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chemistry

$$A \xrightarrow{k_{cis}} A^*$$

$$A + A^* \underset{k_r^A}{\overset{k_f^A}{\rightleftharpoons}} [AA^*] \xrightarrow{k_{cat}^A} 2A^*$$

$$PPase + A^* \underset{k_r^P}{\overset{k_f^P}{\rightleftharpoons}} [PPaseA^*] \xrightarrow{k_{cat}^P} PPase + A$$

$$N + A^? \underset{k_r^N}{\overset{k_f^N}{\rightleftharpoons}} \left[NA^?\right], \quad ? \in \{, *\}$$

$$[AN] + A^* \underset{k^-}{\overset{k^+}{\rightleftharpoons}} [ANA^*] \xrightarrow{k_*^-} [A^*N] + A^*$$

$$[A^*N] + A \underset{k^-}{\overset{k^+}{\rightleftharpoons}} [ANA^*]$$

model

$$\begin{aligned}(\partial_t - D\Delta)\, A = &-k_{cis}A - k_f^A A^* A - k^+ [NA^*]\, A \\ &+ k_r^A [AA^*] + k_{cat}^P [PPaseA^*] - k_f^N NA + k_r^N [NA] + k^- [ANA^*]\end{aligned}$$

$$\begin{aligned}(\partial_t - D\Delta)\, A^* = &\, k_{cis}A - k_f^A AA^* + k_r^A [AA^*] + 2k_{cat}^A [AA*] - k_f^P PPaseA^* + k_r^P [PPaseA*] - k_f^N NA^* + k_r^N [NA^*] \\ &- k^+ [NA]A^* + (k^- + k_*^-)[ANA^*]\end{aligned}$$

$$(\partial_t - D\Delta)[AA^*] = k_f^A AA^* - (k_r^A + k_{cat}^A)[AA^*] \quad ? \approx 0?$$

$$(\partial_t - D\Delta)PPase = (k_r^P + k_{cat}^P)[PPaseA^*] - k_f^P PPaseA^* \approx 0$$

$$(\partial_t - D\Delta)[PPaseA^*] = k_f^P PPaseA^* - (k_r^P + k_{cat}^P)[PPaseA^*] \approx 0$$

$$\partial_t N = -k_f^N N(A + A^*) + k_r^N([NA] + [NA^*])$$

$$\partial_t [NA] = k_f^N NA - (k_r^N + k^+ A^*)[NA] + k^-[ANA^*]$$

$$\partial_t[NA^*] = k_f^N NA^* - \left(k_r^N + k^+ A\right)[NA^*] + \left(k^- + k_*^-\right)[ANA^*]$$

$$\partial_t[ANA^*] = -(2k^- + k_*^-)[ANA^*] + k^+\left([NA]A^* + [NA^*]A\right)$$

$$N + [NA] + [NA^*] + [ANA^*] = N_0$$