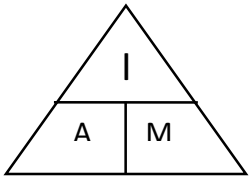
OCR AS Level Biology A
By
Mo Awe

The use and manipulation of the magnification formula



This is a handy way to remember the relationship between image size (I), actual size (A) and magnification (M)

1000micrometer= 1mm
1000nm = 1 micrometer

The difference between magnification and resolution

Magnification is the ratio of image size to actual size and **resolution** is the ability to distinguish two spate points that are close together.

The interrelationships between organelles in the role of protein production and secretion

1. The nucleus contains the gene for protein
2. Ribosomes is the site of protein synthesis
3. The sent to the Golgi apparatus in vesicles where it is further processed and packaged
4. Sent to plasma membrane where vesicle fuses in exocytosis

The similarities and differences between prokaryotic and eukaryotic cells

Similarities:

- Presence of plasma membrane, cytoplasm, ribosomes, DNA and RNA

Differences:

- Prokaryotes have no centrioles, nucleus, membrane bound organelles unlike eukaryotes
- Prokaryotes have smaller ribosomes known as 70s and cell wall is made from peptidoglycan

The ultrastructure of eukaryotic cells and the functions of the different cellular components + the importance of the cytoskeleton

STRUCTURE	FUNCTION
Nucleus, nuclear envelope and nucleolus • This is surrounded by a double membrane known as the nuclear envelope	• The nucleolus is the site where ribosomes are made • The pores allow mRNA to leave the nucleus to be involved in translation • The job of the nuclear membrane is to separate the contents of the nucleus from the rest of the cell
Rough endoplasmic reticulum • Ribosomes are embedded in the structure	• Synthesis protein • Cisternae transport substances from one area of a cell to another area
Smooth endoplasmic reticulum	• Contain enzymes that are involved in lipid metabolism

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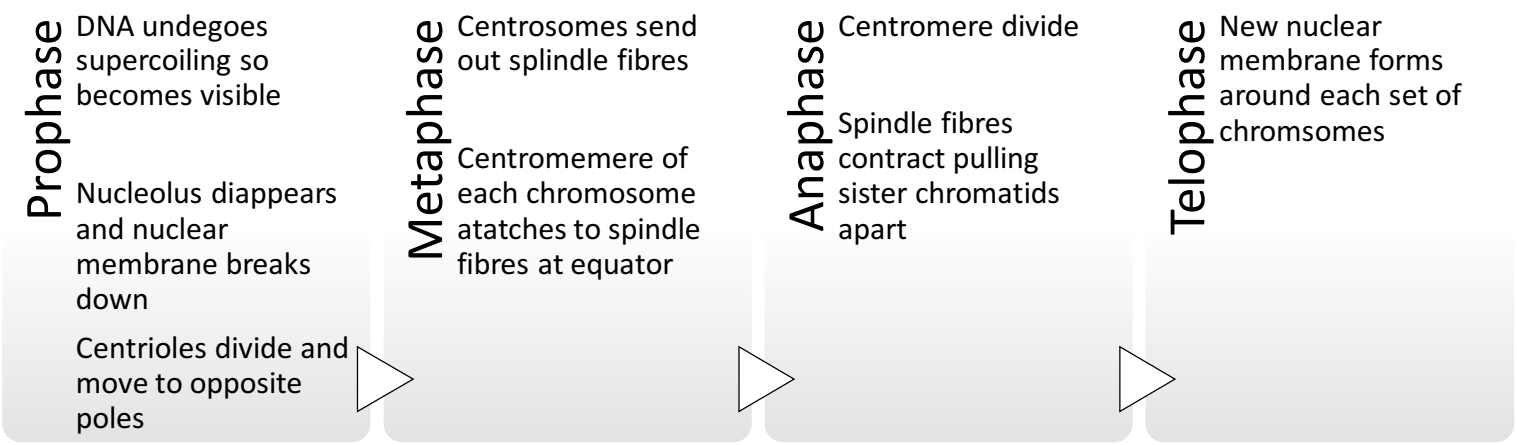
The main stages of mitosis



Cytokinesis is where the cytoplasm divides:

- Equator tucks inwards
- Organelles are shared and Golgi apparatus produces vesicles for the plasma membrane

The significance of mitosis in life cycles

Budding

1. Cytoplasm and cell wall form a bulge
2. Nucleus moves into the bud
3. The bud breaks off and there is uneven distribution of cytoplasm

Mitosis in plants

Plants do not have centrioles and during cytokinesis the vesicles from the Golgi apparatus form the plasma membrane **and** the cell wall.

Asexual reproduction

This is quicker than sexual reproduction
However, lack of genetic variation means population is susceptible to disease and environmental change. More common in plants as cannot move

The significance of meiosis in life cycles

Meiosis is a type of nuclear division that results in half the number of chromosomes of the parent cell

The significance of meiosis:

- Increases genetic diversity
- This means that it increases survival as some organisms would have characteristics that enable them to be better adapted

