

## PHAR 750 Quiz II - B

PHAR 750: Biopharmaceutics/Pharmacokinetics  
October 16, 2007

Name: KEYB  
Total 25 points

Circle your final answers.

$$\begin{aligned} \text{Dose} &= 1000 \text{ mg} \\ F &= 1 \\ f_e &= 0.30 \end{aligned}$$

$$C_p = 22 \text{ mg/L} e^{-\frac{0.23}{\text{hr}} t}$$

For the above equation, an 1000 mg iv bolus dose was administered and 30% of the drug is excreted unchanged in the urine.

1. Calculate the elimination half-life for the drug above? (3 points).

$$t_{1/2} = \frac{0.693}{0.23} = \boxed{3.01 \text{ hr}}$$

2. Calculate the amount excreted unchanged for the drug above? (3 points).

$$A_{e\infty} = f_e \text{ D.F.S} = (0.3)(1000 \text{ mg})(1)(1)$$

$$A_{e\infty} = \boxed{300 \text{ mg}}$$

3. Calculate the volume of distribution for the drug above? (4 points).

$$V_d = \frac{\text{D.F.S}}{C_p} = \frac{(1000 \text{ mg})(1)(1)}{22 \text{ mg/L}} = \boxed{45.45 \text{ L}}$$

4. Calculate the renal clearance (Cl<sub>r</sub>) for the drug above? (5 points).

$$\begin{aligned} Cl_r &= f_e Cl_p \\ &= f_e k V_d = (0.30) \left( \frac{0.23}{\text{hr}} \right) (45.45 \text{ L}) = \boxed{3.14 \text{ L/hr}} \end{aligned}$$

5. Calculate the C<sub>p</sub> 2 hrs after a 750 mg iv dose? (6 points).

$$\begin{aligned} C_p &= \frac{\text{D.F.S}}{V_d} e^{-\left(\frac{0.23}{\text{hr}}\right)t} \\ &= \frac{(750 \text{ mg})(1)(1)}{45.45 \text{ L}} e^{-\left(\frac{0.23}{\text{hr}}\right)(2 \text{ hr})} = \boxed{\frac{10.42 \text{ mg}}{\text{L}}} \end{aligned}$$

Misoprostol (Cytotec, GD Searle) is a synthetic prostaglandin E<sub>1</sub> analog. According to the manufacturer, the following information was obtained when a 200 μg oral dose of misoprostol was taken with an antacid or high fat breakfast:

Condition	C <sub>max</sub> (pg/mL)	AUC (pg*hr/mL)	T <sub>max</sub> (min)
fasting	811	417	14 ± 8
with antacid	689	349	20 ± 14
with high fat breakfast	303	373	64 ± 79

6. What is *relative bioavailability* of the high fat breakfast to the fasting conditions? (4 points).

*reference*

*Dose is the same*

$$\begin{aligned} \frac{F_{\text{high fat}}}{F_{\text{fasting}}} &= \frac{\cancel{\text{Dose}}_{\text{fasting}}}{\text{AUC}_{\text{fasting}}} \cdot \frac{\text{AUC}_{\text{high fat}}}{\cancel{\text{Dose}}_{\text{high fat}}} \\ &= \frac{\text{AUC}_{\text{high fat}}}{\text{AUC}_{\text{fasting}}} \\ &= \frac{373 \text{ pg}\cdot\text{hr}/\text{mL}}{417 \text{ pg}\cdot\text{hr}/\text{mL}} \\ &= \boxed{0.89} \end{aligned}$$