

NAME _____

Deletion, Insertion & Substitution



There are several types of mutations:

✓ **DELETION** (a base is lost/deleted)

✓ **INSERTION** (an extra base is added/inserted)

--- Deletion & insertion may cause what's called a **FRAMESHIFT** mutation, meaning the **reading "frame"** changes, thus changing the amino acid sequence from this point forward

✓ **SUBSTITUTION** (one base is substituted for another)

--- If a substitution **changes** the amino acid, it's called a **MISSENSE** mutation

--- If a substitution **does not change** the amino acid, it's called a **SILENT** mutation

--- If a substitution **changes the amino acid to a "stop,"** it's called a **NONSENSE** mutation



Complete the boxes below. Classify each as **Deletion, Insertion or Substitution AND** as either **frameshift, missense, silent or nonsense** (**Hint:** Deletion & Insertion will always be frameshift).

Original DNA Sequence: T A C A C C T T G G C G A C G A C T ...

mRNA Sequence: A U G U G G A A C C G C U G C U G A

Amino Acid Sequence: MET - TRP - ASN - ARG - CYS - STOP

Mutated DNA Sequence #1 T A C A T C T T G G C G A C G A C T ...

What's the mRNA sequence? A U G U A G A A C C G C U G C U G A (Circle the change)

amino acid sequence? MET - STOP

Will there likely be effects? yes What type of mutation is this? point mutation - nonsense

Mutated DNA Sequence #2 T A C G A C C T T G G C G A C G A C T ...

What's the mRNA sequence? A U G C U G G A A C C G C U G C U G A (Circle the change)

amino acid sequence? MET - LEU - GLU - PRO - LEU - LEU

Will there likely be effects? yes What type of mutation is this? insertion - frameshift

Mutated DNA Sequence #3 T A C A C C T T A G C G A C G A C T ...

What's the mRNA sequence? A U G U G G A A C G C U G C U G A (Circle the change)

amino acid sequence? MET - TRP - ASN - ARG - CYS - STOP

Will there likely be effects? no What type of mutation is this? point mutation - silent

Mutated DNA Sequence #4 T A C A C C T T G G C G A C T A C T ...

What's the mRNA sequence? A U G U G G A A C C G C U G A U G A (Circle the change)

amino acid sequence? MET - TRP - ASN - ARG - STOP

Will there likely be effects? yes What type of mutation is this? point mutation - nonsense

Gene Mutations Packet Answer Key

Jin-Ying Zhang



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