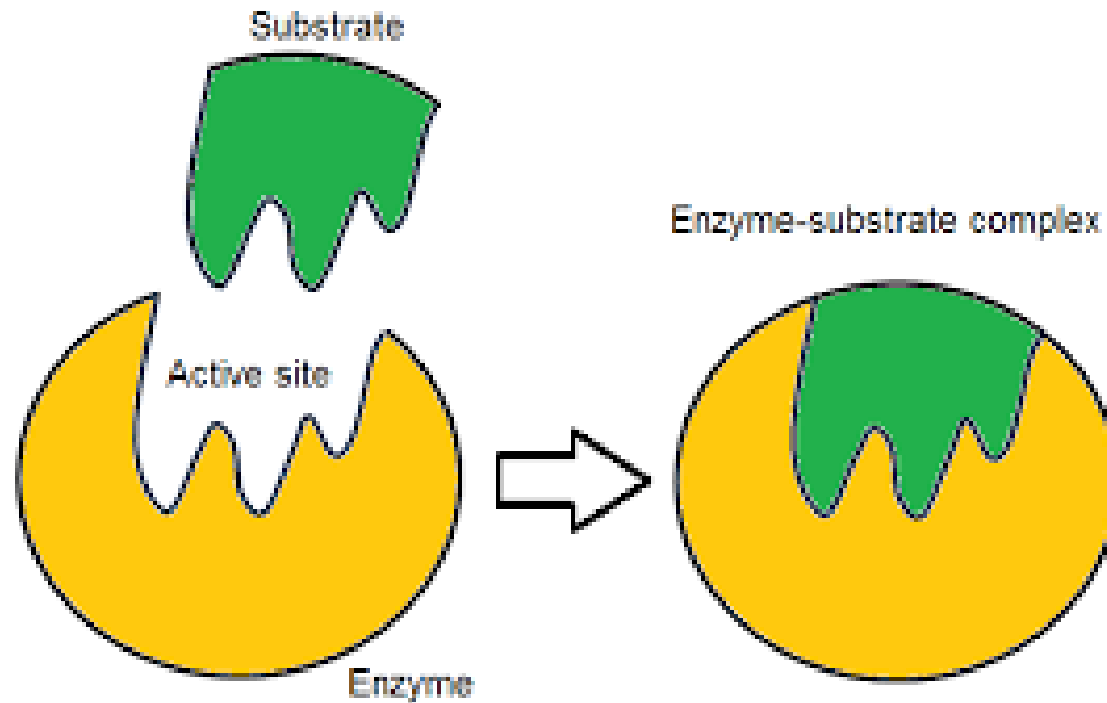


Molecular recognition

- The term *molecular recognition* refers to the specific interaction between two or more molecules through noncovalent bonding such as hydrogen bonding, metal coordination, hydrophobic forces etc.
- In biology molecular recognition could be often described using a lock and key model

