4.2.1

Central Dogma

Strands of nucleic acids are the basis of information storage and carry all necessary instructions to make proteins. This idea is captured as the ***Central Dogma of Molecular* Biology**. At the most simplistic level the dogma explains how DNA makes RNA and how RNA makes protein. At a more specific level there are two major concepts of the central dogma listed below.

1. DNA contains all information necessary to make the macromolecule protein. This information is stored in the cell nucleus and carried out of the nucleus by RNA and delivered to ribosomes. Ribosomes are the factory that "translates" the instructions into a functional protein.

2. When the instructions are translated into a functional protein the process is called gene expression which can be divided into two stages: transcription and translation. Transcription is the process of converting DNA to RNA while translation is the process of delivering the message to the ribosome.

Note: Four types of RNA are utilized in this process: messenger RNA (mRNA), ribosomal RNA (rRNA), transfer RNA (tRNA), and microRNA (miRNA). mRNA is the carrier of information from the DNA. rRNA is the primary component of ribosomes and is thus directly involved in the process of protein synthesis. tRNA is an "adaptor" that serves as the link between the mRNA, the ribosomes and the individual amino acids needed to assemble proteins. Finally, microRNA can modulate gene expression, even "silencing" mRNAs before they arrive to the ribosome.