MUTATIONS
AS AN EVOLUTIONARY FORCE

CLEARING UP COMMON MISCONCEPTIONS

MUTATION ≠ ALWAYS BAD

Some mutations are bad and some are good.

Most mutations do not cause major physical changes.

So... you **probably** won't grow a second head!

DNA can self-repair to prevent mutations from creating physical changes

HOW MUTATIONS HAPPEN

Mutations can happen from mistakes in DNA replication. Environmental pressures like UV radiation from the sun or chemicals can also exacerbate these mistakes in replication.

DNA IS THE GENETIC MATERIAL IN ALL LIVING THINGS ---> DNA REPLICATES ---> ERROR IN DNA

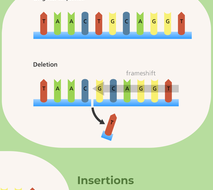
TYPES OF MUTATIONS

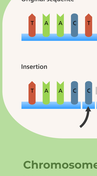
Substitutions

1 or more bases are SWITCHED in the DNA sequence

Deletions

1 or more bases are DELETED in the DNA sequence . . . which causes the entire code to SHIFT



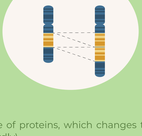


Insertions

1 or more bases are ADDED to the DNA sequence . . . which also causes the code to SHIFT

Chromosome mutations

Whole sections of the chromosome (bundle of DNA) are affected by insertion, duplication, inversion with another chromosome, or deletion



The common thread:

Sometimes, mutations change the shape of proteins, which changes the phenotype (impacts the individual outwardly)

MUTATIONS AS THE BUILDING BLOCKS OF EVOLUTION

Evolution can only use what it is provided - like **mutations!**

Mutation

Variation

Blue = more fit to survive & reproduce

Natural Selection

Definition: the biological change in species over several generations

EVOLUTION

WHY WE SHOULD CARE

Mutations can greatly affect life.
Ex. Sickle Cell Anemia

Harms VS **Benefits**

A single substitution **mutation** in both copies of the gene can cause severe disease

One mutated copy provides **malaria resistance** with **mild sickle cell anemia** due to the sickle shape of some red blood cells

Ex. COVID-19 Pandemic

Old variant couldn't survive against vaccinated individuals' antibodies

Highly contagious delta variant of COVID-19 continues to spread

Chance mutation allowed virus survival & reproduction even in vaccinated individuals

CONCLUSION

Mutations sound scary, but they are happening in us all **at every second... of every day**

The ones that "stick" around MIGHT be good (or neutral) enough to be passed on to offspring

FUELING **EVOLUTION**

Janelle Renterghem, Elena Wernecke, Molly O'Brien

SOURCES:
https://pixabay.com/vectors/evolution-evolving-mankind-men-age-1295256/
https://www.pinterest.com/pin/428170082993178243/
https://www.ncbi.nlm.nih.gov/books/NBK9900/
https://www.nicepng.com/ourpic/u2r5r5e6u2w7u2_point-mutation-substitution-mutation/
https://www.pinterest.co.uk/pin/272252383820381161/
http://mchsscience10.centralddpma.weebly.com/gene-mutation.html
https://www.brainpop.com/search/?keyword=health
https://www.nature.com/scitable/knowledge/library/mutations-are-the-raw-materials-of-evolution-17395346/
https://www.who.int/news-room/feature-stories/detail/the-effects-of-virus-variants-on-covid-19-vaccines?gclid=Cj0KCQiwkICRBhCxARIsAHMdoqTPqHtBYJYj_MtfeRyCfCfDs8RVBLKnXxWxTJ3Pcv6Ls6ssaAeX9EALw_wcB
https://www.nature.com/scitable/topicpage/natural-selection-uncovering-mechanisms-of-evolutionary-adaptation-35539/