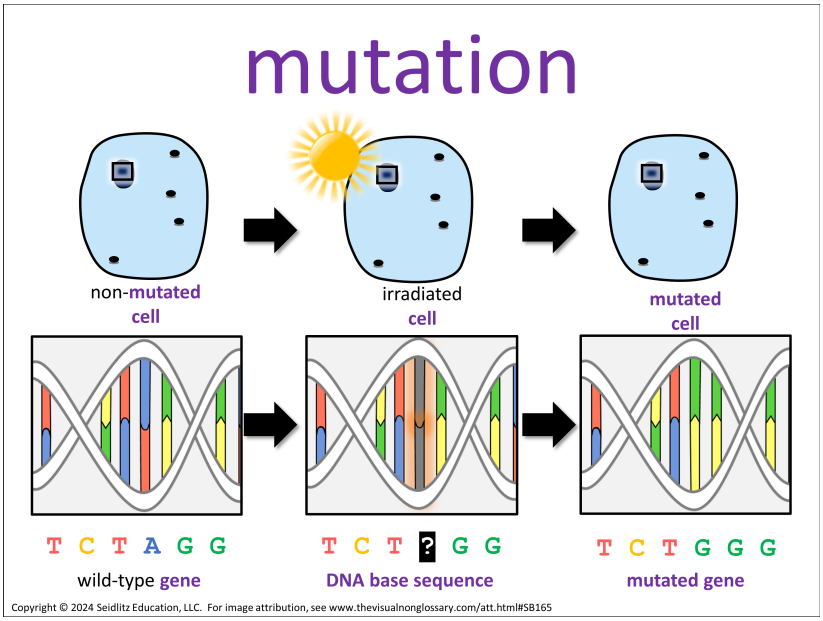
The Visual Non-Glossary™

Mutations in The Body

As we read, we'll explore how mutations occur and what effects they can have.

Pay Attention To:

- what a mutation is
- where mutations happen
- what can cause a mutation
- how mutations affect organisms
- how mutations can spread



A **mutation** is a change in the **DNA** of a living thing. **DNA** is inside every **cell** and gives instructions to the body. These instructions are made up of a code using four different **bases**. The **sequence**, or order, of the **bases** tells the body how to build proteins. Proteins help the body work and grow.

Sometimes, this **sequence** can change. That change is called a **mutation**. A **mutation** can happen when something like sunlight or chemicals affects the **DNA**. One **base** might get changed, or a base might be added or taken out. This makes the instructions different.

Not every **mutation** causes a problem. Some changes don't affect the organism at all. But some **mutations** can change how something looks or works. For example, a **mutation** might change the color of an animal's fur or make a plant grow faster.

When a **mutation** happens in just one **cell**, it usually stays there. But if it gets passed on to a new organism, the **mutation** will be in every **cell** of that organism. This means the new **sequence** is part of the body from the start.

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Over time, helpful **mutations** can become common in a group of organisms. If a **mutation** helps an organism survive and have babies, that trait can spread. But harmful **mutations** may go away if the organism doesn't survive.

Scientists study **mutations** to learn how living things grow, change, and pass traits to the next generation.

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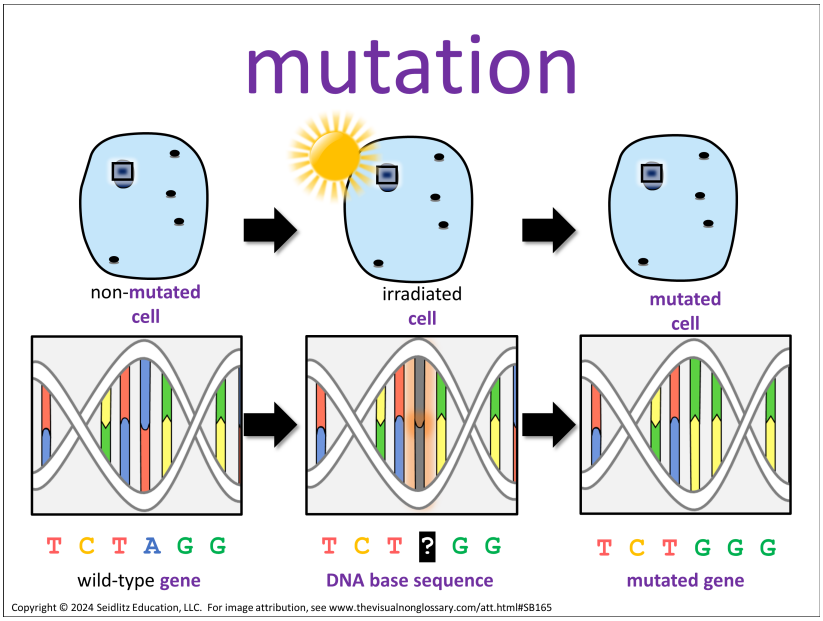

A **mutation** is a change in the **DNA** of an organism. DNA is found inside a **cell** and contains instructions for how the body functions. These instructions are written in a code made up of four chemical units called **bases**. The specific **sequence** of these **bases** determines how proteins are made, and proteins control many parts of how an organism looks and behaves.

