**Mutations Practice #1**

*DIRECTIONS: Identify the type of mutation (insertion, deletion, silent, missense, nonsense) in the examples below and describe how the protein is* ultimately affected by the mutation.

**Example #1:**

Wild type mRNA: A U G A A A U U C C G A A C U U C A U A A

Mutant mRNA: A U G U A A U U C C G A A C U U C A U A A

Type of Mutation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Effect on Protein being translated: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Example #2:**

Wild type mRNA: A C U A U G C C G C U A A A U G C A A U U U A A

Mutant mRNA: A C U A U G C C C G C U A A A U G C A A U U U A A

Type of Mutation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Effect on Protein being translated: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Example #3:**

Wild type mRNA: C G U U U A A U G C G G C A U G A U U A G A U U

Mutant mRNA: C G U U A A U G C G G C A U G A U U A G A U U

Type of Mutation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Effect on Protein being translated: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Example #4:**

Wild type mRNA: A G U U U A A U G C C U U A C U U A G G U C U A U A G A C U

Mutant mRNA: A G U U U A A U G C C G U A C U U A G G U C U A U A G A C U

Type of Mutation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Effect on Protein being translated: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Example #5:**

Wild type mRNA: A G C A U G C G G U U G G C G C C A G G A U A A U G G U

Mutant mRNA: A C C A U G C G G U U G G C G C C A G G A U A A U G G U

Type of Mutation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Effect on Protein being translated: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Example #6:**

Wild type mRNA: A G C A U G C G G U U G G C G C C A G G A U A A U G G U

Mutant mRNA: A G C A U G C G G C G G U U G G C G C C A G G A U A A U G G U

Type of Mutation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Effect on Protein being translated: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Example #7:**

Wild type mRNA: C G U U U A A U G C G G C A U G A U U A G A U U

Mutant mRNA: C G U U U A A U G C G G C A U G A U A G A U U

Type of Mutation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Effect on Protein being translated: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Example #8:**

Wild type mRNA: U U A A U G C G G C A U G A U U A G A U U U G A

Mutant mRNA: U U A A U G C G G C A U G A C U A G A U U U G A

Type of Mutation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Effect on Protein being translated: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Mutation Practice #2**

 DNA: TAC ACC CCT GCT CAA CAG TTA ACT

1. Above is a sequence of DNA. Use this template chain to make a sequence of mRNA.
2. Use the Genetic Code chart to list the amino acid sequence that would result from this mRNA chain.
3. Below are several examples of mutations. For each, identify where the error occurs, and identify the type of error that has occurred – frameshift or point (specify silent, nonsense, or missense). You may have to look at the genetic code chart to determine the type of point mutation. Identify any amino acid changes to support your answer.
	1. AUG UGG GGC CGA GUU GUC AAU UGA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. AUG UAG GGA CGA GUU GUC AAU UGA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. AUG UGG GGA CGA GUU GUC AAC UGA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	4. AUG UGC GGA CGA GUU GUC AAU UGA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	5. UGU GGG GAC GAG UUG UCA AUU GA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	6. AUG UGG GGA CAG AGU UGU CAA UUG A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	7. AUG UGG GGA CGG GUU GUC AAU UGA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Which of the above (a-g) would result in no change in the protein made?
5. Which of the above (a-g) would likely result in no protein being made?
6. Which of the above (a-g) would likely result in the WRONG protein being made?
7. Compare the amino acid sequence for the set of proteins below. List the possible codons for each amino acid that differs, and identify the type of mutation that would have caused this to occur.

Neuropressin: Met-Try-Gly-Arg-Iso-Val-Asp

Glycophorin: Met-Try-Gly-Arg-Val-Val-Asp