

## Chp 13 Welling

## IV Bolus dose problems

1.  $D_A = D_B$

$$C_0^A = 10 \text{ mg/ml} \quad t_{1/2}^A = 2 t_{1/2}^B$$

$$C_0^B = 20 \text{ mg/ml}$$

$$C_{A_0} = \frac{D_0}{V_A} \quad (1)$$

$$t_{1/2}^A = \frac{\ln 2}{k_{el}} \quad \text{eqn 13.10} \quad (2)$$

$$Cl_p^A = k_e^A V_A \quad (3)$$

- Solve (1) for  $V_A$  and sub into (3)

$$Cl_p^A = k_e^A \frac{D_0}{C_{A_0}}$$

- Solve (2) for  $k_{el}$  and sub in above

$$Cl_p^A = \frac{\ln 2}{t_{1/2}^A} \left( \frac{D_0}{C_{A_0}} \right)$$

- Likewise for B

$$Cl_p^B = \frac{\ln 2}{t_{1/2}^B} \left( \frac{D_0}{C_{B_0}} \right)$$

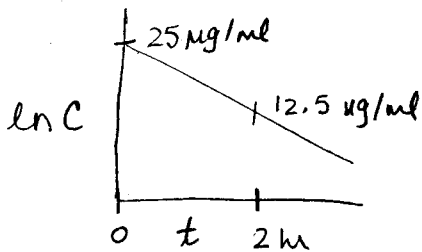
$$\frac{Cl_p^A}{Cl_p^B} = \frac{t_{1/2}^B}{t_{1/2}^A} \cdot \frac{D_0^A}{C_{A0}} \cdot \frac{C_{B0}}{D_0^B}$$

Since  $t_{1/2}^A = 2t_{1/2}^B$  ;  $C_0^B = 2C_0^A$  ;  $D_0^A = D_0^B$

$$\frac{Cl_p^A}{Cl_p^B} = \frac{1}{2} \cdot \frac{1}{1} \cdot \frac{2}{1} = 1$$

$$\boxed{Cl_p^A = Cl_p^B}$$

2) 250 mg =  $D_0$



$$C = C_0 e^{-k_{el} t}$$

$$\ln C = \ln C_0 - k_{el} t$$

$$\text{slope} = -k_{el}$$

$$\text{slope} = \frac{\ln 12.5 - \ln 25}{2} = -k_{el} = 0.346 \text{ h}^{-1} \quad -0.346 \text{ h}^{-1}$$

$$\boxed{k_{el} = 0.346 \text{ h}^{-1}} \quad 0.346 \text{ h}^{-1}$$

$$V = D_0 / C_0 = 250 \text{ mg} / 25 \text{ mg/ml}$$

$$V = 10^4 \text{ ml} = 10 \text{ L}$$

$$Cl_p = k_{el} V = (0.346 \text{ h}^{-1})(10 \text{ L}) = \boxed{3.46 \frac{\text{L}}{\text{h}} = Cl_p}$$

3.  $\left. \begin{array}{l} 25\% \text{ kidneys} \\ 75\% \text{ hepatic} \end{array} \right\} \frac{\text{kidney}}{\text{total}} = \frac{1}{4}$

4.  $D_0 = 100 \text{ mg}$   
 $t_{1/2} = 4 \text{ h}$   
 $C = 4.0 \text{ } \mu\text{g/ml}$  after 1 hr

$$t_{1/2} = \frac{\ln 2}{k_{el}} \Rightarrow k_{el} = \frac{\ln 2}{4 \text{ h}} = 0.173 \text{ } \mu\text{h}$$

$$C = C_0 e^{-k_{el} t}$$

$$4.0 \frac{\mu\text{g}}{\text{ml}} = C_0 e^{-0.173 \text{ } \mu\text{h} (1 \text{ h})}$$

$$C_0 = 4.8 \text{ } \mu\text{g/ml} = \frac{D_0}{V} \quad D_0 = 100 \text{ mg}$$

$$\frac{100,000 \text{ } \mu\text{g}}{4.8 \text{ } \mu\text{g/ml}} = V = 20,800 \text{ ml} = 20.8 \text{ L}$$

5.  $D_0 = 200 \text{ mg}$   
 $C(10 \text{ h}) = 3.28 \text{ } \mu\text{g/ml}$   
 $C(16.92 \text{ h}) = 1.64 \text{ } \mu\text{g/ml}$

Excel graph

