

# Pharmacology

## Pharmaco Kinetics

drug movement  $\Rightarrow$  Studies how body interacts w/drug

## 4 pillars of Pharmacokinetics (ADME)

### Absorption

how drug moves from point of Absorption to bloodstream

factors:

best (100% effective)

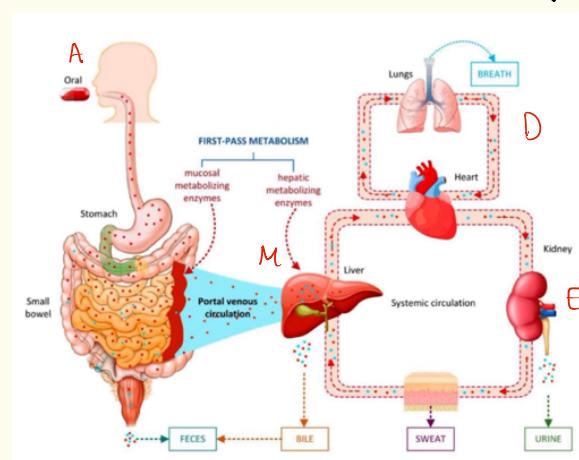
- ① Pathway of Absorption (oral, IV, Rectal)
- ② Drug Composition (Different drugs have different Absorption Rates) :  $\uparrow$  complex,  $\uparrow$  Absorption time
- ③ Blood flow to target organ:  $\uparrow$  blood flow,  $\downarrow$  time to reach target
- ④ Gastric pH: Drug capsules usually melt at Stomach pH (pH = 2); people who take Antacids (drugs which make Stomach Acid more basic), so ingested drugs might take longer to dissolve and be absorbed

### Distribution

how drug is dispersed throughout body tissues

factors:

- ① Plasma protein: drug molecules that are bound to plasma proteins cannot cross tissues and are ineffective
- ② Tissue permeability: Impermeable tissues  $\implies \downarrow$  drug effectiveness ( $\downarrow$  permeability)
- ③ Blood flow to target organ:  $\uparrow$  blood flow,  $\downarrow$  time to reach target
- ④ Volume of Distribution ( $V_d$ )



### Metabolism

How drugs are broken down in body (liver)  
chemically modifying the drug.

#### ① Phase I:

Reduction, Oxidation, Hydrolysis (cytochrome P450)

#### ② Phase II: Conjugation (used if phase I fails)

Glucuronidation, Sulfation  $\rightsquigarrow$  Add  $SO_4^{2-}$

(Adding Glucuronic Acid)

\* GlicUA (biochem I)

#### ③ First-pass effect (liver metabolizes and removes some of drug before it reaches target organ $\Rightarrow$ drug effectiveness $\downarrow$ )

### Excretion

How drug is removed from body (kidneys usually)

factors: (examples)

#### ① Urine (Urinary)

#### ② Faeces (Biliary)

#### ③ Other (exhalation, sweat ...)

(or lipophilic)

Phase I + Phase II both cause drug change from hydrophobic to hydrophilic; this  $\downarrow$  chance of drug moving back into bloodstream (and thus avoid being excreted)