MUTATIONS WORKSHEETS

Name : **Date :**

There are three main types of mutations: point missense mutations, point nonsense mutations, and frameshift mutations. In each of the following DNA sequences, you will use the mRNA and amino acid sequences to identify the mutation that occurred and the effects of each on, if any. Look and analyze carefully! 10 points

Original DNA Sequence: TAC ACC T TGGCGACGACT
mRNA Sequence: AUG UGG AAC CGC UGC UGA
Amino Acid Sequence: Met Trp Asn Arg Cys STOP

Mutated DNA Sequence #1: TAC ATC TTG GCGACG ACT
What's the mRNA sequence?
What will be the amino acid sequence?
Will there likely be effects?
What kind of mutation is this?

Mutated DNA Sequence #2: TAC GAC CTT GGC GAC GAC T
What's the mRNA sequence?
What will be the amino acid sequence?
Will there likely be effects?

What kind of mutation is this?

Mutated DNA Sequence #3: TAC ACC TTA GCG ACG ACT
What's the mRNA sequence?
What will be the amino acid sequence?
Will there likely be effects?
What kind of mutation is this?

Mutated DNA Sequence #4: TAC ACC TTG GCG ACT ACT
What's the mRNA sequence?
What will be the amino acid sequence?
Will there likely be effects?

What kind of mutation is this?

Mutated DNA Sequence #5: TAC ACC TTG GGA CGA CT
What will be the corresponding mRNA sequence?
What will be the amino acid sequence?
Will there likely be effects?
What kind of mutation is this?

1. Which type of mutation is responsible for new variations of a trait?
2. Which type of mutation results in abnormal amino acid sequence?
3. Which type of mutation stops the translation of the mRNA?

Answer Key

MUTATIONS WORKSHEETS

There are three main types of mutations: point missense mutations, point nonsense mutations, and frameshift mutations. In each of the following DNA sequences, you will use the mRNA and amino acid sequences to identify the mutation that occurred and the effects of each on, if any. Look and analyze carefully! 10 points

Original DNA Sequence: TAC ACC T TGGCGACGACT
mRNA Sequence: AUG UGG AAC CGC UGC UGA
Amino Acid Sequence: Met Trp Asn Arg Cys STOP

Mutated DNA Sequence #1: TAC ATC TTG GCGACG ACT
What's the mRNA sequence? AUG UAG AAC CGC UGC UGA
What will be the amino acid sequence? Met stop
Will there likely be effects? Yes, No protein is translated
What kind of mutation is this? Substitution Point missense

Mutated DNA Sequence #2: TAC GAC CTT GGC GAC GAC T
What's the mRNA sequence? AUG CUG GAA CCG CUG CUG A
What will be the amino acid sequence? Met Leu Glu Pro Leu
Will there likely be effects? Yes, useless, damaging protein could be produced since there's not stop codon and energy will be sapped.
What kind of mutation is this? insertion, frameshift

Mutated DNA Sequence #3: TAC ACC TTA GCG ACG ACT
What's the mRNA sequence? AUG UGG AAU CGC UGC UGA
What will be the amino acid sequence? Met Tp Asn Arg Cys stog
Will there likely be effects? NO
What kind of mutation is this? Substitution, Silent mutation due to redundancy in codons

Mutated DNA Sequence #4: TAC ACC TTG GCG ACT ACT
What's the mRNA sequence? AUG UGG AAC CGC UGA UGA
What will be the amino acid sequence? Met Trp Asn Arg stop
Will there likely be effects? Possibly, depends what role that last, one and only missing aa plays in the shape of the protein.
What kind of mutation is this? Point, substitution, missense.

Mutated DNA Sequence #5: TAC ACC TTG GGA CGA CT
What will be the corresponding mRNA sequence? AUG UGG AAC OCU GCU GA
What will be the amino acid sequence? Met Trp Asn Pro Ala
Will there likely be effects? yes
What kind of mutation is this? POINT, DELETION, MISSENSE, frameshift

1. Which type of mutation is responsible for new variations of a trait? substitution
2. Which type of mutation results in abnormal amino acid sequence? frameshift
3. Which type of mutation stops the translation of the mRNA? Point mutation producing a stop codon after Met.