Biology A level OCR - Eukaryotic Cell Structure Cheat Sheet

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Cells

There are two fundamental types of cells: prokaryotic and eukaryotic.

Prokaryotes - unicellular organisms with an undivided cytoplasm. The cytoplasm is made of cytosol (water, salts and organic molecules).

Eukaryotic - multicellular organisms. Eukaryotic cells have a more complex inner structure (e.g. nucleoplasm, cytoplasm).

This topic is about the ultrastructure of the cell (what can be observed with an electronic microscope).

The cytoskeleton

A network of fibres found throughout eukaryotic cells' cytoplasm which provide stability and structure to the cell as well as hold organelles in place. It also controls cell and organelle movement.

It is made of three structures:

Microfilaments - Made from protein *actin*. Responsible for cell movement and cell contraction (during cytokinesis).

Microtubules - Determines the shape of a cell due to polymerised globular tubulin proteins. Used as tracks for the movement of organelles (e.g. vesicles). They also make up spindle fibres used on the separation of chromosomes.

Intermediate fibres - Provide mechanical strength to cells and maintain their integrity.

Nucleus

Contains coded genetic info (DNA molecules). DNA controls protein synthesis. It is often the biggest organelles in the cell.
DNA is contained in a double membrane (nuclear envelope) which protects it from damage. Nuclear pores allow substances in and out of the nucleus. DNA molecules are too big to leave the nucleus so they are transcribes into RNA.
DNA + histones (proteins) = chromatin (coils and condensed to form chromosomes).

The nucleolus

Area within the nucleus which produces ribosomes. Composed of proteins and RNA. RNA produces rRNA (ribosomal ribo nucleic acid) which combines with proteins to make ribosomes.

Vesicles

Membranous sacs used for storage and transport consisting of a single membrane with fluid.

Lysosomes

Vesicles containing hydrolytic enzymes. These break down cellular waste material (including old organelles), pathogens absorbed by phagocytes or cells (apoptosis).

Compartments for life

Metabolism - synthesis and breaking down of molecules.
Reactions take place in the cytoplasm which is separated from external environment by a cell-surface membrane.
Organelles are membrane bound compartments where different reactions can take place during to the specific environments they provide.
Membranes are selectively permeable (only allow certain substances in and out).
Some organelles are common to all Eukaryotic cells and are seen in animal cells.

Mitochondria

Site of cellular respiration (production of ATP). More mitochondria = more energy used.
Mitochondria have a double membrane: the inner membrane is folded (forms structures called cristae) and a fluid interior (the matrix). Membrane contains the cristae contains enzymes used for respiration.
Mitochondria also contains small amounts of DNA (called mitochondrial DNA or (mt)DNA). Mitochondria produce their own enzymes and reproduce themselves.