biology Btec unit 1 Cheat Sheet

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key words

membrane bound - surrounded by a membrane

linear - the ends of the DNA molecule is in a chromosome

nucleus - the organelle that contains the cell DNA and the control center of the cell

cytoplasm - where metabolic reactions take place

cell wall - protects and supports each cell and the whole plant

lysosomes - the organelle that digests food particles, wastes, cell parts, and foreign invaders

golgi vesicle - responsible for transporting, modifying, and packaging proteins and lipids into vesicles to be transported where needed

rough ER - has ribosomes attached; it synthesises and transports proteins

smooth ER - flattened cavities surrounded by a thin membrane which do not have anything attached. These synthesise carbohydrates and lipids

cell membrane - separates the interior of the cell from the outside environment

mitochondrion - the organelle that breaks down food molecules to make ATP

golgi apparatus - here newly made proteins are modified and then packaged into vesicles

nucleolus - dense spherical structure inside the nucleus that produces ribosomes and RNA

centriole - take part in cell division

ribosome - the organelle in which amino acids are hooked together to make proteins

chloroplast - the organelle that uses the energy of sunlight to make food

endoplasmic reticulum - the organelle that makes lipids, breaks down drugs and other substances, and packages proteins for golgi complex

golgi complex - the organelle that processes and transports proteins and other materials out of the cell

large central vacuole - the organelle that stores water and other materials

pits - all water to enter and leave the xylem vessels

vacuole - maintains turgor to ensure a rigid frame work in the cell

vesicle - these transport materials around the cell or out the cell

cell theory

all living things are composed of cells products

new cells are formed only by the division of pre-existing cells

the cell contains inherited information (genes), which is used as instructions for growth, functioning and development

the is the functioning unit of life; the metabolic reactions of life take place within the cells

Magnification equation triangle

Image size (I)= actual size (A) x magnification (M)

Actual size (A) = image size (I) / magnification (M)

Magnification (M) = image size (I) / actual size (A)

bacteria cells (cont)

Transcription and translation can occur simultaneously because the genetic material is free in the nucleoid surrounded by ribosomes.

The newly made protein toxin is moved to the surface membrane ready to be secreted to cause infection.

red blood cells

Light microscopy vs electron microscopy

white blood cells

Neutrophils are a type of white blood cell and they play an important role in the immune system. They have multi-lobed nuclei, which enables them to squeeze though small gaps when travelling to the site of infection. The cytoplasm holds lysosomes that contain enzymes that are used to digest pathogens that are ingested by the neutrophil.

root hair cell

bacteria cells

bacteria cells like many other animals and plants, produce and secrete toxins that have an effect on other organisms

DNA is free in the cytoplasm of a prokaryotic cell in the area called the nucleoid

A section of DNA containing a genetic code for a metabole unwinds and hydrogen bonds break.

RNA nucleotides line up (complementary base pairing). Messenger RNA is formed. This process is known an transcription.

The next process is the production of the bacterial protein. This is called translation and it occurs at the ribosomes.

Red blood cells or erythrocytes are a biconcave shape. This increases the surface area to volume ratio of an erythrocyte. They are flexible so that they can squeeze through narrow blood capillaries. Their function is to transport oxygen around the body. In mammals, erythrocytes do not have a nucleus or other organelles. This increases space for the haemoglobin molecules inside the cell that carry oxygen.

eukaryotic and prokaryotic

eukaryotic	prokaryotic
eukaryotic cells make up multicellular cellular organisms such as plants and animals. they are complex cells with a nucleus and membrane--bound organelles	prokaryotic cells are single celled organisms. they are simple structures and do not have a nucleus or any membrane-bound organelles
plants and animals	bacteria

light microscopy	electron microscopy
Light microscopes use visible light and magnifying lenses to observe small objects	They use a beam of electrons in a vacuum with a wavelength less than 1nm to visualise the specimen.
Positives: can observe sub-cellular structures	**Positive**: x500000 magnification, high resolution (0.1nm) electron micrographs produced.
Limitations: lower magnification (x500) and resolution (x200nm)	**Limitations**: destroy the sample.

egg cells

Egg cells, or ova, are the female gametes in animals. An egg cell is one of the largest cells in the human body, and is approximately 0.12 mm in diameter. It contains a nucleus which houses the genetic material. The zona pellucida is the outer protective layer/membrane of the egg. Attached to this is the corona radiata, which consists of two or three layers. Its function is to supply proteins needed by the fertilised egg cell.

These cells are found at a plants roots, near the growing tip. They have long hair like extensions called root hairs. The root hairs increase the surfae area of the cell o maximise the movement of water and minerals from he soil into the plant root

key functions of a cell

one of the key functions of a cell is to synthesise proteins for use inside the cell, to lead to cell multiplication and for secretion out of the cell for example, insulin

proteins are synthesised on ribosomes attached to rough endoplasmic reticulum

the newly synthesised proteins are transported through the cisternae of the rough ER and packaged into vesicles

they are transported to the golgi apparatus, where vesicles fuse with the surface of the golgi apparatus and the apparatus enter

key functions of a cell (cont)

it is here that the newly synthesised proteins are modified and then packaged into vesicles. secretory vesicles will transport proteins that are to be released from the cell to the cell surface membrane

they will fuse with the membrane and release the protein by exocytosis

gram staining

gram positive	gram negative
if you see a purple stain when observing the smar under a microscope it shows that gram-positive bacteria are present	if the smear has retained the pink safranin stain, this shows that gram-negative bacteria are present. this is because their thinner cell walls and lipid membranes allow ethanol (applied during the method) to wash off all the crystal violet purple stain and to then retain the pink safranin stain
doesn' have an outer membra	has an outer membrane

Positive **P**urple

squamous epithelial tissue

location

sperm cell

sperm cells are male gametes in animals. They have a tall like structure called a a undulipodium so hey can move. They also contain many mitochondria to supply the energy needed for his movement. The sperm head is 3 µm wide and 4 µm long. it is made up of an acrosome, which contains digestive enzymes . These enzymes are released when the sperm meets the egg, to digest the protective layer and allow the sperm to penetrate. The sperm's function is to deliver genetic information to the egg cell or ovum (female gamete). This is fertilisation

Time line about the cell

1665	Robert Hooke first described a cell
	Anton Van Leeuwenhoek was the person who observed bacteria and protoctists
1674 - 1683	The first living cell was observed protoctists from pond water samples, after developing powerful glass lenses
1831	The nucleus is observed
	Robert Brown an English botanist was the first to observe and describe the nucleus in a plant cell
1674 - 1683	Universal cell theory

Time line about the cell (cont)

	Matthias Schleiden suggests that all plant material is composed of cells. Jan Purkyne observed that animal tissue is composed of cells and the structure is similar to plant tissue. The scientist credited for the universal cell theory is Theodore Schwann, a German physiologist. He proposed that 'all living things are made of cells'.
1852	Evidence of the origin of the new cell
	Robert Remak observed cell division in animal cells. His findings were not accepted at the time, but in 1855 Rudolf Virchow published the findings as his own to show new cells form from existing ones
1860	Spontaneous generation disproved
	Louis Pasteur demonstrated that bacteria will only grow sterile nutrient broth after it has been exposed to air. This disproved the theory of spontaneous generation of cells.