

GCSE Biology (Separate AND Trilogy)

Success criteria: Cell division and stem cells



I can...

Identify the genetic material in a cell as a DNA (Deoxyribonucleic acid), and recognise that in eukaryotic cells there are many long stands of DNA in the nucleus, and each long strand is wrapped up into a structure called a chromosome.

Identify sections of DNA as instructions called genes. Each gene is a code to build a protein. Each chromosome therefore carries many genes.

Describe how organisms grow by making new cells, and that new cells are also needed to replace old/damaged cells.

Understand that each cell of a multicellular organism needs to contain a full set of DNA (all chromosomes, all genes)

New body cells are produced by cell division (MITOSIS)

State that cells have a life cycle which involves the preparation for, and the process of cell division.

Understand that different types of cell will complete the cell cycle in different lengths of time (eg. skin cells wear away so need regular replacement = short cycle)

Describe what happens during the preparation phase (interphase) including growth, production of proteins and organelles and DNA replication.

Understand that chromosomes look different following interphase because the DNA has replicated. Each chromosome now has chromatids so they look 'x' shaped.

Describe the stages of MITOSIS (division of the nucleus) including

- Nucleus breaks down, chromosomes condense and become visible attach to spindle fibres (prophase)
- Chromosomes line up along the middle (metaphase)
- Chromatids pulled to opposite poles by spindle fibres (anaphase)
- New nuclei form around the two sets of chromosomes (telophase).

Describe the final phase of cell cycle as cytoplasm division = cytokinesis.

Describe how cells become specialised by turning on/off certain genes, to acquire different structure to enable it to carry our certain functions effectively.

Use the term 'differentiation' to describe the process of cells becoming specialised.

Describe how most animals start life as a single cell called a zygote (eg. fertilised egg cell) and divide by mitosis to form an embryo (ball of unspecialised cells)

Explain how the unspecialised cells from an embryo have the potential to give rise to any type of specialised cell. These cells are called embryonic stem cells.

Define stem cells as

- Unspecialised cells
- Divide indefinitely
- Can produce several types of specialised cells.

State that animal stem cells can be found in adult tissue too, although these do not have the same potential as embryonic stem cells (can only become a few cell types, not all).

Describe how stem cells may be used in medical research.

Evaluate the use of stem cells (ethics).

Recognise that plants also have stem cells (in meristem regions such as shoot and root tips).

Compare the difference in cell differentiation between plants and animals (animal cells differentiate at an early stage animal development, plant cells retain the ability to differentiate throughout life)

Describe how plant clones can be produced and how this is used (producing large numbers of identical plants for commercial value)

AQA exam specification:

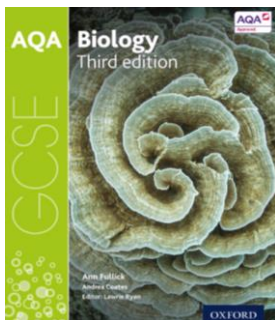
- 4.1.2.1 Chromosomes
- 4.1.2.2 Mitosis and cell cycle
- 4.1.1.4 Cell differentiation
- 4.1.2.3 Stem cells

Additional support:

Access the appropriate textbook on kerboodle.com, create your own revision notes of the key points of the topic and attempt the summary questions.

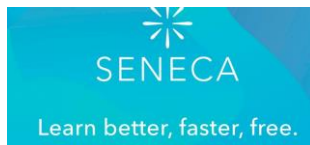


Combined science GCSE textbook
Pages 26-35



Separate Biology GCSE textbook
Pages 26-35

Utilise online revision resources to support your class notes, such as...



Attempt past paper questions using www.physicsandmathstutor.com and self-mark your answers using the official exam mark schemes.



Extension work/extra challenge:

Ask your teacher for the extension task...

Pack 1 Topic 4- Stem Cells - Growing the Future of Medicine (4.1.2.3)