DNA polymerase is far from perfect. When DNA is being replicated, DNA polymerase makes 1 mistake approximately every 10,000 base pairs. There are proofreading enzymes that come along and fix these mistakes, reducing the rate of error to 1 in 1-10 million. However, when you consider that each strand of DNA is approximately 2 billion base pairs long, and you have 46 strands in each cell, that is still a pretty high rate of error. Mistakes that occur within the genetic code when DNA is being replicated are called **mutations**. Even one change in a single base pair can alter the structure and function of an important protein.

*Complete the transcription and translation of the DNA sequence below, then use it to compare to the altered DNA, mRNA, and amino acid sequences in the chart below.*

normal DNA: TAC GGC AAT GAG TTG TTT ACT

mRNA:

amino acid chain:

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of Mutation** | **DNA** | **mRNA** | **Amino Acid Sequence** |
| Silent Point Mutation | TAC GGT AAT GAG TTG TTT ACT |  |  |
| Missense Point Mutation | TAC CGC AAT GAG TTG TTT ACT |  |  |
| Nonsense Point Mutation | TAC GGC ATT GAG TTG TTT ACT |  |  |
| Frameshift Mutation (Insertion) | TAC GAG CAA TGA GTT GTT TAC T |  |  |
| Frameshift Mutation (Deletion) | TAC GCA ATG AGT TGT TTA CT |  |  |