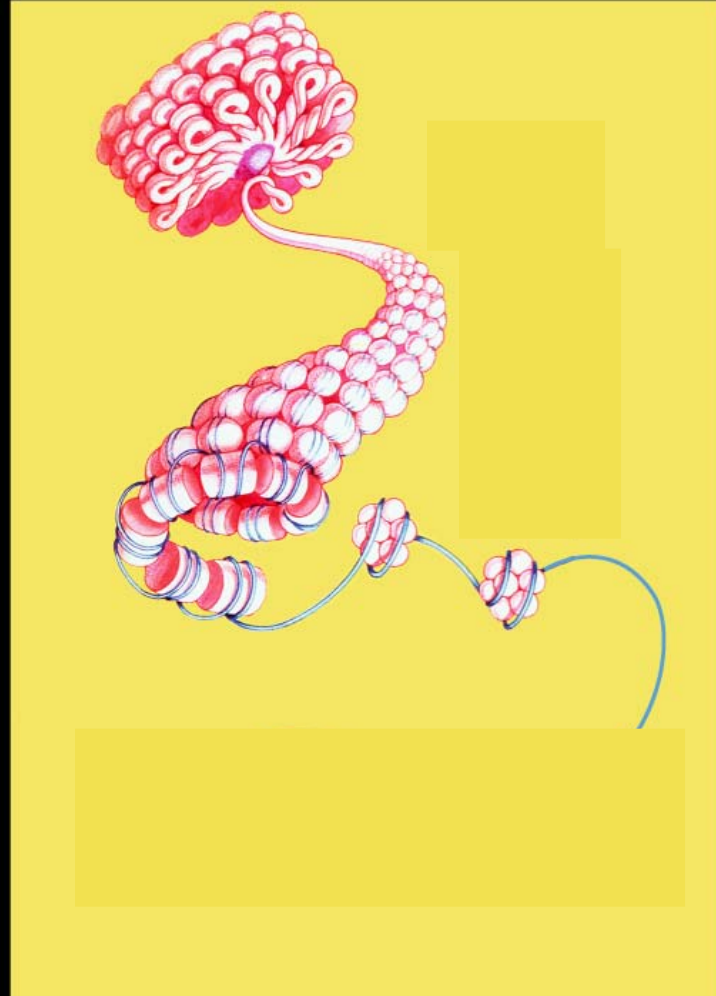
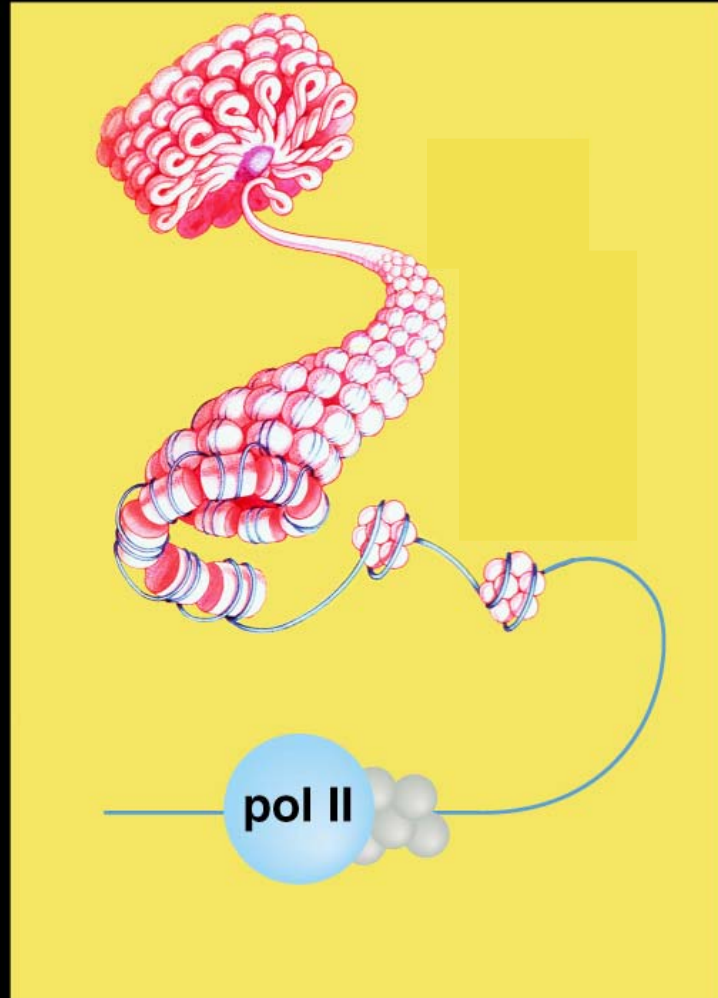




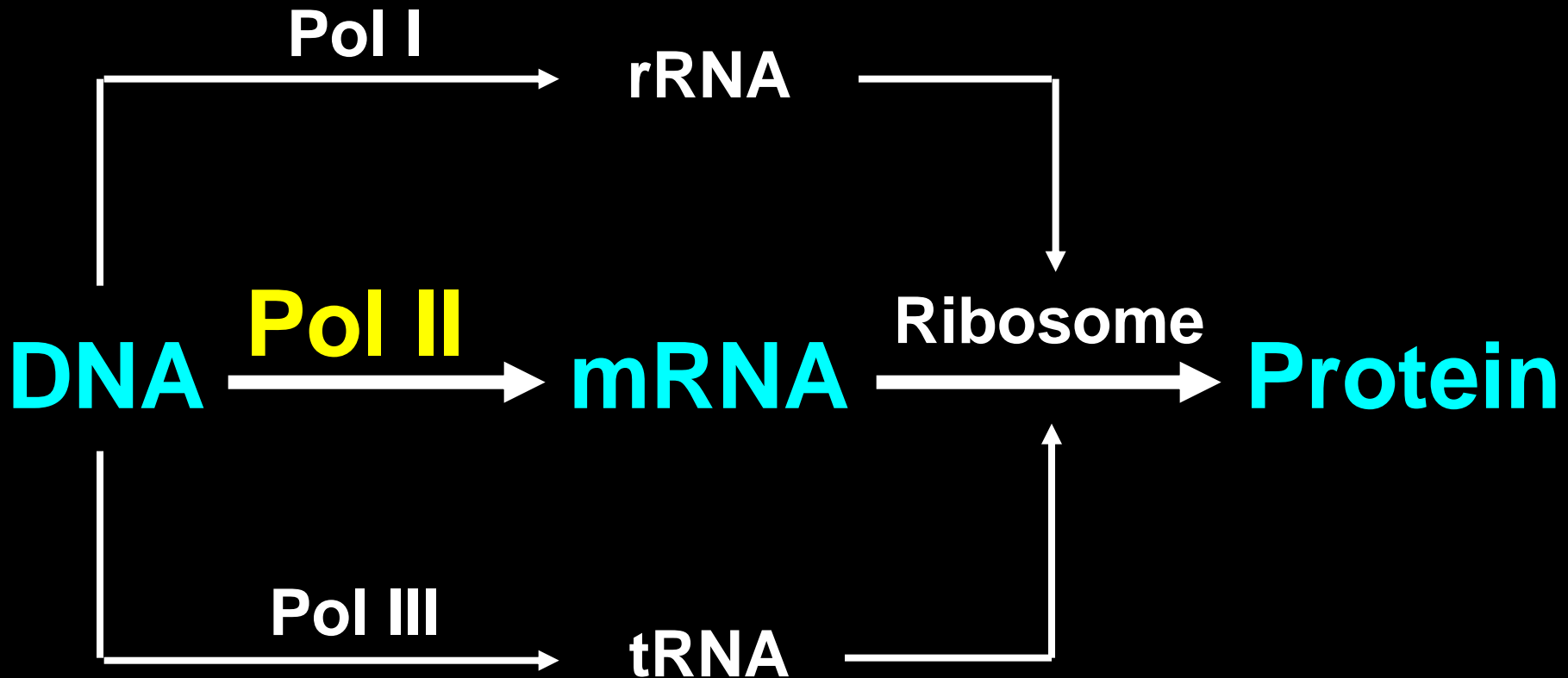
The nucleosome, fundamental particle of the chromosome







