

Translation Questions:

1. Explain why a cell needs both mRNA and tRNA in order to synthesize a protein. First, explain their functions.

2. How do tRNA and mRNA work together to result in the right amino acids in the right sequence as a polypeptide is synthesized?

3. a) Why it makes sense to use the word translation to describe this part of protein synthesis.

b) Explain why it would not make sense to use the word translation to describe mRNA synthesis (transcription).

4. In the table below, compare the DNA for the *Beginning of the Normal Hemoglobin Gene* vs. the *Beginning of the Sickle Cell Hemoglobin Gene*. What is the only difference?

<i>Beginning of Normal Hemoglobin Gene</i>	CACGTAGACTGAGGACTC					
Transcription produces:	codon 1	codon 2	codon 3	codon 4	codon 5	codon 6
<i>Beginning of Normal Hemoglobin mRNA</i>						
Translation produces:	amino acid 1	amino acid 2	amino acid 3	amino acid 4	amino acid 5	amino acid 6
<i>Beginning of Normal Hemoglobin Protein</i>						
<i>Beginning of Sickle Cell Hemoglobin Gene</i>	CACGTAGACTGAGGACAC					
Transcription produces:	codon 1	codon 2	Codon 3	codon 4	codon 5	codon 6
<i>Beginning of Sickle Cell Hemoglobin mRNA</i>						
Translation produces:	amino acid 1	amino acid 2	Amino acid 3	amino acid 4	amino acid 5	amino acid 6
<i>Beginning of Sickle Cell Hemoglobin Protein</i>						

5. How does DNA determine whether you develop sickle cell anemia?

6. Why does a cell need to carry out transcription before translation?

7. To summarize what you have learned, explain how a gene directs the synthesis of a protein. Include in your explanation the words amino acid, anti-codon, codon, cytoplasm, DNA, mRNA, nucleotide, nucleus, protein, ribosome, RNA polymerase, tRNA, transcription, and translation.

8. Considering that we are all made up of the same 4 nucleotides in our DNA, the same 4 nucleotides in our RNA, and the same 20 amino acids in our proteins, why are we so different from each other?