# Pharmacokinetics

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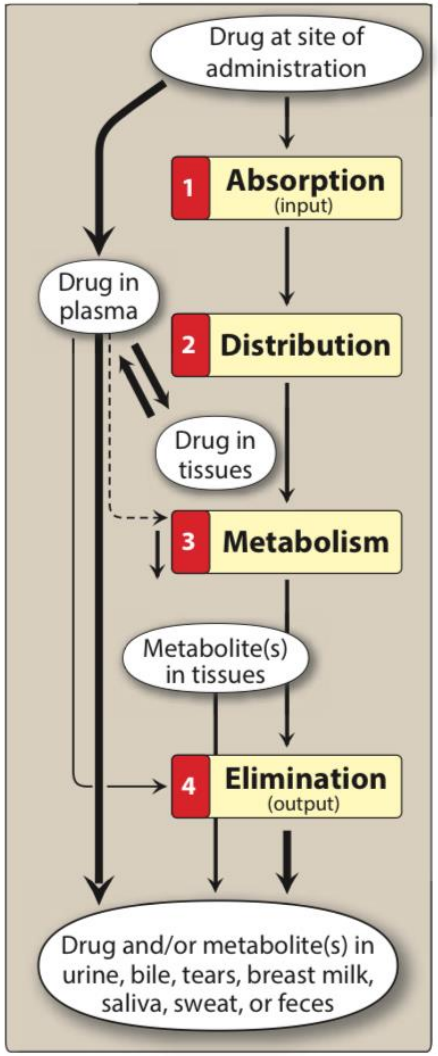
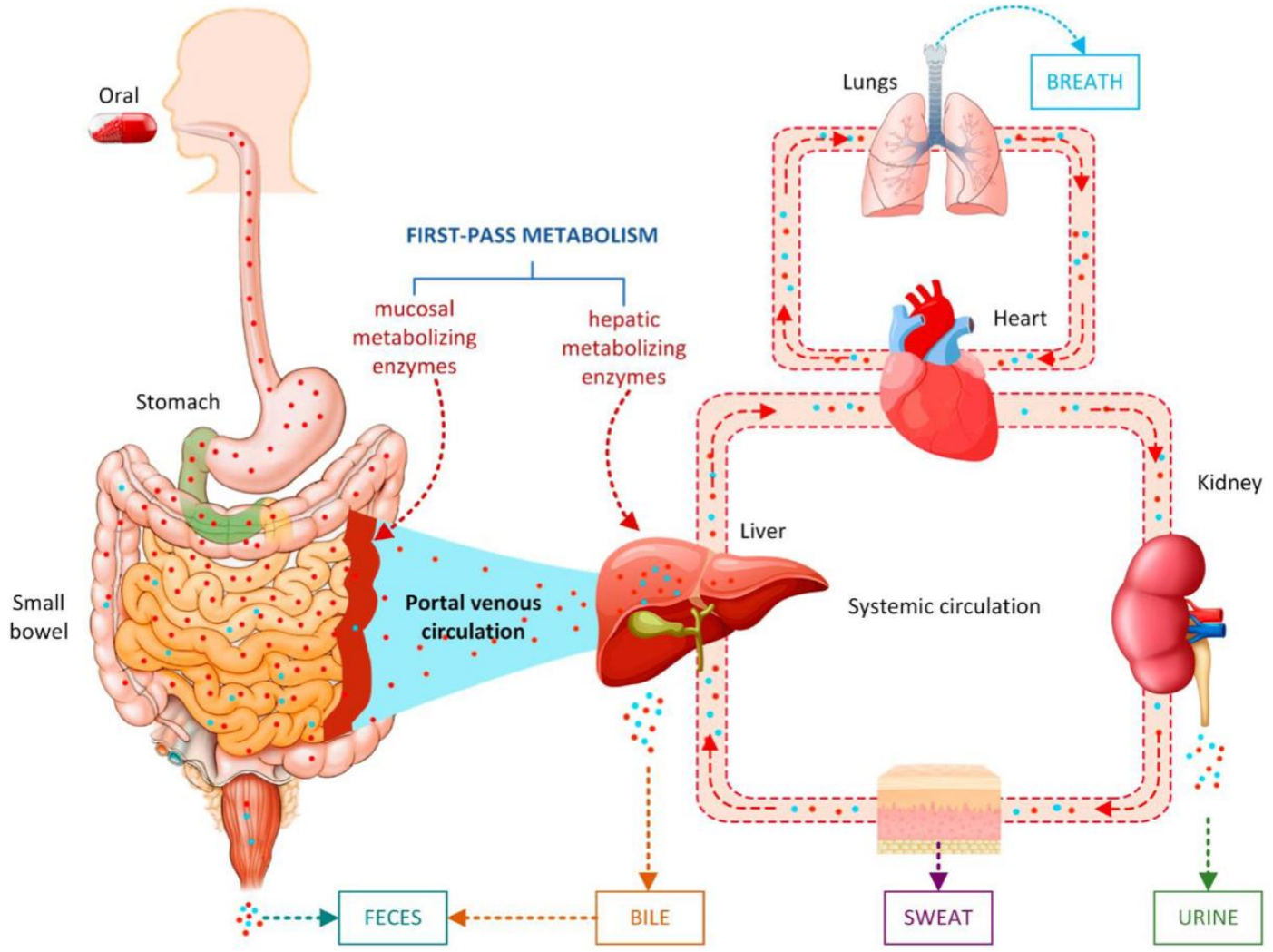
# Pharmacokinetics

