OCR (B) Biology A-level

3.1.1 - Cell division and differentiation

Flashcards

Describe the stages of the cell cycle.

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1. **Mitosis** = two genetically identical cells produced.
2. **Cytokinesis** = the cytoplasm of the cell divides, forming two daughter cells.
3. **Interphase** = cell grows and prepares to divide e.g. chromosomes condense.

Summarise the process of mitosis.

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- **Prophase** = nuclear envelope breaks down, chromosomes condense, centrioles move to opposite poles of the cell.
- **Metaphase** = chromosomes move to the equator, centromeres attach to the spindle fibres.
- **Anaphase** = sister chromatids move to opposite poles.
- **Telophase** = nuclear envelope reforms, spindle fibres break down, chromosomes uncoil.

Summarise the process of apoptosis.

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- Cell shrinks. Nucleus condenses (**pyknosis**) and breaks into fragments (**karyorrhexis**). Blebs develop on the surface.
- After the cell splits up, it ‘displays’ phosphatidylserine on the surface, allowing macrophages to bind and digest the cell.

Discuss the roles of mitosis and apoptosis in growth and repair.

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- Mitosis = cell replacement, creates new cells where tissue is damaged or lost through injury.
- Apoptosis = cell deletion, eliminates damaged cells so they can be replaced by mitosis.

What are stem cells?

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

Name and define the three types of stem cell.

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1. **Totipotent** = can develop into any cell type, including the placenta and embryo.
2. **Pluripotent** = can develop into any cell type, excluding the placenta and embryo.
3. **Multipotent** = can only develop into a few different types of cell.

Give an example of stem cell differentiation.

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Stem cells from bone marrow differentiate into red and white blood cells. Red blood cells are specialised for carrying oxygen. White blood cells are specialised for destroying foreign bodies.

Outline the applications of stem cells.

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- Repair of damaged tissue
- Treating neurological disorders e.g. Parkinson's
- Studying development