Source: KBhBIO101MutationsAllealsInheritance

1 | **Mutations**

Mutations are one way by which totally random, not controlled for, and fully spontaneous genetic modifications happen to literally anywhere in any cell's DNA during KBhBIO101CellReproduction. Specifically, it involves an environmental factor or the sheer entropy of things to directly, or indirectly (by causing/creating a oopsie during KBhBIO101DNAReplication) *mutate* the resulting supposed-to-be-exact copy of DNA.

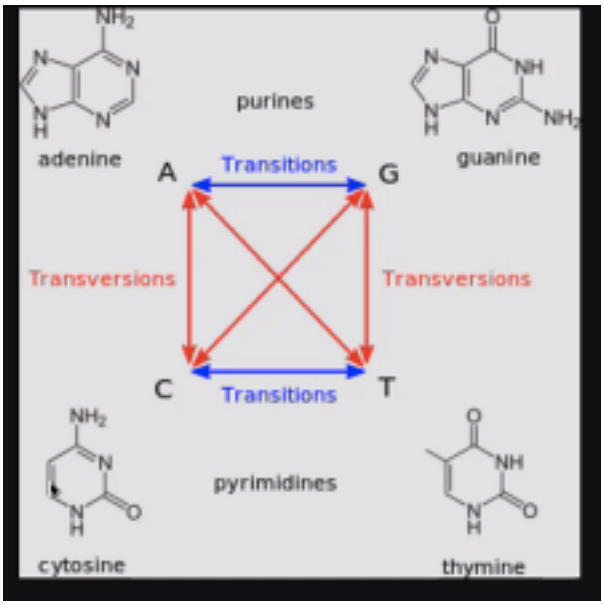
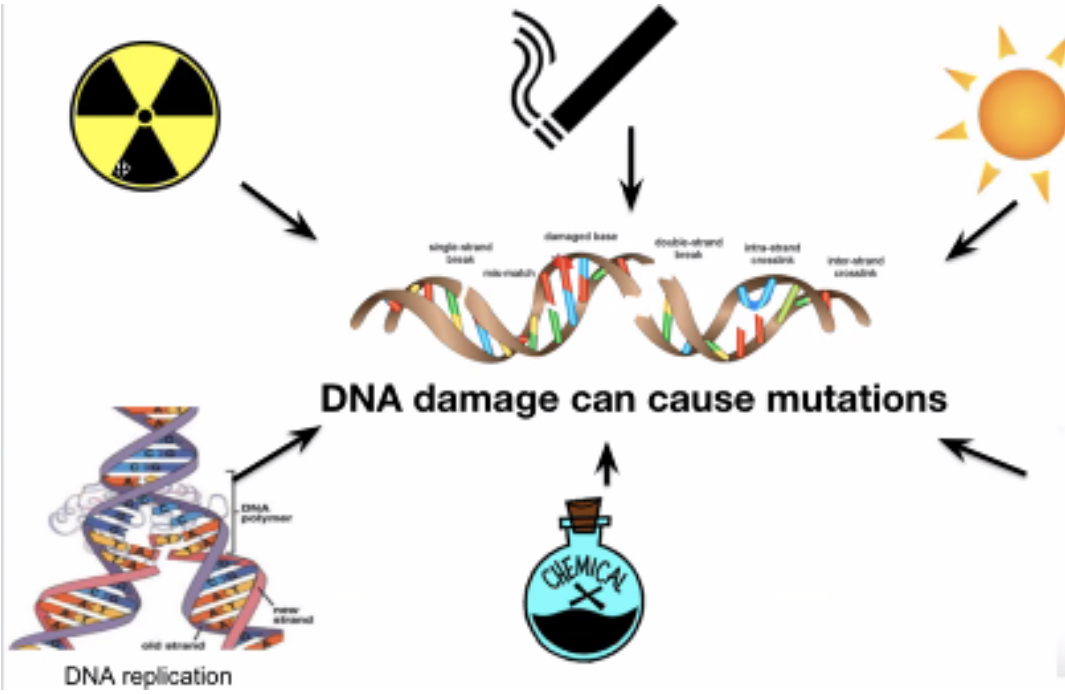


Figure 1: Pasted image 20210331134011.png

Lot's of things cause mutations!



To figure out how mutations work, you first need to know how DNA looks like, so here goes a…

Special Programming! *How does DNA work?*

There are two rought typos of codons on DNA, namely:

- **Pyrimides** - cytosine + thymine. Single ring. Which are usually paired with…
- **Purines** - adenine + guanine. Double ring.

