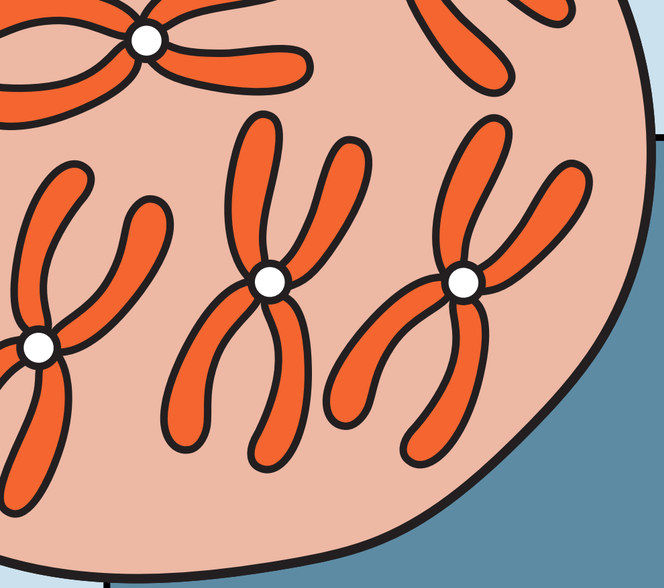
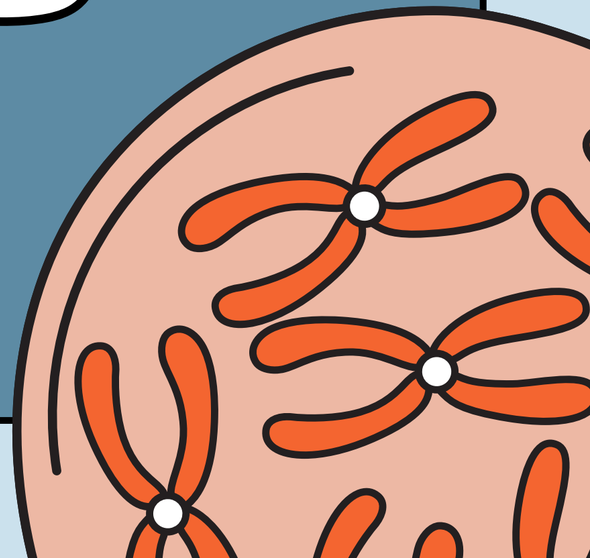
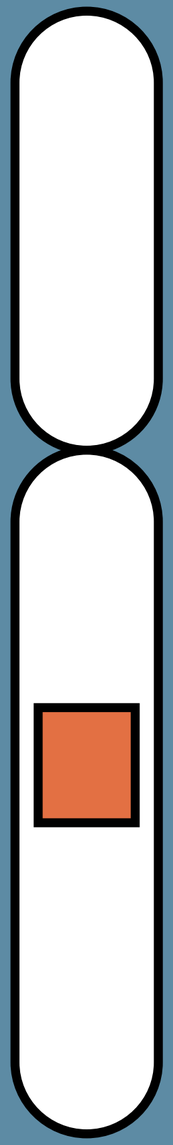


GENETIC MUTATIONS

Grade 10





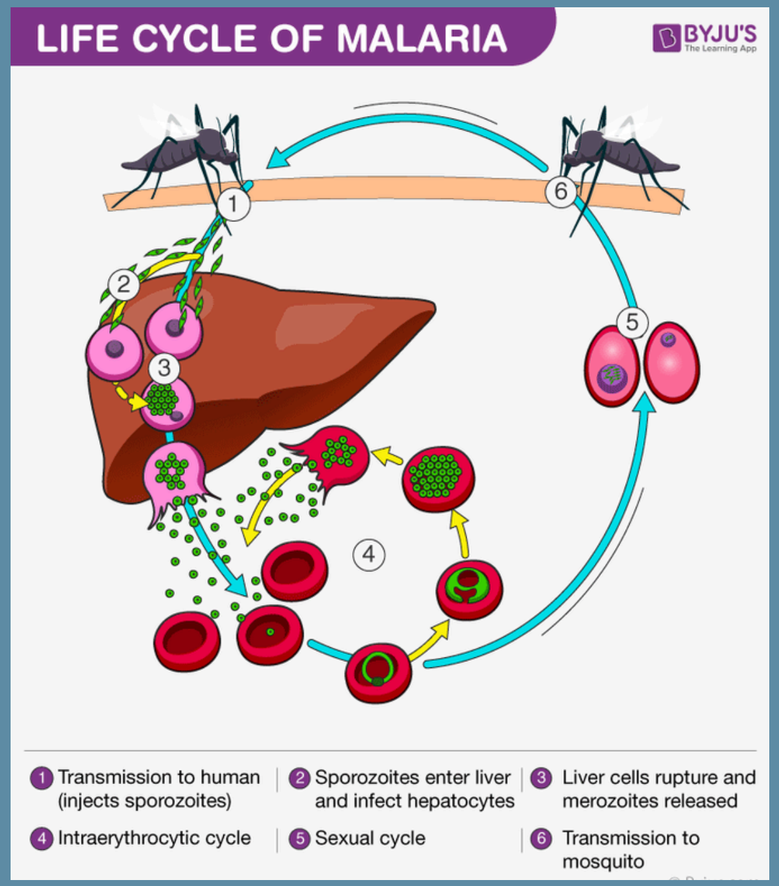
YOU WILL:

Study the theory of mutation of Hugo de Vries, the causes of mutagenesis and types of mutations

