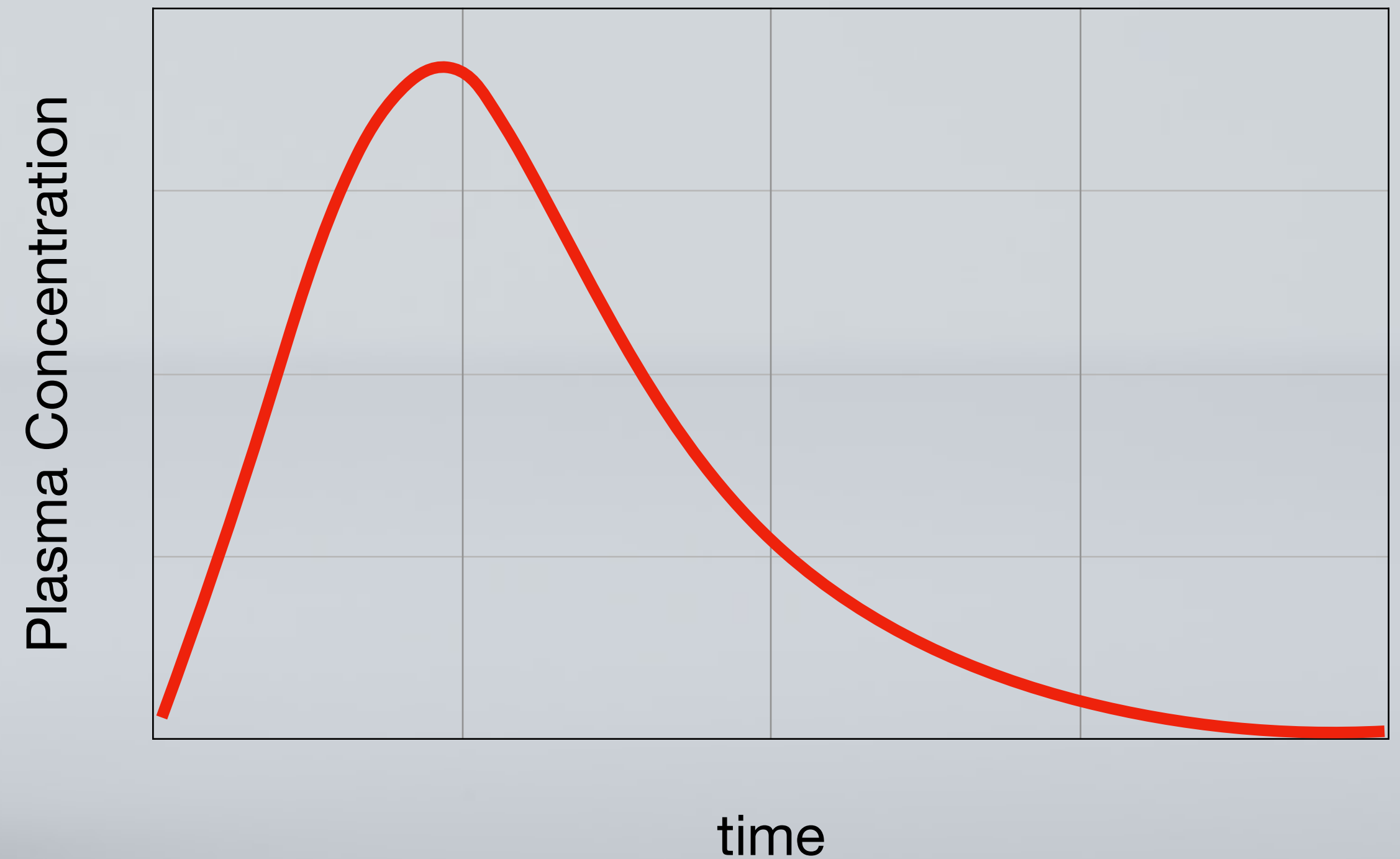
