

# Molecules and Cells

“An invisible world courses through every inch of your body. This is the world of molecules. Your molecules are tiny machines, each performing one microscopic task. Each drop of your blood contains hundreds of different kinds of molecules: some transport food and air, others carry messages, others stand ready to repair an injury. In your eyes, a glittering solution of molecules refracts and focuses an image of light. A subtle change in the shape of another molecule captures this image like a sheet of film. At this moment, in your arms and hands, legions of tiny molecular motors are laboring to hold this book and to turn each page. Indeed, these words you are reading are recognized, sorted, and understood in a flurry of electrochemical impulses, organized by ranks of molecular switches. These everyday tasks—breathing, seeing, moving, and thinking – may be traced to the combined action of invisible molecules. Individually, each of your molecules is a delicate instrument. Together they endow you with life.” (Our Molecular Nature by David S. Goodsell.)

- ! You can't see them but they are everywhere.
- ! A cell is the most basic unit of life.
- ! All things that live are made up from cells.
- ! Cells eat, they grow, and they make more of themselves (replicate).
- ! There are millions of different types of cells - Dog cells are different from fish cells.
- ! Inside your body, there are many different cells, each one doing a different job to keep your body going.
- ! Cells may be tiny but without them, we'd be nothing.
- ! There are between 50 and 75 trillion cells in your body.
- ! Human red blood cells live for around 120 days, but stomach cells only last 2 days.
- ! The biggest single cell is the ostrich egg.
- ! Individual cells come together to form larger structures in the human body.

**One major difference in cells**-----The plant cell and the animal cell  
Many animals have skeletons to give them structure and support but a plant does not and so it has a unique structure called a **cell wall**. This wall is outside the cell structure and is rigid and composed of cellulose.  
Another difference is that the plant cell has an additional organelle called the **chloroplast**. The chloroplast helps the plant to harvest energy from sunlight. Chloroplast has a green pigment, **Chlorophyll**, that's why plants are green.

All cells have–

A **plasma membrane** - a skin protecting it from the outside.  
(The bag)*The cell membrane regulates the movement of water, nutrients and wastes into and out of the cell. Inside the cell membrane are the working parts of the cell.*

The **organelles** - small structures in the cell that carry out the day to day operations of the cell.

The other main organelles are:

The **nucleus** - The brain of the cell. (The marble)

*It contains DNA and RNA and manufactures proteins.*

**Mitochondria** - They are the energy producers of the cell

**Ribosomes** - They produce proteins

**Endoplasmic reticulum** - Transport proteins from the nucleus

**Golgi bodies** - They produce and package proteins

**Chloroplasts** -only in plants - involved with photosynthesis

**Vacuoles** -this organelle has little or no structure. The vacuole is the backpack of the cell.

*In the plant cell it is bigger than in the animal cell. When a cell has stopped growing there is normally one large vacuole. It holds large amounts of water or food. They also hold waste products, which the vacuole breaks into small pieces till it cannot hurt the cell. They hold onto things that the plant might need.*

The **cytoplasm** - this is the packaging of the cell, everything moves in it (jello) This is everything in the cell that is not an organelle.

Cell processes

**Diffusion** -How food, air and water get in and out of the cell

**Photosynthesis and Cellular Respiration** - How the cell gets energy

Let's draw some organelles

Nucleus	Mitochondria	Ribosomes	Endoplasmic Reticulum
Golgi	Chloroplasts	Vacuoles	Cytoplasm

Let's draw 2 cells

Animal Cell	Plant cell