

# PHA 5127 Dose Optimization I

## Homework IV (10 points) Due on Friday, 10/02/2009

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 with liver failure was given 200mg of a drug as an IV bolus injection. The plasma concentrations at 2 hours and 8 hours after injection were 2.68mg/L and 0.81mg/L respectively. The drug is eliminated by hepatic metabolism which is 5.32L/h, and also renal excretion via only glomerula filtration. (Use 130ml/min for glomerula filtration rate).

Determine  $C_0$ ,  $V_d$ ,  $Cl$ ,  $Cl_{ren}$ (renal clearance) and plasma protein binding. (2.5 points, 0.5 each)

2. Predict the half life of a 65 year old, 5'8" tall, 80 kg male patient, who is on aminoglycoside treatment. The serum creatinine level was determined to be 1.5mg/dL. (Hint: use Cockcroft-Gault equation for creatinine clearance, and the equation  $Ke=0.00293*CrCl + 0.014$  for aminoglycoside) (2.5 points)

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

The glomerula filtration rate (GFR) is the maximum value of renal clearance

T F

Fluid is filtered across the glomerulus through passive diffusion

T F

Both bound and unbound drug can be filtered.

T F

Highly ionized substances tend to remain in the urine.

T F

**4. Please predict how the following parameters will change when the liver blood flow is increased in a patient**

**(1) when taking a high extraction drug (1.5 points, 0.5 each)**

the extraction ratio (E)

the clearance (Cl)

oral bioavailability (F)

**(2) when taking a low extraction drug (1.5 points, 0.5 each)**

the extraction ratio (E)

the clearance (Cl)

oral bioavailability (F)