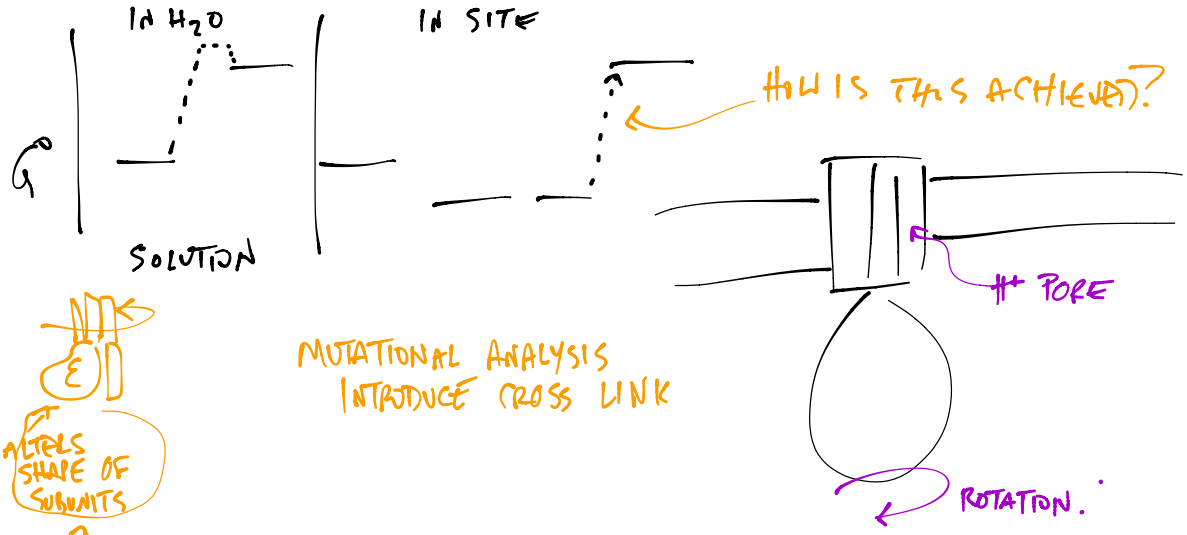
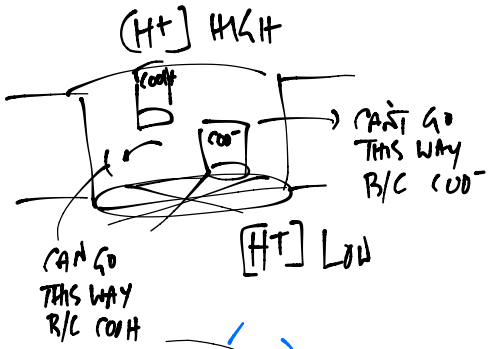


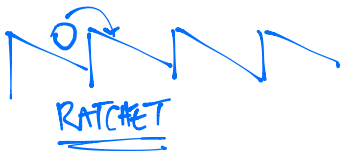
MUTATIONAL ANALYSIS
INTRODUCE CROSS LINK

ALTERS SHAPE OF SUBUNITS

STATIONARY

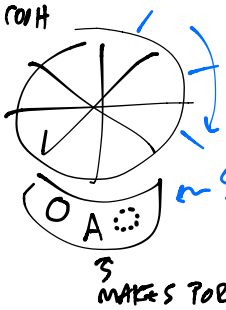


- MACHINES
  - PARTS
  - MECHANISMS



MUTATIONS AS TOOLS
- HOW DO YOU MAKE?
- WHAT CAN IT TELL YOU?

} TALK ABOUT WITH POLYMERS



~ SLIGHTLY CONFUSING THAT IT'S HERE

START WITH KINESIN?

MOLECULAR MOTORS

PEER TO PEER

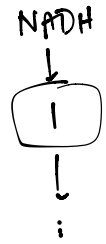
BEHAVIOR
ANATOMY
PROBLEM: SCHRÖDINGER.

