



Recap

We previously six different types of specialised cells in animals and plants, and the specific features that allow these cells to adapt for their function.

1.1.4 Cell Differentiation

In this section, we will learn about 3 examples of viral diseases. You need to know these specific examples for AQA exams.

Cell differentiation

• **Cell differentiation is vital for the survival of an organism.** Cell differentiation is the process by which a cell changes, becoming more and more suited, or specialised, for a particular function.

• **Differentiation involves many changes.** The number of organelles may change, or the size of the cell may change. For example, during differentiation sperm cells gain lots of mitochondria.

Timing of Differentiation

• **The body begins with undifferentiated cells.** The embryo has stem cells, which are undifferentiated. As the organism grows, clusters of cells become specialised into different tissues specialised for a particular role.

• **Animal cells differentiate early.** Animal cells differentiate and specialised early in the development of the organism

• **Plant cells take longer to differentiate.** Many plant cells do not ever become specialised and so continue to have the ability to differentiate.



Key Aims

1. Definition of Differentiation
2. Timing of Differentiation
3. Differentiation > Specialisation



AQA Specification

As an organism develops, cells differentiate to form different types of cells. Most types of animal cell differentiate at an early stage.



AQA Specification

Many types of plant cells retain the ability to differentiate throughout life.





AQA Specification

In mature animals, cell division is mainly restricted to repair and replacement.



AQA Specification

As a cell differentiates, it acquires different sub-cellular structures to enable it to carry out a certain function. It has become a specialised cell.

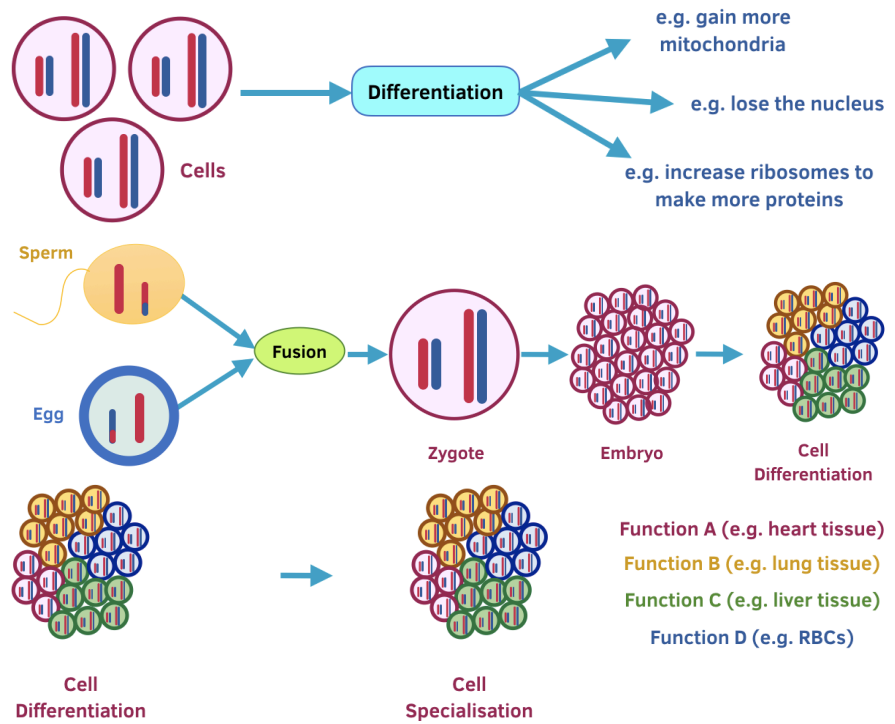


Fig 1. Cell Differentiation and Specialisation.

Differentiation > Specialisation

- **Cell division is used to repair tissues.** In mature animals, cells divide in order to replace damaged cells, therefore repairing the tissue that they make up. For example, every time you touch an object you lose some skin cells, so the cells on the surface divide quickly to replace the lost cells.
- **Differentiation makes a cell specialised.** As the cells differentiate, they develop different characteristics and structures within the cell, as illustrated above. These help the cell to carry out a specific function. This is what is meant when a cell is specialised.





Knowledge Recall

1. What is cell differentiation?
2. What is cell division useful for?
3. What is meant by the term specialised cell?

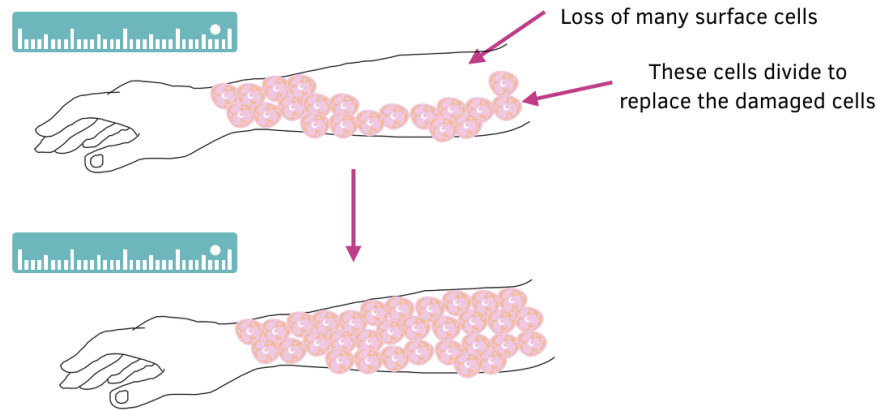


Fig 2. Tissue Repair. Cell division is useful for replacing damaged cells.

