

Name: _____

SS#: _____

PHA 5127

First Exam Fall 1999

On my honor, I have neither given nor received unauthorized aid in doing this assignment.

Name

Question/Points

1. _____/5

2. _____/5

3. _____/20

4. _____/10

5. _____/10

6. _____/10

7. _____/10

8. _____/15

9. _____/15

TOTAL _____/100pts

Name: _____

SS#: _____

1. The volume of distribution of a lipophilic drug X is 500 L. Mark which of the following statement(s) is (are) consistent with this observation (5 points)
 - A ____ plasma protein binding is more pronounced than tissue binding
 - B ____ tissue protein binding is more pronounced than plasma protein binding
 - C ____ the drug is able to cross membranes
 - D ____ drug X can not be an acid or base as drug X is able to cross membranes
 - E ____ the clearance of this drug has to be low

Name: _____

SS#: _____

2.) What are advantages and disadvantages of pulmonary delivery (5 points)

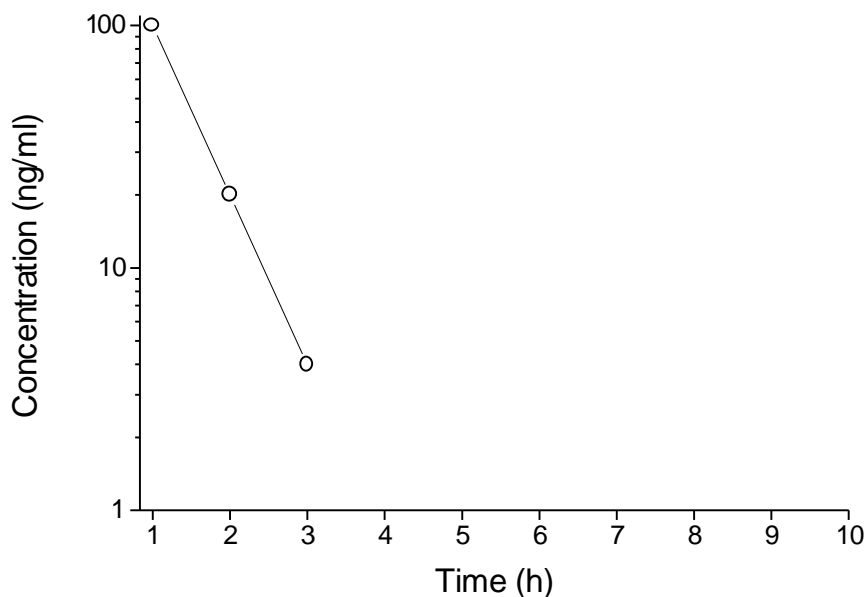
Name: _____

SS#: _____

3. For a typical 70-kg person, the volume of distribution of drug X is about 35 L. We assume that the plasma volume is 3 L, and the tissue volume is 38 L. Generally the unbound fraction in plasma and tissue is about 0.2. Plasma protein binding of this drug is reduced in patients with hypoalbuminemia. (20pts)

a) If the plasma protein binding is decreased in these patients to 70% ($f_u=0.3$) what is the expected volume of distribution.

b) Assume that this drug can be modeled after an i.v. bolus injection with a one compartment body model (the only one we talked about so far). The following plasma concentration time profile was observed in a typical patient. Indicate on the graph what concentration time profile would be expected in the patient with hypoalbuminemia assuming that the Cl will not change (no calculations necessary just draw another line).



4. The distribution of drug A into the heart is described by a perfusion limited process. The distribution of drug A into the brain is described by a permeability limited

Name: _____

SS#: _____

process. Which of the two tissues (heart/brain) will “fill” up faster with drug A (short explanation) (10 points)

5. Drug X is a weak acidic drug of high lipophilicity which shows low oral bioavailability because of dissolution problems. Give at least 2 methods to improve oral bioavailability of this drug. (10 points)

Name: _____

SS#: _____

6. Explain how you would determine the (absolute) oral bioavailability of a new drug entity (10 points).

Name: _____

SS#: _____

7. A drug is given as an IV bolus injection. The initial plasma concentration (C_{po}) was $40 \mu\text{g/ml}$ and 3 hours later the plasma concentration was $20 \mu\text{g/ml}$. What is the plasma concentration 6 hours after dosing if (8 points)

a) the elimination is first order?

b) the elimination is zero-order?

Name: _____

SS#: _____

- 9.) A hydrophilic drug is taken up by an active transporter within a small region of the intestine. It is highly metabolized in the lung. A start-up company (No Name Inc) wants to develop a sustained release preparation for this product by either the oral route or via a slow release pulmonary formulation. You are an investor would you buy stock of this company? Explain fully. (15 points)