

Pharmacokinetics IV summary

| Topic | Details |
|---|---|
| Excretion of Drugs | Excretion occurs via kidneys (glomerular filtration, proximal convoluted tubules, distal convoluted tubules), also via bile, lungs, saliva, sweat, and milk. |
| glomerular filtration | Free drug molecules smaller than the glomerular pores are filtered into Bowman's capsule. |
| proximal convoluted tubules | Active secretion through acid carriers (e.g., penicillin) and basic carriers (e.g., quinine). |
| distal convoluted tubules | Lipophilic drugs may be reabsorbed. Alkalinization increases acidic drug excretion, acidification increases basic drug excretion. |
| Kinetics Orders | First Order: Elimination proportional to concentration. Zero Order: Constant amount eliminated per time unit. |
| Elimination Half-Life (t_{1/2}) | Time to reduce plasma concentration by half. $t_{1/2} = 0.7 * V_d / CL_s$ Therapeutic effect after 4-5 half-lives. |
| Factors affecting elimination | State of eliminating organ Plasma protein binding (highly bound drugs=slow elimination) V _d of drug (high V _d = longer to eliminate) |
| Steady-State Plasma Concentration (C_{ss}) | Reached after 4-5 half-lives. C _{ss} Proportional to dose. |
| Systemic Clearance (CL_s) | Volume cleared from drug per unit time. Used to calculate maintenance dose. |
| Loading Dose & Maintenance Dose | Loading Dose = V _d * TC. Maintenance Dose = CL _s * TC. |

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| Characteristic | First-Order Kinetics | Zero-Order Kinetics |
|---|---|---|
| Rate of Elimination | Proportional to the drug concentration | Constant amount eliminated per unit time |
| Percentage or Amount | Percentage of drug eliminated remains constant (e.g., 50% of remaining drug) | Fixed amount eliminated (e.g., 10 mg/hour) |
| Half-Life | Constant half-life regardless of concentration | Half-life varies based on drug concentration |
| Reach Steady-State Concentration (C _{ss}) ? | YES | NO |
| Toxicity Risk | NO | YES |

A quick summary from the lecture ,make sure to review it

Good luck 😊