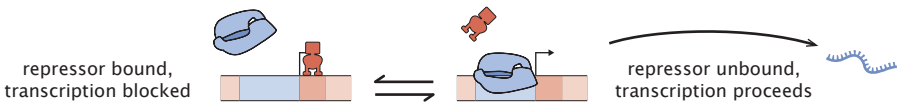
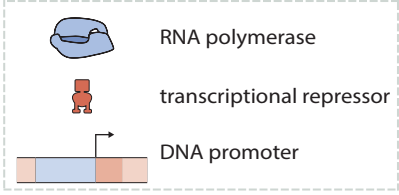
(A)

CANONICAL TRANSCRIPTIONAL REGULATION CARTOON





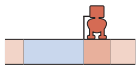
(B)

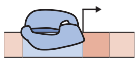
THERMODYNAMIC MODELS

DETAILS OF PROMOTER MODELS

1

state





r → γ → $\varnothing$

weight

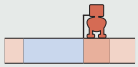
$$\frac{R}{N_{\mathrm{NS}}} e^{-\beta \Delta \varepsilon_R}$$

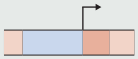
$$1$$

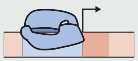
$$\rho = 1$$

2

state







r → γ → $\varnothing$

weight

$$\frac{R}{N_{\mathrm{NS}}} e^{-\beta \Delta \varepsilon_R} \qquad 1 \qquad \frac{P}{N_{\mathrm{NS}}} e^{-\beta \Delta \varepsilon_P}$$

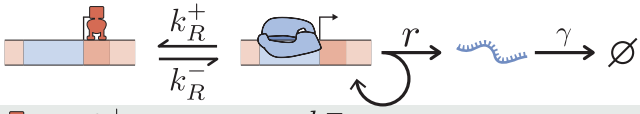
$$\rho = 1 + \frac{P}{N_{NS}} e^{-\beta \Delta \varepsilon_P}$$

(C)

KINETIC MODELS

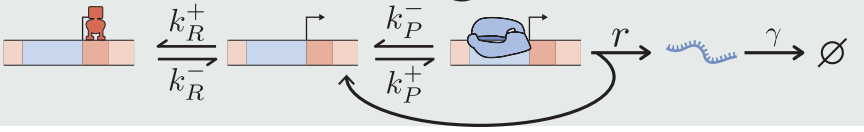
DETAILS OF PROMOTER MODELS

1



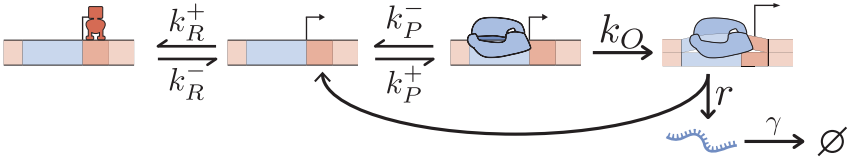
$$\rho = 1$$

2



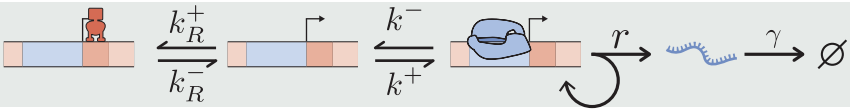
$$\rho = 1 + \frac{k_P^+}{k_P^- + r}$$

3



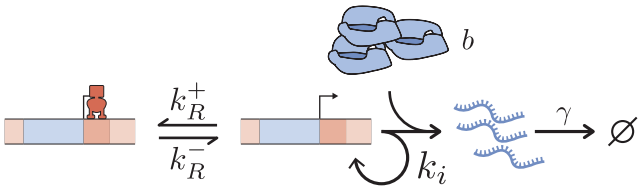
$$\rho = 1 + \frac{k_P^+ (k_O + r)}{r \left(k_P^- + k_O\right)}$$

4



$$\rho = 1 + \frac{k^+}{k^-}$$

5



$$\rho = 1$$

(D)

THE MASTER CURVE FOR SIMPLE REPRESSION

$$\text{fold-change} = (1 + \exp(-\Delta F_R + \log(\rho)))^{-1}$$

$$\Delta F_R = \beta \Delta \varepsilon_R - \log\left(\frac{R}{N_{NS}}\right) \quad \text{(thermodynamic)}$$

$$\Delta F_R = -\log\left(\frac{k_R^+}{k_R^-}\right) \quad \text{(kinetic)}$$