Biophysics Seminar 3/5/18

"The action of Human DNA Primase"

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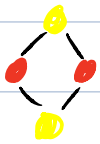
- Primase creates the first copies of the DNA during replication
  - only enzyme that can act upon single-strand DNA
- SAXS (small angle x-ray scattering)
  - population weighted average with parameters sensitive to dynamics
- Power analysis - tells something about the flexibility of the system (what is this?)
- Original crystal structure was inactive configuration
  - built the real structure out of bits of other info. and crystal structures.
  - made a morph to simulate the transformation from inactive to active conformation
- including cofactors reduces the sampling space of the enzyme (2.9 → 3.4). Not crystallizable, but close.
- closed configuration is caught even by primase which is free of cofactor
- ★ - initiation is a rare event; fast, but rare
  - is this surprising? Most, if not all, enzymatic reactions are fast but rare events
  - is primase something special from other enzymes?
- linker region between the domains may be a mechanism

for counting the number of nucleotides that have been counted (the domain gets "caught" on the end of the end of the sequence.

- 4Fe-4S cluster is one of the domains
  - ↳ not really known what it does, but it does have some functional relevance
  - ↳ iron clusters are cool



- look up: DNA can act as a wire (charge transfer)
- this primase reduces DNA, but doesn't oxidize back to original state.
  - ↳ not destroying DNA, is reversible: oxidized protein has a higher affinity for the DNA than the reduced form.
    (this is recent)
  - ↳ reversible once the primase diffuses away from the DNA.
- in the model, the primase sends charge down the copied DNA to oxidize the polymerase to cause Landoff.