

**“Transcription and Translation of DNA”**

(Pages 114 - 116 of the text)

**“Transcription”** means : reading a section of DNA and using its info to build a matching strand or molecule of RNA (ribonucleic acid).

Transcription happens in the nucleus of a cell. The steps are summarized here :

1. Enzymes open up the part of DNA that will be read
2. Nucleotides floating inside the nucleus are used to build a matching molecule of RNA like this...

DNA strand (sense strand)

RNA strand would look like this

**THERE IS NO THYMINE (T) IN RNA, IT IS REPLACED BY URACIL (U) !!!!!!!**

3. When the bases are correctly matched, a “backbone” of ribose sugars and phosphates is made to link the whole molecule together. What you have is a molecule of mRNA (messenger RNA) that can move outside of the nucleus and to ribosomes waiting in the cytoplasm.

“Translation” means :                    ribosomes read the mRNA molecule message and use it to make a protein (a series of linked amino acids).

Translation happens in the cytoplasm of a cell, and ribosomes are an important part of this process. Ribosomes are made up of ribosomal RNA ( rRNA ). The steps are summarized here :

1. The mRNA molecule travels to a ribosome. The ribosome moves along the mRNA until it reaches the “initiator codon” (AUG). The ribosome attaches at this spot and starts reading.
2. The ribosome (rRNA) reads the bases in groups of three, called a “codon”. Each codon will match up with a new molecule : tRNA (transfer RNA). You need a little background info here : there are 20 kinds of amino acids (listed in table 7-1, page 116). Each amino acid can attach to one kind of transfer RNA (look at its shape on page 114). The bottom 3 bases make sure it can only attach to one kind of nucleotide. These 3 bases are called the tRNA’s “anticodon”. Most amino acids have more than one possible codon (they have the first two bases the same though) and so the code is sometimes called a “degenerating” or “degenerative” code.
3. As the ribosome moves along mRNA, codons of bases are read, each one is matched up with the right tRNA and amino acid combo. As the ribosome keeps reading, and tRNA’s are being lined up, a string of amino acids are lined up. They are joined with “peptide bonds” and voila ! You have a protein.