

# CAIE Biology A-level

## Topic 1 - Cell Structure

### Definitions and Concepts

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**Adenosine triphosphate (ATP)** - A nucleotide derivative which acts as the 'energy currency' in cells. It consists of a molecule of ribose joined to the nitrogenous base adenine and three phosphate groups.

**Capsid** - The outer protein shell of a virus that encases and protects the viral genome.

**Cell surface membrane** - A phospholipid bilayer studded with proteins that surrounds cells and separates them from their environment.

**Cell wall** - A permeable layer made of polysaccharides that surrounds plant, algal and fungal cells.

**Centrioles** - Cytoplasmic structures made of microtubules that produce the spindle fibres during mitosis.

**Chloroplast** - An organelle found in plants and algae that is the site of photosynthesis.

**Cilia** - Small, hair-like organelles that extend from the surface of eukaryotic cells. They have motile and sensory functions.

**Electron micrograph** - An image of a non-living structure produced by a scanning electron microscope (SEM) or a transmission electron microscope (TEM).

**Eukaryotic cell** - A type of cell that contains a nucleus along with membrane-bound organelles.

**Eyepiece graticule** - A scale bar inside the eyepiece of a light microscope which can be calibrated against a ruler to measure structures.

**Golgi apparatus/ Golgi body/ Golgi complex** - An organelle found in eukaryotic cells that is involved in the modification and packaging of proteins.

**Lysosomes** - Membrane-bound vesicles in the cytoplasm that contain a hydrolytic enzyme called lysozyme.

**Magnification** - How much bigger an image appears compared to the original object, calculated using the following formula:

$$\text{Image size} = \text{Actual size} \times \text{Magnification}$$

**Microvilli** - Microscopic finger-like projections from the plasma membrane of some animal cells.

**Mitochondrion (pl mitochondria)** - An organelle found in eukaryotic cells that is the site of aerobic respiration.

**Nuclear envelope** - A double membrane that surrounds the nucleus.

**Nucleolus** - A structure found inside the nucleus that contains proteins and RNA and is involved in synthesizing new ribosomes.



**Nucleus** - An organelle found in eukaryotic cells that stores the genetic information of the cell as chromosomes and is surrounded by a membrane called the nuclear envelope.

**Peptidoglycan** - A polymer consisting of amino acids and sugars that forms a 3D mesh and makes up the cell walls of most bacteria.

**Photomicrograph** - An image produced from a light microscope (also known as an optical microscope).

**Plasmodesmata** - Microscopic channels between plant cell walls that facilitate symplastic transport.

**Prokaryotic cell** - A type of cell that does not contain any membrane-bound organelles or a nucleus.

**Resolution** - The ability to distinguish two different points in a specimen.

**Ribosomes** - Organelles found either free in the cytoplasm or membrane-bound that are involved in the synthesis of proteins.

**Rough endoplasmic reticulum (RER)** - A membrane-bound organelle that is involved in the synthesis and packaging of proteins.

**Scanning electron microscope (SEM)** - A type of electron microscope that passes a beam of electrons over the surface of a specimen to produce an image.

**Smooth endoplasmic reticulum (SER)** - A membrane-bound organelle involved in lipid synthesis.

**Stage micrometer** - A scale that may be mounted to the stage of a light microscope and can be used to calibrate an eyepiece graticule.

**Tonoplast** - The lipid bilayer that surrounds a permanent vacuole.

**Transmission electron microscope (TEM)** - A type of electron microscope that passes a beam of electrons through a sample to produce an image.

**Vacuole (permanent)** - A membrane-bound structure found in plant cells that contains cell sap.

**Virus** - A non-living microorganism that consists of genetic material surrounded by a protein husk.

**Viral envelope**: The outermost layer of many types of viruses that consists of phospholipids. The envelope protects the viral genome and helps the virus to evade recognition by the host immune system.