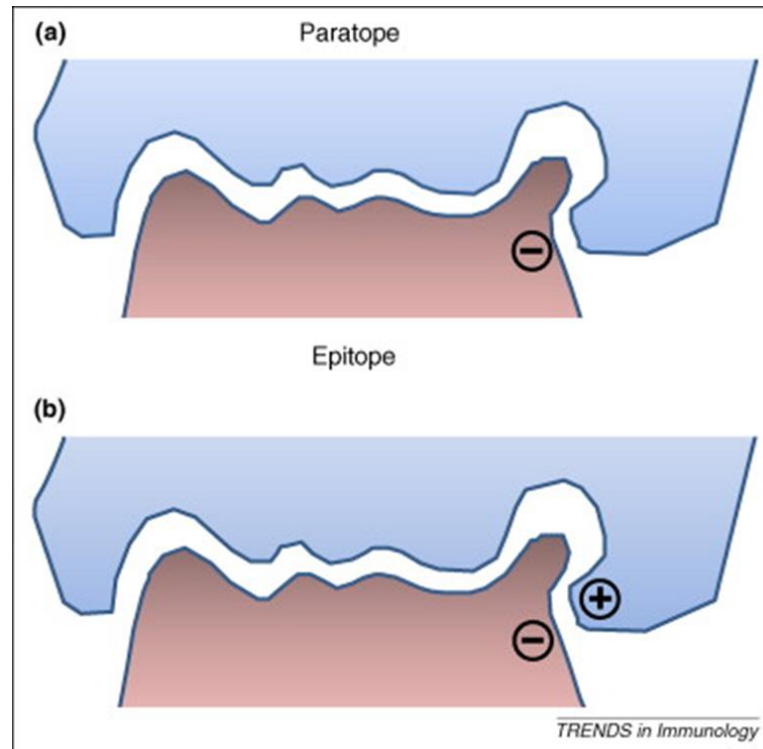
Lock and key model

- Complex 3D shapes of interacting molecules fit each other like lock and key:



Lock and key model

- Electrostatic profile of the interacting molecular shapes is essential in lock and key type of interactions:



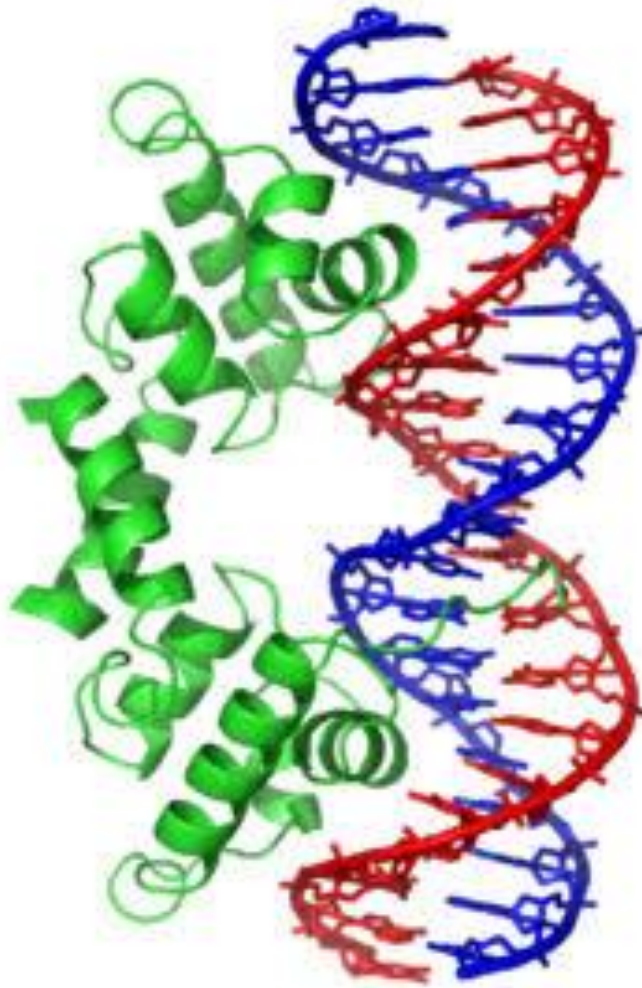
DNA-binding proteins

- There are many proteins in living cells that have ability to bind to single- or double-stranded DNA.
- Binding of a protein to DNA could be either non-specific or specific. Non-specific DNA-protein interactions are not dependent on the DNA sequence.
- Proteins that bind to specific DNA sequences play important role in DNA transcription regulation.

