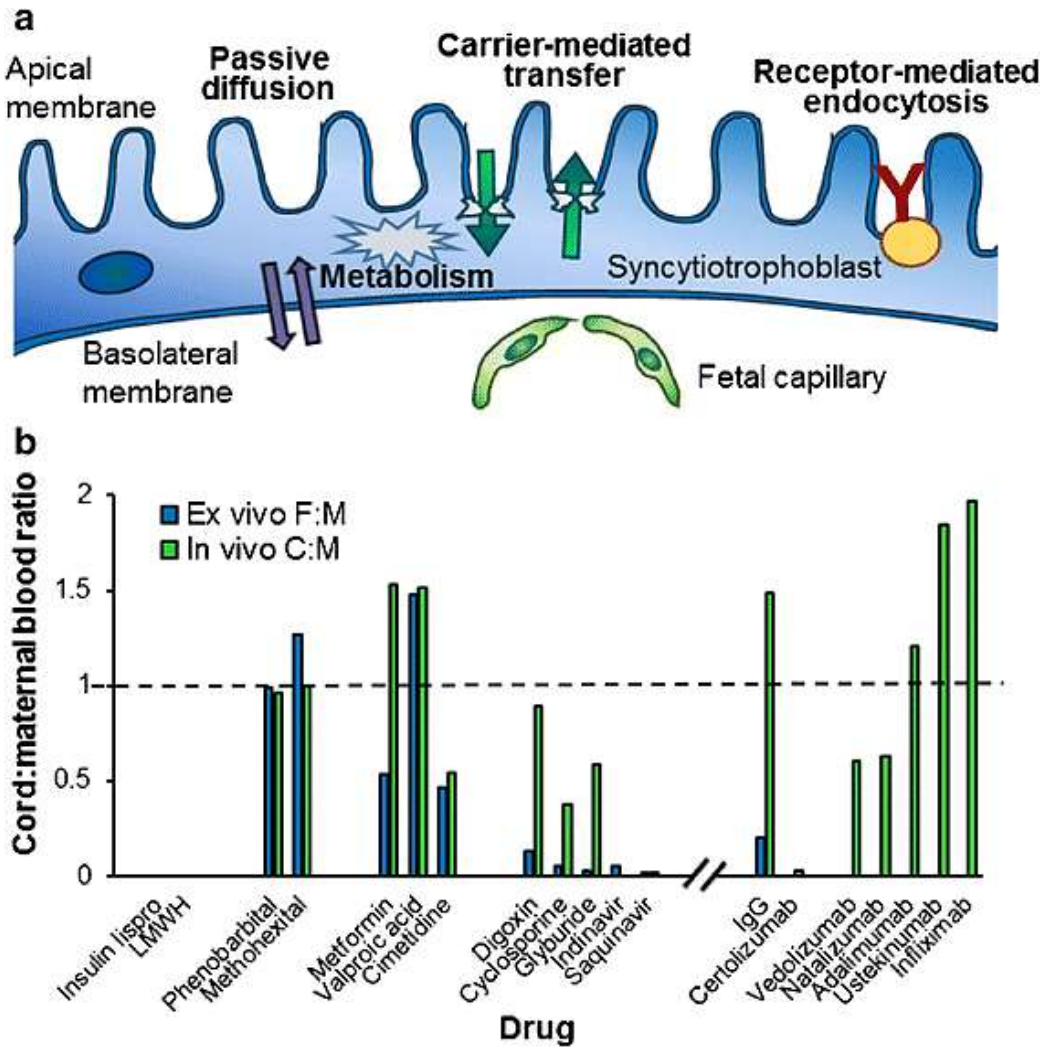
TISSUE BINDING



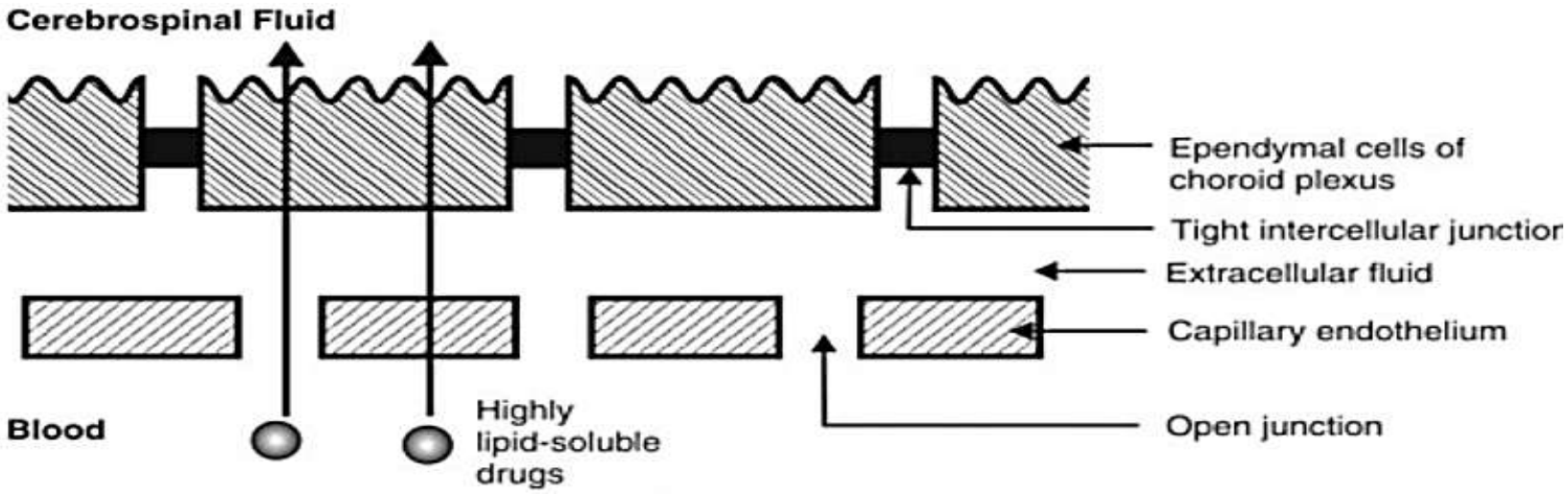
BLOOD BRAIN BARRIER



PLACENTAL BARRIER

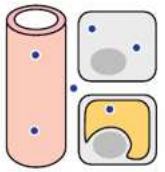


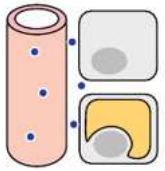
CSF BARRIER

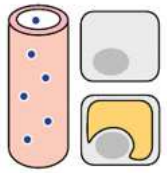

Cerebrospinal Fluid
Ependymal cells of choroid plexus
Tight intercellular junction
Extracellular fluid
Capillary endothelium
Open junction
Blood
Highly lipid-soluble drugs

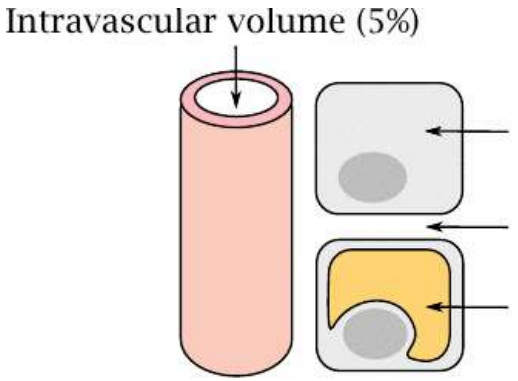
CLASS ASSESSMENTS

How drugs distribute in the body?

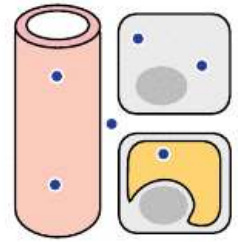


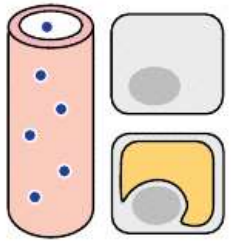




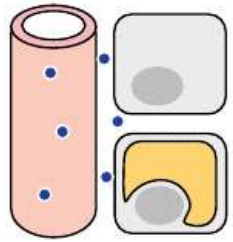


Drug evenly distributed (uncommon)

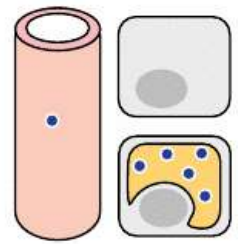




Drug confined to circulation (very large drug molecules)



Drug excluded by cell membranes (very polar drug molecules)



Drug enriched in fat (lipophilic drugs)

SUMMARY

- Drug distribution is key to pharmacokinetics, influenced by solubility, binding, and barriers.
- Understanding it optimizes therapy, minimizes risks. Key concepts: Vd, protein binding, redistribution, special barriers.

REFERENCE

- Rang & Dale's Pharmacology, 9th Edition, Elsevier, 2019.
- Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, McGraw-Hill, 2018.
- Text book of Pharmacology by KD Tripathi.

THANK YOU