RNA polymerase II underlies the central dogma of molecular biology



RNA polymerase II transcription machinery

Pol II

DNA unwinding

RNA polymerization

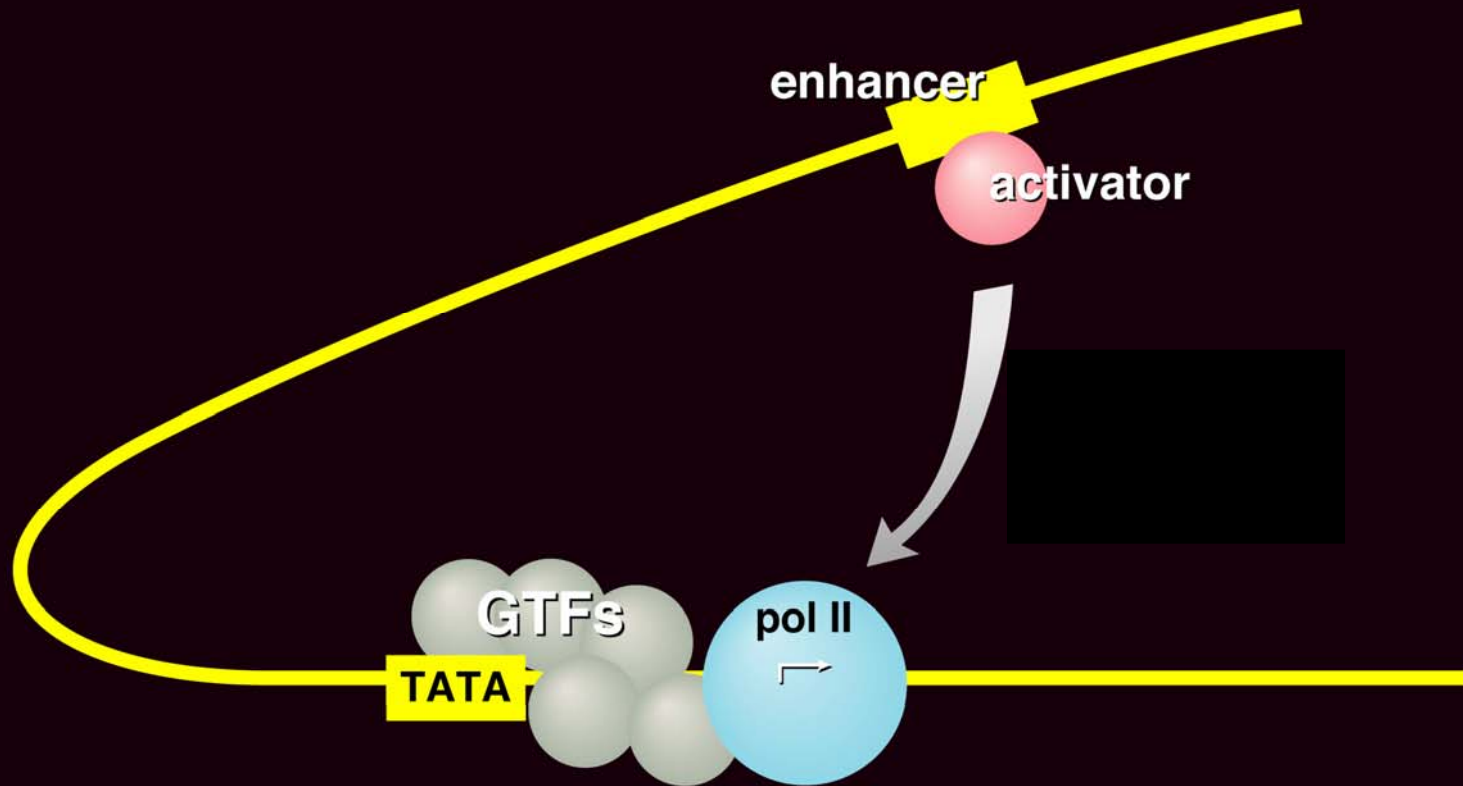
proofreading

GTFs

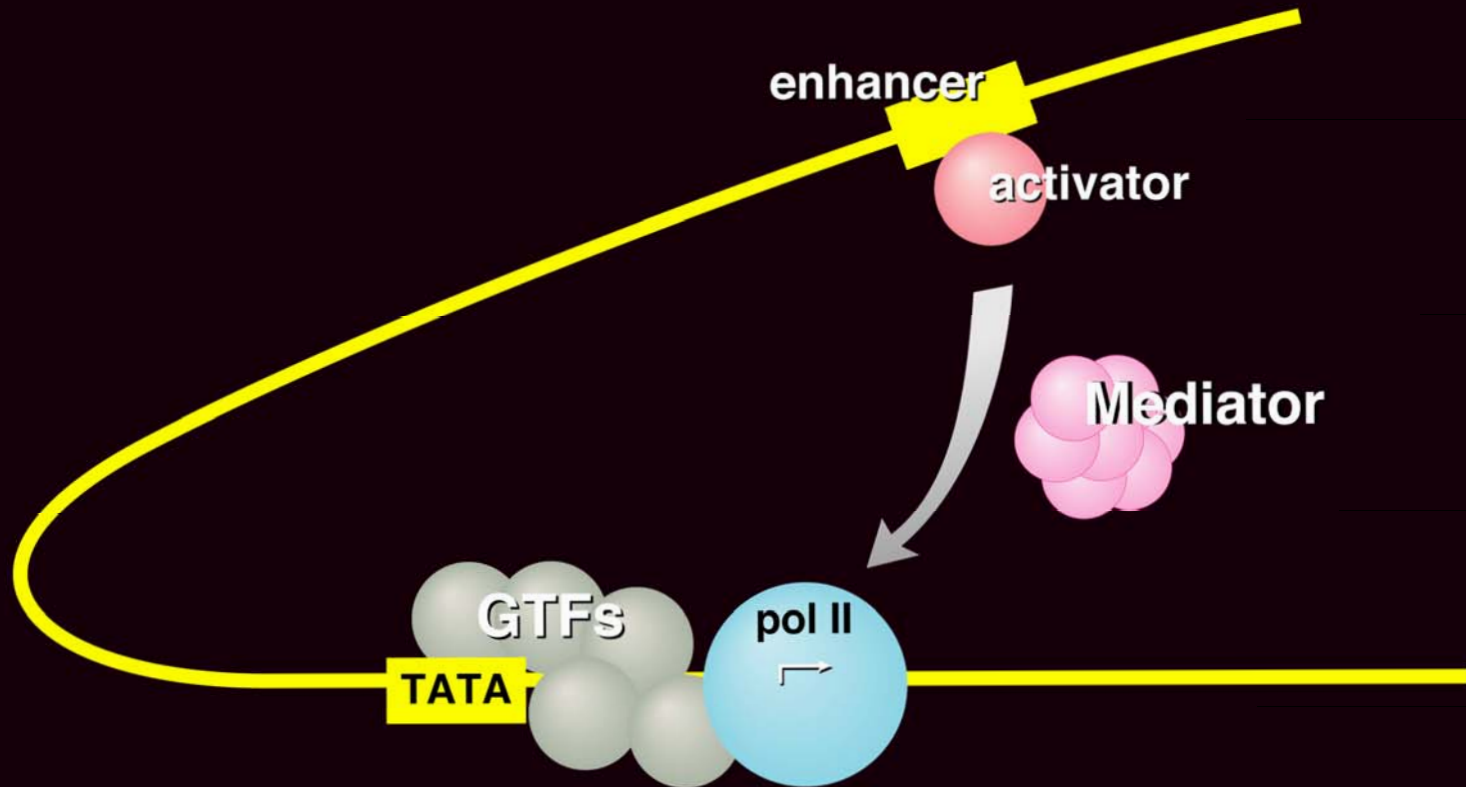
(TFIIB, -D, -E, -F, -H)

promoter recognition

Regulation of RNA polymerase II transcription



Regulation of RNA polymerase II transcription




Mediator of Transcriptional Regulation

- Required for all transcription of all pol II promoters
- Essential link in the chain of communication:
enhancer → activator → Mediator → pol II → promoter
- Co-activator, co-repressor, and general transcription factor
- Processes, transduces transcriptional regulatory information in all eukaryotes

