**Gene Mutations**

* Mutations are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - changes in DNA code- thus a change in a gene(s)
* In gene mutations, the DNA code will have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a codon

**How common are mutations?**

* Mutations occurs at a frequency of about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ base pairs
* Everybody has about 6 mutations in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cell in their body!

**If I have that many mutations, why don’t I look weird? Mutations are not always seen. The affected gene may still function.**

* Mutations may be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Mutations may be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Mutations may have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**How do mutations affect a population?**

* Mutations are a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in a population increasing biodiversity
* Some Variations \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**How are mutation inherited?**

* Only mutations\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are passed onto offspring
* Mutations in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ only affect the organism in which they occur and are not passed onto offspring

**Types of Gene Mutations**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs when the base sequence of a codon is changed.(ex. GCA is changed to GAA)
2. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Mutations

Normal DNA: CGA-TGC-ATC

New DNA:

* + - A single nitrogen base is substituted for another in a codon.
    - It may or may not affect the amino acid or protein

1. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Mutations

Normal DNA: CGA-TGC-ATC

New DNA:

* + - A nitrogen base is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the sequence.
    - It causes the triplet\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to shift
    - It\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ affects the amino acids and, consequently, the protein

1. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Mutations

Normal DNA: CGA-TCG-ATC

New DNA:

* + - A nitrogen base is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the sequence
    - It causes the triplet\_\_\_\_\_\_\_\_\_\_\_\_
    - It\_\_\_\_\_\_\_\_\_\_\_\_\_\_ affects the amino acids and consequently the protein.
    - Gene Mutations: Which mutations would have the least effect on an organism?
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has the least affect because it changes only\_\_\_\_\_\_\_\_ amino acid or it may change \_\_\_\_\_\_\_\_\_ amino acid

**Gene Mutations: which mutation would have the most effect on an organism?**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mutations have the most effect on an organism because the affect many amino acids and consequently the whole protein through a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When it occurs in the gamete (\_\_\_\_\_\_\_\_\_\_\_\_\_) or early in embryonic development (in stem cells or first few days).

**Mutagens: What causes mutations?**

* + - * Natural errors or an environmental event.
    - What is a mutagen?... something that causes the DNA code to change (mutate)… ex:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**What happens to a person who has a mutation?**

* + - May be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or have no physical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ what so ever

**\*\* IF no effect at all, then it is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**