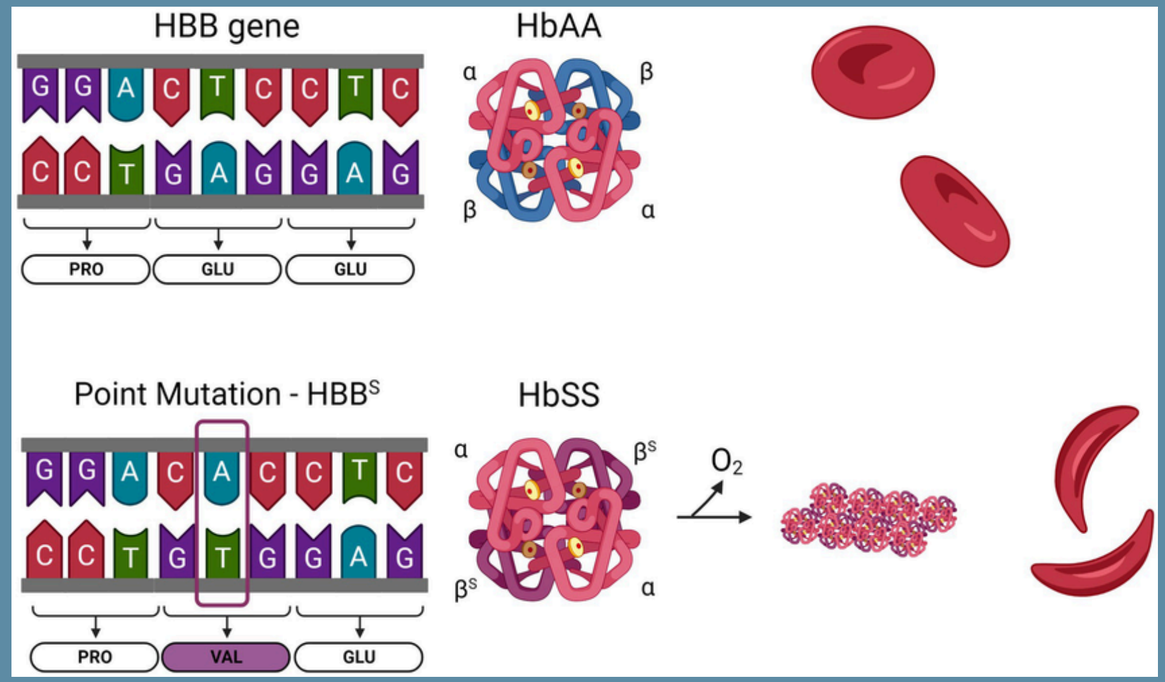
ENGAGE

Is a mutation good or bad?

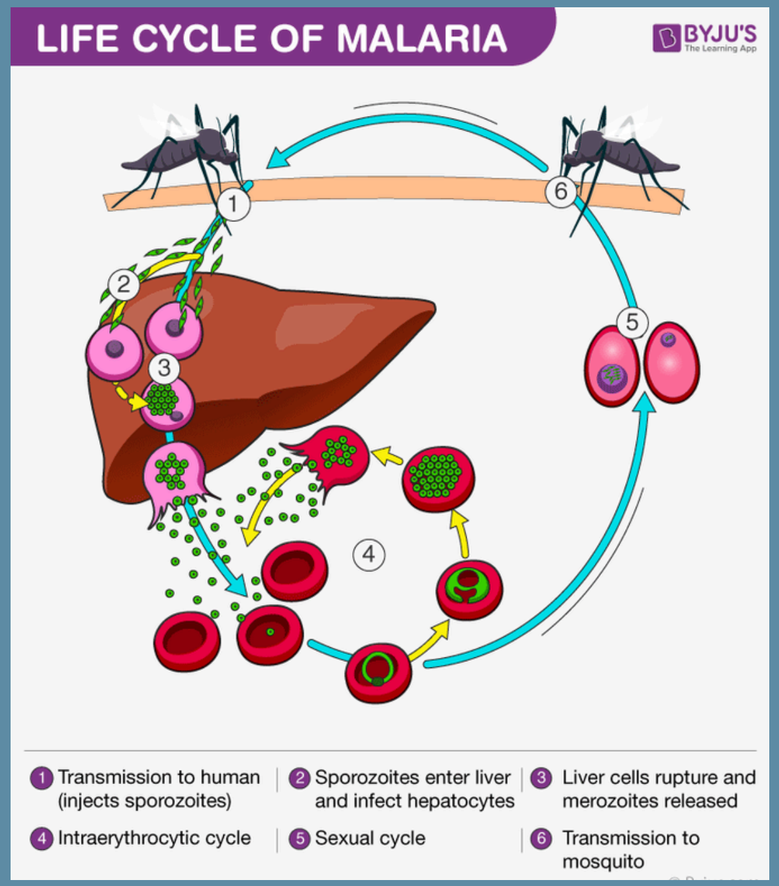
GROUP 1: SICKLE CELL TRAIT & MALARIA RESISTANCE



Sickle cell gene mutation (Hbs)

