

CHAPTER 4	Gene Mutations and Proteins	BLM 4-5
HANDOUT		ANSWERS

Objective: To demonstrate how gene mutations affect the production of proteins.

Procedure

- Use the following base sequence of one strand of an imaginary DNA molecule:
AAT TGA ACA CAT GCG CCC
- Write the base sequence for an mRNA strand that would be transcribed from the given DNA sequence. Place your results in the table below.
- Use a codon table to determine the sequence of amino acids in the resulting protein fragment. Place your results in the table below.
- If the fifth base in the original DNA strand were changed from G to C, how would this affect the resulting protein fragment? Write the new protein fragment in the table below.
- If G were added to the original DNA strand after the third base, what would the resulting mRNA look like? How would this addition affect the protein? Show your results in the table below.

Data

mRNA from Step 2	UUA ACU UGU GUA CGC GGG
Protein Sequence from Step 3	LEUCINE THREONINE CYSTEINE VALINE ARGININE GLYCINE
Protein Sequence from Step 4	LEUCINE SERINE CYSTEINE VALINE ARGININE GLYCINE
MRNA from Step 5	UUA CAC UUG UGU ACG CGG G
Protein Sequence from Step 5	LEUCINE HISTIDINE LEUCINE CCYSTEIN THREONINE ARGININE

Conclusions

- Which change in DNA was a point mutation? Which was a frameshift mutation?

Step 4 was a substitution point mutation. In step 5, adding one base shifted the reading of the sequence.

- In what way did the point mutation affect the protein?

Only one base was changed. The protein may be totally functional, partially functional, or not functional at all. It will depend on how protein takes on its 3-D shape with this one change of amino acid.

- How did the frameshift mutation affect the protein?

The protein created has a very different amino acid sequence and therefore it would not fold the same way and would not be functional.