

Protein Synthesis and Mutations Test Study Guide

1. Where in the cell are ribosomes found and what is their purpose?
2. Differentiate between RNA and DNA. Describe any and all differences.
3. What are the three types of RNA and what are their functions?
4. What is transcription and why does it happen?
5. Describe the steps of transcription.
6. Transcribe the following DNA sequence: ATC ACC GCG TTA CAT CTG TTT
7. What is translation and why does it happen?
8. Describe the steps of translation.
9. Differentiate between codon and anticodon.
10. Translate the mRNA sequence you developed in question 6 into an amino acid sequence.
11. How does mRNA know when to start “calling for” amino acids and how to stop “calling for” amino acids?
12. What are mutations?
13. Differentiate between point mutations and frameshift mutations.

14. Differentiate between missense, nonsense, and silent mutations.
15. List the two different types of frameshift mutations.
16. Differentiate between addition and deletion mutations.
17. Why may frameshift mutations be much more detrimental to an organism than point mutations?
18. Transcribe and translate the original DNA sequence. Then, do the same for each mutated DNA sequence. Then, determine the consequence, if any, for each mutation, by circling your choice for each question. You will need to use your codon chart to help you.

Original DNA sequence:	TAC	ACC	TTG	GCG	ACG	ACT
mRNA transcript:						
amino acids:						

Mutated DNA sequence #4:		TAC ACC TTG GCG ACT ACT					
mRNA transcript: (Circle any changes)							
amino acids:							
Type of mutation (Circle one.)	Point ⇔	Substitution		Frameshift ⇔	Insertion	or	Deletion
How did the mutation affect the amino acid sequence (protein)? (Circle one.)	No change	1 amino acid changed	Premature stop signal	No stop signal	1 amino acid added/deleted		All the amino acids changed after the point of mutation

Mutated DNA sequence #5:		TAC ACC TTG GGA CGA CT					
mRNA transcript: (Circle any changes)							
amino acids:							
Type of mutation (Circle one.)	Point ⇔	Substitution		Frameshift ⇔	Insertion	or	Deletion
How did the mutation affect the amino acid sequence (protein)? (Circle one.)	No change	1 amino acid changed	Premature stop signal	No stop signal	1 amino acid added/deleted		All the amino acids changed after the point of mutation