Case Study 5

1. A 500 mg IV dose of getamicin is given as a short-term IV infusion to an 80kg, 52 year old, 5'5" male patient. He has a serum creatinine of 0.8mg/dL. The clearance of this drug is equivalent to creatinine clearance.

   A. Calculate the clearance.

   B. Assuming this drug is only distributes into extracellular fluid and the volume of extracellar fluid is equal to that of an average person, what is the half-life?

2. Drug X has a narrow therapeutic window (~5-40mg/L). Two plasma samples are drawn for monitoring; one at 2 hours after the first iv bolus administration and one at 12 hours. The concentrations are 33mg/L and 8mg/L, respectively. This drug displays a one compartment body model and 1g was administered.

   A. Calculate the following: Vd, CL, and half-life.

   B. Assumuing linear pharmacokinetics what would the effect be on clearance, volume of distribution, half-life, AUC, and Cmax if the dose were decreased by 25%.

3. Patient AB and Patient CD are on a multiple IV bolus regimen of the same drug and steady state has been reached. This drug is cleared only by glomerular filtration and is not bound to plasma proteins. Both patients have a CLcr of 130mL/min. Patient AB has a longer half-life.

   A. Explain why patient AB has a longer half-life in terms of PK parameters.

   B. Would you expect the Cmax to be higher for patient AB or CD?

   C. Which patient would have more fluctuation in plasma concentration between each dose?

   D. Which patient has a higher average steady state concentration?

True or False
State if the following are True or False

1. If the volume of distribution increases the clearance can remain the same.

2. At steady state (equal dose, equal interval multiple IV) accumulation stops because the amount of drug eliminated during the dosing interval is more than the dose given at each dose time.

3. The time it takes for plasma concentrations to reach steady state after repeated IV doses is dependent on the elimination rate constant.