LECTURE

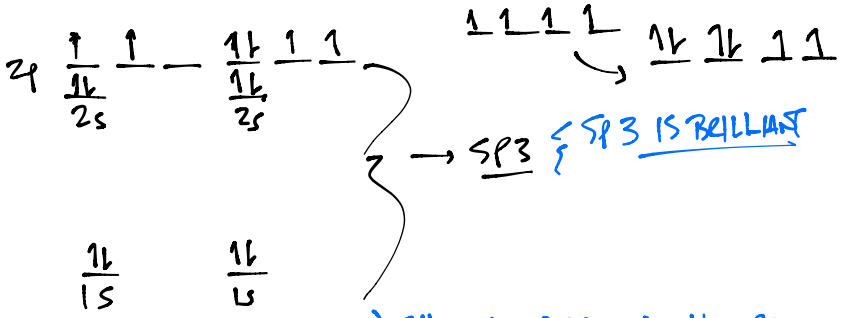
BIG IDEA:

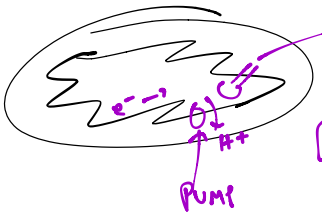
e^- ↓ H^+ ↑ ⇝ ATP?

- HOW MUCH ENERGY?
- LOOK AT MACHINERY.

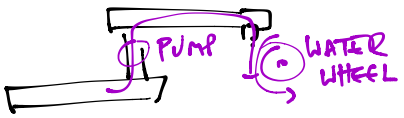


WHAT DOES IT MEAN TO DROP DOWN IN ENERGY?





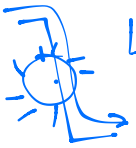
$[H^+]_{in} < [H^+]_{out}$



WILL PUMPING GO ON FOREVER?

NO. "PRESSURE"

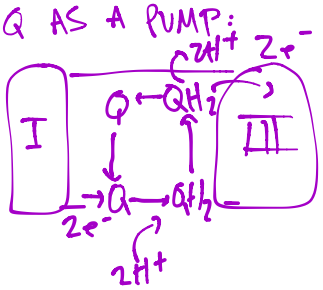
BIGGEST IDEA: $X + O_2$



LIMIT O_2 UNTIL THE VERY END.

↳ START WITH MEMBRANES.
↳ MORE ORDER? HYDROGEN BOND. MODELING.

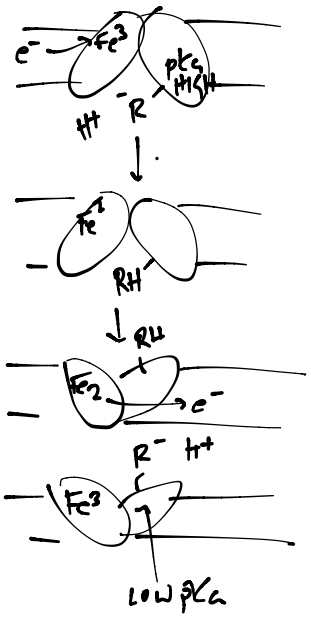
CoQ AS A PUMP:



CLARIFY: NO e^- IN BILAYER

→ GEOMETRY
→ DIFFUSION

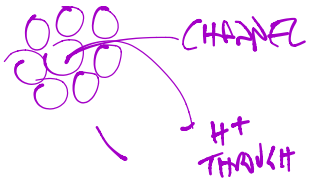
PEER-TO-PEER TRANSDUCTION



SHIFTING pKa?) — HOW DO I SET UP EARLIER?

↳ (HB TANGENT)

↳ HOW CAN pKa CHANGE?



HOW MUCH ENERGY:

TWO KINDS:

- $RT\ln(H_{OUT}/H_{IN})$ ← PROTON MOTIVE FORCE
- ELECTRICAL POTENTIAL

$\Delta G = \Delta G^\circ + RT\ln(C_2/C_1) + nF\Delta E$

↳ ~20 kJ/mol H+

1.5 H+/ATP

CENTRAL PUZZLE: SET UP EXPLICITLY LIKE SCHRÖDINGER

LEGOS

3 PUMPING STATIONS:

~3 ATP/NADH