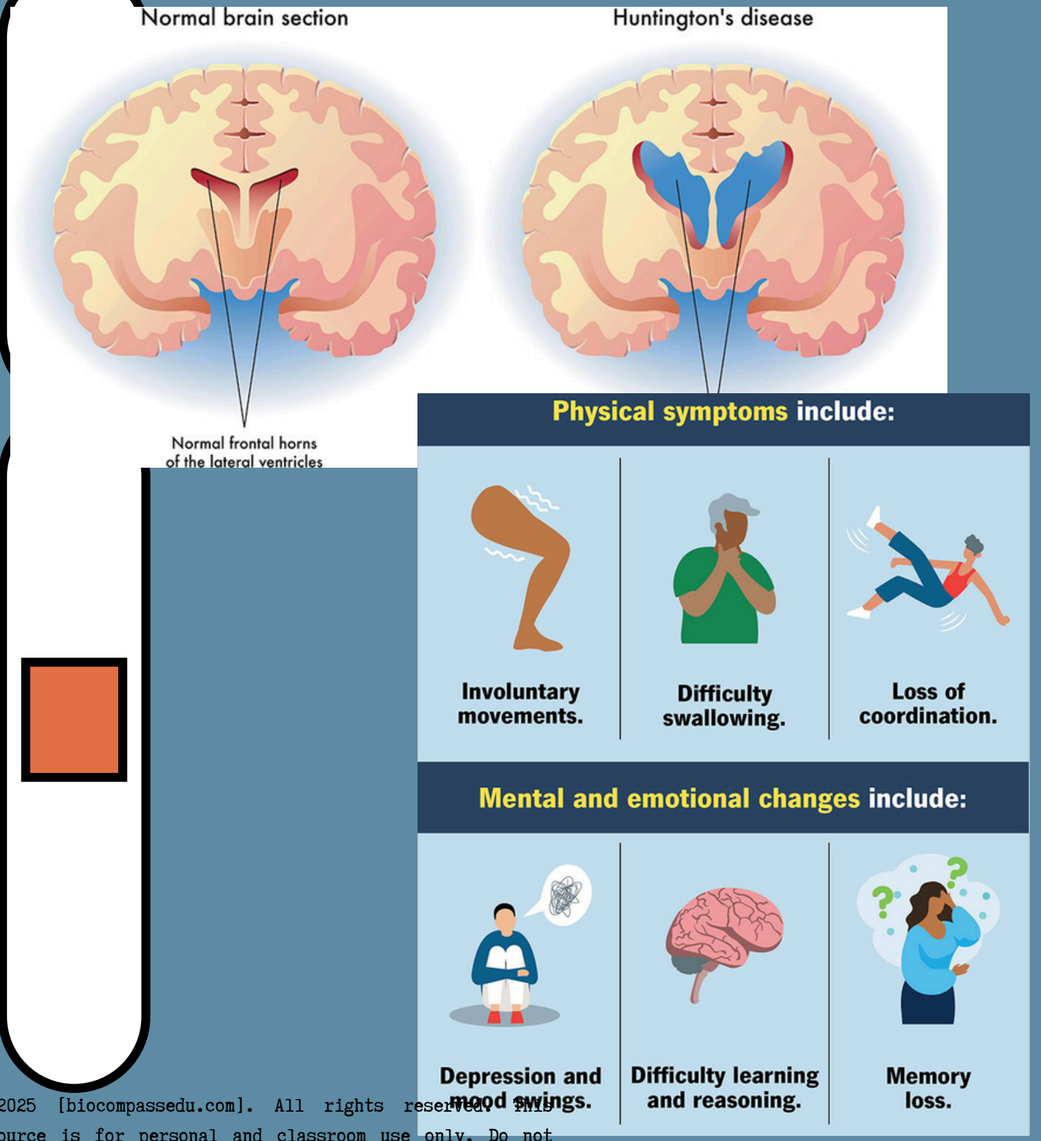


GROUP 1: SICKLE CELL TRAIT & MALARIA RESISTANCE



The sickle cell mutation is beneficial when only one copy of the gene is inherited, providing resistance to malaria. However, if a person inherits two copies, they develop sickle cell disease, which can cause serious health issues.

