MEDICATIONS

Pharmokinetics

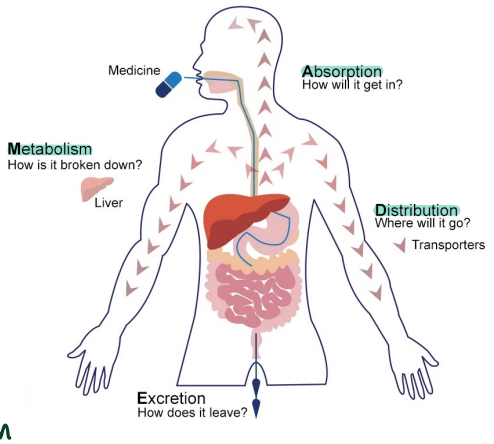
*study of absorption, distribution, metabolism, & excretion (ADME) in the human body

*knowledge of how medications work in the body, their effects on specific organs, their intended actions, & adverse med reactions

Absorption: movement of medication from where it was administered (enters the body), to the circulatory system

*affects the speed & intensity of the meds action in the body

* **factors affecting rate of absorption**:
  - **route of administration**: point where med enters body
  - **ionization**: the PH of medication & site of absorption
  - **dissolution**: medication must be dissolved before absorption happens
  - **blood flow**: meds are absorbed faster where blood flow is high
  - **lipid solubility**: med formulation can either have high or low lipid solubility
  - surface area of absorptive site
  - **client specific factors**: pathophysiological processes, disease/injury, age, etc



Distribution: process to the target organs/tissues following absorption into circulatory system

*affected by clients circulatory status or blood flow & meds solubility & protein binding ability

- **highly vascularized areas**: recieve greatest blood supply
  - heart
  - liver
  - brain
  - kidney
- **low vascularized areas**: bones, skin, adipose tissue

Metabolism (biotransformation): chemical process of converting a medications structure

*can result in amplified medication activity, inactivation of meds, or increased excretion via kidneys, & can toxicity levels of meds

*metabolized primarily in liver & kidneys

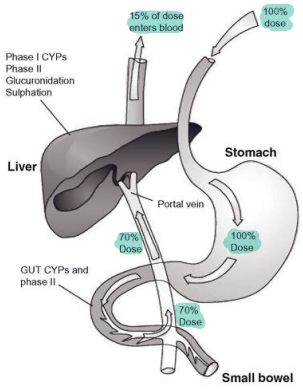
- transformed by group of liver enzymes (cytochrome P-450) to active & inactive substances to allow for their excretion
- ds w kidney & liver disease may have slow rate of medication clearance

*may transform specific meds to another form → more active or potent form

- codeine → morphine resulting in ↑ pain relief

***Prodrugs**: inactive chemicals that are activated through metabolism to exert therapeutic affects

***first pass effect**:



can result in lower concentration of medication reaching systemic circulation, if a majority of the medication has already been metabolized into an inactive form before it enters the blood stream

*knowledge is crucial for determining appropriate route

*CYP enzymes found on liver cells play a role on medication metabolism

- by regulating rate at which a medication is broken down & the amount of time medication stays in body

*Nutrients can influence medication metabolism

Excretion: process that medication is removed from body

*kidneys are primary organ

*rate of med excretion is affected by kidney, heart, & liver function - influence med concentration in body

***medication toxicity**: when body is unable to metabolize & excrete a med

- may cause irreriversable damage to organs

Medication preperation

*pharmacodynamics: study of how med works, its relationship to medication concentration, & how body responds (therapeutic range)

*therapeutic drug monitoring (TDM): method used by health care providers to monitor medication concentration in pt blood

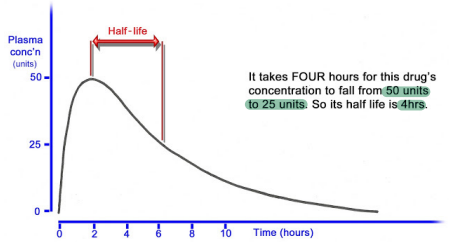
- used for meds that have narrow therapeutic window- safe w/o causing adverse med reaction

*peak and trough blood levels: help maintain therapeutic med levels

- peak blood levels: when med is at highest concentration but below toxic level
  - occur when absorption is complete
- trough blood levels: lowest level of concentration of med that coorelates to rate of elimination
  - measured before administrating next scheduled dose

*half-life: time it takes for medication to fall to half its strength through excretion

- medications with longer half life may be administered once daily to maintain therapeutic level
  - diazapam: half life 20-90 hours



Adverse drug reactions

*unintended & nontherapeutic effects of medication- can range from tolerable to harmful

*adverse drug event: life threatening medication reaction that requires medical intervention to prevent death, permanent disability, congenital anomaly, or causes/prolongs hospitalization

- must be reported to FDA so agency can improve safety outcomes, revise labels & warnings, & withdraw med from market

Allergic reactions

*when body percieves med as a foreign substance stimulating an immune response

Anaphylaxis

*severe reaction in which immune response causes dyspnea, hypotension, & tachycardia

*steven-Jonnson syndrome (SJS)

- 1-14 days following administration
- respiratory distress, fever, chills, diffuse, fine rash, followed by blisters

Medication interactions

*drug-drug interactions: effect that two or more drugs that pt is administered have on each other

- interactions may include intensifying the effects of one of the meds or decreasing affects of one of meds

*drug-food interactions: effects of nutrients on the ADME of medications

*drug-herbal supplement interactions: effects similar to drug-drug

Factors affecting med actions

*teratogenic: medications that can cause fetal defects, pregnancy loss, prematurity or developmental disabilities

- cocaine
- alcohol
- NSAIDs
- ACE inhibitors
- gentamycin
- tetracycline