**Biopharmaceutics & Pharmacokinetics**

**8th SEM**

# Drug Distribution

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# INTRODUCTION

- Once a drug enter into a blood stream the drug is subjected to a numbers of processes called as **DISPOSITION PROCESSES** that tend to lower the plasma concentration of drug.

- **DISTRIBUTION** is a process which involves **reversible transfer of a drug** between compartments.

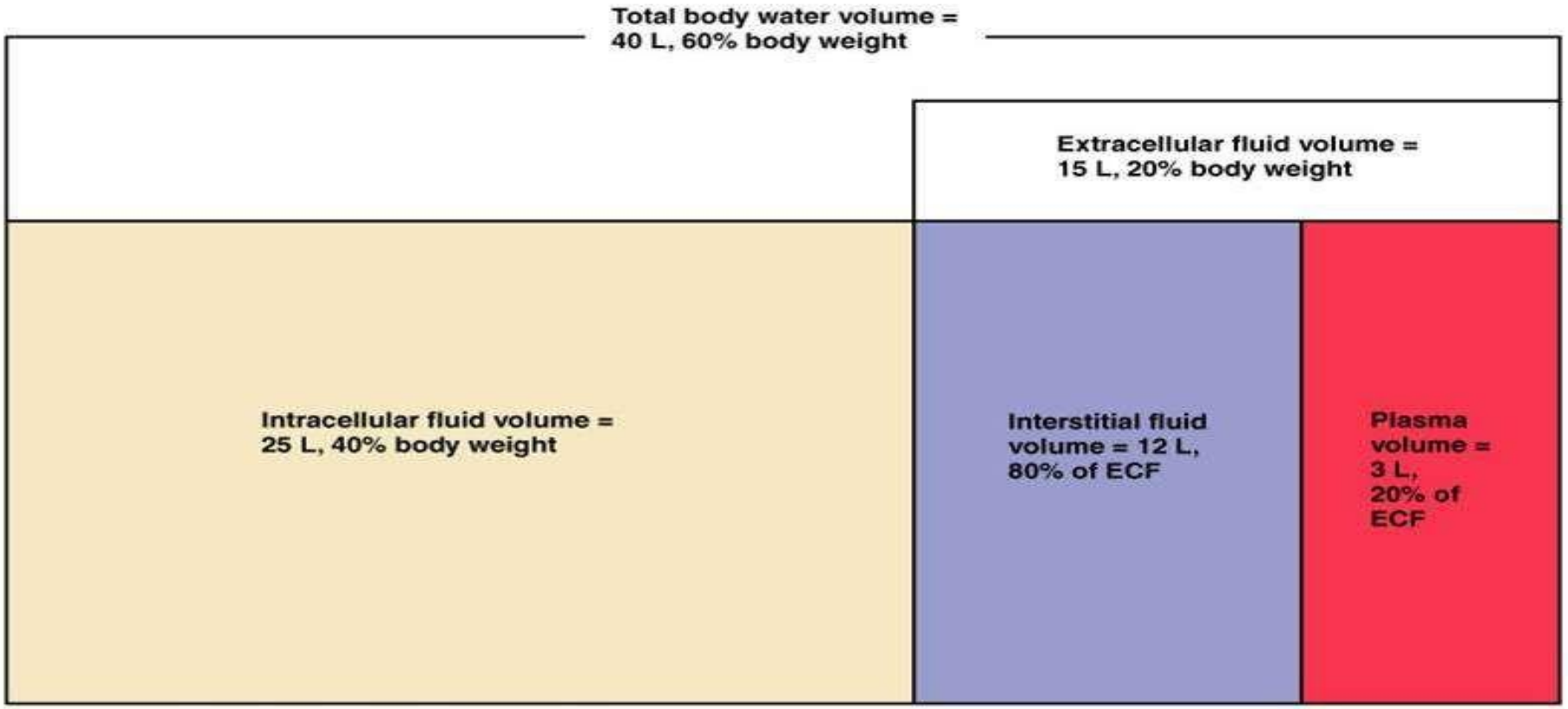
- **ELIMINATION** is a process which involves **irreversible loss of drug** from the body.

# DEFINITION OF DISTRIBUTION

- **DISTRIBUTION** is reversible transfer of a drug between the **ONE COMPARTMENT** (Blood) to **ANOTHER** (Extravascular fluids and tissues).

- Distribution is a passive process for which the driving force is **CONCENTRATION GRADIENT** between the blood and the extravascular tissues.

# Drugs distribution in different compartments of body.




Transcellular fluid(2.5%)– CSF, intraocular, peritoneal, pleural, synovial, digestive secretion, fetus is also special type. Drugs will be in free or bound form.

| Body compartment | Types of drugs |
| --- | --- |
| Total body water | Small, water soluble alcohol and antipyrine. |
| Extracellular space | Large, water soluble mannitol |
| Intravascular space | Very large, strongly protein bound, heparin |
| Body fat | Highly lipid soluble DDT and thiopentone |
| Bones | Fluoride and lead |

Distribution is a **Passive Process**,

for which the

Driving Force is the Conc. Gradient between the Blood and Extravascular Tissues

- The Process occurs by the Diffusion of Free Drug until equilibrium is established

# SIGNIFICANCE

- Pharmacological action of drug depends upon its concentration at the site of action.

