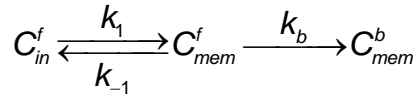


FRAP reactions



Kinetic equations

$$\frac{\partial C_{in}^f}{\partial t} = \beta k_1 C_{mem}^f - k_1 C_{in}^f \text{ hence } C_{in}^f = \beta C_{mem}^f - C_0 e^{-k_1 t};$$

$$\frac{\partial C_{mem}^f}{\partial t} = k_1 C_{in}^f - \beta k_1 C_{mem}^f - k_b C_{mem}^f \text{ hence}$$

$$\frac{\partial C_{mem}^f}{\partial t} = -k_1 C_0 e^{-k_1 t} - k_b C_{mem}^f \text{ hence}$$

$$C_{mem}^f = C_1 e^{-k_b t} - \frac{k_1}{k_b - k_1} C_0 e^{-k_1 t};$$

Initial and boundary (limiting) conditions

$$C_{mem}^f \Big|_{t=0} = 0 \text{ hence } C_{mem}^f = \frac{k_1}{k_b - k_1} C_0 \left(e^{-k_b t} - e^{-k_1 t} \right);$$

$$C_{mem}^f \Big|_{k_b=0, t \rightarrow \infty} = RC_{in} \text{ hence}$$

Fluorescence kinetics

$$C_{mem}^f = RC_{in} \left(e^{-k_b t} - e^{-k_1 t} \right)$$