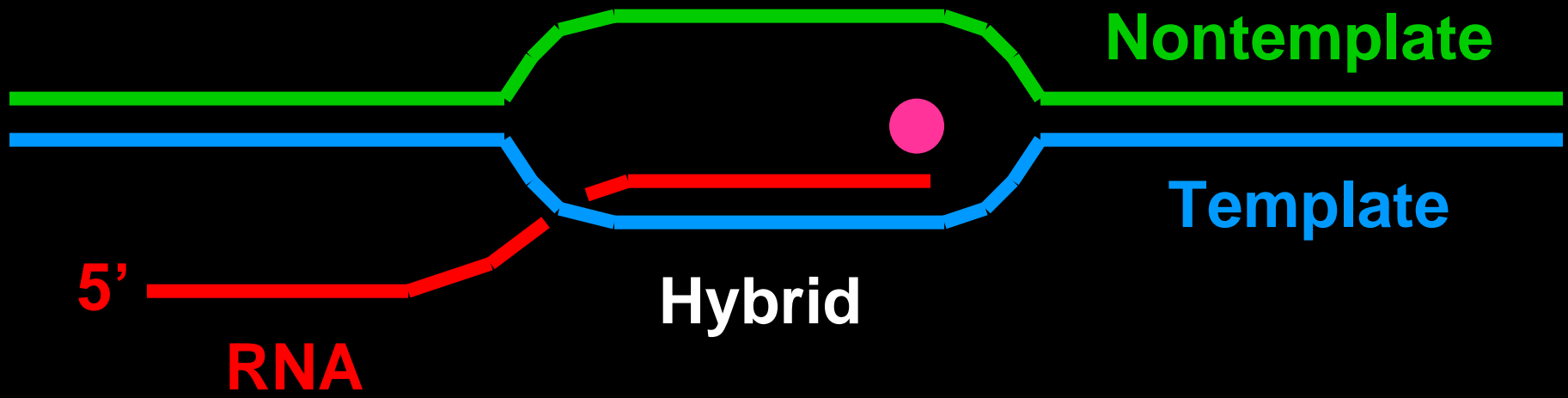
RNA polymerase II transcription machinery

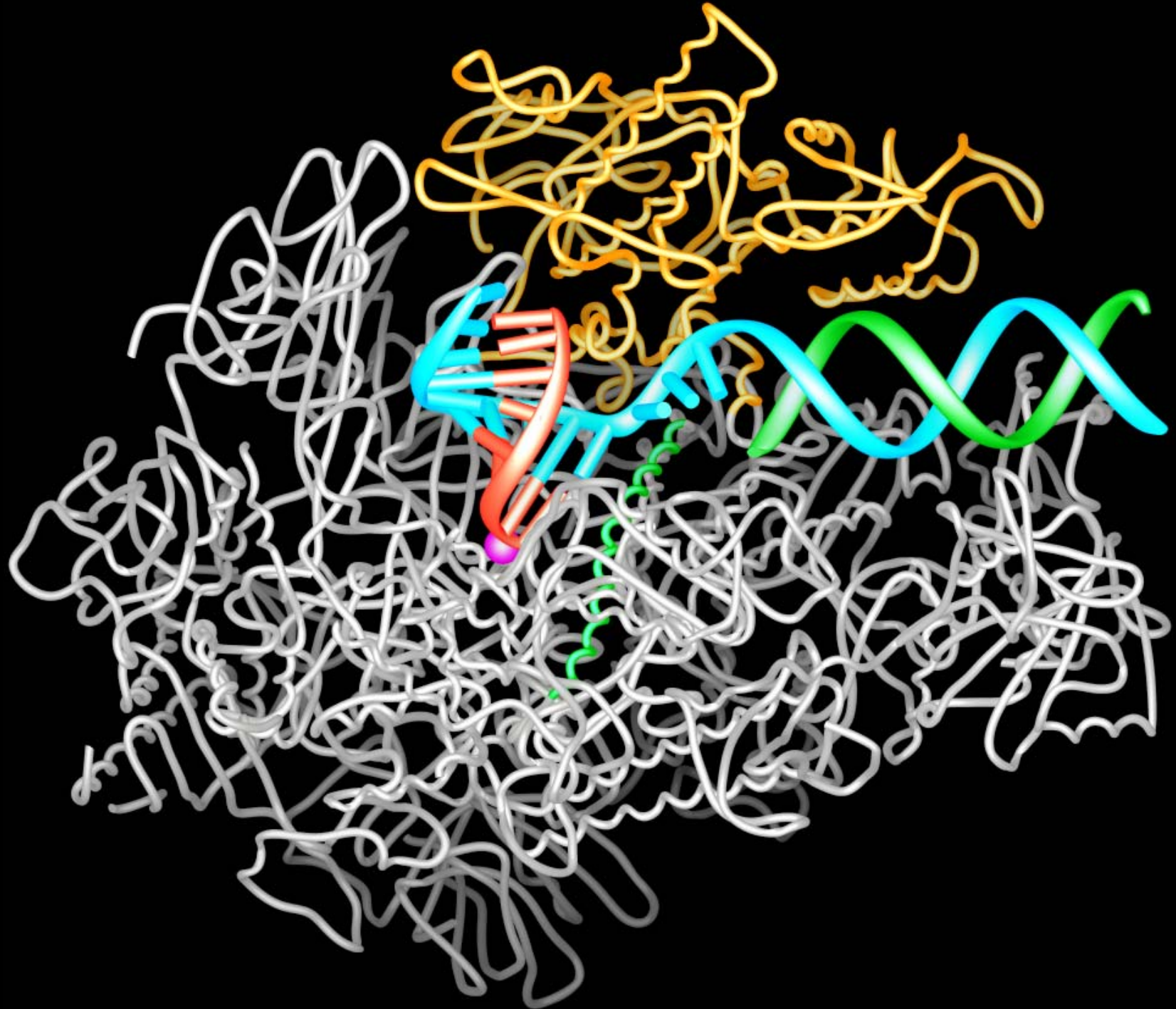
| | subunits | mass (kD) |
|-----------------|-----------------|-------------------|
| pol II | 12 | 513 |
| GTFs | 25 | 1558 |
| Mediator | 20 | 1003 |
| | <hr/> 57 | <hr/> 3074 |