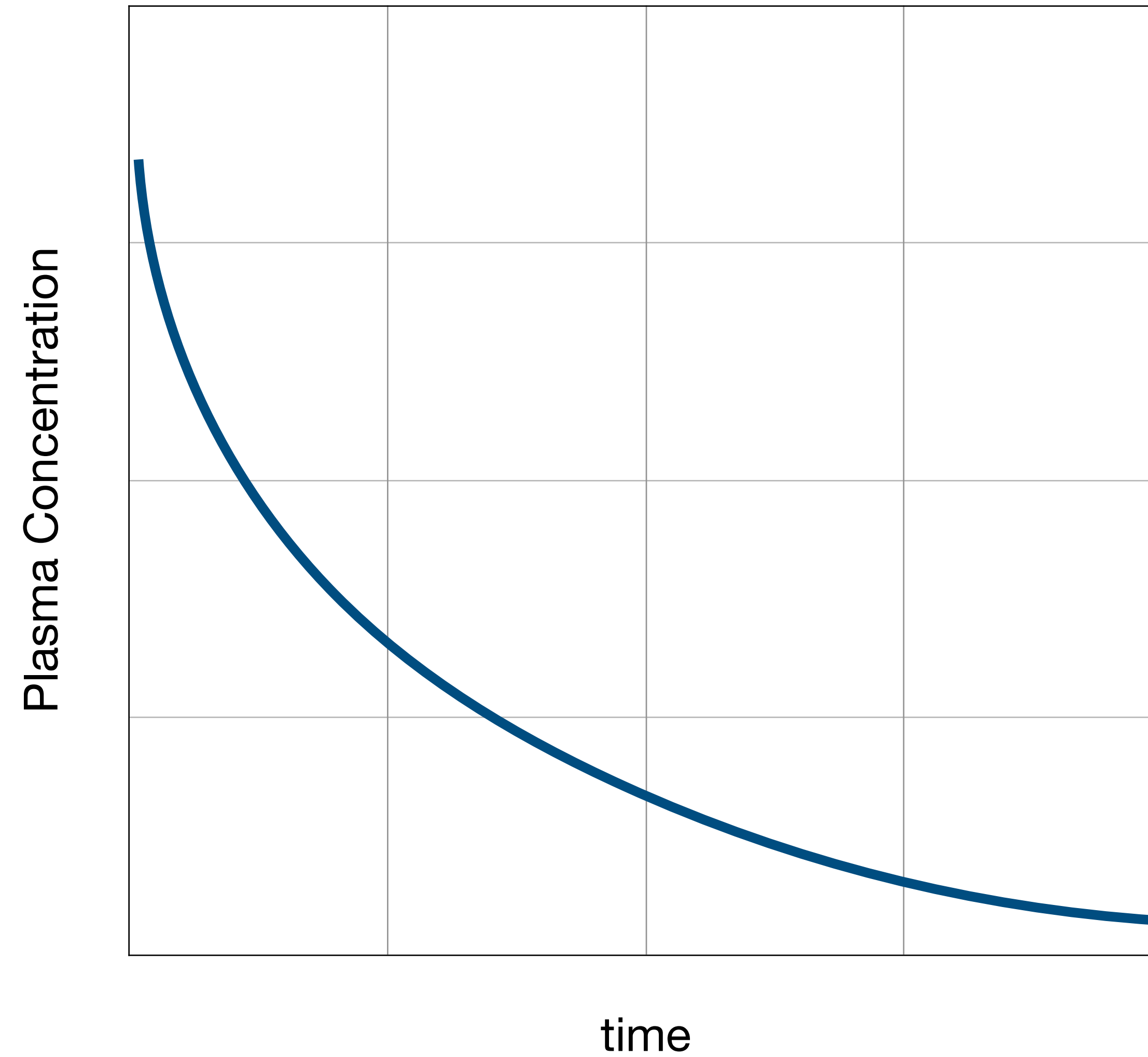