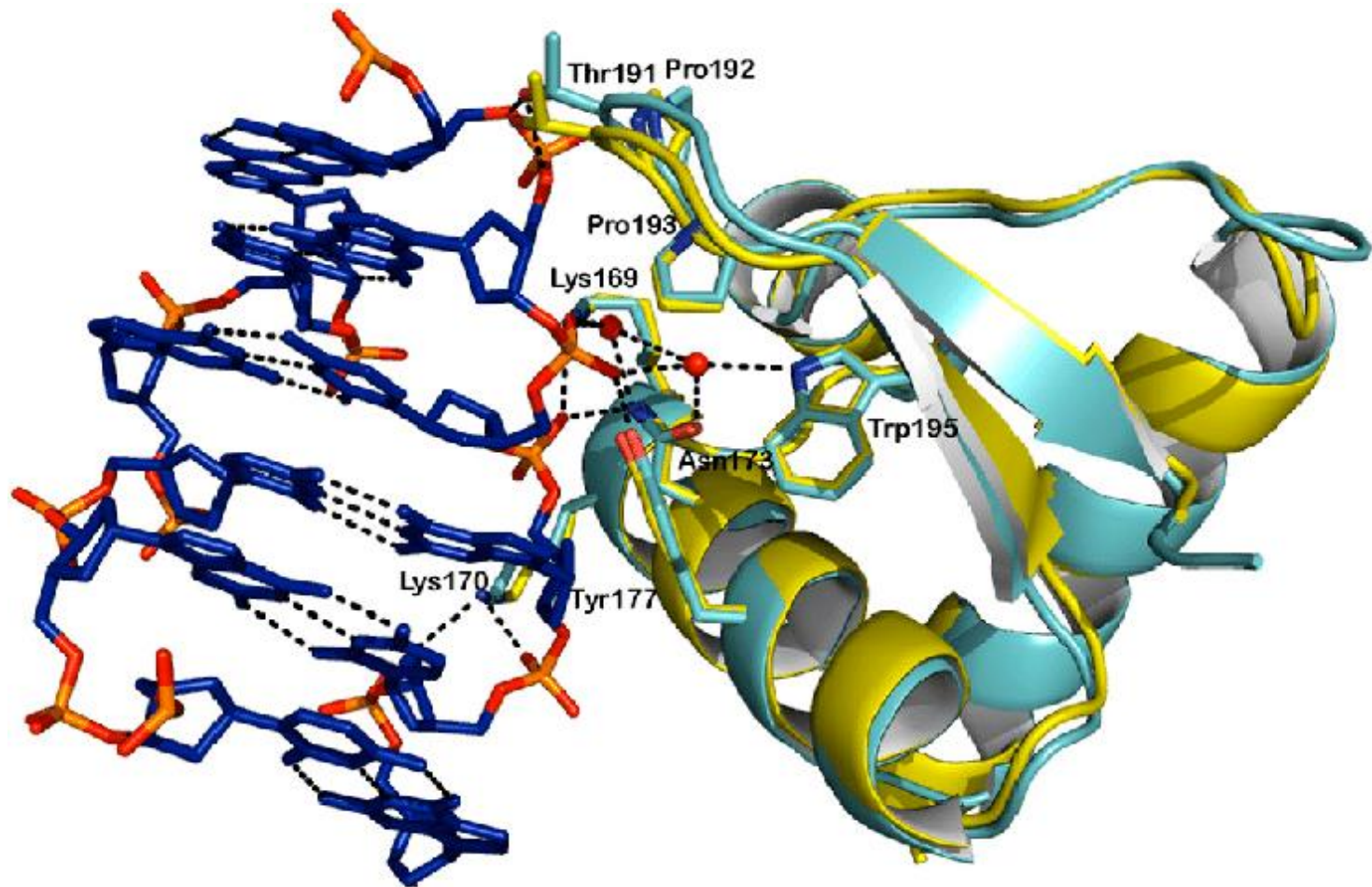
DNA-binding domain

- *DNA-binding domain* is the part of a DNA-binding protein which is responsible for the protein interaction with DNA.
- This interaction occurs through mechanisms of molecular recognition.
- The majority of sequence-specific DNA-binding domains interact with the major groove of DNA, because it exposes more functional groups that identify a base pair.