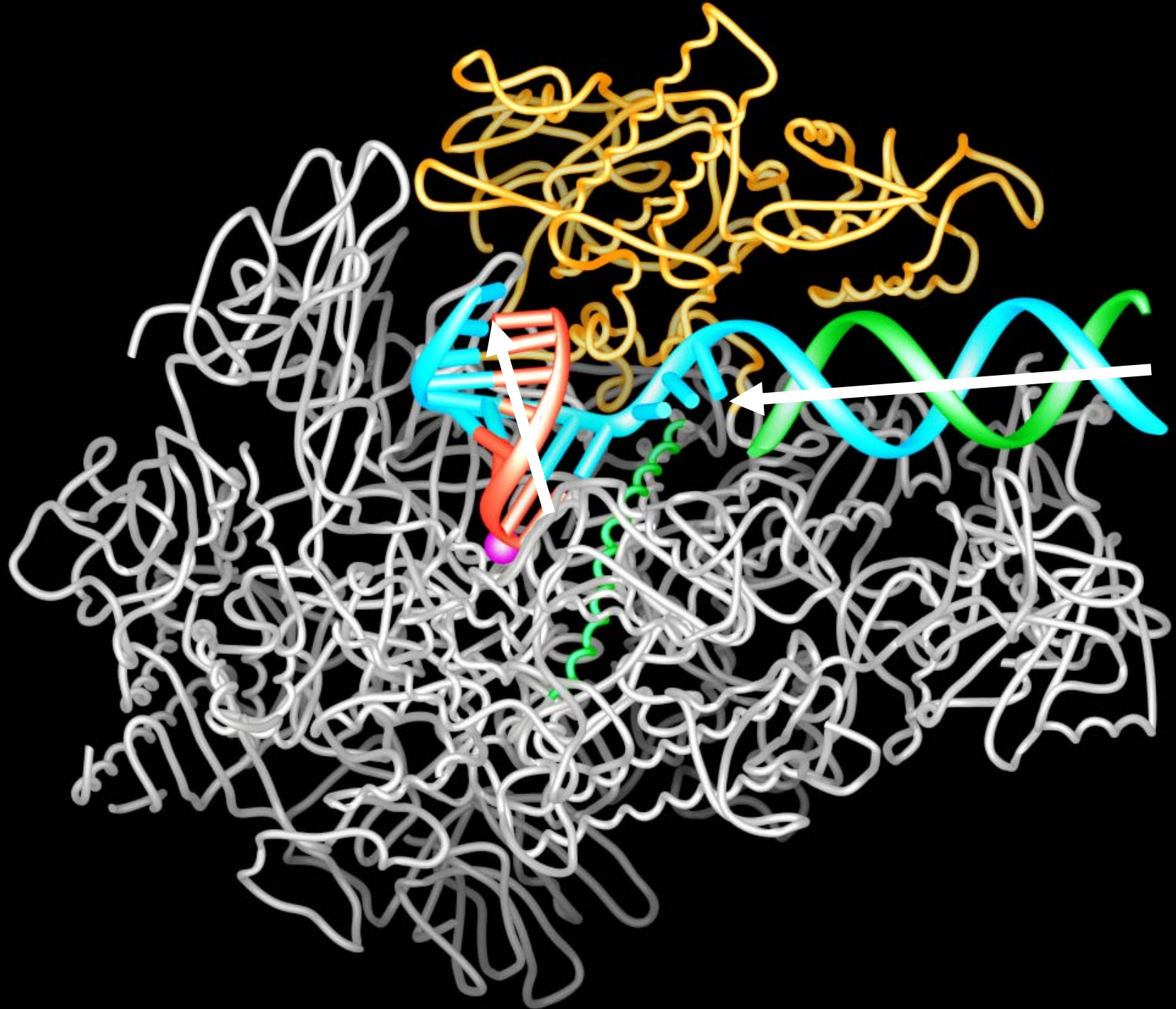


| | |
|---------------------------------|----------------|
| Proteins | 10 |
| Amino acids | 3559 |
| Atoms | 28,378 |
| MW | 0.5 MDa |
| R_{free} (2.8 Å) | 28.2 % |

Pol II





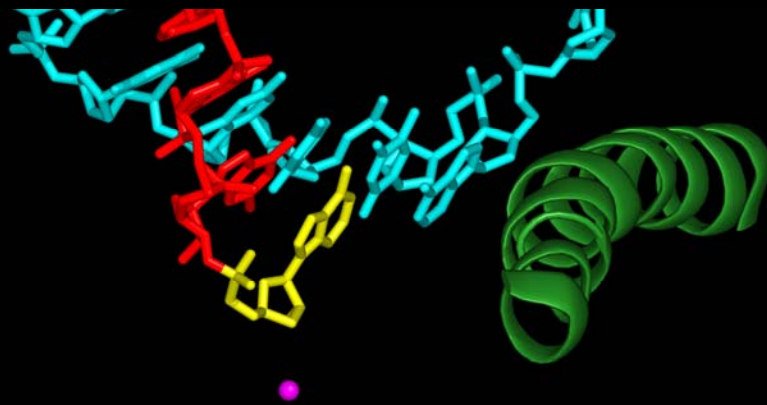
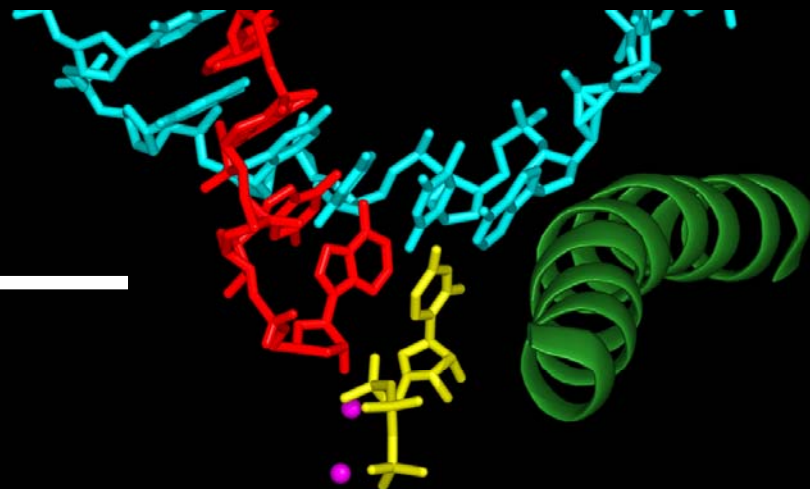