How to code a simple one-compartment pharmacokinetics model in Python

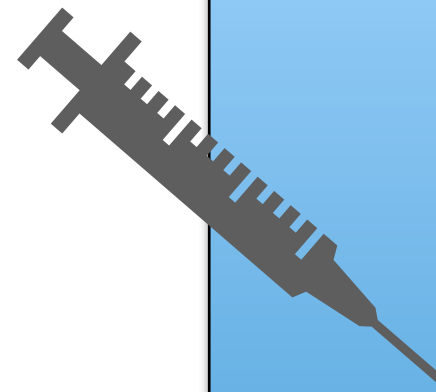


The IV bolus model



The IV bolus model

IV Bolus
(dose)



Elimination Rate

k_e

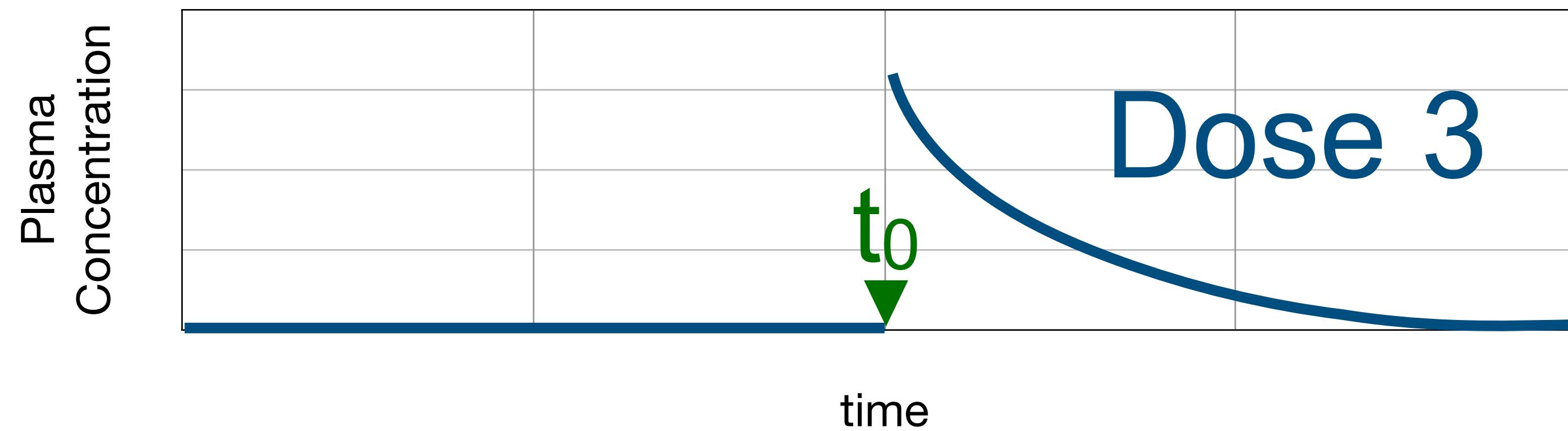
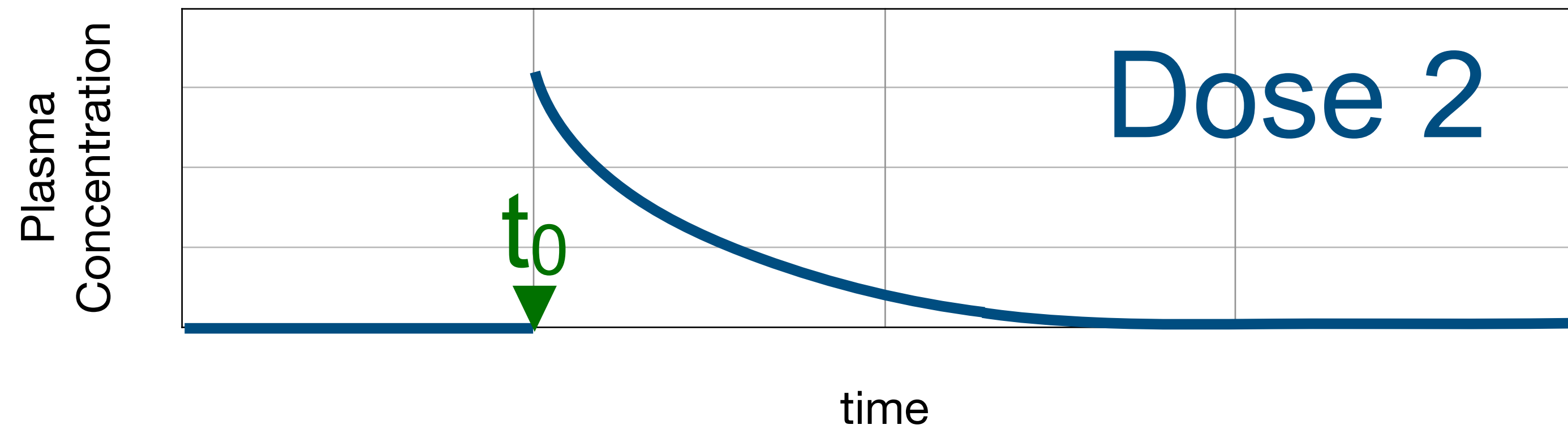
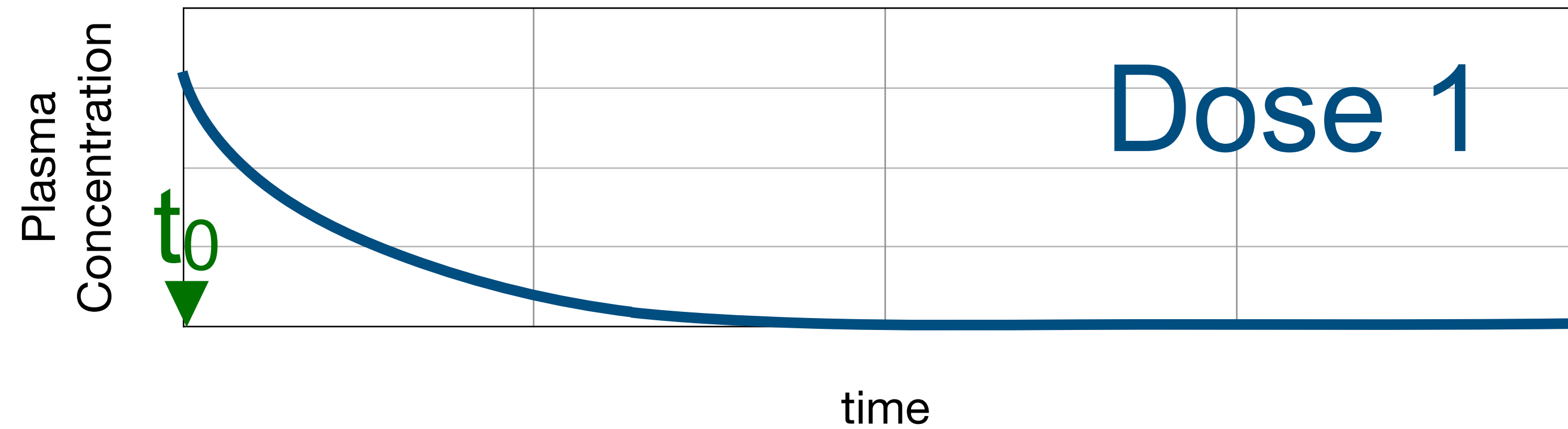