Sometimes, the order of **bases** in a **sequence** can be changed. This change is called a **mutation**. Mutations can happen in many ways. For example, radiation from the Sun or certain chemicals can cause the DNA inside a **cell** to change. In one case, a single **base** might be swapped for another. In other cases, one or more **bases** might be added or deleted from the **sequence**. The result is a new set of instructions.

Not all mutations matter. Some happen in parts of the DNA that do not affect the organism. Others may cause small or big changes. For example, a **mutation** might cause a plant to have slightly different-colored flowers, or it could make an animal better able to survive in its environment.

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A **mutation** usually begins in just one **cell**. That change might stay in that single **cell** and have little effect. But if the **mutation** is passed to the next generation, something different happens. The offspring will not just have the **mutation** in one **cell**—it will be in all the **cells** of that new organism. This means the changed **sequence** becomes a permanent part of that individual's **DNA**.

This process is one way that traits can spread through a population over time. A **mutation** that helps an organism survive or reproduce may become more common, especially if it is passed on to many offspring. On the other hand, harmful mutations may disappear if the organism does not survive or reproduce.

Scientists study **mutations** to understand how organisms change and evolve. They also look at how certain mutations may lead to diseases or other conditions. Understanding the way **DNA** works, and how **mutations** affect it, helps researchers develop medicines and treatments.

In short, a **mutation** begins with a small change in a **sequence** of **bases** in a **cell**. But if that change happens in the right kind of **cell** and leads to a new trait, it can be carried forward into future generations.

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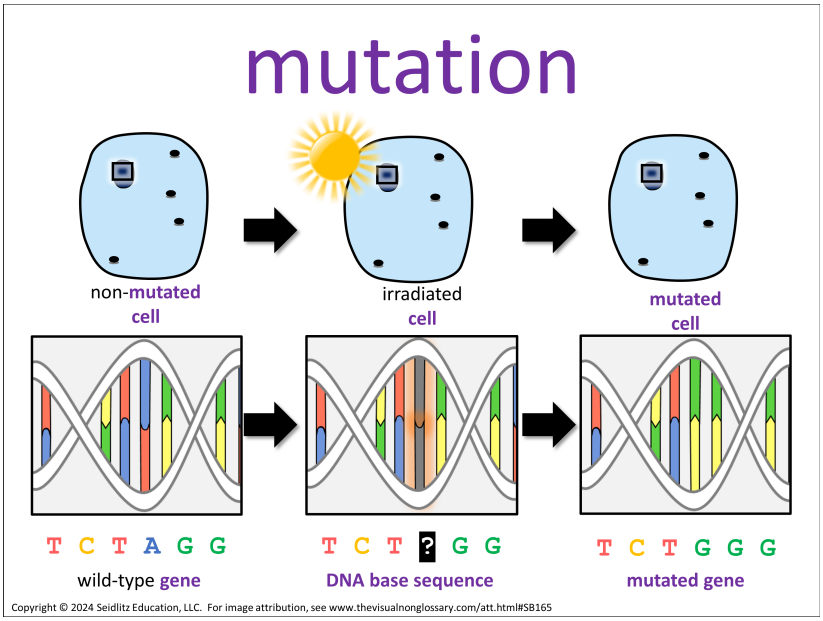

A **mutation** refers to a change in the **DNA** of an organism. Located in every **cell**, **DNA** contains coded instructions that direct the functions and development of life. These instructions are made up of four different **bases** arranged in a specific **sequence**, which determines how proteins are formed—essential components that influence an organism's structure and behavior.

Mutations occur when the usual **sequence** of these **bases** is altered. External factors like radiation or chemicals can damage **DNA**, causing a **base** to be replaced, removed, or added. This disrupts the original instructions and may result in different traits.

The effects of mutations vary widely. Some have no observable impact, while others lead to significant changes. A **mutation** might slightly change a flower's petal color or lead to advantages in survival, such as resistance to disease. These changes can affect an organism's traits in visible or hidden ways.

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When a **mutation** arises in a single **cell**, it may have little effect unless it occurs in a **reproductive cell**. If passed to an offspring, the **mutation** will appear in every **cell** of that new individual, permanently embedding the new **sequence** in its genetic material.

This process contributes to how traits spread within populations. A **mutation** that improves survival or reproduction is more likely to be passed on, while detrimental changes may be naturally filtered out. Over generations, this contributes to genetic diversity and evolutionary change.

By examining **mutations**, scientists gain insight into genetic processes, disease mechanisms, and the ways species adapt over time.