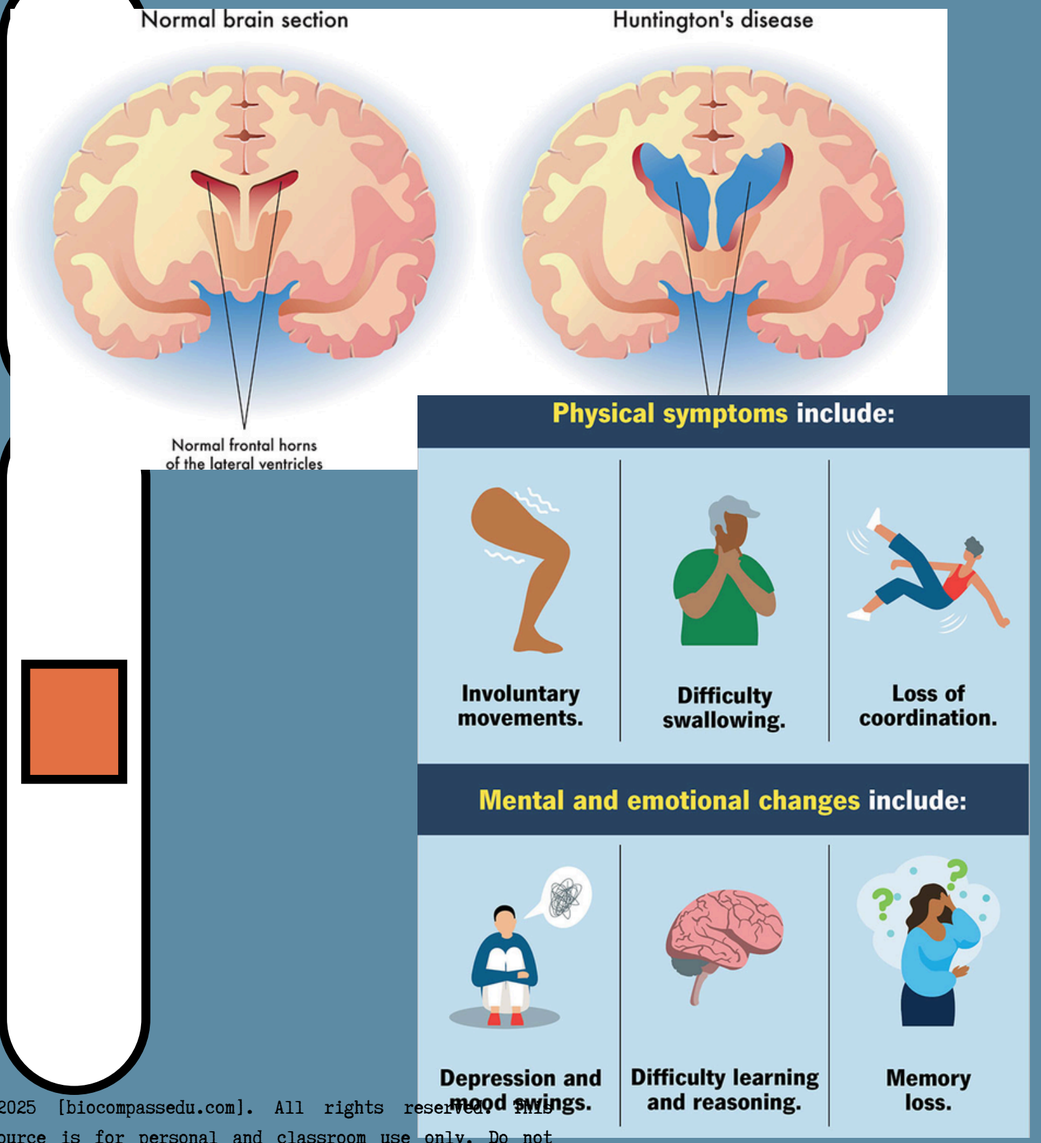
GROUP 2: HUNTINGTON'S DISEASE



A genetic mutation in the HTT gene

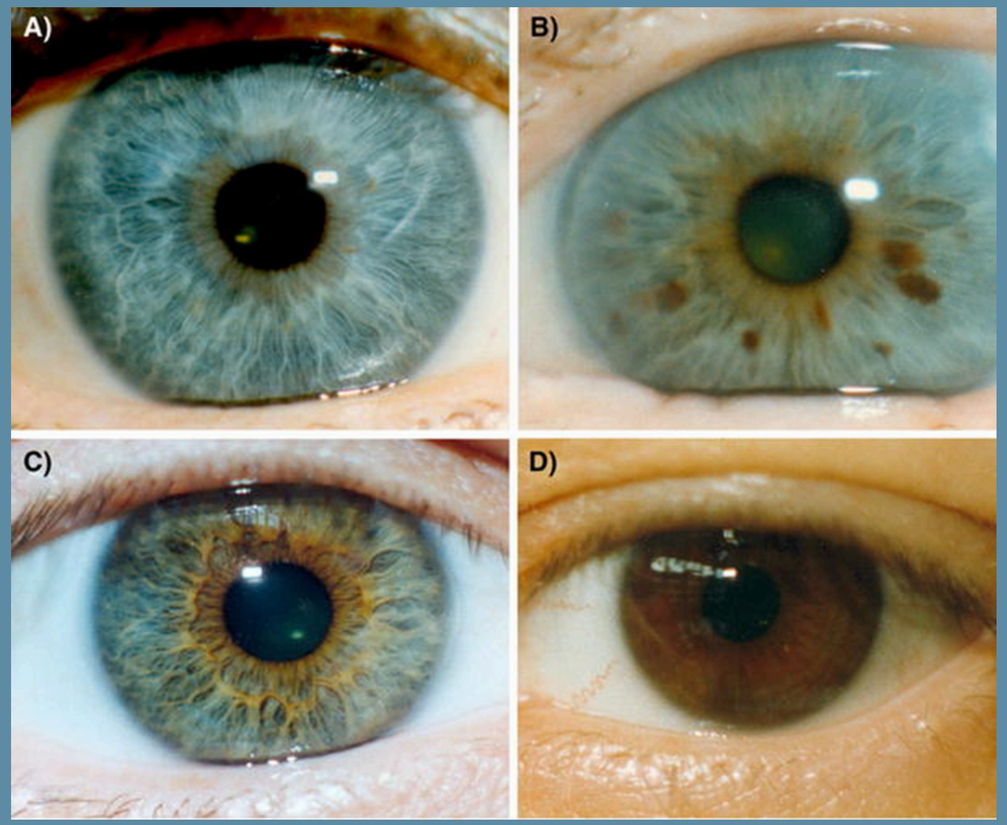
Why do harmful mutations like Huntington's persist in populations despite their severe effects?

GROUP 2: HUNTINGTON'S DISEASE



Huntington's symptoms typically appear later in life, after people have already had children. Since the mutation does not affect reproduction, it continues to be passed on through generations.

