

PHA 5127
Case Study 5
Fall 2007

SET I:

True or False

- T F 1: A one compartment model means that drug in the blood is in rapid equilibration with drug in extravascular tissues.
- T F 2: For a linear model, the rate constant for elimination is not proportional to the amount of drug remaining to be eliminated.
- T F 3: Clearance and volume of distribution are independent each other, but both of them are dependent of dose.
- T F 4: A drug with a linear protein binding has linear pharmacokinetics.
- T F 5: In a linear one-compartmental model, lower dose and lower volume of distribution result in a lower initial drug concentration after a single IV bolus.
- T F 6: In a linear one-compartmental model, any two concentration points in concentration-time profile can determine drug half-life after a single IV bolus.
- T F 7: Total clearance is always greater or equal to renal clearance.

SET II:

Jane, 5'8", 35-year-old, is being treated with the new drug for an infection disease. Jane weights 64.4 kg. $C_{p_{creat}}$ in Jane is 0.8 mg/dL Assume a V_d of 0.24 L/kg*(TBW), and clearance of this drug is equal to creatinine clearance, and this drug follows a linear one compartment model.

1. In order to achieve initial concentration 6 mg/L, please calculate this IV bolus dose.
2. Calculate half-life of this drug, and how many half-lives will it take to drop concentration from 6 mg/L to 750 μ g/mL?

SET III:

Drug-Y is mainly eliminated by liver and kidney. Renal elimination is only by glomerula filtration. Mike with liver failure was given 70mg of this drug via IV bolus. Two plasma concentrations at 3 hours and 8 hours after dose were 1.31mg/L and 0.65mg/L, respectively. The plasma protein binding for the drug is 90%. Calculate the hepatic clearance and the volume of distribution of this drug in Mike? (Use 130ml/min for glomerula filtration rate).

SET IV:

The renal clearances, the fractions of unbound in plasma and the molecular weights of four drugs in a 75 kg subject are as follows:

	CL_{renal} (mL/min)	fu	MW
A	20	0.5	500
B	0.10	0.5	200
C	20	0.1	800
D	50	0.9	100

Which of following statement is true? (GFR is 130 mL/min and urine flow is 1.5mL/min.)

- A: Drug A has renal secretion.
- B: Drug B has renal secretion.
- C: Drug C has renal secretion.
- D: Drug D has renal secretion.
- E: None of above