

# Medicinal Science

## Recommended Movies

### *Gorillas in the Mist (1988)*

An absolute classic that retells the true story of the life and work of Dian Fossey and her work studying and protecting mountain gorillas from poachers and habitat loss. A tear jerker.

### *Lorenzo's Oil (1992)*

Based on a true story. A young child suffers from an autoimmune disease. The parents research and challenge doctors to develop a new cure for his disease.

### *Something the Lord Made (2004)*

Professor Snape (the late great Alan Rickman) in a very different role. The film tells the story of the scientists at the cutting edge of early heart surgery as well as issues surrounding racism at the time.

## DNA and the Genetic Code

In living organisms nucleic acids (DNA and RNA) have important roles and functions related to their properties. The sequence of bases in the DNA molecule determines the structure of proteins, including enzymes.

The double helix and its four bases store the information that is passed from generation to generation. The sequence of the base pairs adenine, thymine, cytosine and guanine tell ribosomes in the cytoplasm how to construct amino acids into polypeptides and produce every characteristic we see. DNA can mutate leading to diseases including cancer and sometimes anomalies in the genetic code are passed from parents to babies in disease such as cystic fibrosis, or can be developed in unborn fetuses such as Down's Syndrome.

Read and make notes from the information on these websites:

<http://www.bbc.co.uk/education/guides/z36mmp3/revision>

<http://www.s-cool.co.uk/a-level/biology/dna-and-genetic-code>

And take a look at these videos:

<http://ed.ted.com/lessons/the-twisting-tale-of-dna-judith-hauck>

<http://ed.ted.com/lessons/where-do-genes-come-from-carl-zimmer>

## Task

Produce a wall display to put up in your classroom in September. You might make a poster or do this using PowerPoint or similar. Your display should use images, keywords and simple explanations to:

Define gene, chromosome, DNA and base pair

Describe the structure and function of DNA and RNA

Explain how DNA is copied in the body

Outline some of the problems that occur with DNA replication and what the consequences of this might be.

## **Exchange and Transport**

Organisms need to exchange substances selectively with their environment and this takes place at exchange surfaces. Factors such as size or metabolic rate affect the requirements of organisms and this gives rise to adaptations such as specialised exchange surfaces and mass transport systems. Substances are exchanged by passive or active transport across exchange surfaces. The structure of the plasma membrane enables control of the passage of substances into and out of cells

Read and make notes from the information on these websites:

<http://www.s-cool.co.uk/a-level/biology/gas-exchange>

<http://www.s-cool.co.uk/a-level/biology/nutrition-and-digestion/revise-it/human-digestive-system>

And take a look at these videos:

<http://ed.ted.com/lessons/insights-into-cell-membranes-via-dish-detergent-ethan-perlstein>

<http://ed.ted.com/lessons/what-do-the-lungs-do-emma-bryce>

## **Task**

Create a poster or display to go in your classroom in September. Your poster should either: compare exchange surfaces in mammals and fish or compare exchange surfaces in the lungs and the intestines. You could use a Venn diagram to do this. Your poster should:

Describe diffusion, osmosis and active transport

Explain why oxygen and glucose need to be absorbed and waste products removed

Compare and contrast your chosen focus.

## Cells

The cell is a unifying concept in biology, you will come across it many times during your two years of A level study. Prokaryotic and eukaryotic cells can be distinguished on the basis of their structure and ultrastructure. In complex multicellular organisms cells are organised into tissues, tissues into organs and organs into systems. During the cell cycle genetic information is copied and passed to daughter cells. Daughter cells formed during mitosis have identical copies of genes while cells formed during meiosis are not genetically identical

Read and make notes from the information on these websites:

<http://www.s-cool.co.uk/a-level/biology/cells-and-organelles>

<http://www.bbc.co.uk/education/guides/zvjycdm/revision>

And take a look at these videos:

<https://www.youtube.com/watch?v=gcTuQpuJyD8>

<https://www.youtube.com/watch?v=L0k-enzoeOM>

<https://www.youtube.com/watch?v=qCLmR9-YY7o>

## Task

Produce a one page revision guide to share with your class in September summarising one of the following topics: Cells and Cell Ultrastructure, Prokaryotes and Eukaryotes, or Mitosis and Meiosis.

Whichever topic you choose, your revision guide should include:

Key words and definitions

Clearly labelled diagrams

Short explanations of key ideas or processes.

## **Biological Molecules**

Biological molecules are often polymers and are based on a small number of chemical elements. In living organisms carbohydrates, proteins, lipids, inorganic ions and water all have important roles and functions related to their properties. DNA determines the structure of proteins, including enzymes. Enzymes catalyse the reactions that determine structures and functions from cellular to whole-organism level. Enzymes are proteins with a mechanism of action and other properties determined by their tertiary structure. ATP provides the immediate source of energy for biological processes.

Read and make notes from the information on these websites:

<http://www.s-cool.co.uk/a-level/biology/biological-molecules-and-enzymes>

<http://www.bbc.co.uk/education/guides/zb739j6/revision>

And take a look at these videos:

<https://www.youtube.com/watch?v=H8WJ2KENIK0>

<http://ed.ted.com/lessons/activation-energy-kickstarting-chemical-reactions-vance-kite>

Task:

Krabbe disease occurs when a person doesn't have a certain enzyme in their body. The disease affects the nervous system. Write a letter to a GP or a sufferer to explain what an enzyme is.

Your poster should:

Describe the structure of an enzyme

Explain what enzymes do inside the body