Plasma volume (V_d)

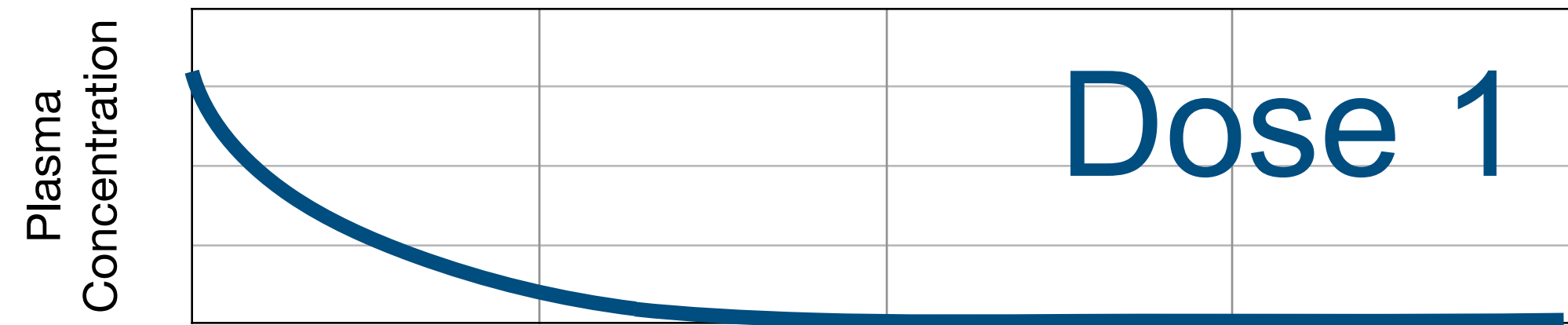
The IV bolus model

$$C(t) = \frac{dose}{Vd} e^{-k_e(t-t_0)}$$

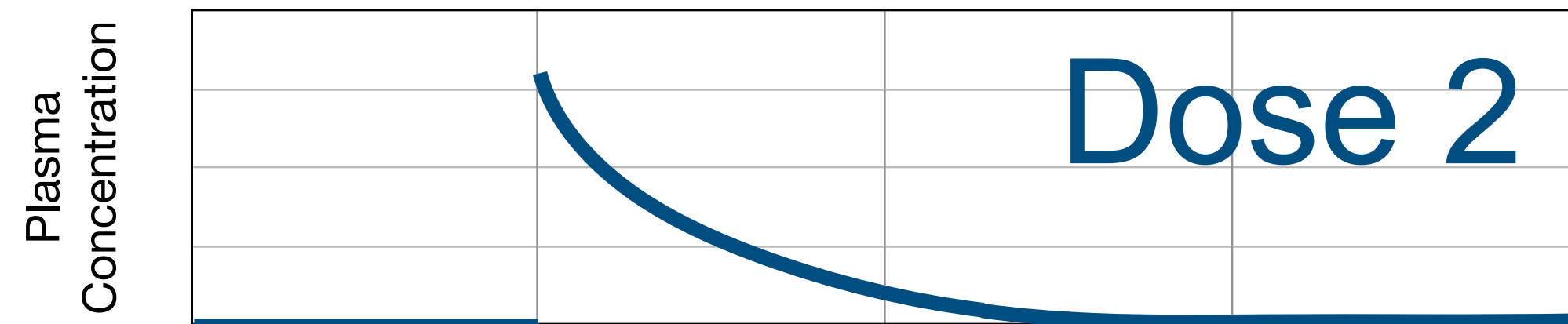
Multiple doses



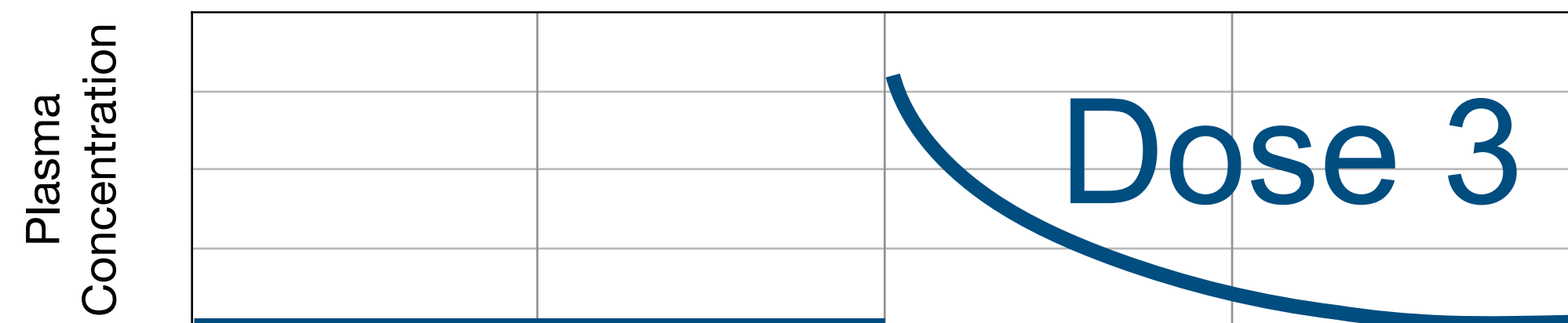
Multiple doses



