

PHA 5127
Fall 2005
Homework #3

1. A 34 year-old male patient needs to take gentamicin (aminoglycosides) for treatment of gram-negative pneumonia infection. The body weight of this patient is 74kg. The volume distribution of gentamicin is 18 L.
 - a. Calculate the Creatinine Clearance (CrCL) for this patient (1pt)
 - b. Calculate the elimination rate constant (k_e) (1pt)
 - c. Calculate the total clearance (CL_T) (1pt)
 - d. Calculate the non-renal clearance (CL_{nonren}) (Hint: using the intercept of k_e) (1pt)
 - e. Calculate the renal clearance (CL_{ren}) (1pt)

2. Drug X is a weak base with $pK_a=9.0$. Its unionized form is non-polar. It has a volume distribution of 30L, $t_{1/2}$ of 2 hour and fraction unbound (f_u) of 0.2. The renal clearance accounts for 20% of the total clearance.
 - a. Calculate the total and renal clearance. (1pt)
 - b. Is secretion or reabsorption definitely involved in the renal clearance of drug X? Why? (1pt)

 - c. If we know that reabsorption is involved, will the renal clearance increase or decrease if pH of urine changes from 7.5 to 4.5? Why? (1pt)

3. Which of the following factors does NOT influence glomerular filtration: (2pt)
 - a) molecular size
 - b) protein binding
 - c) lipid solubility
 - d) renal blood flow

