

PHA 5128 Dose Optimization II, Spring 2011, Homework V, Due on Friday 02/25/2011
Total Points: 10 (2 Points per Problem)

If you any questions regarding this homework assignment, do not hesitate to contact Benjamin Weber (benjaminweber@ufl.edu). Please provide all answers with their **appropriate units** and all graphs with **appropriately labeled axes**. 0.25 points will be deducted for each missing or inappropriate unit or axes label. Please provide all answers on separate sheets (does not apply to TRUE/FALSE questions). **Remember to show how you found your answer**. Answers lacking adequate justification may not receive full credit.

Problem 1 (Digoxin)

R.J. is a 50-year-old, 70-kg man (non-obese) and has a serum creatinine of 1.2 mg/dL. Calculate a maintenance dose at steady state that will achieve an average digoxin plasma concentration of 750 ng/L.

- Develop a dosing regimen assuming that digoxin is available in tablets of 125- μ g and 250- μ g.
- You decided to give 125- μ g and 250- μ g tablets on alternate days for an average dose of 187.5 μ g/day. Four weeks later, R.J. is started on long-term medication with quinidine sulfate tablets. Would you have to adjust his dosing regimen? If yes, calculate a new maintenance dose and recommend a new dosing regimen.

Problem 2 (Methotrexate)

J.J. is a 25-year-old, 80-kg (non-obese), man with a serum creatinine of 1.0 mg/dL. He has osteonic sarcoma and is to receive 30g IV methotrexate (MTX) infused over 4 h. Calculate the anticipated MTX concentration (in μ M) at the end of the 4h infusion, 12h after the start of the infusion, and 48h after the end of the infusion. A sketch of the expected plasma-concentration-time profile may be helpful to answer this problem.

Problem 3 (Theophylline)

J.P., a 126-kg (total body weight), 6'1" tall, 56-year-old man, is seen in the emergency department with asthma that is unresponsive to inhaled bronchodilators and epinephrine.

- Estimate an IV loading dose and maintenance dose (expressed as dosing rate) of theophylline that will produce a theophylline concentration of 10 mg/L. J.P. suffers from CHF and smokes 2 packs of cigarettes a day.
- J.P. could finally be convinced to stop smoking and lost 30kg. How would you have to adjust his loading dose and maintenance dose (expressed as dosing rate)?

Problem 4 (Theophylline)

J.D. is a 2-year-old, 9 kg male child in the hospital who is placed on a theophylline drip at 1 g/kg/hr after first receiving a 5 mg/kg bolus at 1 pm. The infusion is discontinued at 7pm. Plasma concentration samples were obtained at 2pm and 8pm. Could you use the Chiou-equation to estimate his clearance? Explain why or why not.

Problem 5 (Lidocaine)

R.I., a 65-year-old, 70-kg man (non-obese), was admitted with a diagnosis of cirrhosis. On the fourth day, he developed ventricular arrhythmias, and lidocaine was ordered. He received an initial 60-mg bolus dose at 10am followed by 120-mg administered over the next 15 minutes (8 mg/min). At 11am he was to be given a 2 mg/min constant infusion. (Hint: A graph of the anticipated concentration time profile might be helpful to answer this problem)

- a. Calculate his anticipated lidocaine concentration at the start of his maintenance infusion and at steady state.
- b. Evaluate this dosing regimen based on therapy recommendations for lidocaine.