

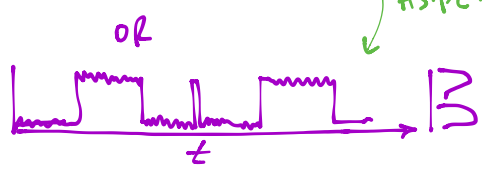
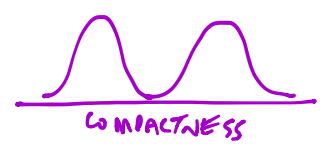
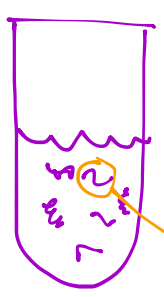
$$\Delta G = -RT \ln (P_f/P_u)$$

$$\Delta H = -RT \ln (\langle W_f \rangle / \langle W_u \rangle)$$

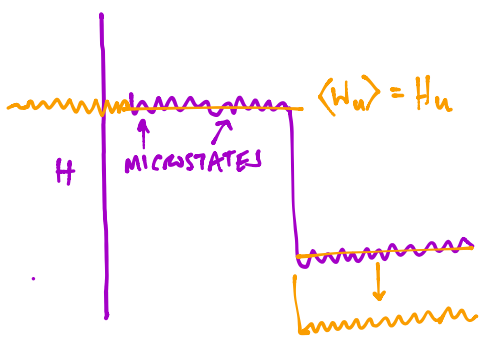
$$\Delta S = R \ln (N_f/N_u)$$

CLEAN UP:

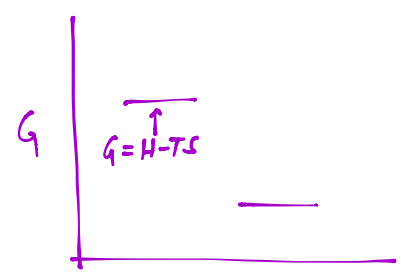
ΔH° VS ΔE°
 ↑ CONST PRESSURE ↑ CONST VOLUME



ASIDE: ELLIPTIC HYPOTHESIS



\Rightarrow



IF A PROTEIN HAS $\Delta G^\circ = -28 \text{ kJ/mol}$, WHAT FRACTION OF THE TIME IS IT FOLDED?

$$\theta = \frac{[F]}{[F] + [u]}$$

$$\frac{[u] e^{-\Delta G/RT}}{[u] e^{-\Delta G/RT} + [F]} = \frac{e^{-\Delta G/RT}}{1 + e^{\Delta G/RT}}$$

$R = 0.008314 \text{ kJ/mol}\cdot\text{K}$
 $T = 300 \text{ K}$

$$\Delta G = -RT \ln ([F]/[u])$$

$$e^{-\Delta G/RT} = [F]/[u]$$

$$[u] e^{-\Delta G/RT} = [F]$$

$-28 \text{ kJ/mol} \rightarrow 0.999988$
 $-39 \text{ kJ/mol} \rightarrow 0.9999985$

Θ IS KEY TO BIOCHEM:

$$\Theta \equiv \frac{[\text{STATE}]}{[\text{ALL STATES}]} \leftarrow \text{PARTITION FUNCTION } (Q)$$

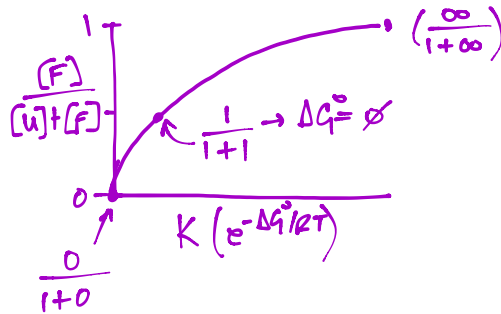
$$\Theta = \frac{[F]}{[W] + [F]}$$

$$\Theta = \frac{[\text{OCC}]}{[\text{OCC}] + [\text{FREE}]}$$

$$\Theta = \frac{[\text{Hb} \cdot \text{O}_2] + [\text{Hb} \cdot 2\text{O}_2] \dots}{[\text{Hb}] + [\text{Hb} \cdot \text{O}_2] + [\text{Hb} \cdot 2\text{O}_2] \dots} \frac{[F]}{[W] + [F]}$$

BIOLOGY: CONTROLS SYSTEM

PRACTICE: OFTEN THE THING YOU CAN MEASURE



KEY FEATURES:

- SATURATES
- $\Theta = 0.5$ (USUALLY) $\Delta G^\circ = 0$
- SETS "RANGE" FOR BIOLOGICAL RESPONSE