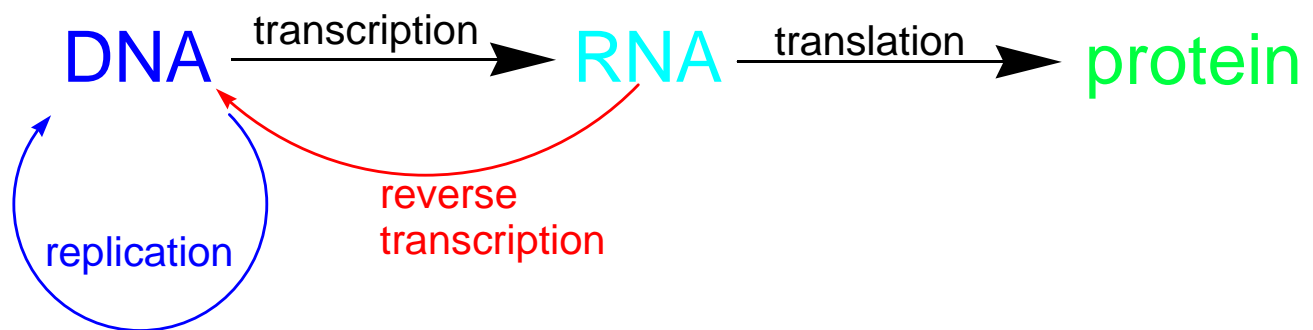


Information storage & expression: The Central Dogma

All living things [and many viruses] store the information needed to produce the various molecules that do the jobs needed for them to remain alive [in the case of viruses, perpetuate their genome] in deoxyribonucleic acid (DNA). The conversion of the information from DNA to job doing forms is sometimes called The Central Dogma. Based on what you know of science, must there be some irony intended in that name? (If that isn't clear, look up the meaning of dogma.)

The Central Dogma



The key to high fidelity replication, transcription (& reverse transcription), and translation is Watson-Crick base-pairing that occurs between A and T (U in RNA) and G and C. The capabilities of the enzymes catalyzing these reactions also influence fidelity of information transfer. Fidelity in translation is also dependent on high specificity recognition of amino acids and their respective tRNAs. This is determined by the selectivity of the enzymes that catalyze linkage of amino acids to tRNAs.

To prepare for the lectures on Nucleic Acids, you should view a series of animations on the processes in The Central Dogma.

Go to <http://www.dnai.org/>, click on Code, then click on **Copying the Code**.

- 1) If you have no previous experience with this subject, go through the pieces of the puzzle section.
 - 2) If you have some previous experience, click on putting it together and view the Replication and Transcription animations and do the Interactive exercise.
 - 3) Next click on **Reading the Code** and follow the same pattern as above (in #1 & 2).
- Regardless of your experience level, go to the pieces of the puzzle section and click on the puzzle piece labeled The genetic code and view that animation. Be sure to view the Translation animation and go through the Interactive exercise before you leave the web site.

Question: After studying this material, do you have an idea how wild type DNA would have to change to go from coding for Glutamic acid at the 6th position of the beta chain of hemoglobin to coding for Valine at the 6th position of the beta chain? (*i.e.*, How did the Sickle-cell mutation come into existence?)