SHAPES AND FUNCTIONS OF THE CELLS

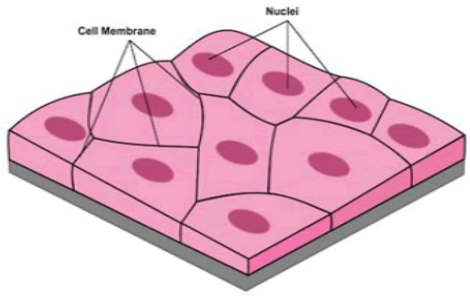
The variety of cell shapes in **Prokaryotes** and **Eukaryotes** reflects each cell's functions, confirming the **structure-function relationship** throughout biology. Animal cells, in particular, come in various shapes and sizes. Plant cell shapes are similar because of their rigid cell wall.

• Different shapes of cells:

A) Shapes of epithelial cells include:

1) Squamous shape:

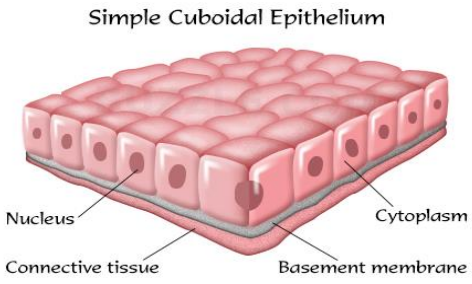
- Large, flattened cells filled with cytoplasm possess a small, round nucleus at the center. They have an irregularly round shape.
- These cells are typically found lining surfaces requiring a smooth fluid flow, as seen in **blood vessels**.
- They are also found lining areas requiring a fragile surface for molecules enabling passage, such as air sacs in the **lungs**.



Simple squamous epithelium.

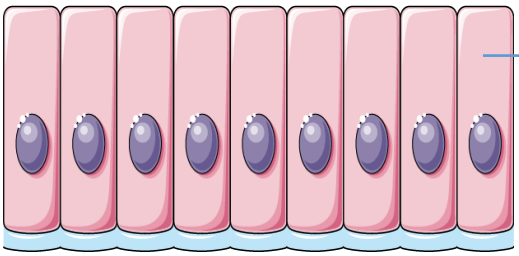
2) Cuboidal shapes:

- **Cube-like** in appearance, meaning they have equal width, height, and depth. They have large spherical nuclei that are centrally located.
- They are typically found in **glandular** (secreting) tissue and **kidney tubules**.



3) Columnar shape:

- **Column-like** in appearance, meaning they are taller than they are wide. Their oval nucleus is usually located towards the basal region of the cell.
- There are two functionally different types: **ciliated** and **nonciliated.**
- It lines the digestive system organs in humans, including the **stomach** and **intestines**.



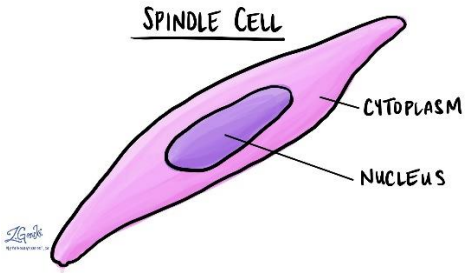
Non-ciliated



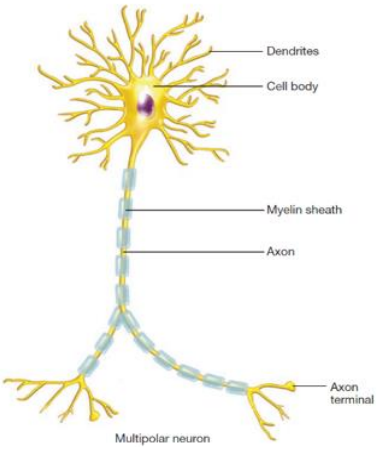
Ciliated

B) Shapes of Non-epithelial cells include:

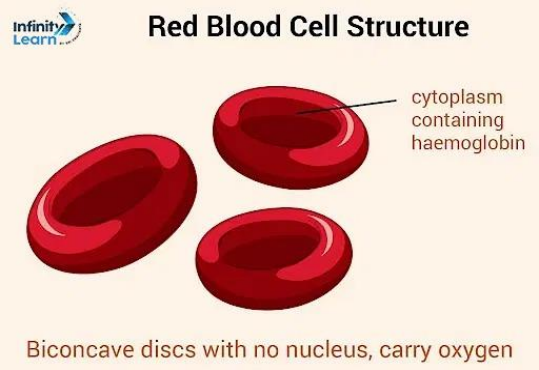
1) Spindle shape: broad in the middle, then tapering at both ends. The nucleus is in the middle along its length **(ex, Smooth muscle).**



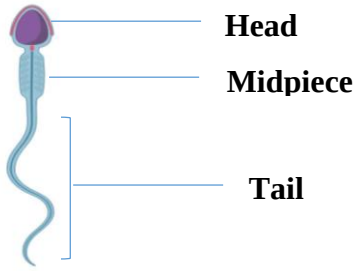
2) Stellate shape: star-like shape due to the presence of branches called **dendrites**; their job is to carry electrical messages from the brain to the rest of the body (**ex, Neuron**).



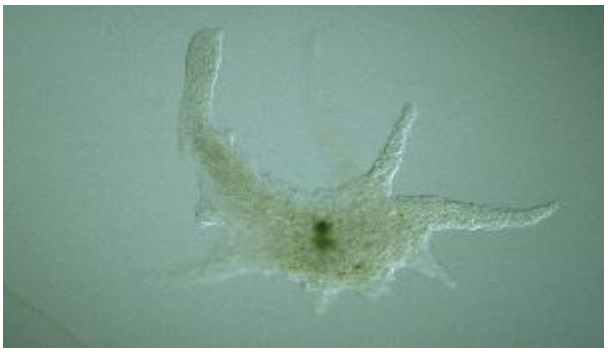
3) **Circular shape:** **(ex, Red blood cell),** disk-like shape with concave edges and hemoglobin molecules that attach with O_2 and CO_2 molecules; these concave edges contribute to the transfer and carry these molecules between the lung and another body system.



4) **Sperm shape:** This includes the **head** (**DNA** content), the **midpiece** appearance, and the **tail's** structure **(ex, Sperm)**.



5) **Amoeboid shape:** The cytoplasm contains a substance known as **plasma gel** that can change consistency and move around more than the rest of the cytoplasm **(ex, White blood cells).**



- **Cells are varying in their sizes, some of them are large ex: bird egg, while others are very small and cannot see with naked eye, ex: human cells.**