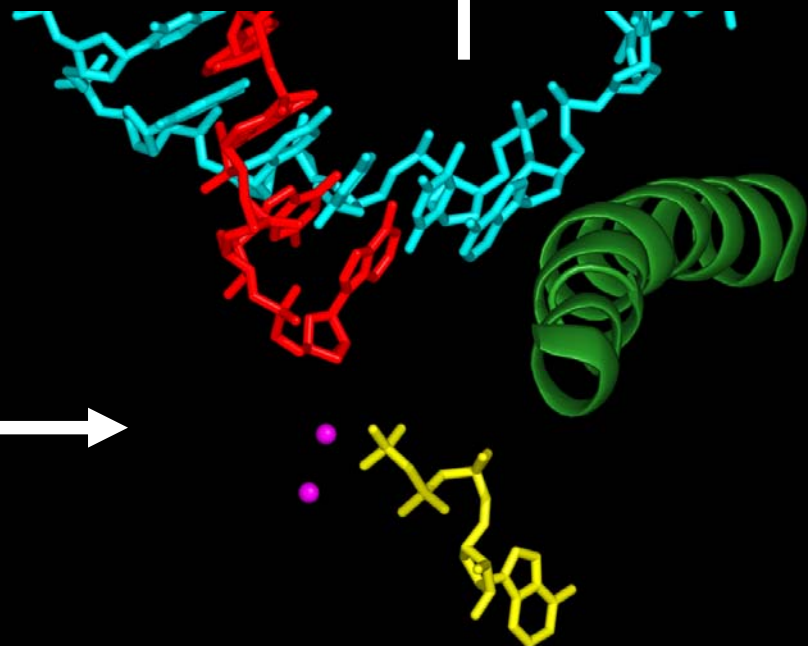
pre-translocation



NTP rotates into A site

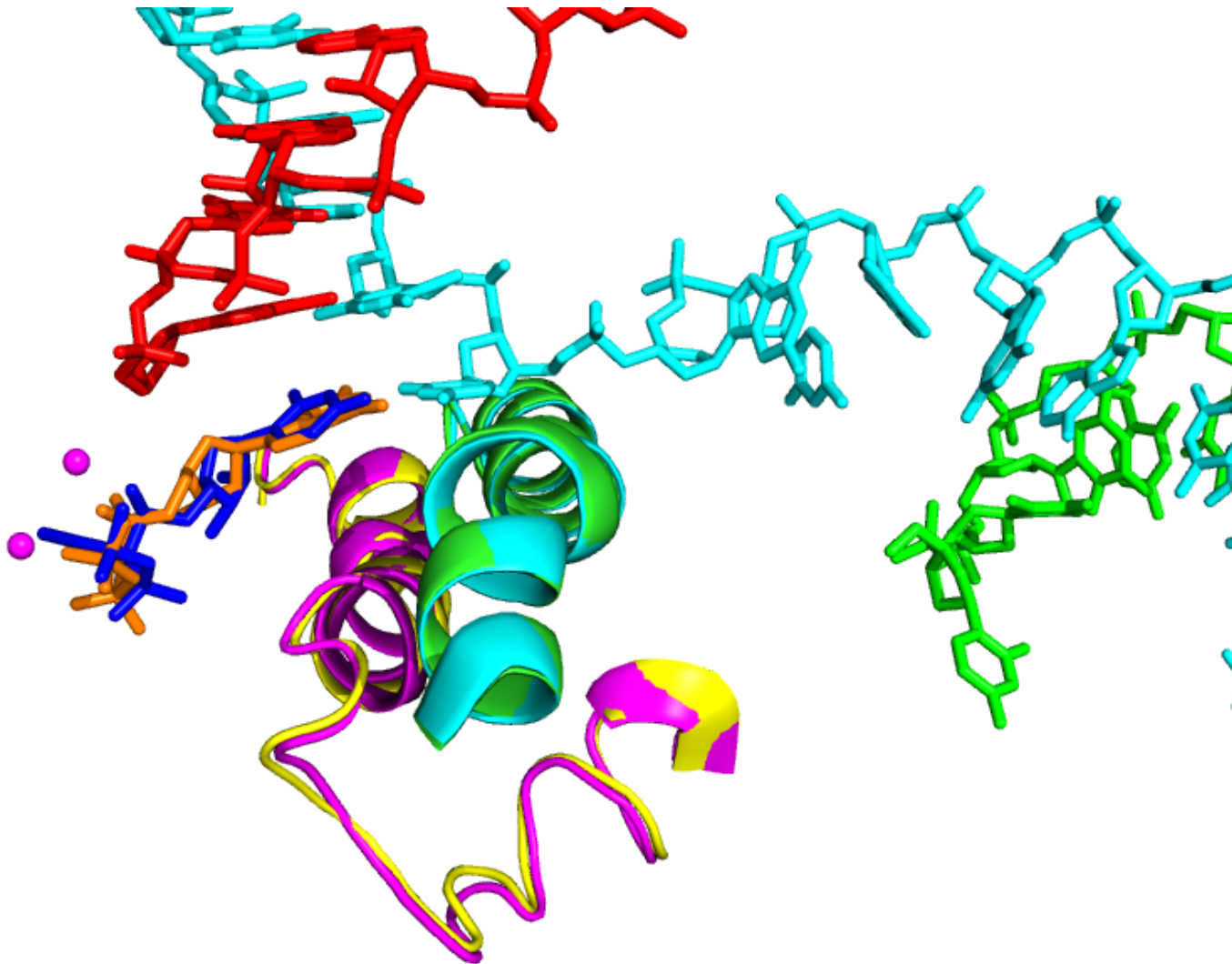


post-translocation



NTP enters E site

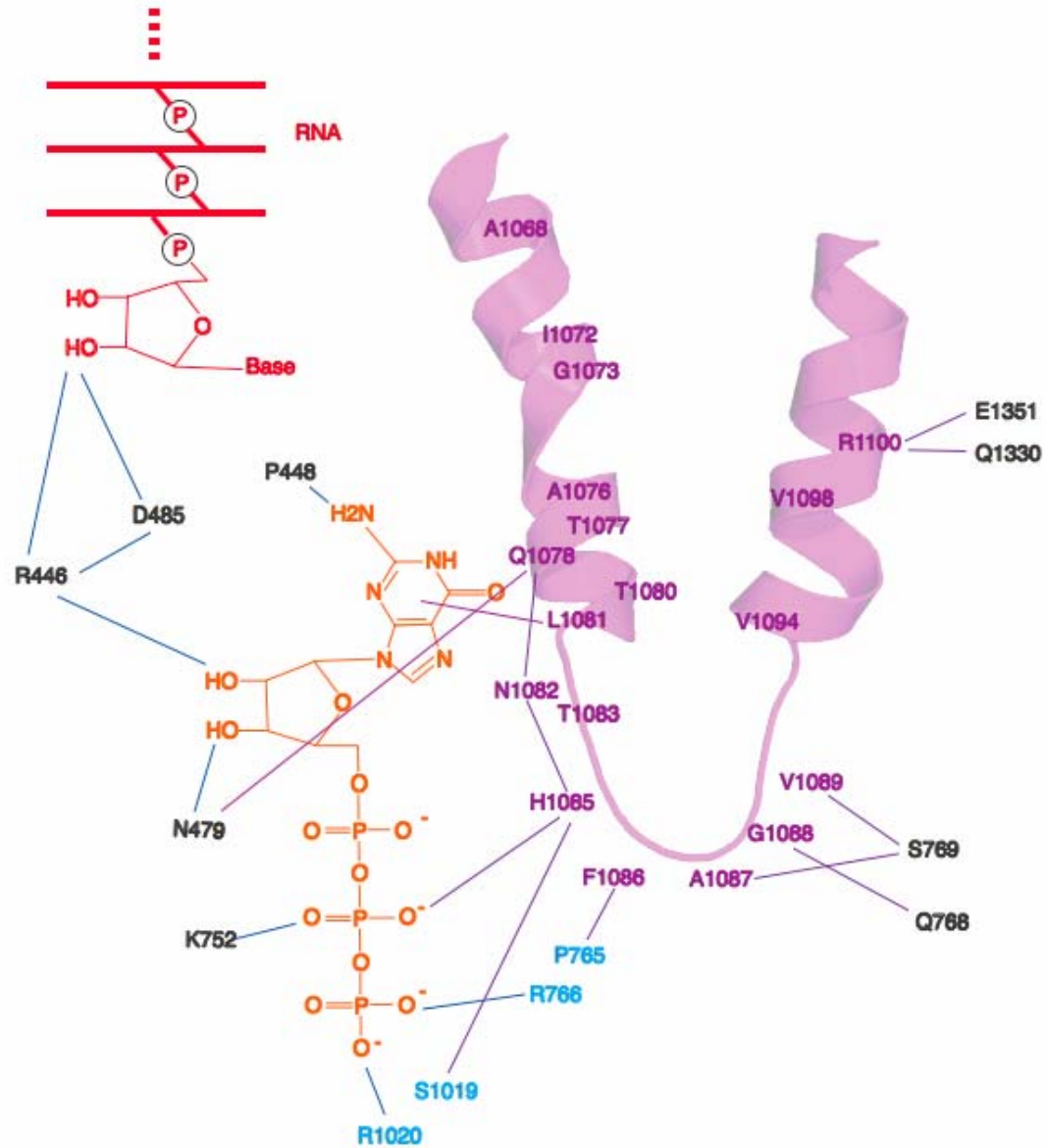
Trigger loop contacts NTP in the A site



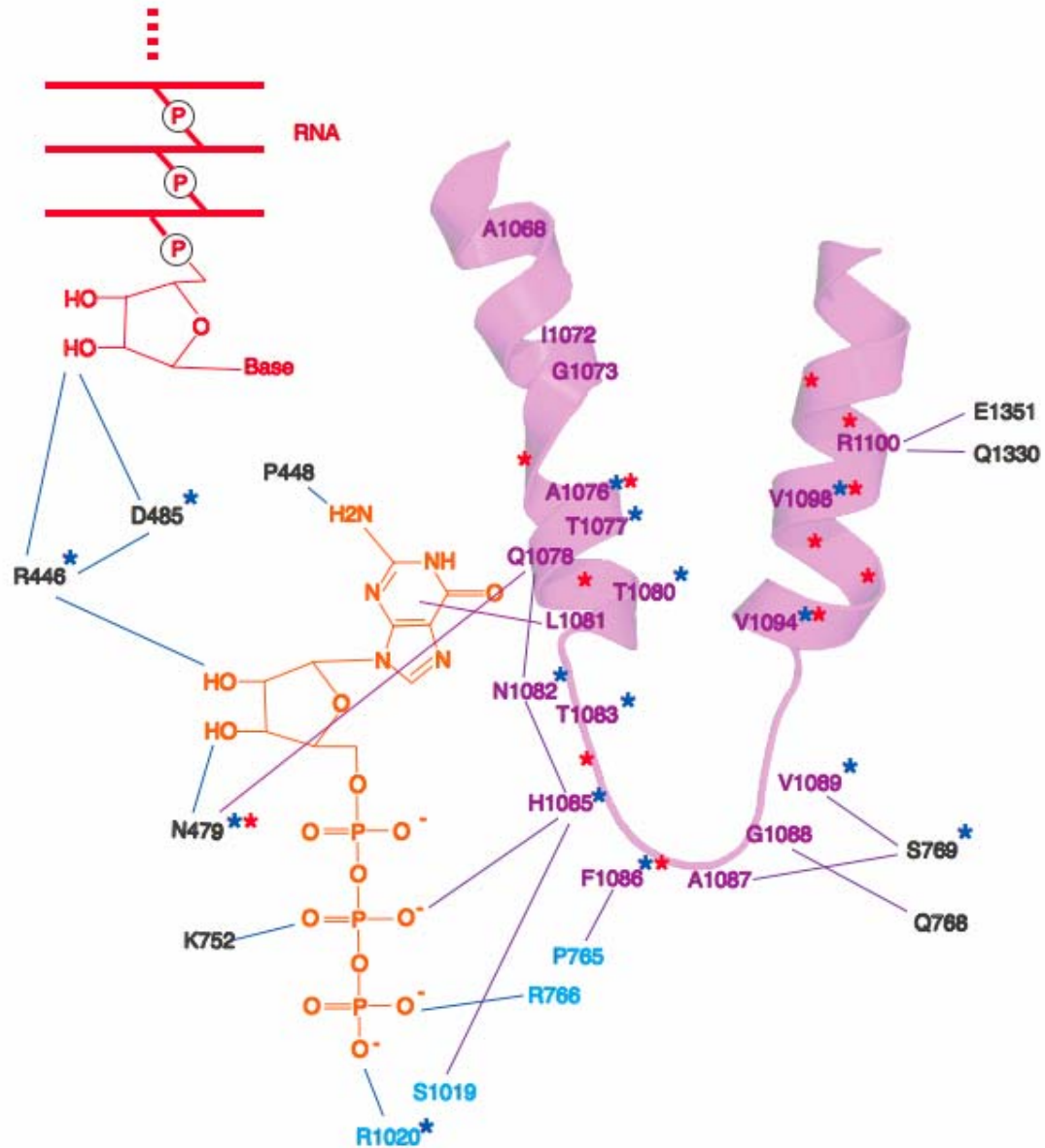
Multiple conformations of the trigger loop