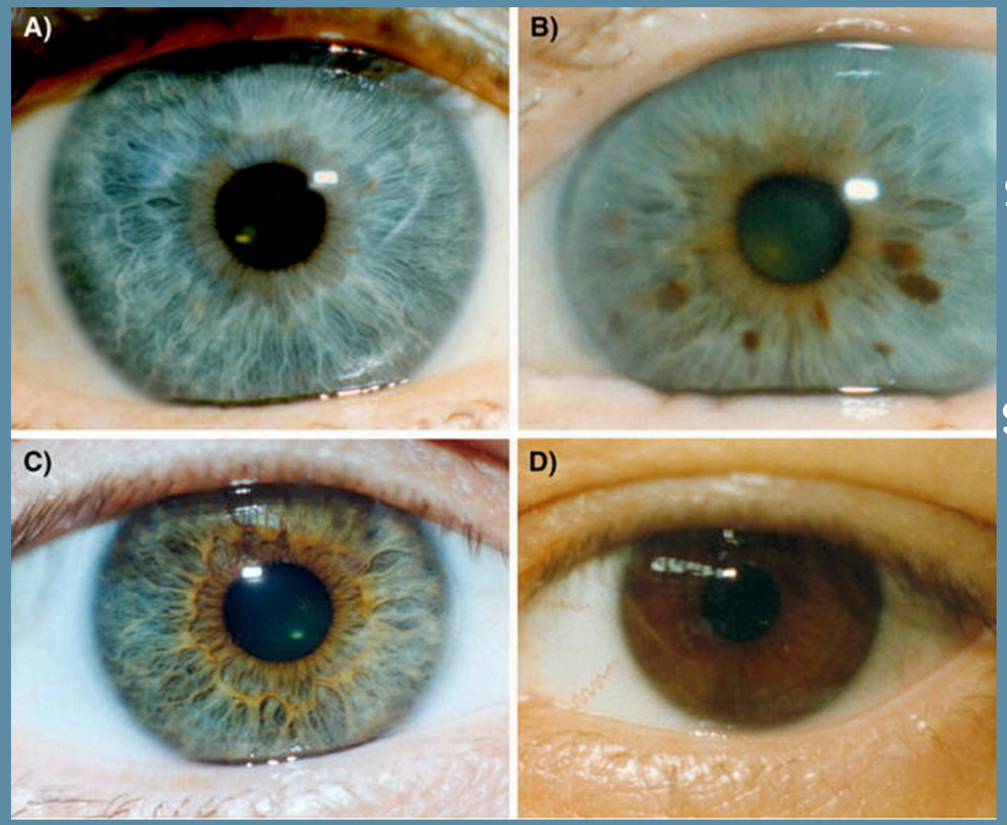
GROUP 2: BLUE EYES



Scientists believe that all humans originally had brown eyes, but around 6,000-10,000 years ago, a mutation in the OCA2 gene led to the first cases of blue eyes

Could a neutral mutation like blue eyes ever become beneficial in some environments?

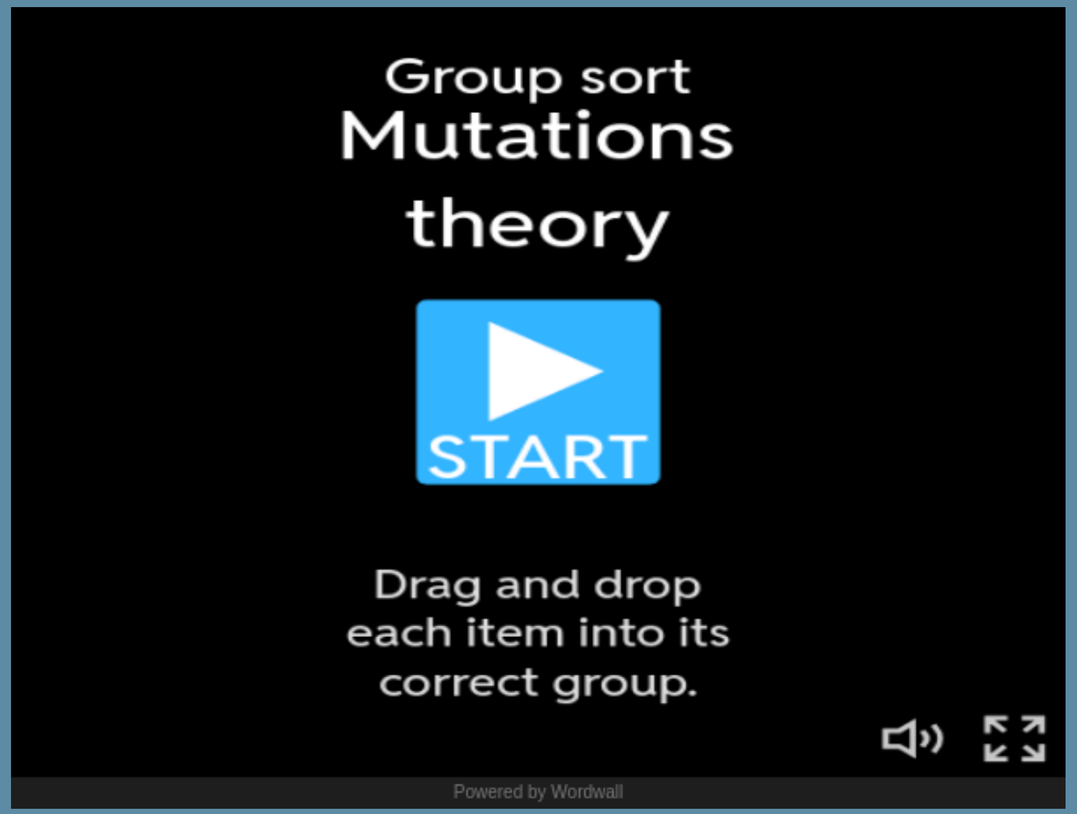
GROUP 2: BLUE EYES

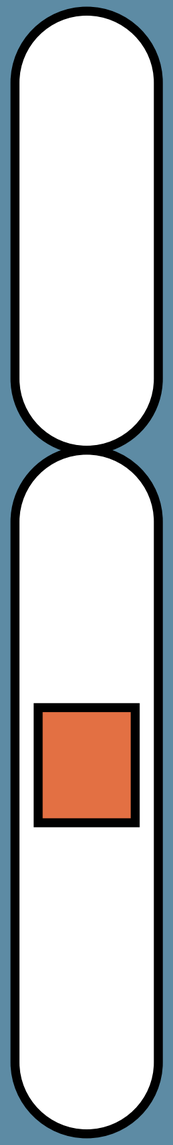


While blue eyes do not impact survival, they may have been socially or culturally preferred in some societies, influencing mating choices. Additionally, in areas with less sunlight, lower melanin levels might have helped with vitamin D production, making the mutation slightly advantageous.

