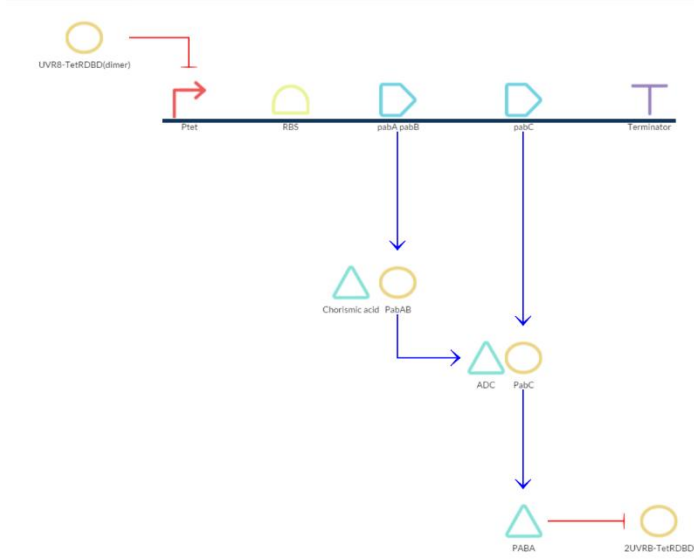


Sunlight protector



Formulae for two certain parts

PabAB and PabAPabB

$$\frac{d[\text{PabAB}]}{dt} = A \cdot k_{P_{tet}} \chi_{P_{tet}} [\text{PabAPabB}^F] - k_{deg} [\text{PabAB}]$$

$$[\text{PabAPabB}^F] = [\text{PabAPabB}] \frac{1}{1 + \left(\frac{[\text{UVR 8-TetR}_{DBD}^{dimer}]}{KM_{TetR}} \right)^{n_{TetR}}}$$

PabC

$$\frac{d[\text{PabC}]}{dt} = A \cdot k_{P_{tet}} \chi_{P_{tet}} [\text{pabC}^F] - k_{deg} [\text{PabC}]$$

$$[\text{pabC}^F] = [\text{pabC}] \frac{1}{1 + \left(\frac{[\text{UVR 8-TetR}_{DBD}^{dimer}]}{KM_{TetR}} \right)^{n_{TetR}}}$$

ADC and PabAB

$$\frac{d[\text{ADC}]}{dt} = \frac{k_{cat} [\text{PabAB}]}{KM_{PabAB} + [\text{ADC}]}$$

PABA and PabC

$$\frac{d[\text{PABA}]}{dt} = \frac{k_{cat} [\text{PabC}]}{KM_{PabAB} + [\text{PABA}]} - k_{out} [\text{PABA}]$$

Formulae for numerical simulation

$$\frac{d[\text{ADC}]}{dt} = \frac{k_{cat} [\text{PabAB}][\text{ChorismicAcid}]}{KM_{PabAB} + [\text{ADC}]}$$

$$\frac{d[\text{PABA}]}{dt} = \frac{k_{cat}[\text{PabC}][\text{ADC}]}{\text{KM}_{\text{PabAB}} + [\text{PABA}]} - k_{out}[\text{PABA}]$$

Parameter Table

Symbols	Parameters	Values and Units
K_UVR8_hv	Light dependent dissociation rate UVR8 dimer	2.08*10 ⁻³ s ⁻¹
K_UVR8_decay	Dimerization rate UVR8 monomer	8.4*10 ⁻¹⁰ nM ⁻¹ s ⁻¹
KM_PABA	PABA Michaelis constant	960*10 ² nM
n_PABA	PABA cooperativity coefficient	1
A	Basal expression fraction	0.05
K_Ptet	Tet promoter expression strength	1.1nM s ⁻¹
K_deg	Protein degradation rate	3.85*10 ⁻⁵ s ⁻¹
KM_TetR	TetR repression coefficient	100nM
N_TetR	TetR cooperativity coefficient	1
K_cat	PabAB catalysis rate	0.65 s ⁻¹
KM_PabAB	PabAB Michaelis constant	960*10 ³ nM
K_out	pABA outflux rate	3.85*10 ⁻⁴ s ⁻¹

Reference: http://2012.igem.org/Team:ETH_Zurich