**Pharmacokinetics** is the study of how the human body affects the drug, including: the processes of absorption, distribution, metabolism, and excretion - ADME).

Importance: Understanding pharmacokinetics is crucial for determining: drug dosage, timing, and potential side effects.




Oral
FIRST-PASS METABOLISM
mucosal metabolizing enzymes
hepatic metabolizing enzymes
Stomach
Small bowel
Portal venous circulation
Liver
Lungs
BREATH
Heart
Kidney
Systemic circulation
FECES
BILE
SWEAT
URINE

# Key Processes of Pharmacokinetics

- **Absorption**: How the drug enters the bloodstream.
- **Distribution**: How the drug spreads through the body's tissues.
- **Metabolism**: How the body breaks down the drug, usually in the liver.
- **Excretion**: How the drug or its metabolites are removed from the body.

# Absorption

**Definition**: The process by which a drug passes from its site of administration into the bloodstream.

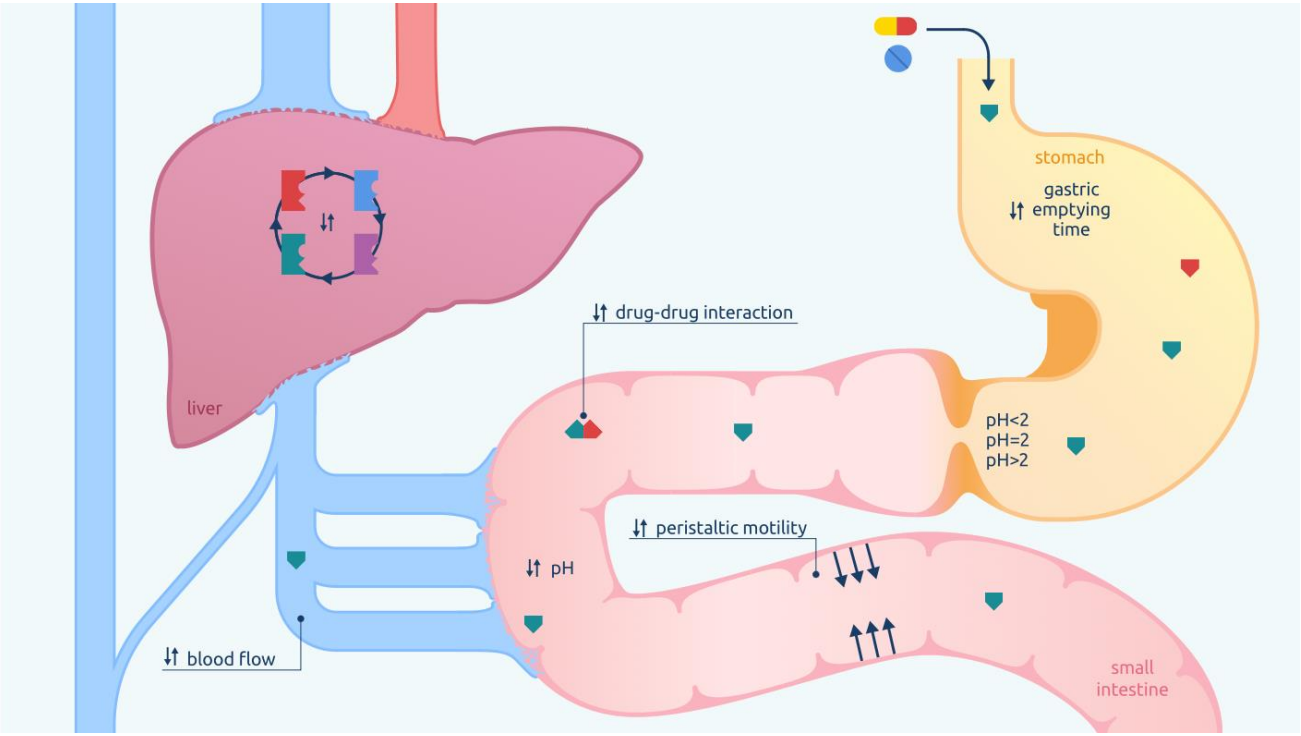
Factors Affecting Absorption:

