**PHA 5127**
**Answers Case Study 4**
**Fall 2007**

1. For the following situations, indicate whether the drug is filtered, reabsorbed or actively secreted (Assume GFR is 130 mL $min^{-1}$, urine flow is 1.5 ml $min^{-1}$)

• A drug with fu = 0.02and a ClREN = 20 mL min-1 is _____
(GRF*fu=2.6 < Clren, Secreted)

• A drug with fu = 0.40 and a ClREN = 52 mL min-1 is _____
(GFR*fu=52 = Clren, Filtered)

• A drug with fu = 0.30 and a ClREN = 0.45 mL min-1 is _____
(GFR*fu=39 > Clren= Urine flow*fu=1.5*.3, Complete Reabsorbed)

2. Calculate the ke of a 56 year old, 79 kg male patient with a serum creatinine of 1.6 mg/dL who requires an aminoglycoside treatment. [Use ke= 0.00293 (CrCL)+0.014 $hr^{-1}$].

*Solution*:

with Cockcroft-Gault Equation

$$CLCr = (140 - age) \bullet Wt / (72 \bullet SerumCr) = (140 - 56) \bullet 79 / (72 \bullet 1.6) = 57.6\ ml/\min$$

$$ke = 0.00293\ (CrCL) + 0.014\ h^{-1} = 0.183\ h^{-1}$$

3. Mark whether the following statements for a **high extraction drug** are True or False

$$Cl = \frac{Q_H \bullet f_u \bullet Cl_{\text{int}}}{Q_H + f_u \bullet Cl_{\text{int}}} \approx Q_H \qquad E = \frac{f_u \bullet Cl_{\text{int}}}{Q_H + f_u \bullet Cl_{\text{int}}} \approx 1 \qquad F = 1 - E \approx \frac{Q_H}{f_u \bullet Cl_{\text{int}}}$$

**T F** The oral bioavailability (F) will be close to 1. (F)
**T F** Clearance will increase significantly after induction of the relevant enzyme. (F)
**T F** The hepatocyte membranes do not represent a barrier. (T)

4. Mark whether the following statements are True or False

**T F** a. Since creatinine is endogenous and predominantly eliminated by kidney, its clearance is a good estimation of renal active secretion. (F)

**T F** b. Creatine clearance can only be used to estimate the renal clearance of drugs that are similar to creatine, which does not show plasma albumin binding. (F)

**T F** c. “Linear pharmacokinetics” means that the plasma drug concentration versus time plots will result in a straight line. (F)