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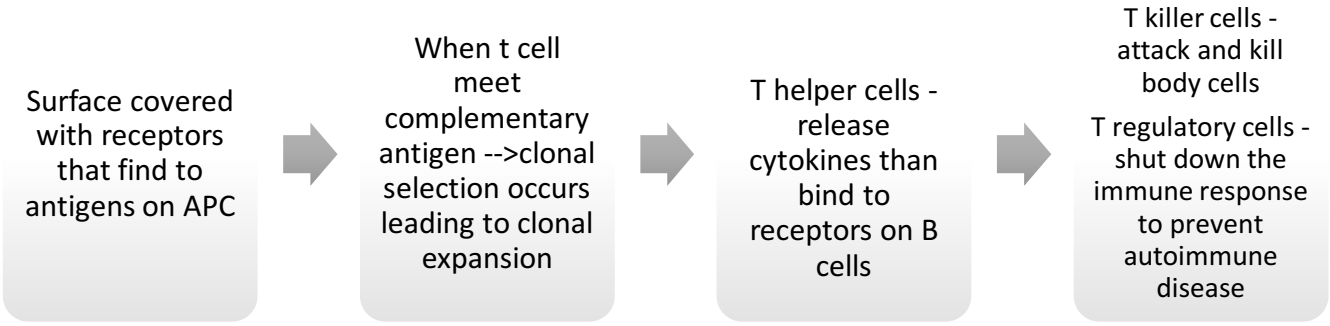
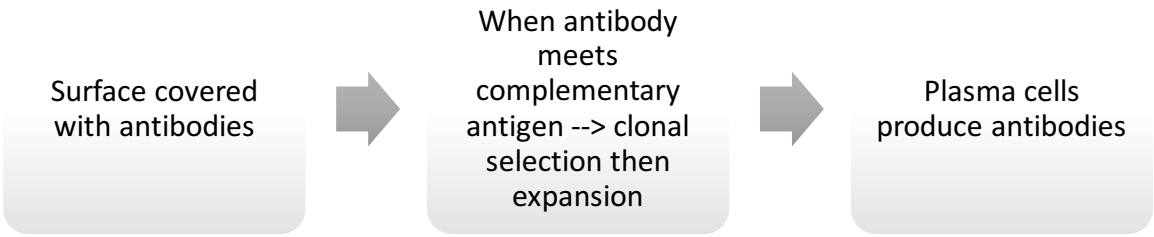
T lymphocyte activation



B lymphocyte activation



B cells come from **stem cells** and spread out throughout the lymphatic system

T cells come from **stem cells** but mature in **thymus gland**

Cell wall	Peptidoglycan	Present in many species	Chitin	Cellulose	None
Nutrition	Heterotrophic Parasitic Autotrophic	Heterotrophic Parasitic Autotrophic	Hetero-trophic	Autotrophic	Heterotrophic
Locomotion	Some have flagella	Some have Undulipodium	None	None	Muscular tissue

Evidence that has led to new classification systems

Recent research in the sequence of bases in RNA of ribosomes has revealed that actually the Prokaryote can be split into Archaea and Bacteria

Phylogeny

The evolutionary relationship between organisms and groups of organisms

Evidence for natural selection and evolution

Fossil evidence – Similarities between fossils can be used to reveal evolutionary relationships

Molecular evidence – Closely related species have similar DNA and more distantly related species would have difference in their DNA

Different types of variation

Intraspecific variation – Variation between members of the same species

Interspecific variation – Variation among different species

Continuous variation – There is not distinct group and is causes by genes and the environment e.g. height and weight

Discontinuous variation – There are distinct groups and is caused by genes e.g. blood group

Anatomical adaption – These are associates with structure e.g. predators have sharp teeth to kill prey

Physiological adaptions – These are associated with the working of the body system e.g. some C4 plants collect carbon dioxide at night so can keep their stomata close during the hot day

Behavioral adaptions – These are associated with eating and mating e.g. plants close their stomata to make their leaves wilt, so smaller surface area exposed to the sun

The mechanism of natural selection

Genetic variation exists and the environment might change which is known as a selection pressure. Some variations are better adapted, so survive and pass on advantageous allele to the next generation

Convergent evolution
Organisms from different taxonomic groups can become adapted to the environment by adopting similar anatomical features e.g. marsupial and placental mole.

PRACTICALS

BIURET TEST
This is a test for protein
The test solution needs to be alkaline therefore sodium hydroxide added and copper II sulphate added

Positive solution turns purple
Negative stays blue

BENEDICTS TEST FOR REDUCING SUGAR
This is a test for reducing sugar

Dissolve in water the add benedicts reagent and heat at 80 degrees for 3 minutes

A precipitate forms and positive colour change form blue to brick red

BENEDICTS TEST FOR NON-REDUCING SUGAR –

This is a test for non-reducing sugar e.g. sucrose

Hydrolyse the bond to free up the reducing groups

Dissolve in water and add dilute HCl and boil for 2 minutes, then neutralise by adding sodium hydrogencarbonate solution then add benedicts reagent

A precipitate forms and positive colour change form blue to brick red

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IODINE TEST
This is a test for starch
Dissolve in water and add iodine solution
A positive change to deep blue from yellow brown as the triiodide ion slips in middle of amylose helix causing colour change

EMULSION TEST
This is a test for lipids
Dissolve in alcohol and add water
Positive when water is added the clear filtrate will turn cloudy or milky

BIOSENSORS
Converts a chemical variable to an electrical signal
Glucose diffuses towards immobilised enzymes which catalyses a reaction that releases hydrogen peroxide which reacts with platinum electrode to generate a current which is proportional to glucose concentration

COLORIMETER

Use a centrifuge to separate precipitate from excess benedicts and pipette into cuvette then placed in colorimeter

After each reading colorimeter needed to be rinsed e.g. water

Create calibration curve and plot glucose concentration on percentage transmission