So if a mutation replaces adenine and guanine, it would has less of an effect because a double ring is still matched with a single ring. But if an adenine is replaced by thymine, we could have a bigger issue because double-double ring is much longer than a traditional single/double match.

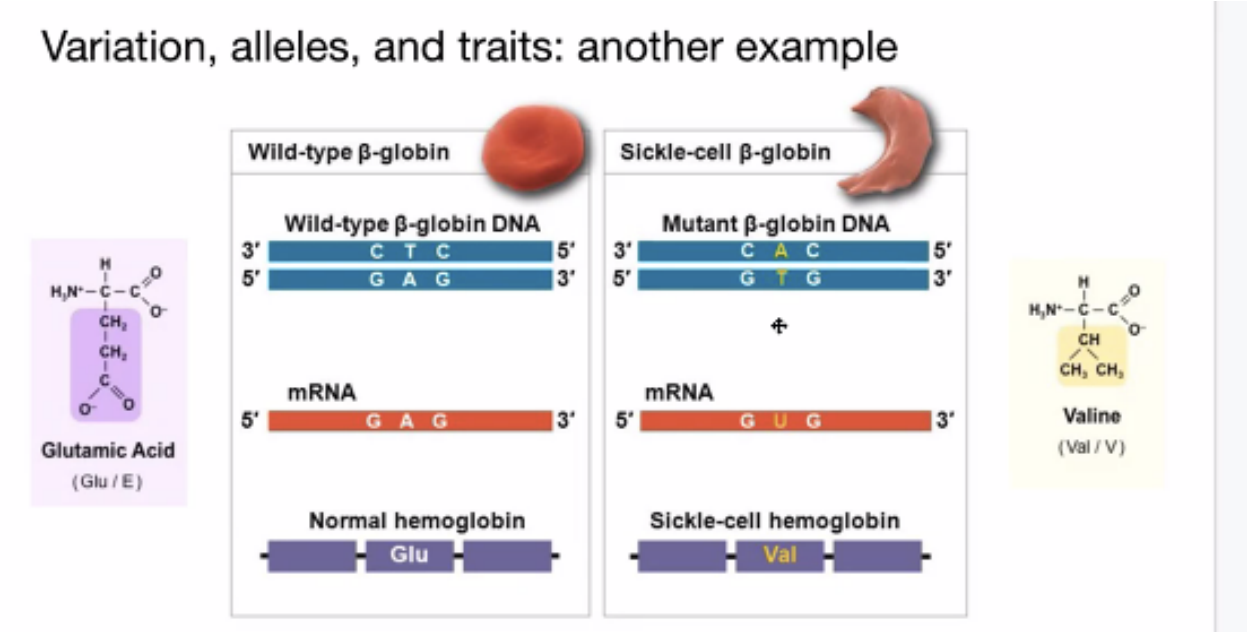
Thank you for coming to this assembly. You could leave now. ***

1.1 | **Mutation Vocab**

Trait: characteristic of organism influnenced by its genes & modified by its enviroment

Phenotype: a collective subset of all the traits (“that looks different from wild type”) in an organism

1.2 | **And now, an example**



Mutant hemoglobin could… 1) with one mutation, cause a slight change in the RBC but cause resistance to malaria 2) with two mutation, cause sickle-cell.

Remember that DNA codes for proteins, so mutations in DNA will cause different proteins BUT not necessarily different traits. In the case of 1-chromasome sickle-cell mutation, a protein is changed but the result is not nocessarily a different RBC.

1.3 | Types of Mutations

There are many types/methods by which DNA mutate. These different types dictate when they happen ([KBhBIO101Meiosis] or [KBhBIO101Mitosis]?), how severe they are, and also their frequency. See… [KBhBIO101TypesOfMutations]

1.4 | Impacts of mutations

Mutations does one of two things, which are both pretty obvious: they either cause a **loss of function** for the organism/cell or **gain of function** for the organism/cell (you either loose something or gain something… duh).

Loss of function mutations - Complete loss of a proteins - Reduction of a protein's ability to function

Gain of function mutations - Increase the function of a protein - Aquire new protein function - Expression of protein in new location/time

Neutral function Does nothing :(

1.5 | Protein Pathways

Most DNA/proteins trigger in a pathway — in that an environment factor does not directly trigger a protein action; instead, a *sequence* of actions from the surface down happen and mutation in any of that sequence of proteins may cause a difference in function.