HUGO DE VRIES'S MUTATION THEORY

https://wordwall.net/resource/86433468/%d0%b1%d0%b8%d0%be%d0%bb%d0%be%d0%b3%d0%b8%d1%8f/mutations-theory





HUGO DE VRIES'S MUTATION THEORY

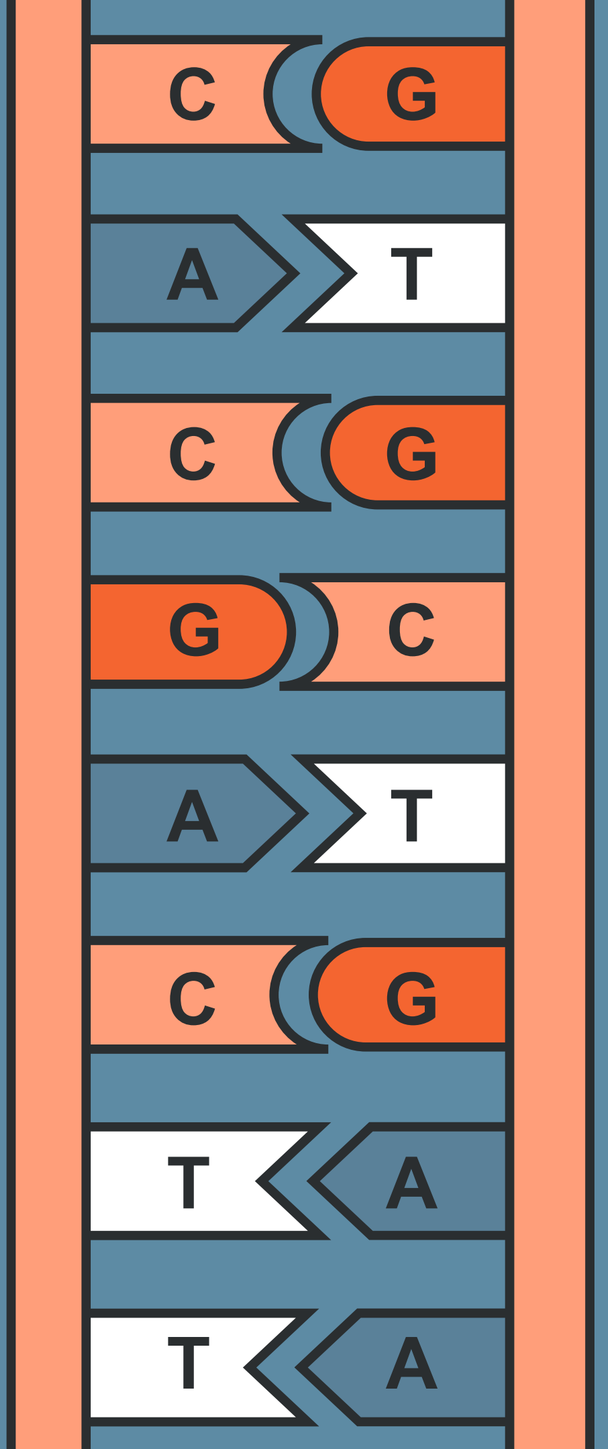
- **Mutations are sudden.** Мутациялар кенеттен болады.
- **New forms are stable.**Жаңа формалар тұрақты.
- **The probability of detecting mutations depends on the number of individuals studied.** Мутацияларды анықтау ықтималдығы зерттелетін даралардың санына байланысты.
- **Similiar mutations can occur repeatedly.**Ұқсас мутациялар қайталануы мүмкін.
- **Mutations can be either beneficial or harmful.**Мутациялар пайдалы да, зиянды да болуы мүмкін

WHAT IS A GENETIC MUTATION?

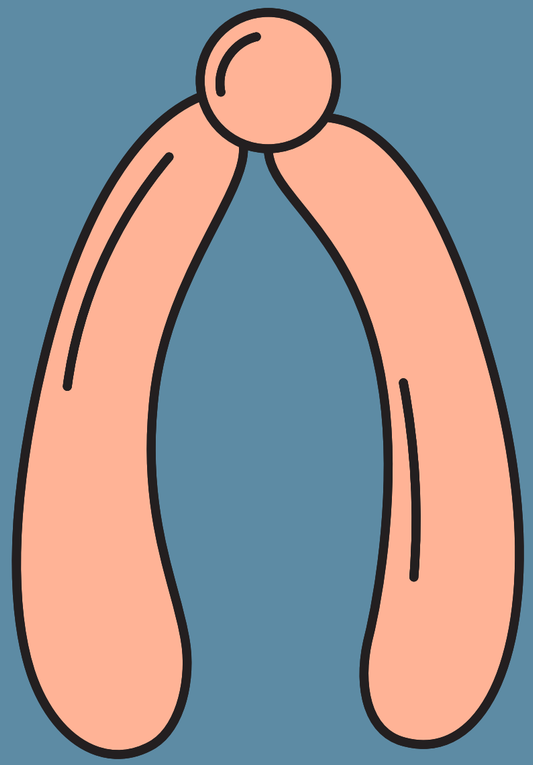
A genetic mutation is a change that occurs in our DNA code (sequence of nucleotides).

