

DNA Interactions with Proteins

Created: Wednesday, 20 July 2011 05:06 | Published: Wednesday, 20 July 2011 05:06 | Written by [Super User](#) | [Print](#)

How DNA interact with proteins?

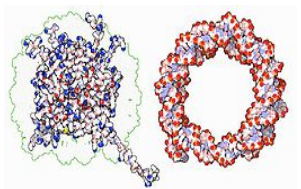
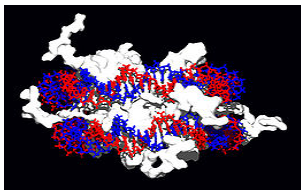
Interactions with proteins



Interaction of protein decides all the functions of DNA. Proteins help DNA to perform the functions.

These [protein interactions](#) can be non-specific. To a single sequence of DNA the protein binds specifically. Not only proteins but also enzymes can bind to DNA. Out of all enzymes, the DNA polymerases play the most important role. DNA polymerases copy the DNA base sequence in transcription process, and the DNA replication is also equally important.

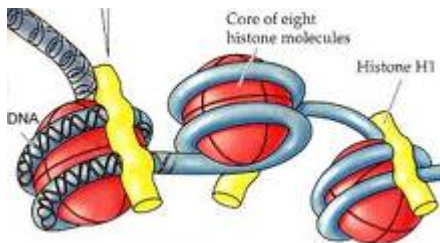
DNA-binding proteins



DNA is present within chromosomes, and it is held in complexes embedded with structural proteins. The structural proteins convert the DNA into chromatin with compact structure. In eukaryotes these small basic proteins called [histones](#) bind to DNA. Many types of proteins are present in prokaryotes.

Nucleosome

The histones form a disk-shaped complex named as [nucleosome](#). It has 2 turns of double-stranded DNA wrapped around its surface. These non-specific interactions are formed through basic residues in the histones making [ionic bonds](#) to the acidic sugar-phosphate backbone of the DNA, and are therefore largely independent of the base sequence.



Methylation, phosphorylation and [acetylation](#) are the chemical modifications of the basic amino acid residues. The strength of the interaction between the DNA and the histones is altered by these chemical changes.

High-mobility group proteins are the nonspecific DNA binding protein that bind to DNA. Arranging nucleosomes as a large structure of chromosomes is done with the help of these proteins.

DNA binding proteins bind single-stranded DNA specifically. These binding proteins stabilize the single-stranded DNA and protect it from many issues like [stem-loops](#) formation or [nucleases](#) degradation.

Transcription factors:

[Transcription factors](#) regulate transcription process. Transcription factors bind to DNA in 2 ways.

1. They can bind the RNA polymerase which is responsible for DNA transcription. It is done either directly or through mediator proteins. This helps to locate the polymerase enzyme's presence in the promoter region and helps to start transcription.
2. They can bind [enzymes](#) that modify the histones at the promoter. The accessibility of the DNA template to the polymerase is changed by this.

Change in one activity of a transcription process affects thousands of genes. These proteins control the responses to development, environmental conditions and etc.

Want to know more about DNA interaction process? [Click here](#) to schedule live online session with e Tutor!

About eAge Tutoring:

[eAgeTutor.com](#) is the premium online tutoring provider. Using materials developed by highly qualified educators and leading content developers, a team of top-notch software experts, and a group of passionate educators, eAgeTutor works to ensure the success and satisfaction of all of its students.

[Contact us](#) today to learn more about our tutoring programs and discuss how we can help make the dreams of the student in your life come true!

Reference Links:

- http://en.wikipedia.org/wiki/DNA-binding_protein
- <http://en.wikipedia.org/wiki/Nucleosome>
- http://www.biochem.arizona.edu/classes/bioc568/protein_dna_interactions.htm
- <http://www.youtube.com/watch?v=eYrQ0EhVCYA&NR=1>