DNA-protein interaction

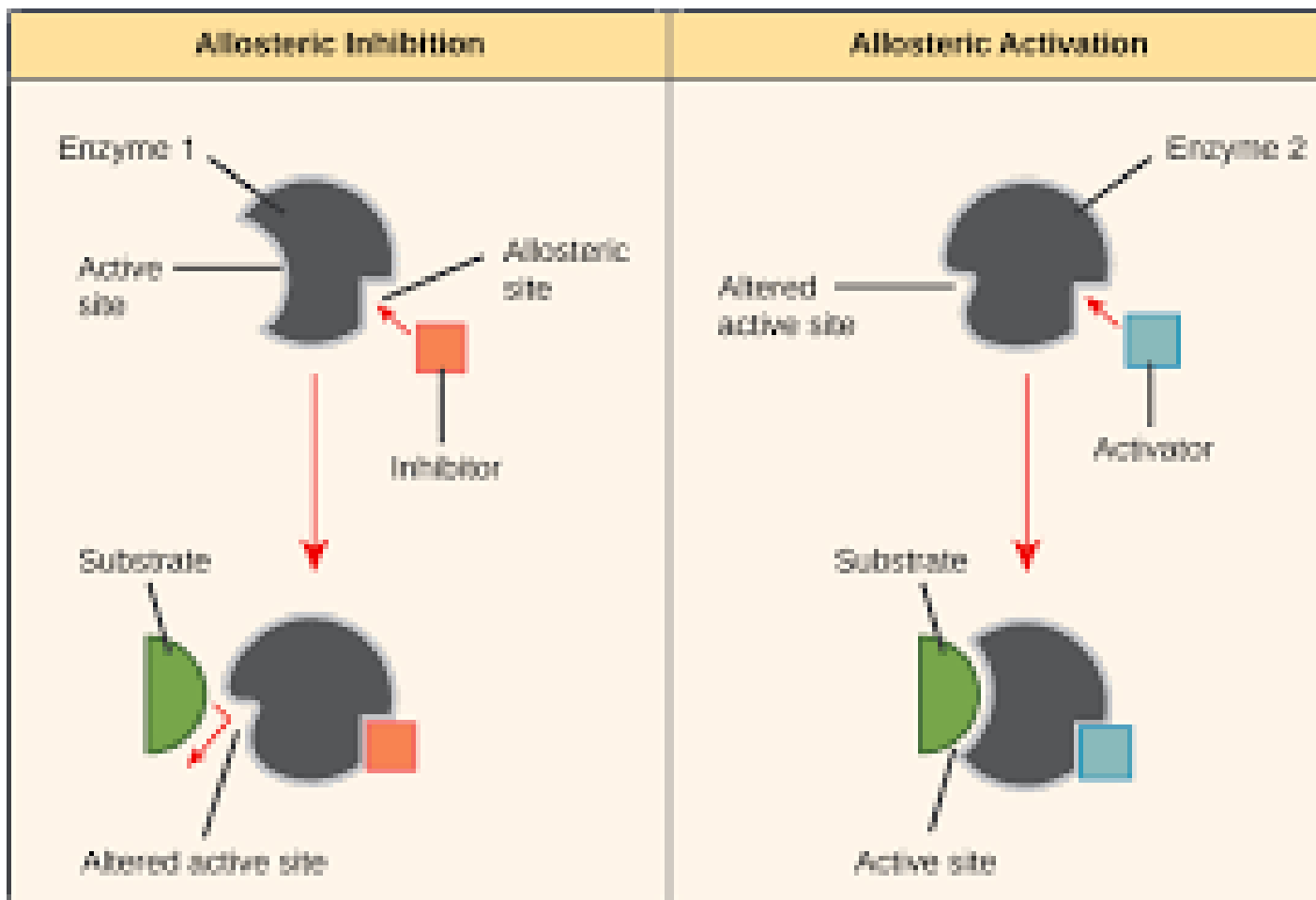


DNA-protein interaction, close-up



Allosterism

- Allosterism (allosteric behavior) is defined as the situation where activity of a protein is altered as a consequence of some molecule binding at a site different from the active site.



- DNA-protein interactions are often regulated through allosteric mechanisms:

