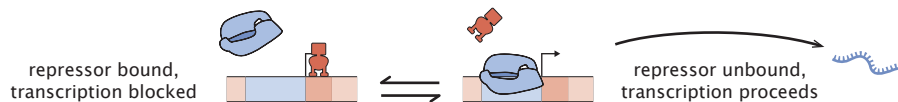


(A)

## CANONICAL TRANSCRIPTIONAL REGULATION CARTOON



RNA polymerase



transcriptional repressor

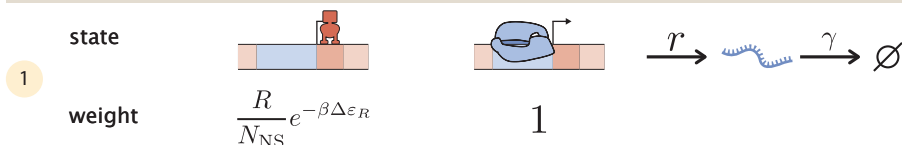


DNA promoter

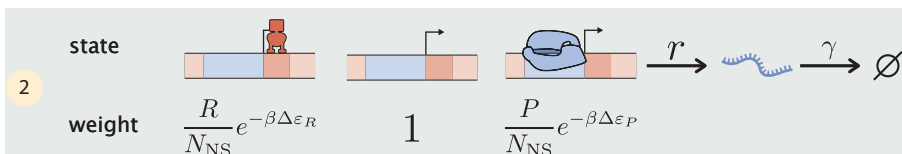
(B)

## THERMODYNAMIC MODELS

## DETAILS OF PROMOTER MODELS



$$\rho = 1$$

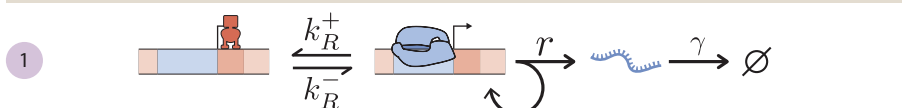


$$\rho = 1 + \frac{P}{N_{NS}} e^{-\beta \Delta \varepsilon_P}$$

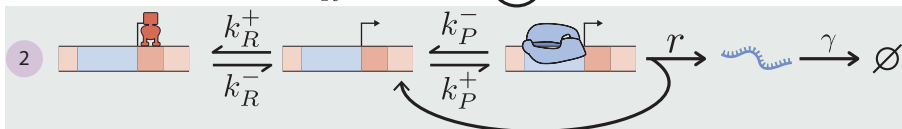
(C)

## KINETIC MODELS

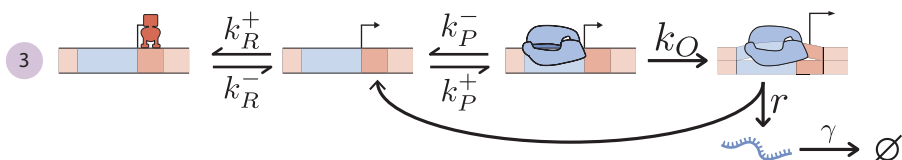
## DETAILS OF PROMOTER MODELS



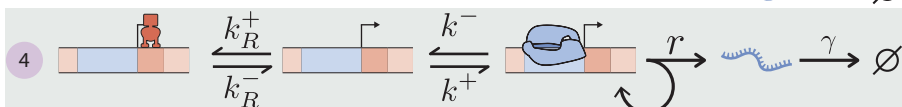
$$\rho = 1$$



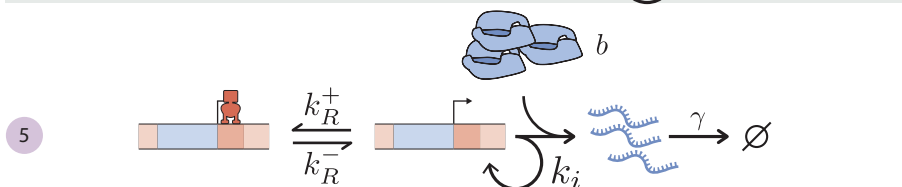
$$\rho = 1 + \frac{k_P^+}{k_P^- + r}$$



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



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



$$\rho = 1$$

(D)

## THE MASTER CURVE FOR SIMPLE REPRESSION

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

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

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

