PHA 5127 Homework 4 Fall 2006
(10 points total)

1) Mark is a 65-year-old, 5'7'', 105kg man with a serum creatinine concentration of 2.2mg/dL. He is going to receive an antibiotic A for his infection. Knowing this drug is mainly eliminated by Glomerula filtration and has no protein binding, finish the following questions with appropriate units. (3 pts)

   a) Calculate the "Ideal Body Weight" and "Adjusted Body Weight". State which of the prior two weight measurements should be used for the estimation of the Cl_{ren} (note: if his total body weight is over 120% of IBW, he is an obese patient); (1 pts)

   b) Estimate the CL of this drug; (1 pts)

   c) If 80% of this drug is bound to plasma protein (instead of no protein binding), re-calculate CL (1 pts)

2) Drug B is mainly eliminated by the kidneys and 40% of this drug is binding to plasma protein. For patient A, his 24-hour urine collection volume is 2.8 L with the drug concentration in urine of 1.2 mg/L. Knowing his drug concentration in plasma for the last 24 hrs is 0.5 mg/L, estimate his Cl. Does the elimination involve re-absorption? Explain! If your answer is yes, is this a complete passive diffusion? (2 pts)

3. State if the following are True or False (0.5 points each)

T F a. Ionization, protein binding, glomerula filtration rate and urine flow are the factors that significantly affect the renal clearance of a drug. Assume the drug is only cleared by glomerular filtration with the passive renal re-absorption.

T F b. If Drug A is excreted by glomerular filtration as well as by hepatic metabolism and Drug B is cleared only by hepatic clearance, then in a patient with total renal failure, total body clearance of drug A and B will be affected.

T F c. Normal urine flow is 1-2 ml/min. Cl_{ren} still can be 0 ml/min even though there is no active re-absorption.

T F d. The maximum value of renal clearance is that of the glomerula filtration rate.

T F e. Tubular secretion most often occurs with weak organic acid.

A renal clearance of 700 ml /min may suggest the following:

T F f. The drug is eliminated only by glomerular filtration

T F g. The drug is eliminated by tubular secretion

T F h. Drug interactions in renal tubules are likely

T F i. The drug is probably nonionized

T F j. The drug is extensively reabsorbed in renal tubules