Differential Equation System "CELL DEATH"

1 Rate Laws

1.1 Reaction: re2

$$v_1 = [s_7] \cdot k_{B_{0034}} \tag{1}$$

1.2 Reaction: re3

$$v_2 = \frac{k_1 \cdot {K_m}^{hill}}{{K_m}^{hill} + \left(\frac{[s_{13}]}{vol \cdot N}\right)^{hill}} \cdot [s_3] \tag{2}$$

1.3 Reaction: re4

$$v_3 = [s_{29}] \cdot k \tag{3}$$

1.4 Reaction: re5

$$v_4 = [s_{13}] \cdot [s_{23}] \cdot k - [s_{15}] \cdot k \tag{4}$$

1.5 Reaction: re7

$$v_5 = [s_{13}] \cdot d \tag{5}$$

1.6 Reaction: re8

$$v_6 = [s_{15}] \cdot d \tag{6}$$

1.7 Reaction: re9

$$v_7 = [s_{29}] \cdot d \tag{7}$$

1.8 Reaction: re10

$$v_8 = [s_{28}] \cdot d \tag{8}$$

1.9 Reaction: re17

$$v_9 = d \cdot [s_{23}] \tag{9}$$

1.10 Reaction: re1

$$v_{10} = k \cdot [s_2] \tag{10}$$

1.11 Reaction: re11

$$v_{11} = d \cdot [s_7] \tag{11}$$

1.12 Reaction: re21

$$v_{12} = [s_{23}] \cdot [s_{26}] \cdot k \tag{12}$$

1.13 Reaction: re22

$$v_{13} = [s_{30}] \cdot k \tag{13}$$

1.14 Reaction: re23

$$v_{14} = [s_{30}] \cdot k \tag{14}$$

2 Equations

2.1 Species: s1 (transcriptie_LuxR)

$$\frac{\mathrm{d}[\mathrm{s}_1]}{\mathrm{d}t} = -v_{10} \tag{15}$$

2.2 Species: s2 (gen_LuxR)

$$\frac{\mathrm{d}[\mathrm{s}_2]}{\mathrm{d}t} = 0 \tag{16}$$

2.3 Species: s3 (gen_ccdB)

$$\frac{\mathrm{d}[\mathrm{s}_3]}{\mathrm{d}t} = 0 \tag{17}$$

2.4 Species: s4 (translatie_LuxR)

$$\frac{\mathrm{d}[\mathrm{s}_4]}{\mathrm{d}t} = -v_1 \tag{18}$$

2.5 Species: s6 (transcriptie_ccdB)

$$\frac{\mathrm{d}[\mathrm{s}_6]}{\mathrm{d}t} = -v_2 \tag{19}$$

2.6 Species: s7 (mRNA_LuxR)

$$\frac{\mathrm{d}[\mathrm{s}_7]}{\mathrm{d}t} = -v_{11} + v_{10} \tag{20}$$

2.7 Species: s8 (sa37_degraded)

$$\frac{\mathrm{d}[\mathrm{s}_8]}{\mathrm{d}t} = v_{11} \tag{21}$$

2.8 Species: `s9` (sa44_degraded)

$$\frac{\mathrm{d}[\mathrm{s}_9]}{\mathrm{d}t} = v_7 \tag{22}$$

2.9 Species: `s10` (sa38_degraded)

$$\frac{\mathrm{d}[\mathrm{s}_{10}]}{\mathrm{d}t} = v_5 \tag{23}$$

2.10 Species: `s12` (translatie_ccdB)

$$\frac{\mathrm{d}[\mathrm{s}_{12}]}{\mathrm{d}t} = -v_3 \tag{24}$$

2.11 Species: `s13` (C0062_LuxR)

$$\frac{\mathrm{d}[\mathrm{s}_{13}]}{\mathrm{d}t} = -v_5 - v_4 + v_1 \tag{25}$$

2.12 Species: `s14` (sa45_degraded)

$$\frac{\mathrm{d}[\mathrm{s}_{14}]}{\mathrm{d}t} = v_8 \tag{26}$$

2.13 Species: `s15` (HSL_LuxR_complex)

$$\frac{\mathrm{d}[\mathrm{s}_{15}]}{\mathrm{d}t} = -v_6 + v_4 \tag{27}$$

2.14 Species: `s23` (HSL)

$$\frac{\mathrm{d}[\mathrm{s}_{23}]}{\mathrm{d}t} = -v_{12} - v_9 - v_4 + v_{14} + v_6 \tag{28}$$

2.15 Species: `s24` (sa23_degraded)

$$\frac{\mathrm{d}[\mathrm{s}_{24}]}{\mathrm{d}t} = v_9 \tag{29}$$

2.16 Species: `s26` (lactonase)

$$\frac{\mathrm{d}[\mathrm{s}_{26}]}{\mathrm{d}t} = -v_{12} + v_{14} + v_{13} \tag{30}$$

2.17 Species: `s25` (hydroxyacid)

$$\frac{\mathrm{d}[\mathrm{s}_{25}]}{\mathrm{d}t} = v_{13} \tag{31}$$

2.18 Species: `s28` (P1010_CcdB)

$$\frac{\mathrm{d}[\mathrm{s}_{28}]}{\mathrm{d}t} = -v_8 + v_3 \tag{32}$$

2.19 Species: `s29` (mRNA_CcdB)

$$\frac{\mathrm{d}[\mathrm{s}_{29}]}{\mathrm{d}t} = -v_7 + v_2 \tag{33}$$

2.20 Species: `s30` (EnzymeComplex)

$$\frac{\mathrm{d}[\mathrm{s}_{30}]}{\mathrm{d}t} = -v_{14} - v_{13} + v_{12} \tag{34}$$

2.21 Species: `s16` (HSL)

$$\frac{\mathrm{d}[\mathrm{s}_{16}]}{\mathrm{d}t} = 0 \tag{35}$$

2.22 Species: `s17` (C0062_LuxR)

$$\frac{\mathrm{d}[\mathrm{s}_{17}]}{\mathrm{d}t} = 0 \tag{36}$$

3 Parameters

Parameter	Value
vol	7.0E-16
N	6.023E23

4 Species

Species	Initial concentration	compartment
s_{1}	0.0	default
s_{2}	1.0	default
s_{3}	1.0	default
s_{4}	0.0	default
s_{6}	0.0	default
s_{7}	0.0	default
s_{8}	0.0	default
s_{9}	0.0	default
s_{10}	0.0	default
s_{12}	0.0	default
s_{13}	0.0	default
s_{14}	0.0	default
s_{15}	0.0	default
s_{23}	0.0	default
s_{24}	0.0	default
s_{26}	0.0	default
s_{25}	0.0	default
s_{28}	0.0	default
s_{29}	0.0	default
s_{30}	0.0	default
s_{16}	4.9E-324	
s_{17}	4.9E-324	

5 Compartments

Compartment	Volume
$default$	1.0