

**PHA 5128 Dose Optimization II**  
**Spring 2010**  
**Homework Assignment II**  
**Due on 02/02/2010**  
**10 points**

Please contact Benjamin Weber ([benjaminweber@ufl.edu](mailto:benjaminweber@ufl.edu)) if there are any questions regarding this homework assignment. **0.25 points** will be deducted for each answer that is not provided with the appropriate unit. **Remember to show how you found your answer.** Answers lacking adequate justification may not receive full credit.

1. TRUE (T) or FALSE (F) [4 points, 0.5 each]

The total body water (in % of body weight) in neonates is usually smaller than in adults

T     F

The glomerular filtration rate (GFR) in neonates is usually smaller than in adults

T     F

Patients with an increased body weight tend to have a larger volume of distribution

T     F

The effect of body weight on volume of distribution does not depend on the lipophilicity of the drug

T     F

Drugs with a high octanol/water lipid partition coefficient (LPD) usually show a larger volume of distribution in obese patients

T     F

The allometric body weight model can be used to convert body surface area (BSA) into total body weight (TBW)

T     F

The terminal half-life of aminoglycosides is approximately 2 hours

T     F

Aminoglycosides cannot pass membranes very well because of their low protein binding

T     F

2. Calculate the ideal body weight (IBW) of a female person who is 168 cm tall. Which body weight (IBW, TBW (total body weight), or ABW (adjusted body weight)) would you use in the Cockcroft-Gault equation if the person weighs 60 kg? [0.5 points]

3. F.G. (female, 32 years, 68 kg, 175cm, serum creatinine = 1.2 mg/dL) is hospitalized with a severe urinary infection. The physician decides to treat the infection with gentamicin (target “true”  $c_{\max}$  at steady state = 4.5 mg/L) and asks to you to come up with a once-a-day dosing regimen for F.G.
- Comment on the once-a-day dosing regimen for gentamicin. What is the rationale for once-a-day dosing regimen for gentamicin? **[1 point, 0.25 each]**
  - Comment on the choice of 4.5 mg/L as target  $c_{\max}$ . Do you support the decision? **[0.5 points]**
  - Which gentamicin dose would you recommend for F.G. assuming drug administration via IV infusion for 30 minutes? **[1 point]**
  - Calculate the “clinical” peak concentration at steady state (30 min before next infusion is started) and comment on this concentration regarding to any possible side effects of aminoglycoside therapy. **[0.5 points]**
4. J.C. a 75 kg, 40-year-old patient with a serum creatinine of 1.8 mg/dL, has been receiving IV tobramycin, 110 mg over one-half hour every 8 hours, for several days. A peak plasma concentration obtained 1 hour after start of an infusion was 8 mg/L, and a trough concentration obtained 30 minutes before initiation of a dose was 3 mg/L. Estimate  $k$ ,  $CL$ , and  $V_d$  for tobramycin in J.C. **[1.5 points]**
5. Which dosing interval would you recommend for amikacin to treat a patient ( $CL=83.33$  mL/min, 80 kg) that suffers from a pulmonary infection if the “true” peak and trough concentrations at steady state are supposed to be 30 mg/L and 5 mg/L, respectively? Assume a short-term infusion over 45 minutes. **[1 point]**