## Reactions in the Model

This page contains the reactions that are used in the model. It shows how each reactions change the number of molecules and the rate at which they happen.

1 . Transcription of mRNA:

$$m \xrightarrow{O \cdot \frac{\alpha_0}{4}} m + 1$$

2.+3. Decay of mRNA:

$$m \xrightarrow{\frac{m}{\tau_m}} m - 1$$

$$m \xrightarrow{m \cdot E_f \cdot k_c} m - 1$$

4.+5. Transcription and decay of  $RelB_2$ :

$$B_2 \xrightarrow{trans_B \cdot m} B_2 + 1$$

$$B_2 \xrightarrow{\frac{B_2}{\tau_B}} B_2 - 1$$

6.+7. Transcription and decay of RelE:

$$E_f \xrightarrow{trans_E \cdot m} E_f + 1$$

$$E_f \xrightarrow{\frac{E_f}{\tau_E}} E_f - 1$$

8.+9. Reaction for  $RelB_2RelE$  complex

$$E_f + B_2 \xrightarrow{B_2 \cdot E_f \cdot k_b} B_2 E$$

$$B_2E \xrightarrow{K_D(B_2E)\cdot k_b\cdot B_2E} B_2 + Ef$$

10.+11. Component decay in  $RelB_2RelE$  complex

$$B_2E \xrightarrow{\frac{B_2E}{\tau_c}} Ef$$

$$B_2 E \xrightarrow{\frac{B_2 E}{\tau_E}} B_2 E - 1$$

12.+13. Reaction for  $RelB_2RelE_2$  complex

$$B_2E + E_f \xrightarrow{B_2E \cdot E_f \cdot k_b} B_2E_2$$

$$B_2E_2 \xrightarrow{K_D(B_2E_2)\cdot k_b\cdot B_2E_2} B_2E + Ef$$

14.+15. Component decay in  $RelB_2RelE_2$  complex

$$B_2E_2 \xrightarrow{K_D(B_2E_2)\cdot k_b\cdot B_2E_2} 2Ef$$

$$B_2 E_2 \xrightarrow{\frac{B_2 E_2}{\tau_E}} B_2 E_2 - 1$$

Equations related to the operator: 16.+17. Binding of RelB to operator

$$O + B_2 \xrightarrow{O \cdot B_2 \cdot k_b} O.B_2$$

$$O.B_2 \xrightarrow{K_{D1} \cdot k_b \cdot O.B_2} O + B_2$$

18. + 19. Binding of  $RelB_2RelE$  complex to operator

$$O + B_2 E \xrightarrow{O \cdot B_2 E \cdot k_b} O \cdot B_2 E$$

$$O.B_2E \xrightarrow{K_{D3}\cdot k_b\cdot O.B_2E} O + B_2E$$

20. + 21. Binding of second  $RelB_2RelE$  complex to operator

$$O.B_2E + B_2E \xrightarrow{O.B_2E \cdot B_2E \cdot k_b} O.(B_2E)_2$$

$$O.(B_2E)_2 \xrightarrow{KD2 \cdot k_b \cdot O.(B_2E)_2} O.B_2E$$

22.-25. Stripping through RelE

$$O.B_2E + Ef \xrightarrow{k_b \cdot Ef \cdot O.B_2E} O + B_2E_2$$

$$O + B_2E_2 \xrightarrow{O \cdot B_2E_2 \cdot \frac{K_D(B_2E_2)}{K_{D3}}} O.B_2E + Ef$$

$$O.(B_2E)_2 + E_f \xrightarrow{k_b \cdot E_f \cdot O.(B_2E)_2} O.B_2E + B_2E_2$$

$$O.B_2E + B_2E_2 \xrightarrow{O.B_2E \cdot B_2E_2 \cdot \frac{K_D(B_2E_2)}{K_{D2}}} O.(B_2E)_2 + E_f$$