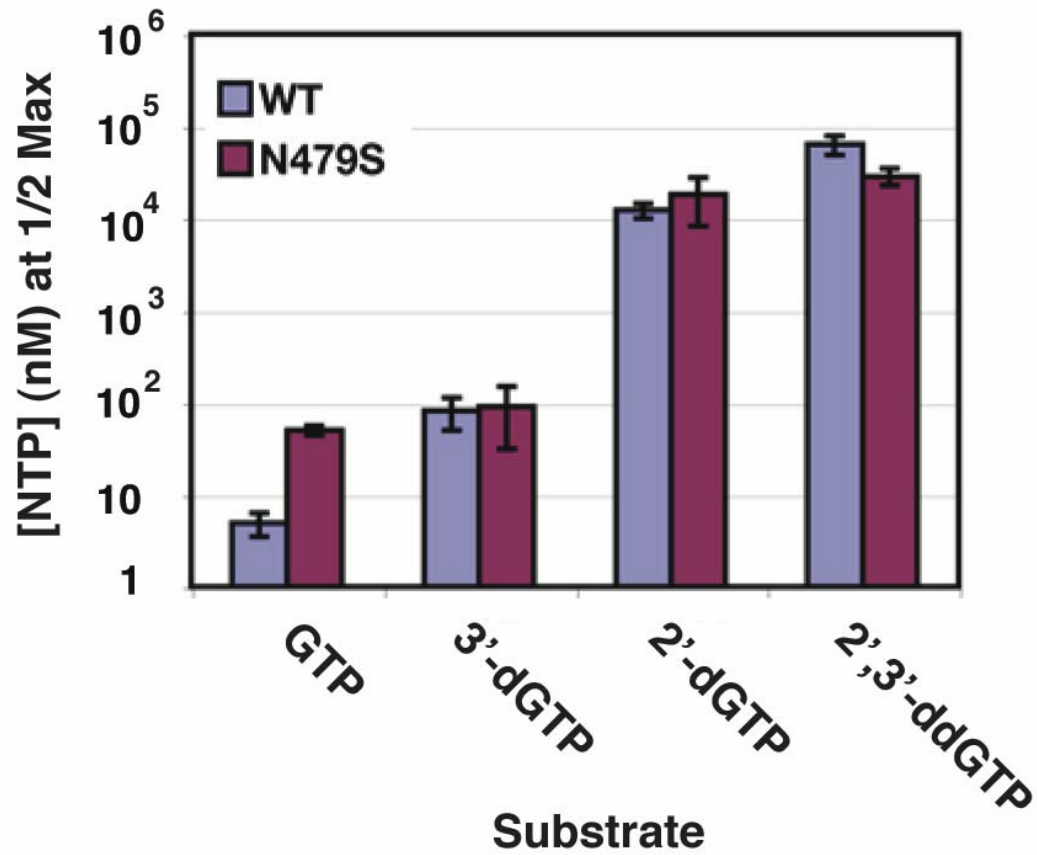
Trigger Loop Network



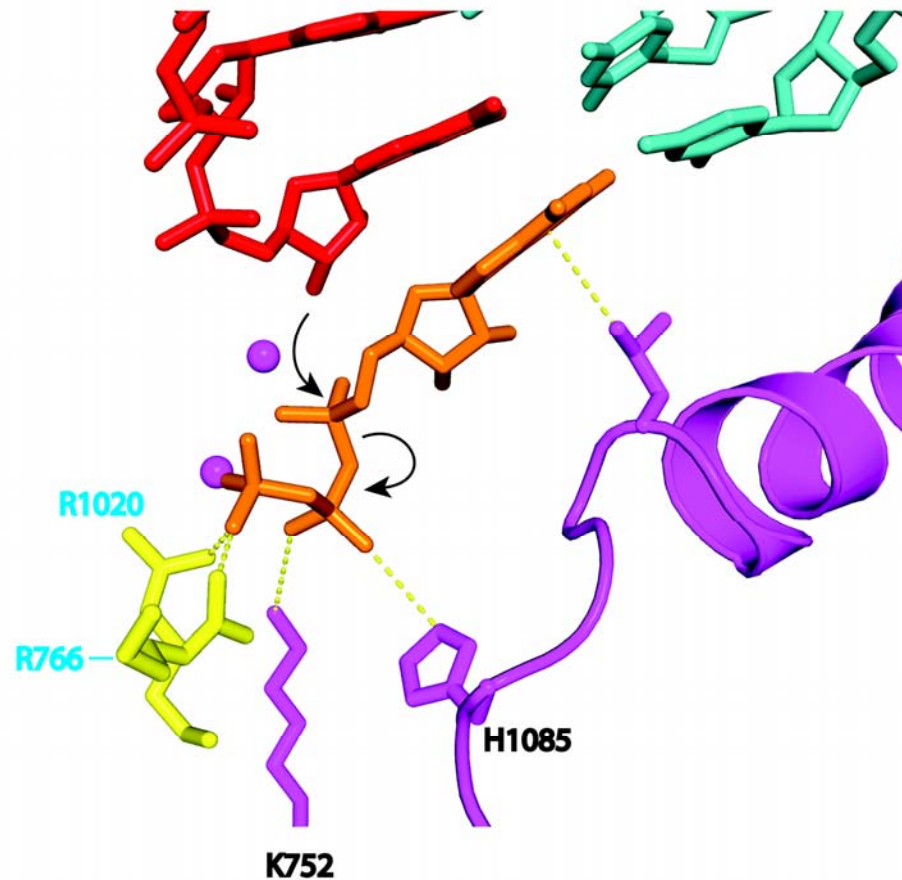
Trigger Loop Network



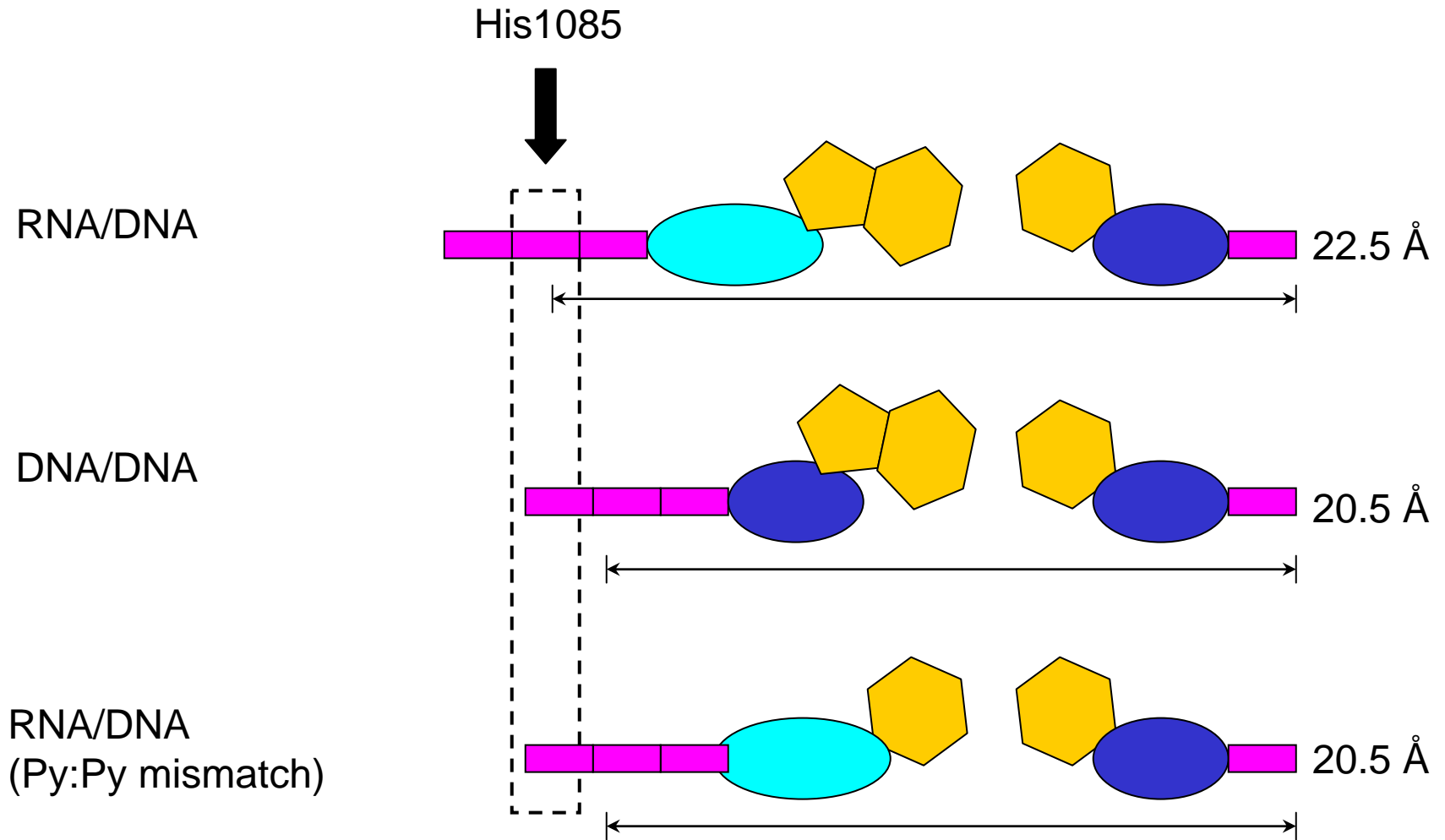
