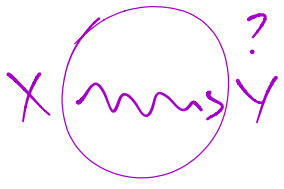
START W/ CLASS DISCUSSION OF ENZYMES. ANYTHING UNCLEAR?

WHAT IS ALLOSTERY?

HOW DOES IT WORK?

REAL LIFE: HEMOGLOBIN



?

DEFINE:

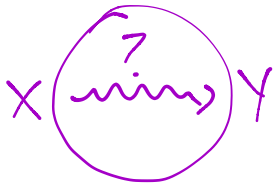
LECTURE #13: ALLOSTERY.

$$V_0 = k_{cat} \cdot [E]_t \cdot \frac{[S]_0}{[S]_0 + K_M}$$

NONCOMPETITIVE ↙ ; CONGRESS ↙ ; SUICIDE ↑ ; COMPETITIVE ↑

HOW IS (I) "SENSED" AND RESPONDED TO?

ALLOSTERY: BEHAVIOR @ ONE SITE ALTERED BY BINDING @ ANOTHER



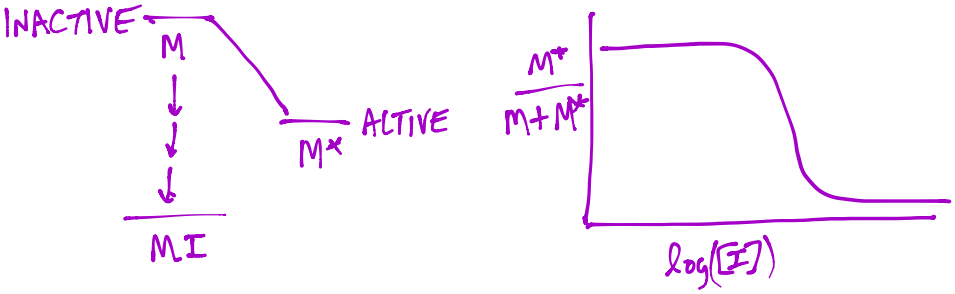
SHOW RUBE-GOLDBERG

SHOW STATIC STRUCTURE → BOUNCING AROUND

SHOW MORPH BETWEEN STATES.

← FREE ENERGY LANDSCAPE?

HOW CAN WE MANIPULATE THIS?



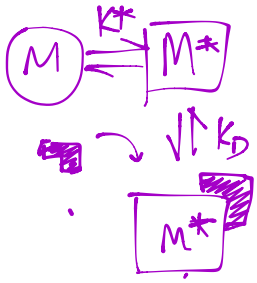
ALLOSTERY INGREDIENTS:

1) 2 (OR MORE) STATES
2) ... LO/NO BARRIER.
3) ... WITH DIFFERENT BINDING
4) ... WITH DIFFERENT ACTIVITY.

IN HOMEWORK WORK THRU ΔG...

SMALL Δ STRUCTURE HUGE EFFECT.

FINE BALANCE OF K^* AND K_D.



- HOW IMPROVE θ
- WHAT ARE WE DOING PHYSICALLY?
- RETURN TO MM (SUBTLE).

ANALYZE WITH ENZYME:

OPTIMIZE ALLOSTERY

$R \rightleftharpoons T \quad K^* \cdot [R] = [T]$

$$K_D = \frac{[T][B]}{[T{\cdot}B]}$$

$$K_D[T{\cdot}B] = [T][B]$$

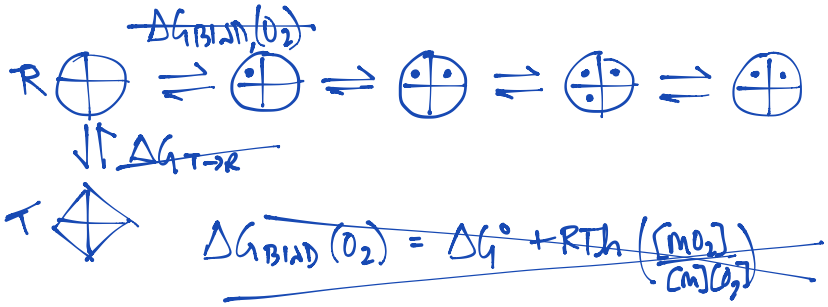
$$\frac{[R]}{[R]+[T]+[T{\cdot}B]} = \frac{1}{1 + K^* + K^* \frac{[B]}{K_D}}$$

$K^*[R]$ ↑

$\frac{[T][B]}{K_D}$ ↗

$$\frac{K^*[R][B]}{K_D}$$

$$\frac{1}{1 + K^*(1 + [B]/K_D)}$$



$\Delta G_{BIND}(O_2) = \Delta G^\circ + RT \ln \left(\frac{[MO_2]}{[M][O_2]} \right)$

@ K_D, $\Delta G_{BIND} = 0$

$[L] = K_D$

$K_D = \frac{[L][M]}{[ML]}$

$1 = \frac{[M]}{[ML]}$

CAN
CAN
CAR
RAN