

Mutate a DNA sequence!

Let's review...

The genetic code is the instruction manual that the cell uses to produce the proteins it needs. Proteins are made of amino acids that are strung together in a chain. Each 3-letter codon found on mRNA (the complementary copy of DNA) encodes a specific amino acid. When the code is being 'read' by a ribosome, the amino acids encoded in the mRNA codons are assembled in order to make the protein needed. We also need to remember...

- All proteins begin with the 'start' codon, which codes for the amino acid methionine with the mRNA codon AUG.
- There are three different 'stop' codons that signify the end of a protein chain.
- Different codons can encode the same amino acid.

So, what happens when the bases in a DNA strand is changed or altered in some way? These are DNA mutations...

CHROMOSOMAL MUTATIONS:

Deletion:

Duplication:

Inversion:

Translocation:

Insertion:

GENE MUTATIONS:

Frameshift mutations:

Point mutations:

Jumping genes:

EFFECT ON THE PROTEIN...

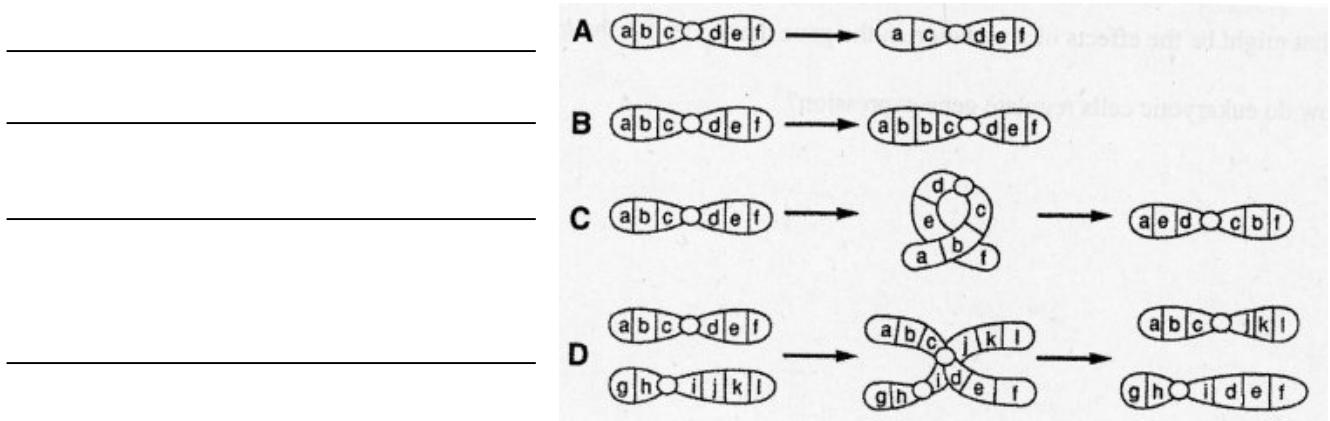
Missense mutations:

Nonsense mutations:

Silent mutations:

PRACTICE PROBLEMS

Write the name of each type of chromosome mutation on the line next to each letter...



Now let's mutate a DNA sequence in several different ways...

Original DNA = TACAAACCCGGGTTTATT
 Original mRNA = AUGUUUGGGCCCAAUAA
 Amino Acid Sequence = _____

1

Original DNA = TACAAACCCGGGTTTATT
 Mutated DNA = TACAAACCCGGCTTTATT
 New mRNA = _____
 Amino Acid Sequence = _____
 What type of mutation would this cause? Silent Missense Nonsense

2

Original DNA = TACAAACCCGGGTTTATT
 Mutated DNA = TACAAACCCGGGGGTTTATT
 New mRNA = _____
 Amino Acid Sequence = _____
 What type of mutation would this cause? Silent Missense Nonsense

3

Original DNA = TACAAACCCGGGTTTATT
 Mutated DNA = TACAAACCCGGGATTATT
 New mRNA = _____
 Amino Acid Sequence = _____
 What type of mutation would this cause? Silent Missense Nonsense

4

Original DNA = TACAAACCCGGGTTTATT
 Mutated DNA = TACAAACCCGGGTTGATT
 New mRNA = _____
 Amino Acid Sequence = _____
 What type of mutation would this cause? Silent Missense Nonsense