Nucleotide selection in RNA chain extension from 10 to 11 residues



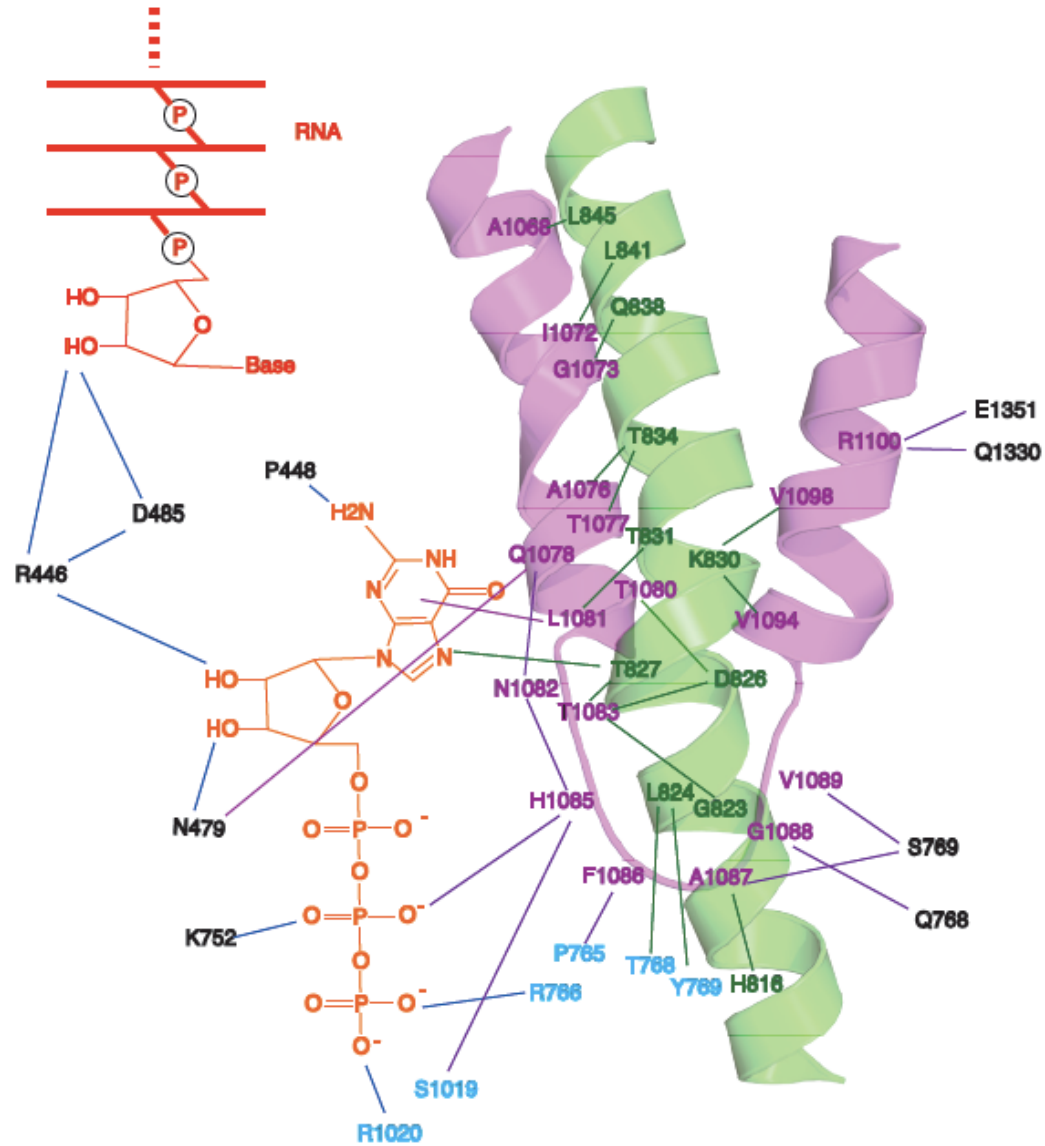
Trigger loop couples nucleotide selection to catalysis