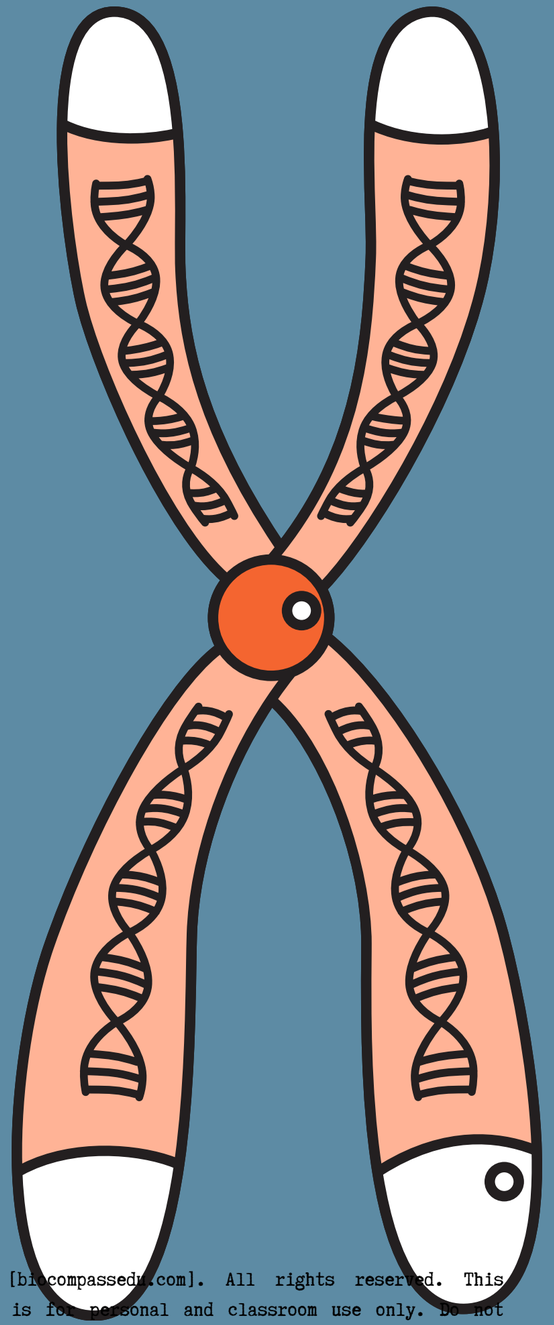
The four nucleotides are:

- Adenine (A)
- Cytosine (C)
- Guanine (G)
- Thymine (T)



Sometimes, mistakes happen during the DNA copying process, leading to changes called mutations.





WHAT CAUSES MUTATIONS?

Errors in DNA replication during cell division.

Exposure to mutagens (radioactive substances, x-rays, ultraviolet radiation and certain chemicals).

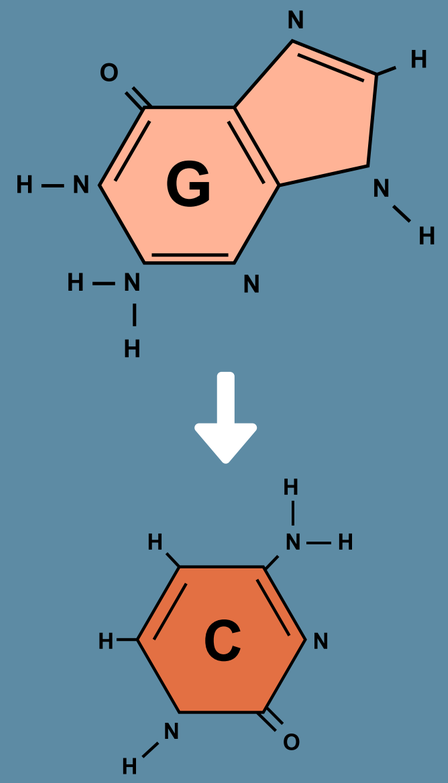
Viral infections and other infectious agents.

TYPES OF MUTATIONS

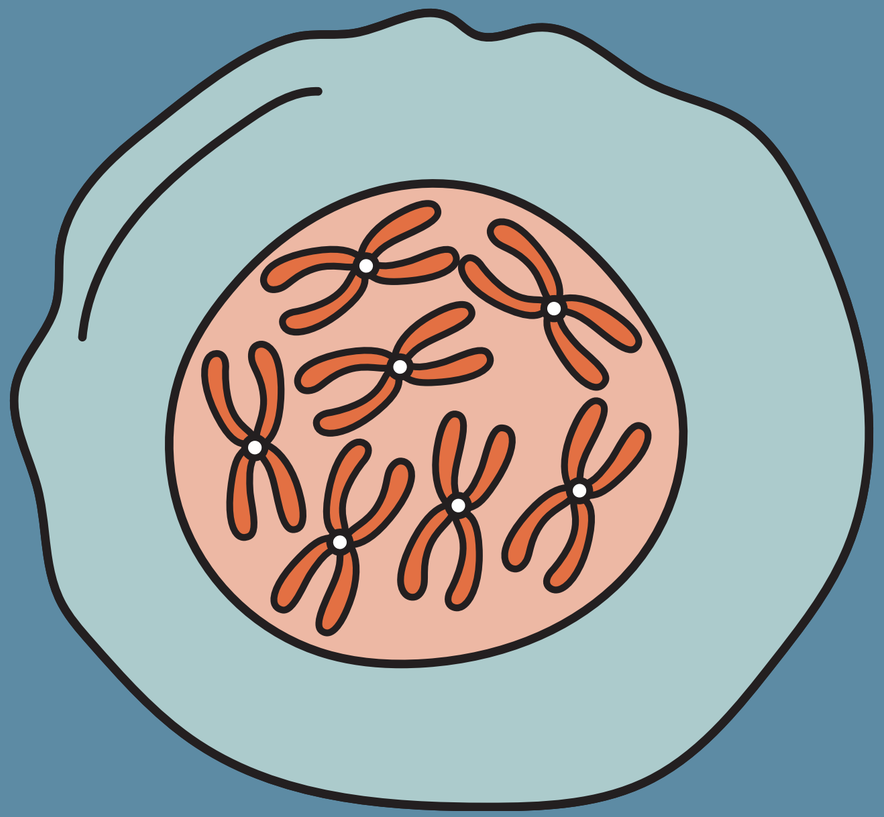
POINT MUTATION

Point mutations are like small spelling mistakes that affect only one or a few letters in our DNA code.