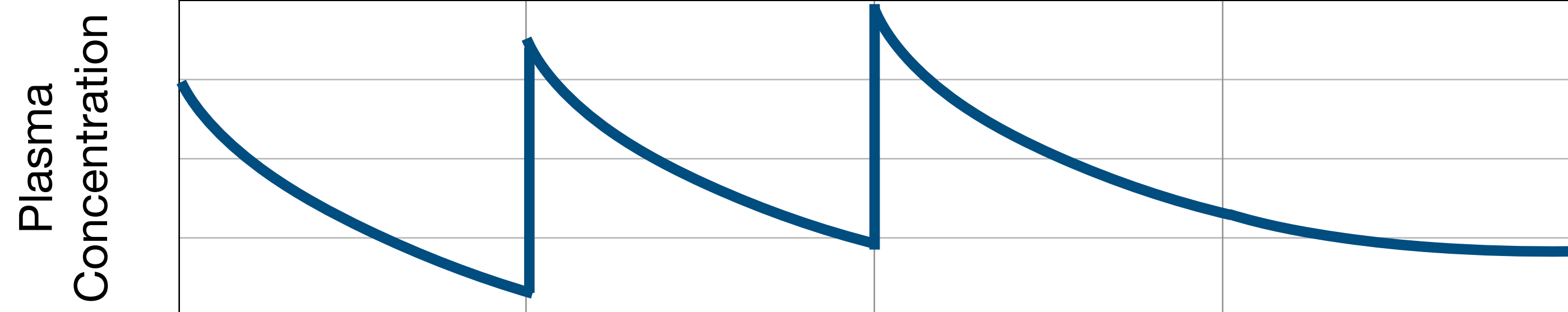
time



time

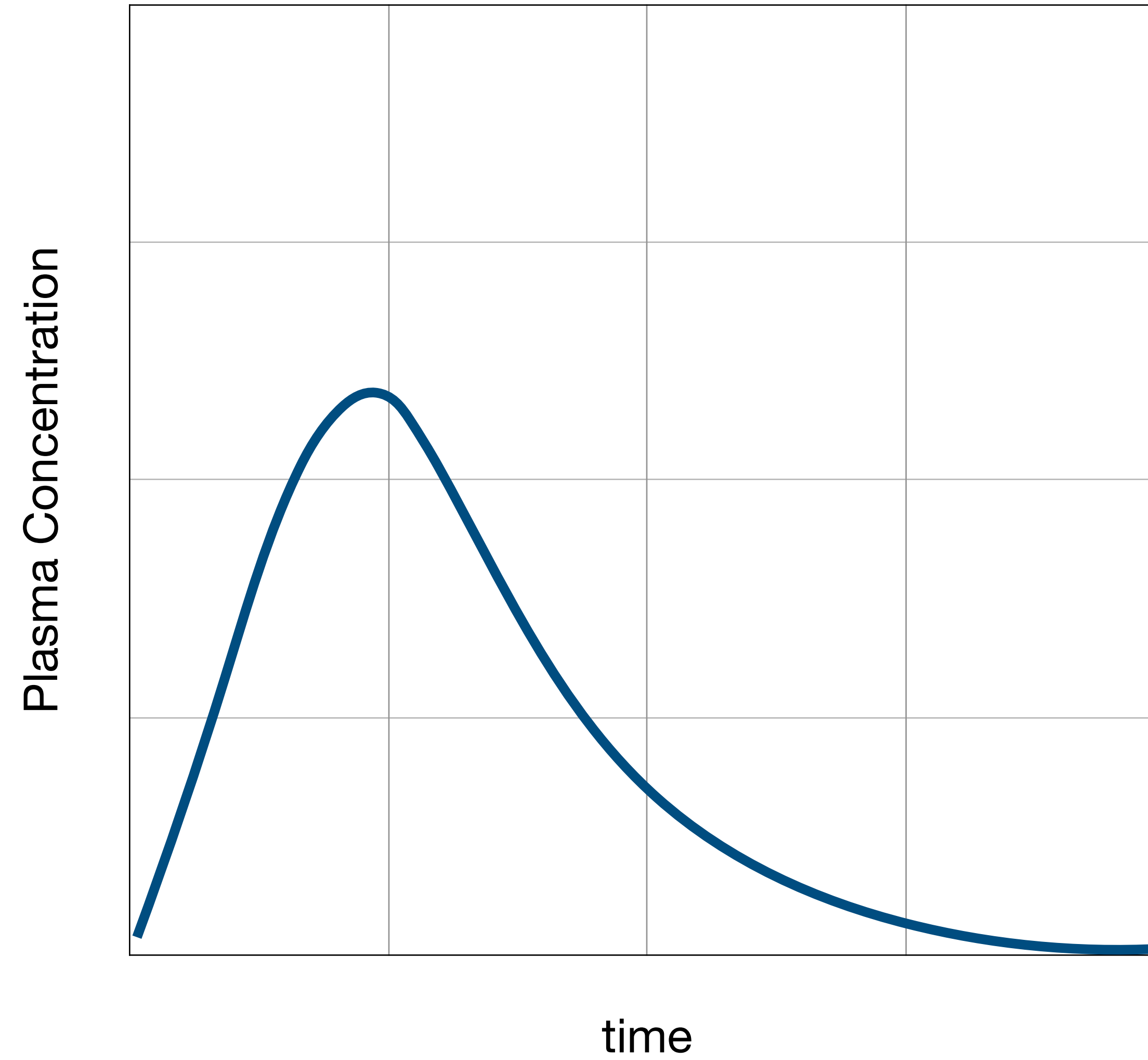


time

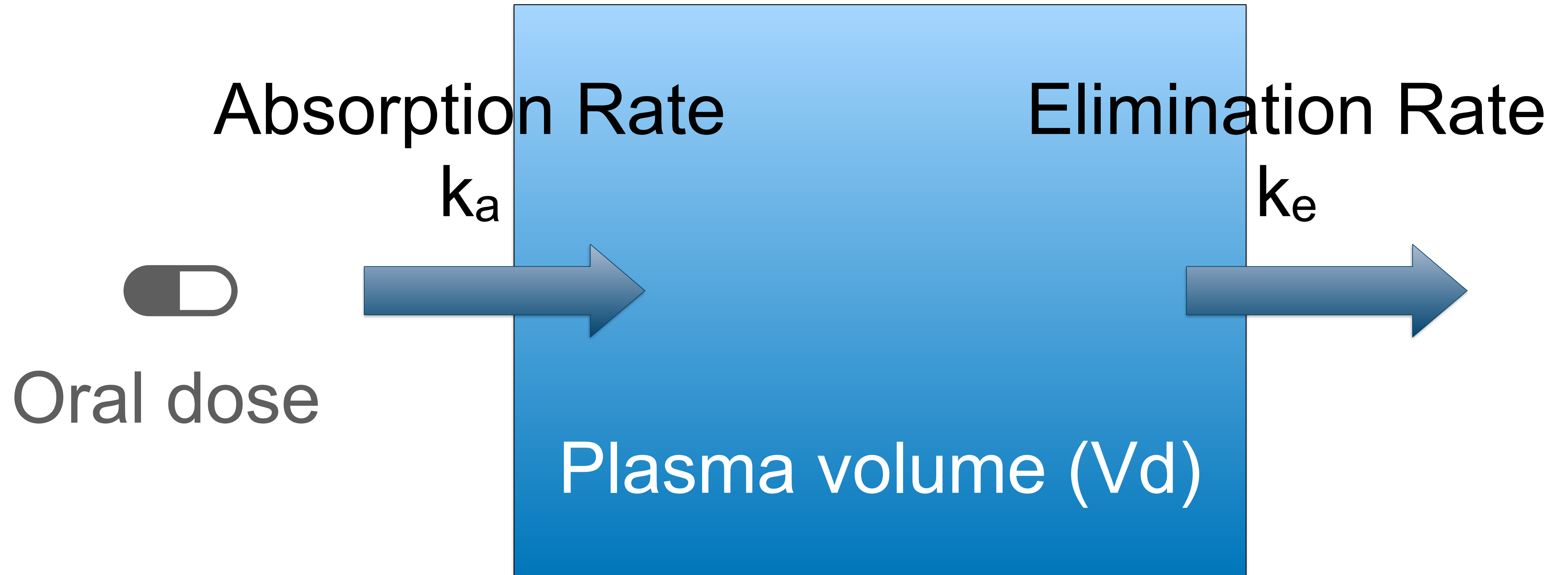


time

The oral model



The oral model



The oral model

$$C(t) = \frac{dose \times k_a}{Vd(k_a - k_e)} (e^{-k_e(t-t_0)} - e^{-k_a(t-t_0)})$$

The two cases for oral model

If $k_a \neq k_e$:

$$C(t) = \frac{dose \times k_a}{Vd(k_a - k_e)} (e^{-k_e(t-t_0)} - e^{-k_a(t-t_0)})$$

If $k_a = k_e = K$:

$$C(t) = \frac{dose \times K}{Vd} e^{-K(t-t_0)}$$