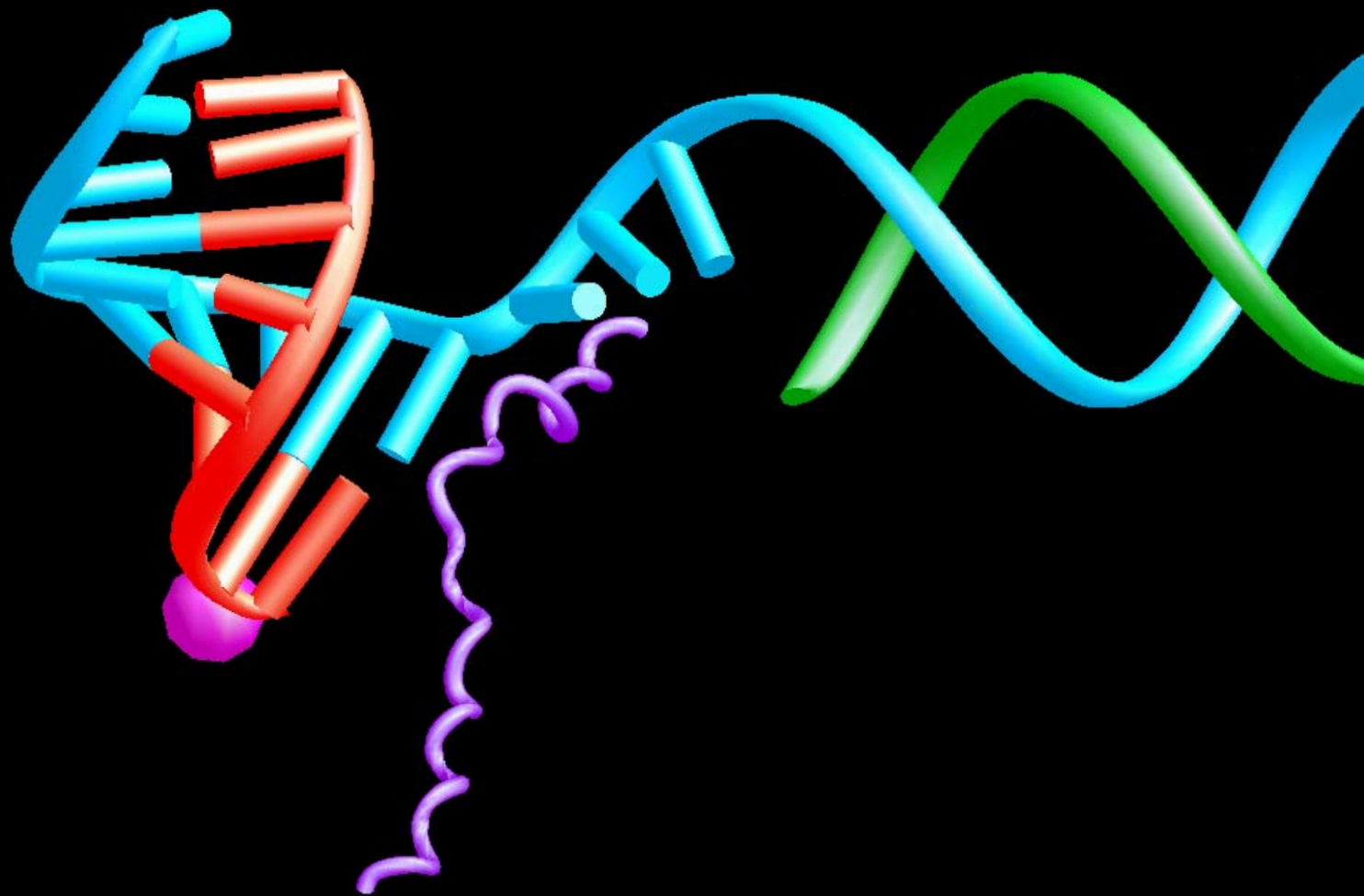
Nucleotide selection by alignment with the trigger loop, coupling recognition to catalysis

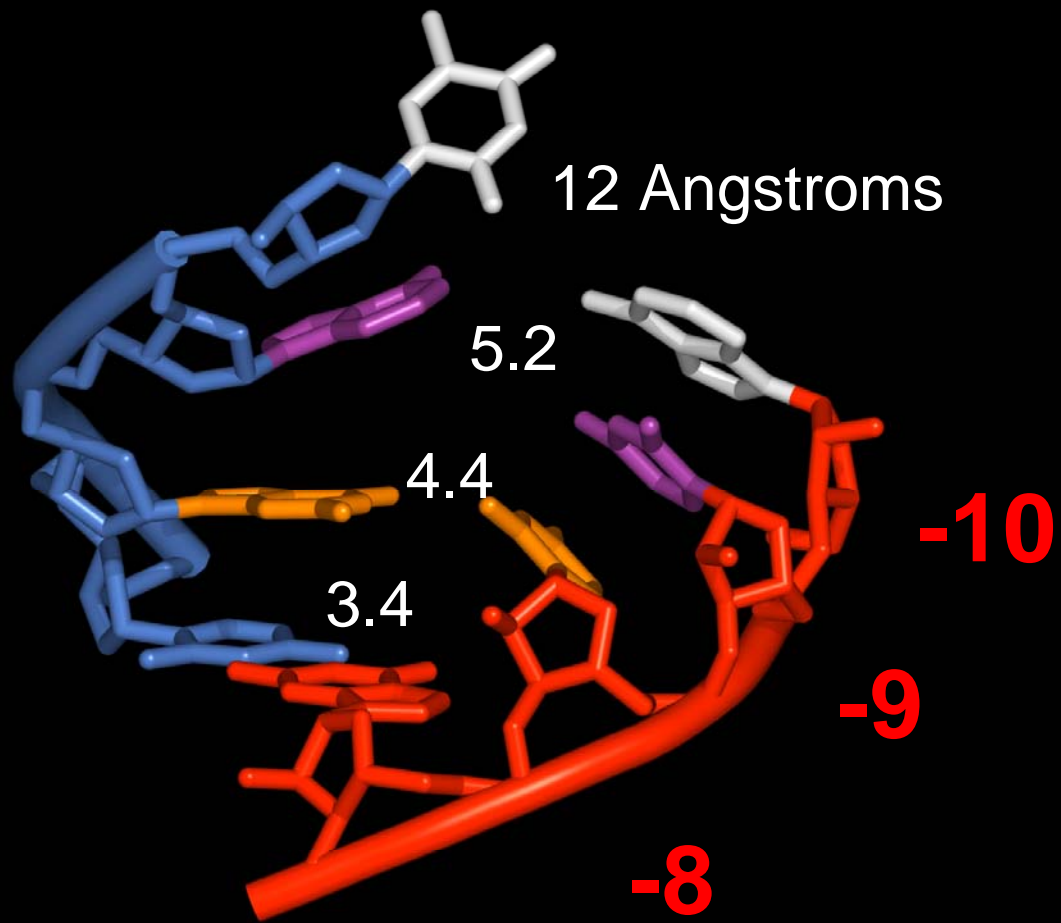


Trigger Loop Network









■ Template DNA

■ RNA

