Pharmacology

Pharmaco Kinetics

drug movement ⇒ Studies how body interacts w/drug

4 pillars of Pharmacokinetics (ADME)

Absorption

how drug moves from point of Absorption to bloodstream

factors:

1. Pathway of Absorption (oral, IV (best (100% effective)), Rectal)
2. Drug Composition (Different drugs have different Absorption Rates) : ↑ complex, ↑ Absorption time
3. Blood flow to target organ: ↑ blood flow, ↓ 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 ⟹ ↓ drug effectiveness (↓ permeability)
3. Blood flow to target organ: ↑ blood flow, ↓ time to reach target
4. Volume of Distribution (V_d)

Metabolism

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

factors:

1. Phase I: Reduction, Oxidation, Hydrolysis (cytochrome P450)
2. Phase II: Conjugation (used if phase I fails)
   Glucuronidation, Sulfation → Add SO_4^{2-}
   (Adding Glucuronic Acid)
   ★ GlcUA (biochem I)
3. first-pass effect (liver metabolizes and removes some of drug before it reaches target organ ⇒ ∴ drug effectiveness ↓)

Excretion

How drug is removed from body (kidneys usually)

factors: (examples)

1. Urine (Urinary)
2. Faeces (Biliary)
3. Other (exhalation, sweat ...)

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