

Table S1: Acceptable ranges and chosen parameter values for PDE and stochastic simulations.

Parameter	Range	Value for PDE Simulation (Parameter Set 1)	Value for Stochastic Simulation (Parameter Set 2)
γ_C	$\gamma_x \leq 1 \times 10^{-2} \text{ s}^{-1}$ [s12]	$2.89 \times 10^{-4} \text{ s}^{-1}$	$2.89 \times 10^{-3} \text{ s}^{-1}$
γ_T		$2.89 \times 10^{-4} \text{ s}^{-1}$	$2.89 \times 10^{-3} \text{ s}^{-1}$
γ_L		$2.89 \times 10^{-4} \text{ s}^{-1}$	$2.89 \times 10^{-3} \text{ s}^{-1}$
γ_I		$1.16 \times 10^{-3} \text{ s}^{-1}$	$2.89 \times 10^{-2} \text{ s}^{-1}$
γ_A	$\gamma_A \sim 2 \times 10^{-3} \text{ s}^{-1}$ [s13]	$7.70 \times 10^{-4} \text{ s}^{-1}$	$2.89 \times 10^{-2} \text{ s}^{-1}$
γ_{mO}	$3.5 \times 10^{-4} \leq \gamma_m \leq 2.3 \times 10^{-2} \text{ s}^{-1}$ [s14]	$5.78 \times 10^{-4} \text{ s}^{-1}$	$5.78 \times 10^{-3} \text{ s}^{-1}$
γ_{mQ}		$5.78 \times 10^{-3} \text{ s}^{-1}$	$5.78 \times 10^{-2} \text{ s}^{-1}$
$V_{PLtetO-1}$	$V_x \leq 4 \text{ s}^{-1}$ [s15]	0.3 s^{-1} [s16]	4 s^{-1}
$V_{PLlacO-1}$		0.23 s^{-1} [s16]	4 s^{-1}
V_{PR}		0.06 s^{-1} [s17]	4 s^{-1}
V_{PLuxI}		0.26 s^{-1} [s18]	4 s^{-1}
N_C	$1 \leq N_x \leq 30$	5	4
N_{TO}		5	4
N_L		5	4
N_I		5	4
N_{TQ}		5	4
C		$1.5 \times 10^{-9} \text{ M}$ [s19]	$1.5 \times 10^{-9} \text{ M}$
K_C	$1 \times 10^{-13} \leq K_x \leq 1 \times 10^{-7} \text{ M}$ [s20, 21]	$2.5 \times 10^{-8} \text{ M}$ [s21]	$3 \times 10^{-9} \text{ M}$
K_T		$1.786 \times 10^{-10} \text{ M}$ [s22]	$3 \times 10^{-9} \text{ M}$
K_L		$1 \times 10^{-13} \text{ M}$ [s20]	$3 \times 10^{-9} \text{ M}$
K_{RA}		$1.5 \times 10^{-9} \text{ M}$ [s18]	$6.75 \times 10^{-9} \text{ M}$
n_C		2 [s21, 23]	2
n_T		2 [s23]	2
n_L		2 [s23]	2
n_{RA}		2 [s18]	2
$\ell_{PLtetO-1}$		1/5050 [s16]	1/1000
$\ell_{PLlacO-1}$		1/620 [s16]	1/1000
ℓ_{PR}		1/131 [s24]	1/1000
ℓ_{PLuxI}		1/167 [s18]	1/1000
ϵ_C	$\epsilon_x \leq 5.78 \times 10^{-3} \text{ s}^{-1}$ [s25]	$4.470 \times 10^{-4} \text{ s}^{-1}$	$3.712 \times 10^{-4} \text{ s}^{-1}$
ϵ_{TO}		$2.269 \times 10^{-6} \text{ s}^{-1}$	$1.856 \times 10^{-4} \text{ s}^{-1}$
ϵ_L		$2.113 \times 10^{-9} \text{ s}^{-1}$	$3.712 \times 10^{-4} \text{ s}^{-1}$
ϵ_I		$2.655 \times 10^{-5} \text{ s}^{-1}$	$3.815 \times 10^{-2} \text{ s}^{-1}$
ϵ_{TQ}		$6.224 \times 10^{-6} \text{ s}^{-1}$	$1.856 \times 10^{-3} \text{ s}^{-1}$
v_3		0.01335 s^{-1} [s26]	0.01 s^{-1}
k_f	$1 \times 10^4 \leq k_f \leq 5 \times 10^9 \text{ M}$ [s27]	$1 \times 10^9 \text{ M}^{-1} \text{ s}^{-1}$ [s27]	$5 \times 10^9 \text{ M}^{-1} \text{ s}^{-1}$
k_r	$k_r \geq 5 \times 10^{-4} \text{ s}^{-1}$ (est. from [s18, 27, 28])	50 s^{-1} (est. from [s18, 27, 28])	15 s^{-1}
p_R		$1 \times 10^{-8} \text{ M}$	$1.8 \times 10^{-8} \text{ M}$
d_{AHL}		$1.667 \times 10^{-12} \text{ m}^2 \text{ s}^{-1}$ (est. from [s29])	$1.667 \times 10^{-12} \text{ m}^2 \text{ s}^{-1}$

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