Route of administration (oral, IV, etc.)

Drug formulation.

Blood flow to the absorption site.

Gastric pH.



# Distribution

**Definition**: The dispersion of a drug throughout the fluids and tissues of the body.

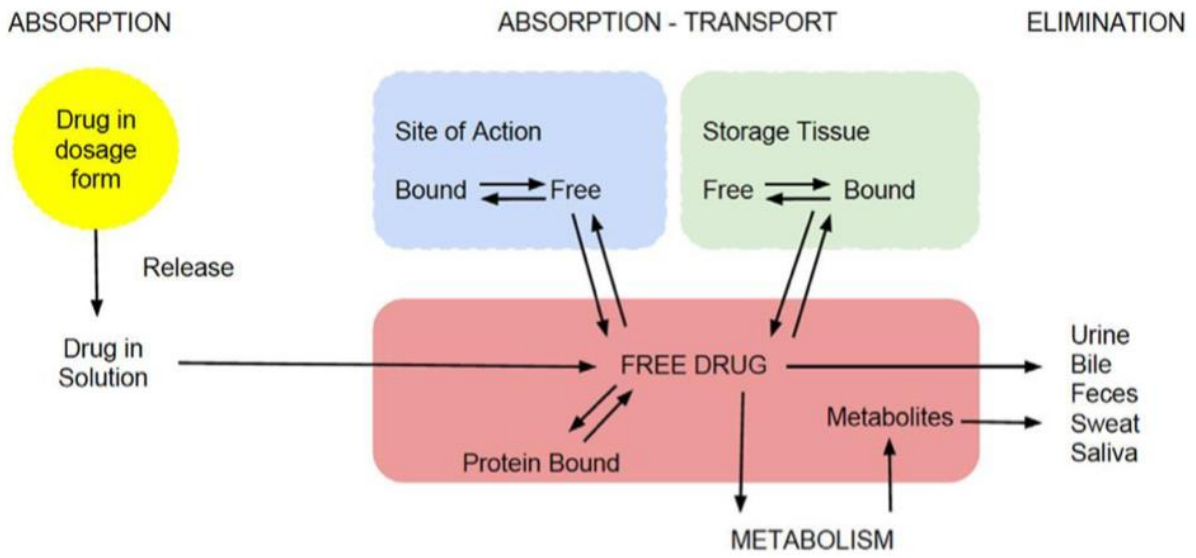
<u>Factors Influencing Distribution:</u>

Plasma protein binding.

Tissue permeability.

Blood flow to organs.

Volume of distribution (Vd).



