PHARMACOKINETICS QUIZ
MAY 21, 1999

1. Aprazolam is used to treat anxiety disorder. Assume the half-life is 11.2 hours, S = 1, F = 1, and Vd is 0.9 L/Kg. A 82 KG patient is taking 0.5 mg of drug every 8 hours.

\[ t_{1/2} = \frac{\ln 2}{\lambda} = \frac{0.693}{11.2} = 0.0618 \] 

What is the expected Cpss maximum concentration of aprazolam at steady state?

\[ C_{\text{pss max}} = \frac{5SF/Vd}{1-e^{-\lambda t}} = \frac{(1)(1)(0.5 mg)/(9)(82)}{(1-e^{-(0.0618)(8)})} = \frac{0.006775 \text{ mg}}{1-0.6099} = 0.0173 \text{ mg/L} \]

2. What is the expected Cpss minimum concentration of aprazolam at steady state?

\[ C_{\text{pss min}} = C_{\text{pss max}} e^{-\lambda t} = (17.3)(e^{-(0.0618)(8)}) = 10.55 \text{ mg/L} \]

3. What dose of aprazolam should be given every 8 hours to the patient in question 1 above to produce a Cpss maximum at steady state of 35 micrograms / liter?

\[ \frac{C_1}{C_2} = \frac{D_1}{D_2} = \frac{17.3}{35} = 0.5 \] 

\[ D_2 = 1.01 \text{ mg} \]

4. If a 320 lb person has been taking 2 mg of aprazolam three times a day (6 A.M., 2 P.M., and 10 P.M. each day) for 6 months, and is depressed and takes all of the remaining 20 tablets in the bottle at bedtime (10 P.M.), what is the predicted maximum aprazolam concentration in this patient following the dose of 20 tablets?

\[ \frac{320 \text{ lbs}}{2.2} = 145.45 \text{ Kg} \]

\[ C_{\text{pss max}} = \frac{(1)(1)(2 mg)/(9)(145.45)}{(1-e^{-(0.0618)(8)})} = \frac{0.01527}{0.3900} = 0.3917 \text{ mg/L} \text{ or } 39.17 \text{ mcg/L} \]

\[ C_{\text{pss min}} = (39.17)(e^{-(0.0618)(8)}) = 23.88 \text{ mcg/L} \]

\[ \Delta C_P = SF/Vd = (1)(1)(20 \text{ tabs})(2 mg/12h)/(9)(145.45) = 30.55 \text{ mcg/L} \]

5. WW, a 72-year old female with a heart valve replacement is 5'3" tall and weighs 60 kg, and Scr = 1.2 mg%. She developed arterial fibrillation yesterday (no CHF) and at 9:00 a.m. yesterday she was given a 800 mcg. IV loading dose of digoxin (divided appropriately). What are the expected TBS of digoxin in WW following the 800 mcg. Loading dose?

\[ C_{\text{p total}} = 23.88 + 30.55 = 32.4 \text{ mcg/L} \]

\[ TBS = \text{Total amount in the body} = 800 \text{ mcg} \]