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# THE BIOSPHERE

The basic unit of life

Santillana

## Cells

Cells are the smallest structural units of life that can function independently.

Cells were first discovered in 1665 by Robert Hooke.

## Main parts of a cell

Cell membrane. A thin layer that covers the entire cell which regulate the passing of substances into and out of the cell.

Cytoplasm. A jelly-like substance inside the cell which has organelles with specialized functions.

Genetic material. It consists primarily of DNA. It gives instructions to the cell which control its activities.

## Prokaryotic cells

Genetic material floats freely throughout the cytoplasm.

The large majority are single-celled organisms, such as bacteria.

Prokaryotic cells generally contain a cell wall, ribosomes, genetic material and flagellum.

In some bacteria, another layer, called a bacterial capsule, surrounds the cell wall.

The flagellum is used for movement.

## Eukaryotic cells

Genetic material is located inside a nucleus.

They are larger than prokaryotic cells.

Eukaryotic cells generally contain a nucleus and organelles.

Animal eukaryotic cells are different from plant eukaryotic cells.

## Animal cells

Animal cells usually have an irregular shape, as they do not have rigid wall.

They have a nucleus in the centre.

Some can move about using flagella or other mechanisms.

## Plant cells

Plant cells have a rigid cell wall that gives the cell a regular shape and protects it.

They have a nucleus located on one side, due to the large size of the vacuole.

They do not have the ability to move about freely.

## Organelles and their functions

- **Ribosomes:** produce proteins.
- **Endoplasmic reticulum (ER):** Rough ER stores and transport proteins. Smooth ER are involved in lipid production.
- **Golgi apparatus:** processes and packages proteins and lipids.
- **Mitochondria:** produce energy.
- **Lysosomes:** digest complex substances.
- **Centrosomes:** contribute to cell division and movement.
- **Chloroplasts:** responsible for photosynthesis.
- **Vacuoles:** store food, water and waste.