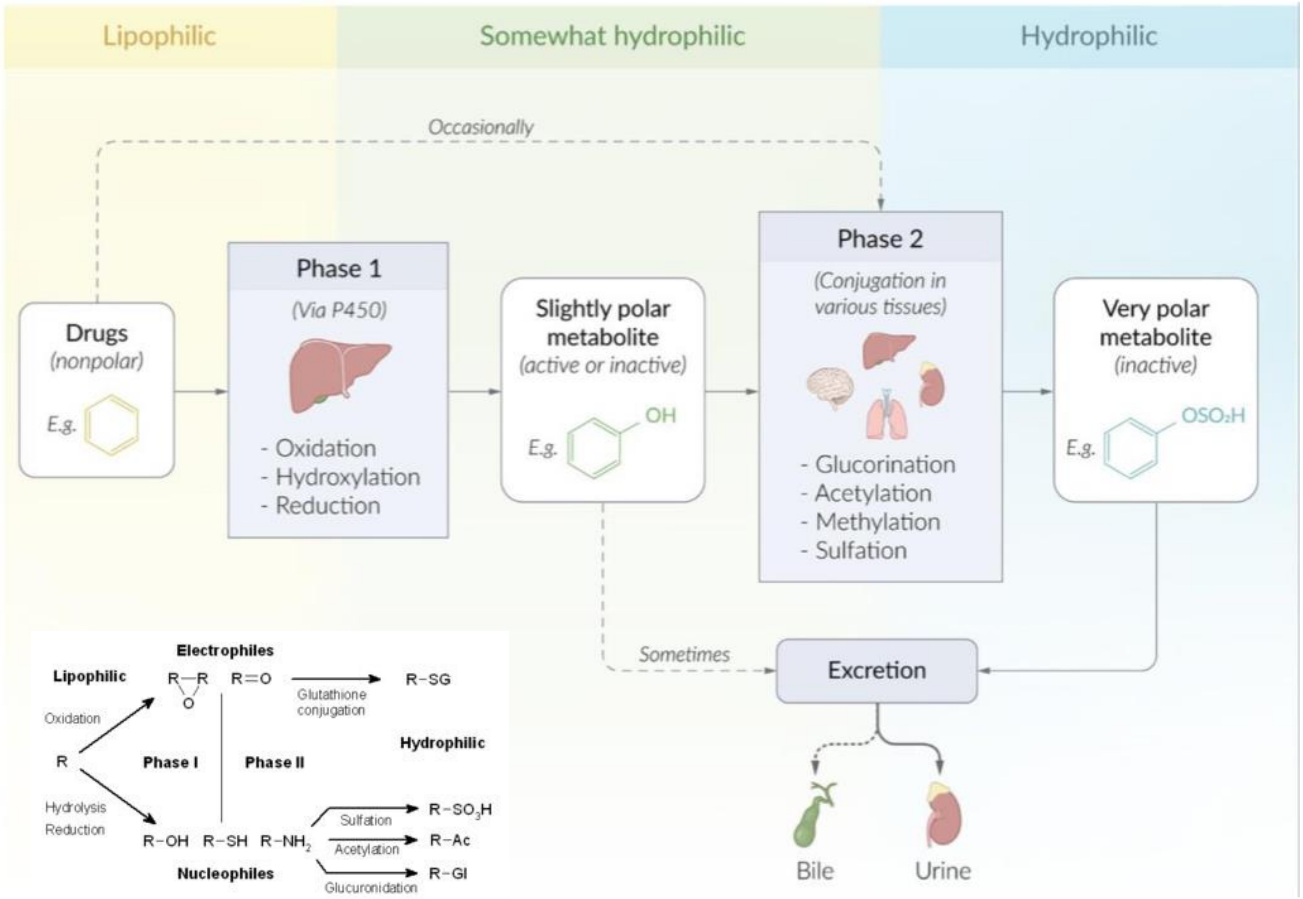
# Metabolism

**Definition**: The chemical alteration of the drug in the body, often in the liver.

**Phase I Reactions**: Oxidation, reduction, hydrolysis (usually cytochrome P450 enzymes).

**Phase II Reactions**: Conjugation (glucuronidation, sulfation).

First-pass effect: Liver metabolism reduces the drug's concentration before it reaches systemic circulation



# Excretion

Definition: The removal of drugs and their metabolites from the body, primarily via the kidneys.

<u>Routes of Excretion:</u>

Renal (urine).

Biliary (feces).

Others: sweat, saliva, exhalation.