

Cell Structure and Function

Section 1: Cell structure

- a) Describe 3 differences between plant & animal cells (include cell wall + chloroplasts)
- b) Label and describe the function of the following parts of an animal cell:
- cell membrane
 - nucleus
 - chromatin
 - nuclear pore
 - nuclear membrane
 - rough endoplasmic reticulum
 - smooth endoplasmic reticulum
 - Golgi apparatus
 - vesicles
 - vacuoles
 - mitochondria
 - lysosomes
 - ribosomes
- c) Describe the difference between chromatin and chromosomes
- d) Describe the difference between cells and tissues.

Section 2: DNA Structure

- a) Identify the following on a diagram of the structure of DNA
- nucleotides, base pairs, sugar and phosphate
- b) Define a gene.
- c) Explain what is similar about the DNA of all living things, in addition to what is different

Section 3: DNA Functions:

- a) Describe why DNA replication is necessary and the steps involved in DNA replication
- a. You need to be able to draw and label DNA replication
- b) Describe 4 uses of proteins in the body. Describe how proteins differ.
- c) Describe the steps of protein synthesis (include the roles of mRNA, tRNA, ribosomes, amino acids, codons and anticodons.)
- a. You need to be able to draw and label transcription and translation
- d) Given a table of mRNA codons and amino acids, determine the sequence of amino acids produced by a section of DNA (gene).
- e) Define a mutation and describe the effect of a mutation on the protein product.
- f) Describe 4 possible consequences for cells that have mutations.
- g) Describe how a mutation may lead to a genetic disease.

Section 4: Cancer

- a) Describe 2 differences between benign and malignant tumors.
- b) Describe 2 differences between normal cells and cancer cells. (include metastasis)
- c) Describe how the mice and sweetener lab was tested, and how a conclusion was made

Section 5: Applications in Genetics

- a) Describe the difference between the 4 major blood types.
- b) Describe what happens in an antibody/antigen reaction.
- c) Given data showing red blood cell clumping due to an antibody/antigen reaction, determine the blood type of the individual.

Section 6: Genetic Engineering

- a) Define recombinant DNA and describe how this technology is used to produce human proteins like insulin.
- b) Describe what a DNA fingerprint shows. Solve a crime using DNA fingerprint data.
- c) Define and give an example of a transgenic organism (genetically modified organism)