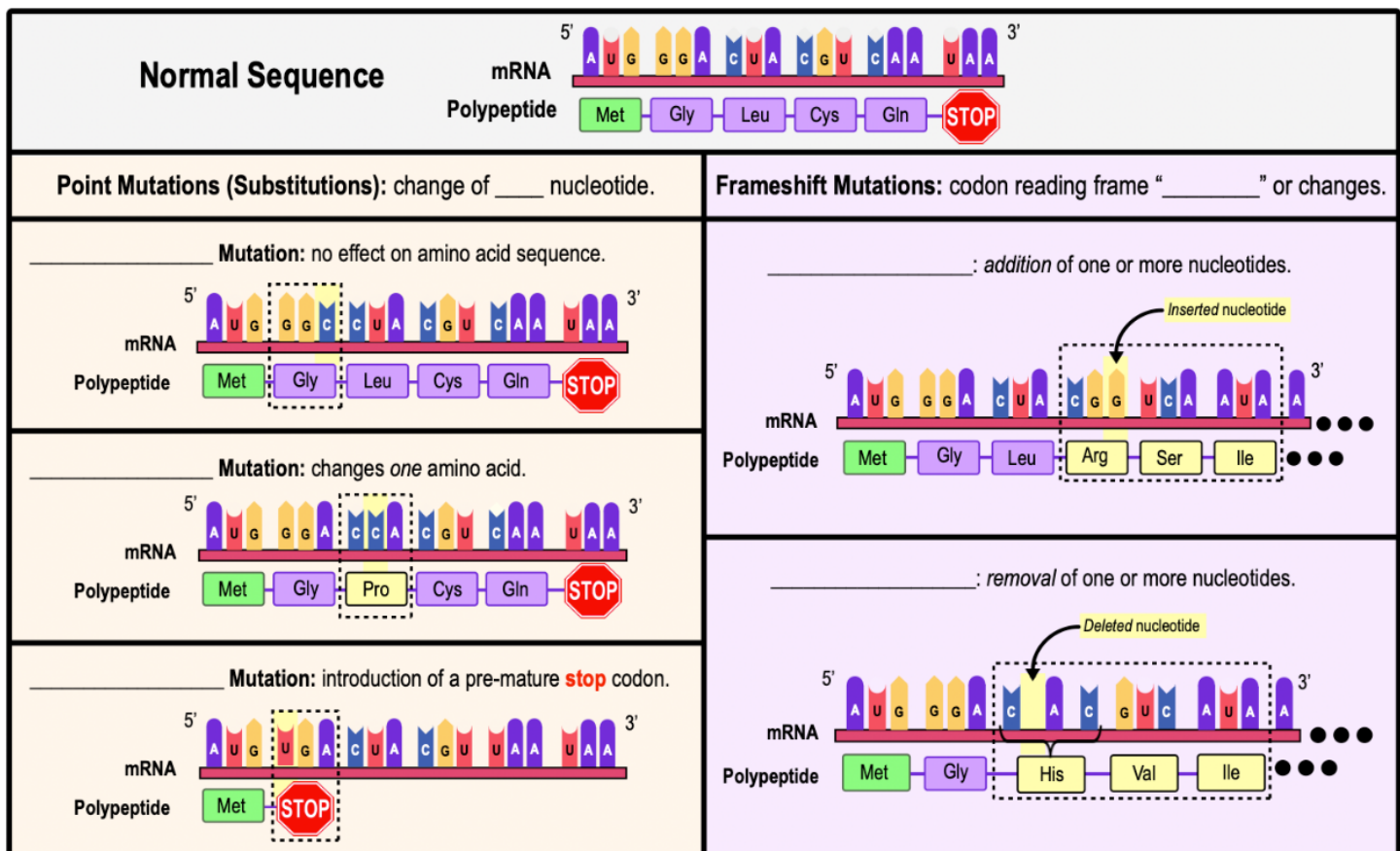


CONCEPT: MUTATIONS

- **Mutations:** permanent _____ in the _____ sequence.
 - Mutations in the DNA, can impact the _____ (via transcription), which can impact proteins (via translation).
 - Can either be harmful, beneficial or neutral in terms of their impact/result.
 - Can occur _____ or can be *induced* by environmental factors or chemical agents (*mutagens*).
- Mutations are largely responsible for the tremendous _____ found amongst organisms.

Types of Mutations

- There are several types of mutations including the following:



PRACTICE: Which of the following mutations, occurring just after the start codon in the mRNA is likely to have the most serious effects on the polypeptide product?

- Deletion of one codon.
- Deletion of one nucleotide.
- Insertion of three nucleotides.
- Substitution of one nucleotide.

CONCEPT: MUTATIONS

PRACTICE: A single base substitution is LEAST likely to be deleterious (dangerous) when the change results in _____.

- a) Replacement of a codon specifying a hydrophilic amino acid with a codon that specifies a hydrophobic amino acid.
- b) Replacement of a codon which codes for an amino acid with a stop codon.
- c) The change of a codon specifying a specific amino acid important for the active site of the protein.
- d) Replacement of a codon specifying an amino acid with a redundant codon specifying the same amino acid.

PRACTICE: A section of DNA has this base sequence: AGCGTTACCGT. A mutation in this DNA strand results in this base sequence: AGGCGTTACCGT. What type of mutation does this change represent?

- a) Frameshift mutation.
- b) A missense mutation.
- c) A nonsense mutation.
- d) A silent mutation.

PRACTICE: A nonsense mutation:

- a) Causes an incorrect amino acid to be inserted into a polypeptide chain.
- b) Causes synthesis of a polypeptide chain to be terminated prematurely.
- c) Prevents the start of translation.
- d) Only affects the mRNA code but does not affect the amino acid sequence of the polypeptide.