

Central Dogma of Biology POGIL

PROTEIN SYNTHESIS

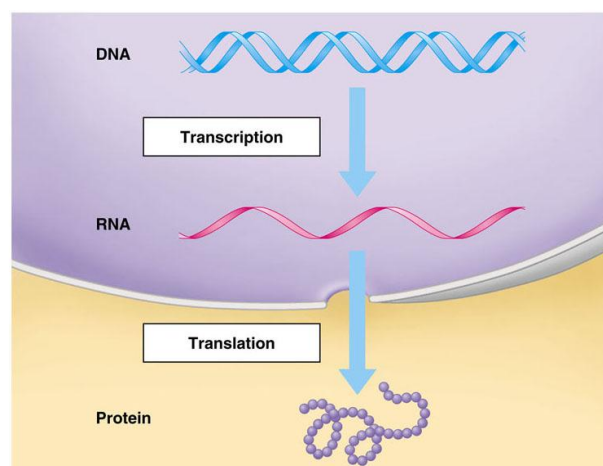
Use the diagrams and text provided & your textbook (which is online) to answer the following questions.

Module 1: Pre-Thinking Questions

1. What molecule does DNA store the instructions for building?
2. Where is DNA located in a eukaryotic cell? Prokaryotic cell?
3. Where are proteins made?
4. How do you think the information stored in DNA gets to the ribosomes in the cytoplasm?

Module 2: The flow of information in Eukaryotic Cells

Figure 1: This figure shows the flow of information in cells from the DNA in the nucleus to a molecule called RNA to the creation of proteins in the cytoplasm. It was discovered that RNA, which is similar but not identical to DNA, moves from the nucleus to the cytoplasm. RNA is a nucleic acid polymer composed of nucleotides like DNA. However, RNA uses the sugar ribose and the nitrogen base uracil, instead of DNA's deoxyribose and thymine. Also RNA is a much smaller molecule than DNA.



5. Fill in the blank:
DNA → Protein
6. What are at least 3 differences between DNA and RNA?

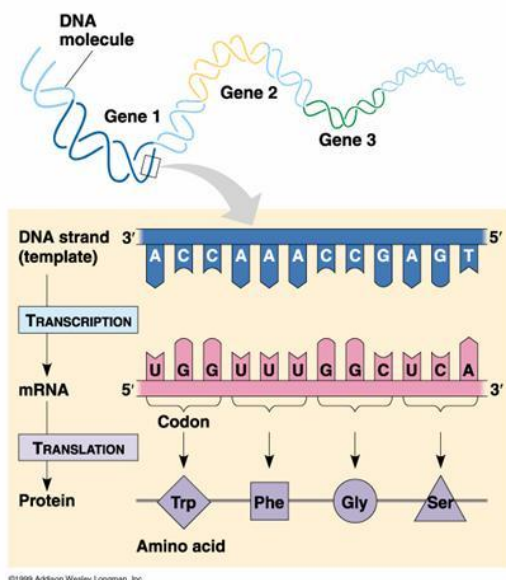
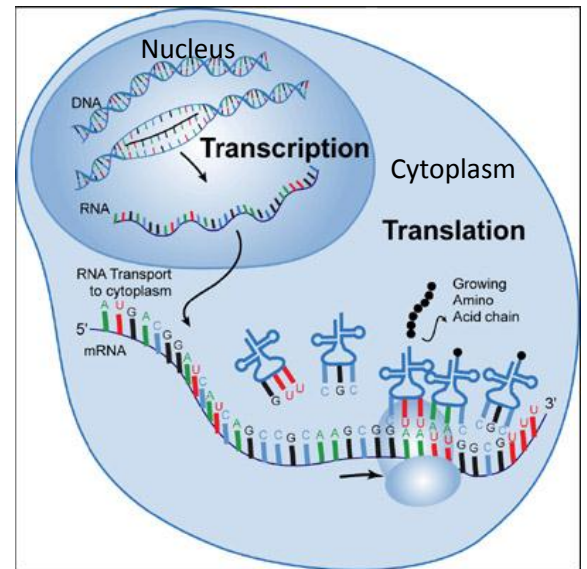


Figure 2: This figure shows the flow of information in a little more detail.

7. What is the process of going from DNA to RNA called? (hint it starts with a T)
8. Look at how the DNA and RNA pair. What does the U in RNA pair with? How is this different from the base pairing rules in DNA?
9. What is the process of going from RNA to protein called? (hint it starts with a T)
10. How many letters of RNA code for an amino acid?

Figure 3: This diagram shows the processes of transcription and translation where they occur in a eukaryotic cell.

11. What is the purpose of transcription? (What does it make?)
12. Where does this process occur?
13. Transcribe the following DNA template into RNA: ATC GGA TAC (look back at figure 2 for help if you need it)
14. What is the process of translation? (What does it make?)
15. Where does this process occur?



Module 3: The 3 Types of RNA.

In any cell, only some of the genes are expressed, that is, transcribed into RNA. There are 3 major types of RNA, each encoded by its own type of gene:

- mRNA - Messenger RNA has the instructions for how to make the protein encoded within its sequence.
- tRNA - Transfer RNA attaches to amino acids and then transfers them to the ribosome during translation.
- rRNA - Ribosomal RNA combines with ribosomal proteins to make up the actual ribosome.

16. Module 3 states that only some genes are expressed. Why do you think that this is true? Why would you express a gene? Why wouldn't you?

17. What types of RNA does DNA make?

