

OCR (B) Biology GCSE

Topic B4.3: How do organisms grow and develop?

Flashcards

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What is the cell cycle?



What is the cell cycle?

- A series of events that take place in a cell involving cell growth, DNA replication and cell division
- It is described as the lifecycle of a cell



State the two stages of the cell cycle



State the two stages of the cell cycle

Stage 1 - interphase

Stage 2 - mitosis



What is interphase?



What is interphase?

The longest stage of the cell cycle that involves cell growth, the synthesis of new organelles and DNA replication



What does DNA replication involve?



What does DNA replication involve?

- Double helix 'unzips' exposing two strands
- DNA bases align next to complementary bases on the DNA strands
- Complementary base pairs join
- Two identical DNA molecules formed



What is mitosis?



What is mitosis?

A form of cell division that produces two genetically identical 'daughter' cells with the same number of chromosomes



Why is mitosis important in organisms?



Why is mitosis important in organisms?

Mitosis is important for:

- Asexual reproduction
- Growth
- Repair of damaged cells
- Cell replacement



Describe the stages of mitosis



Describe the stages of mitosis

- Chromosomes line up along the cell equator
- Spindle fibres pull the two arms of each chromosome to opposite poles of the cell
- Nucleus of the cell divides
- A new membrane forms around each set of chromosomes
- Cell divides producing two identical daughter cells



A cell divides by mitosis once every 2 minutes. Calculate the number of identical cells present after 10 minutes.



A cell divides by mitosis once every 2 minutes.
Calculate the number of identical cells present after
10 minutes.

$$10 \div 2 = 5$$

5 cell divisions have taken place

$$2^5 = 32 \text{ cells}$$



What is cancer?



What is cancer?

- Non-communicable disease
- Uncontrolled cell division (due to damaged DNA) results in the formation of a primary tumour
- Tumour cells break off and spread to other tissues forming secondary tumours



What is a non-communicable disease?



What is a non-communicable disease?

A disease that is not spread between organisms



What is sexual reproduction?



What is sexual reproduction?

- Type of reproduction
- Involves the production of gametes by meiosis
- A gamete from each parent fuses to form a zygote
- Genetic information from each gamete is mixed so the resulting zygote is genetically different from each parent



What are gametes?



What are gametes?

- Sex cells (sperm cells, egg cells)
- Contain half the chromosome number



What is meiosis?



What is meiosis?

A form of cell division involved in the formation of gametes where chromosome number is halved. It involves two divisions.



What must occur prior to meiosis?



What must occur prior to meiosis?

Interphase



What happens during the first stage of meiosis?



What happens during the first stage of meiosis?

The pair of chromosomes are separated and move to opposite poles of the cell.
Chromosome number is halved.



What happens during the second stage of meiosis?



What happens during the second stage of meiosis?

The arms of each chromosome are separated and move to opposite poles of the cell. Four genetically different gametes are produced.



Why is meiosis important for sexual reproduction? (2)



Why is meiosis important for sexual reproduction? (2)

- It increases genetic variation
- It ensures that the resultant zygote has a full set of chromosomes



What are stem cells?



What are stem cells?

Cells that are unspecialised and capable of differentiating into a range of different cell types



What is meant by 'differentiation'?



What is meant by 'differentiation'?

- A process in which stem cells become specialised (have a specific function)
- Some genes switch on or off, determining cell type



Why is cell differentiation important?



Why is cell differentiation important?

It enables the formation of specialised tissues with specific functions e.g. muscle tissue.



What are embryonic stem cells?



What are embryonic stem cells?

Stem cells found in very early embryos that are unspecialised and capable of differentiating into any cell type



When do embryonic stem cells begin to differentiate?



When do embryonic stem cells begin to differentiate?

After the eight cell stage



What is the function of embryonic stem cells?



What is the function of embryonic stem cells?

They enable the growth and development of tissues in human embryos.



What are adult stem cells?



What are adult stem cells?

Stem cells that can differentiate into a limited range of cell types e.g. bone marrow stem cells



What is the primary function of adult stem cells?



What is the primary function of adult stem cells?

Replacement of dead cells e.g.
replacement of red blood cells which
only live for 120 days



Where are stem cells found in plants?



Where are stem cells found in plants?

Meristems



Where is meristem tissue found?



Where is meristem tissue found?

In regions of the plant where cells are continuously dividing e.g. root tips, shoot tips



What are meristematic stem cells?



What are meristematic stem cells?

Stem cells found in meristems that are unspecialised and capable of differentiating into any cell type during the life of a plant

