Table S2: Base parameter values

Elementary Reaction	Parameter	Definition	Value	Reference
$* \rightarrow A_i$	k_A	Internal AHL production rate constant	842 molecules min^{-1}	Varied depending on diffusion rate to keep the steady state level constant (10 nM). 10 nM is a concentration that elicits half-maximal activation of LuxR/I system [1].
$* \rightarrow R$	k_R	R protein production rate constant	20 molecules min^{-1}	Set to provide a saturating level of R protein.
$R + A_i \rightarrow C$	k_{C1}	Complex association rate constant	0.1 $molecules^{-1}$ min^{-1}	Estimated to favor complex association because R proteins tend to form a stable complex [2].
$C \rightarrow R + A_i$	k_{C2}	Complex dissociation rate constant	1 min^{-1}	Estimated to favor complex association because R proteins tend to form a stable complex [2].
$A_i \rightarrow *$	γ_{A_i}	Internal AHL decay rate constant	0.023 min^{-1}	Dominated by dilution due to cell growth.
$A_e \rightarrow *$	γ_{A_e}	External AHL decay rate constant	0.0018 min^{-1}	Measured hydrolysis rate of 3-Oxo-C_6-AHL is 3.07×10^{-5} s^{-1} [3].
$R \rightarrow *$	γ_R	R protein decay rate constant	0.2 min^{-1}	Measured TraR half life is 3.5 min [2].
$C \rightarrow *$	γ_C	Complex decay rate constant	0.02 min^{-1}	Stable and dominated by dilution due to cell growth.
$A_i \leftrightarrow A_e$	P	AHL diffusion rate constant	2×10^{-12} L min^{-1}	Estimated from diffusion rates of sugar group [4].
	V_i	Cell volume	1.6×10^{-15} L	Typical cell volume of *E. coli* [5].
	V_e	Microenvironment volume (average extracellular volume per cell)	7.99×10^{-9} L	
	β	Effective magnitude of extrinsic noise source	49	Set so that extrinsic noise dominates total noise.
$C + C \rightarrow D$	k_{D1}	Dimer association rate constant	0.1 $molecules^{-1}$ min^{-1}	
$D \rightarrow C + C$	k_{D2}	Dimer dissociation rate constant	1 min^{-1}	

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