CONCEPT: MUTATIONS

●**Mutations**: permanent _____ in the _____ sequence.

□ Mutations in the DNA, can impact the _____ (via transcription), which can impact proteins (via translation).

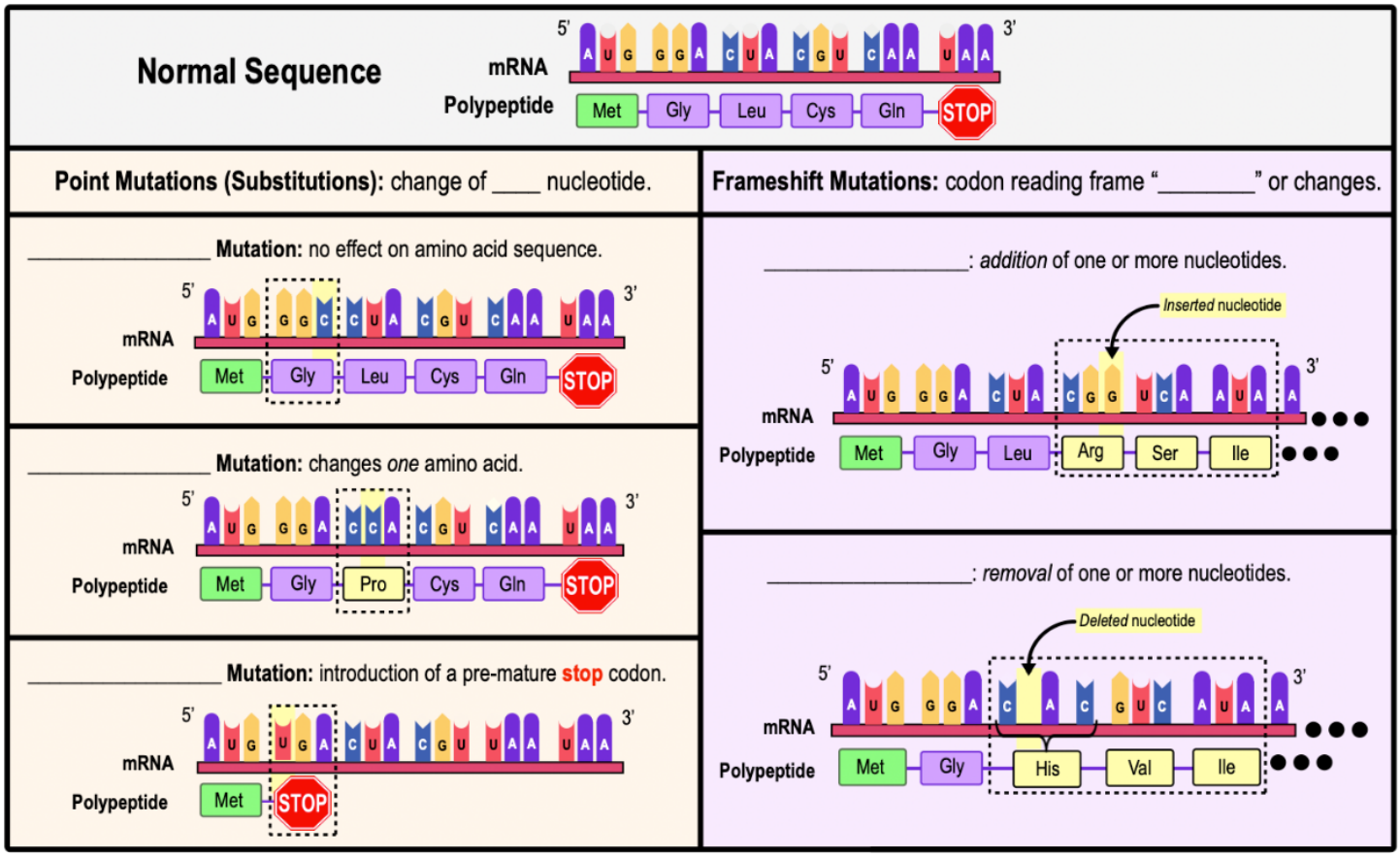
□ Can either be harmful, beneficial or neutral in terms of their impact/result.

□ 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?

a) Deletion of one codon.

b) Deletion of one nucleotide.

c) Insertion of three nucleotides.

d) Substitution of one nucleotide.

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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.