- Distribution plays a significant role in –
  a) Onset of action.
  b) Intensity of action.
  c) Duration of action.

# STEPS IN DRUG DISTRIBUTION

- Permeation of free drug present in blood through capillary wall and entry into extracellular fluid (ECF)

- Permeation of drugs present in ECF through the membrane of tissue cells and into intracellular fluid.

- This is **RATE LIMITING STEPS** and depends upon two factors:-

  a) Rate of Perfusion to the extracellular tissue.

  b) Membrane permeability of the drug.

# DISTRIBUTION PROCESS

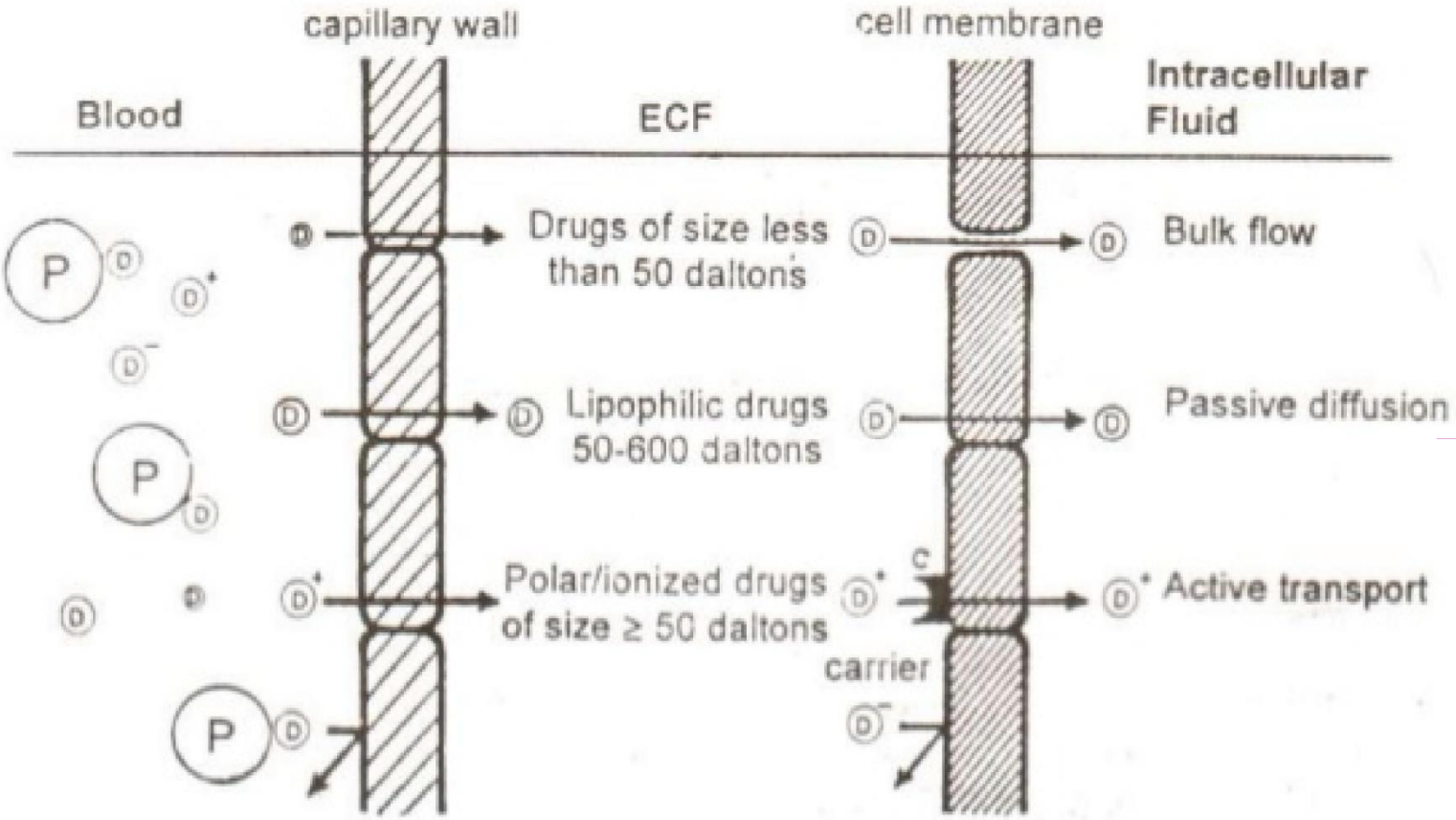



**Fig. 3.3** Plasma membrane barrier and drug diffusion across it

# Thank You