A single base pair may be added, deleted or changed.

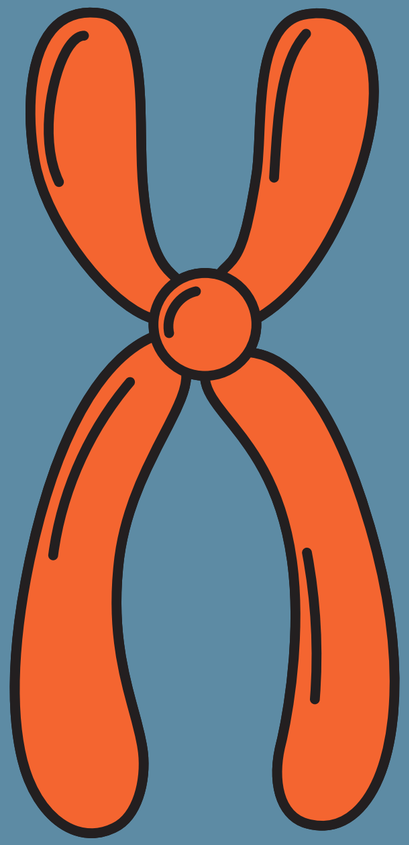


For example, a G (guanine) might be swapped for a C (cytosine).



Insertions or deletions are examples of point mutations.

They are like adding or removing LEGO blocks from the blueprint, causing the instructions to be read differently.



TYPES OF MUTATIONS

CHROMOSOMAL MUTATIONS

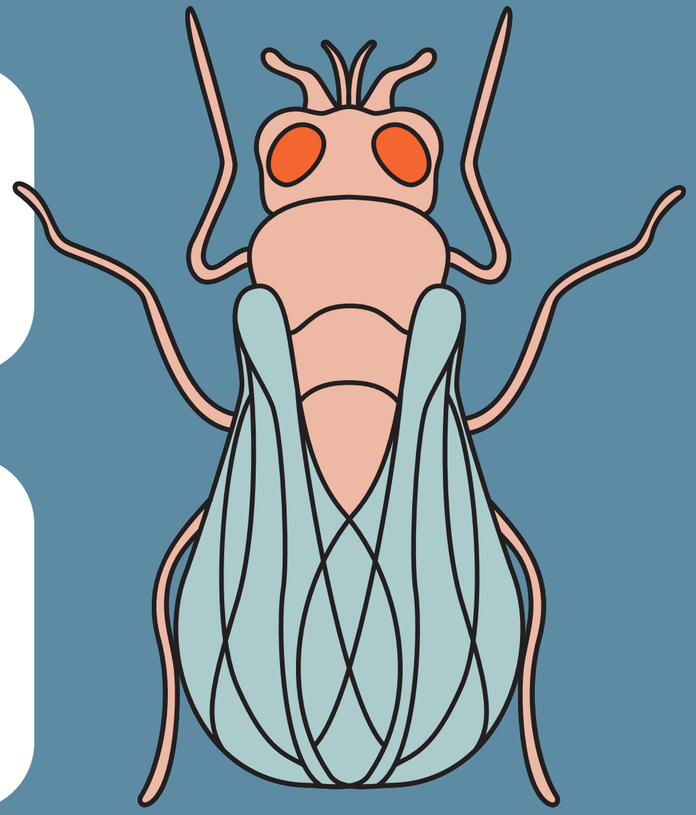
Entire sections of chromosomes can be rearranged or lost.

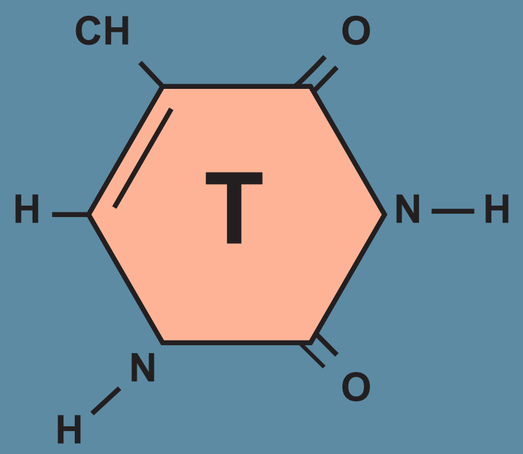
One or more genes may be swapped or deleted.

WHAT CAN HAPPEN?

Some mutations do not cause any noticeable changes, while others can lead to genetic disorders or diseases.

Mutations can even give an organism an advantage in its environment, leading to new traits or abilities (species evolution).



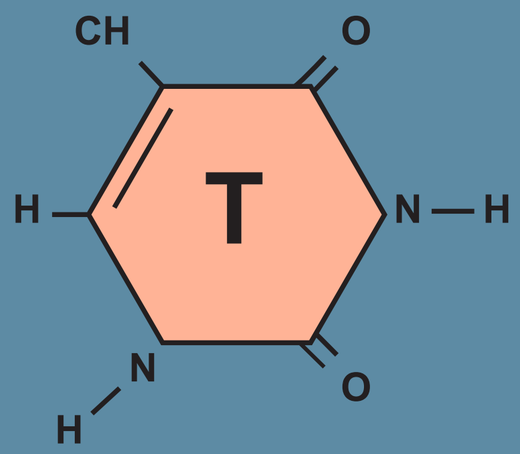


REAL LIFE EXAMPLE

SICKLE CELL ANEMIA

The disease is caused by a mutation in the gene that helps make hemoglobin — a protein that carries oxygen in red blood cells.

It is a point mutation where A (adenine) is replaced by a T (thymine).



HOMEWORK

MUTATIONS

In groups of 3 people create presentation