PHA 5127 Dose Optimization I

Homework II (10 points)

Due on Friday, 09/18/2009

Do not forget the units of the results. 0.1 points will be deducted for each time an answer is provided without the appropriate unit.

1. **A patient is to be started on one medication administered by IV bolus injection. Blood samples were taken at 1 and 5 hours following the first injection of drug in order to determine whether concentrations are in an appropriate range. The information about this study is as follows: (6 points)**

Dose (mg)	Cp at 1h (mg/L)	Cp at 5h (mg/L)
1000	**2.21**	**1.35**

a. Estimate the initial concentration C_0 and the volume of distribution (Vd)

b. The plasma protein binding of this drug in this patient is 10%. Please estimate the tissue binding of this drug. (**Vp=3L, V_T=38L**)

c. If the tissue binding of this drug decreases by 10%, predict the dose that should be administered to reach the same C_0

2. TRUE (T) or FALSE (F) (3 points, 0.5 each)

The volume of distribution (Vd) of a given drug relates the dose with the free plasma concentration at time point zero (C_0)

T F

If a drug has volume of distribution of 150L, the tissue binding is more pronounced than plasma protein binding

T F

If a drug is unable to cross membranes, the volume of distribution cannot be larger than extracellular space.

T F

Increase in plasma protein binding will increase the volume of distribution of a lipophilic drug

T F

Lipophilic unionized drugs are likely to enter tissues relatively fast.

T F

Free plasma levels of drugs with high plasma protein binding (99%) are more prone to be affected by changes in plasma protein binding than drugs with low plasma protein (10 %) binding. (Assume that $f_{u,\ tissue} = 0.1$ and consider only effects of protein binding on Vd).

T F

4. Match the following parameters with correct units (1 point, 0.25 each)

1. Concentration	a. mg*L/hr
2. Half-life	b. hr
3. AUC	c. /hr
4. K_e	d. mg*hr/L
	e. mg/L