

# Lecture 10 - Genome and Chromatin

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There are sections of the genome, with sequences, where there are inverse sequences on specific proteins. These proteins are called “transcription factors”, and the process is “DNA-binding protein with sequence preference”. The area on the DNA is called the binding site. This process enables the unwrapping of the protein, and the DNA, for generating RNA. This RNA is then converted into proteins, between its own start and stop codons.

This then ties into *immunoprecipitation*, which is the process of precipitating protein antigens out of solution, using an antibody that specifically binds to that protein. This can be used for isolating proteins out of a solution containing thousands of different proteins.

*Histones* are highly basic proteins, that are found in eukaryotic cell nuclei and in most Archaeal phyla. They act as spools around which DNA winds to create structural units called *nucleosomes*. Histones prevent DNA from becoming tangled and protect it from DNA damage. In addition, histones play important roles in gene regulation and DNA replication. Without histones, unwound DNA in chromosomes would be very long. For example, each human cell has about 1.8 meters of DNA if completely stretched out; however, when wound about histones, this length is reduced to about 9 micrometers (0.009 mm) of 30 nm diameter chromatin fibres.