

PHA 5127

Case Study #1

Question #1.

Penicillin G was made in three different formulations.

A. Injectable Aqueous Solution

B. Injectable Oil

C. Injectable Oil+Stearate

The same dose (200mg) of Penicillin G product in different formulations was given to a healthy subject. The design of this clinical study is given below:

Period I	Wash Out (2 weeks)	Period II	Wash Out (2 weeks)	Period III
Penicillin G (aqueous solution, 200mg, I.V bolus)		Penicillin G (oil, 200mg, I.M)		Penicillin G (oil + stearate, 200mg, I.M)

The respective plasma concentration vs. time profiles are collected and shown in Figure. 1.

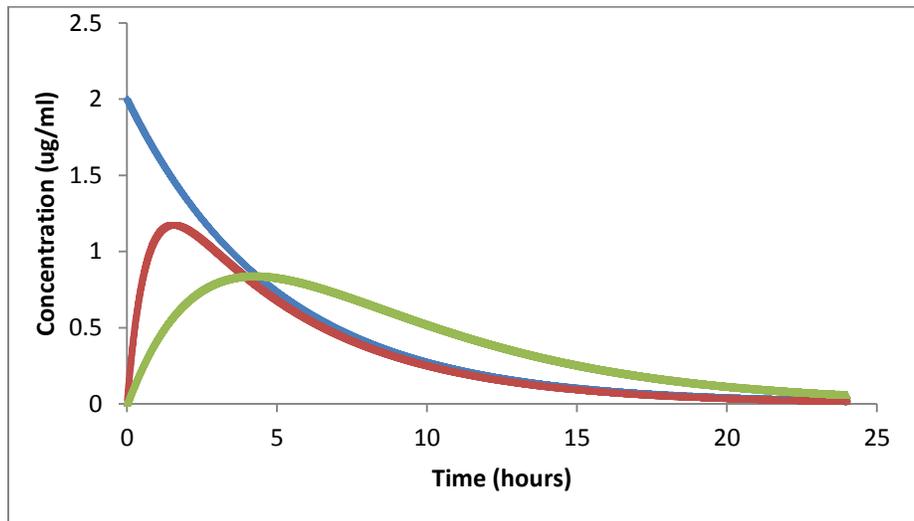


Fig. 1

1.1. Based on the information above, please match each plasma concentration vs. time profile to its correspondent formulation on the graph. Explain your choice.

1.2. If Penicillin G has a therapeutic window of 0.5 ug/ml – 1.5 ug/ml, which formulation should be considered based on the information provided?

Question #2.

200mg Drug A was administered to a patient through i.v bolus injection. His plasma drug concentrations were measured at 5 different time points. The data is summarized in Table.1 below.

Table.1

Time (h)	Plasma Conc (ug/ml)
2	0.78
4	0.46
6	0.27
8	0.16
10	0.09

- 2.1. Is the elimination process zero order or first order? Show your work.
- 2.2. Determine the elimination rate constant K_e and half-life ($t_{1/2}$).
- 2.3. Calculate the initial plasma drug concentration.
- 2.4. Calculate the volume of distribution V_d .
- 2.5. Use trapezoidal rule to calculate the area under the curve $AUC_{0 \rightarrow \infty}$
- 2.6. What is the plasma drug concentration after 12 hours?

Question #3.

- 3.1. T F The plasma concentration time profile of a certain drug is dependent on the dosage form.
- 3.2. T F For a zero-order elimination process, the rate of elimination is dependent on the amount of the drug.
- 3.3. T F For a one-compartment body model first-order elimination process, plasma concentration vs. time profile after an i.v bolus shows a straight line on a linear scale.
- 3.4. T F Instantaneous distribution to body tissues and fluids is assumed in one-compartment body model.