

Previous exam questions in cell physiology (comprehensive)

What is the function of the sodium-potassium pump?

- a) Levelling the membrane potential by transports of sodium and potassium from high to low concentration.
- b) Building up the membrane potential, by active transport of Sodium and Potassium from low to high concentration.
- c) Utilises the concentration gradient of sodium and potassium for synthesis of ATP.
- d) Equalize extracellular and intracellular concentration of Sodium and Potassium.

What is the function of the sodium-potassium pump?

- A Transporting potassium and Sodium across the cell membrane from low to high concentration by utilizing the membrane potential
- B Transporting potassium and Sodium across the cell membrane from low to high concentration by use of energy in the form of ATP
- C Transporting of sodium and potassium from high to low concentration by facilitated diffusion.
- D Equalize extracellular and intracellular concentration of Sodium and Potassium.

And what is the result of this process?

- A Utilizing the concentration gradient of sodium and potassium for synthesis of ATP.
- B The concentration gradient of potassium lead to a diffusion of potassium that is not followed by anionic diffusion, and this builds up a membrane potential
- C As the concentration differences of potassium and sodium across the cell membrane are removed (equalized), the differences in protein anions will create a membrane potential.
- D As the intracellular concentrations of sodium and potassium becomes equal, the membrane potential is determined by the concentration of calcium.

Krebs' cycle is a biochemical process that is the basis for most of the energy production.

Where in the cell does this process take place?

- a) The cytoplasm
- b) Smooth endoplasmatic reticulum
- c) The Golgi apparatus
- d) The mitochondria

Anaerobic respiration is a process where glucose is metabolised to lactic acid, producing a small amount of ATP. Where in the cell does this process take place?

- a) The cytoplasm
- b) Smooth endoplasmatic reticulum
- c) The Golgi apparatus
- d) The mitochondria

What does the cytoskeleton consist of?

- a) Phospholipids
- b) **Amino acids**
- c) Glycogen
- d) Cholesterol

Each of our cells is like a tiny factory where thousands of chemical reactions take place every day in separate and specialized organelles, of which the ribosomes are one type. - What is the major function of this particular organelle?

- A. **Protein synthesis**
- B. Protein modification
- C. Protein collection
- D. Protein package

“The central dogma of molecular biology” says something about the flow of genetic information in living organisms. - What is the direction of this flow?

- A. The flow is unidirectional; RNA – DNA – protein
- B. The flow is reversible; RNA – DNA – protein
- C. The flow is reversible; DNA – RNA – protein
- D. **The flow is unidirectional; DNA – RNA – protein**

The cell (division) cycle is the series of events in a cell between one cell division and the next, leading to its division and replication. The cycle consists of several distinct phases, where one of the phases is called S (synthesis) phase. - What is the most important event that happens in this phase of the cell cycle?

- A. **DNA replication**
- B. Cytokinesis
- C. Mitosis
- D. DNA repair

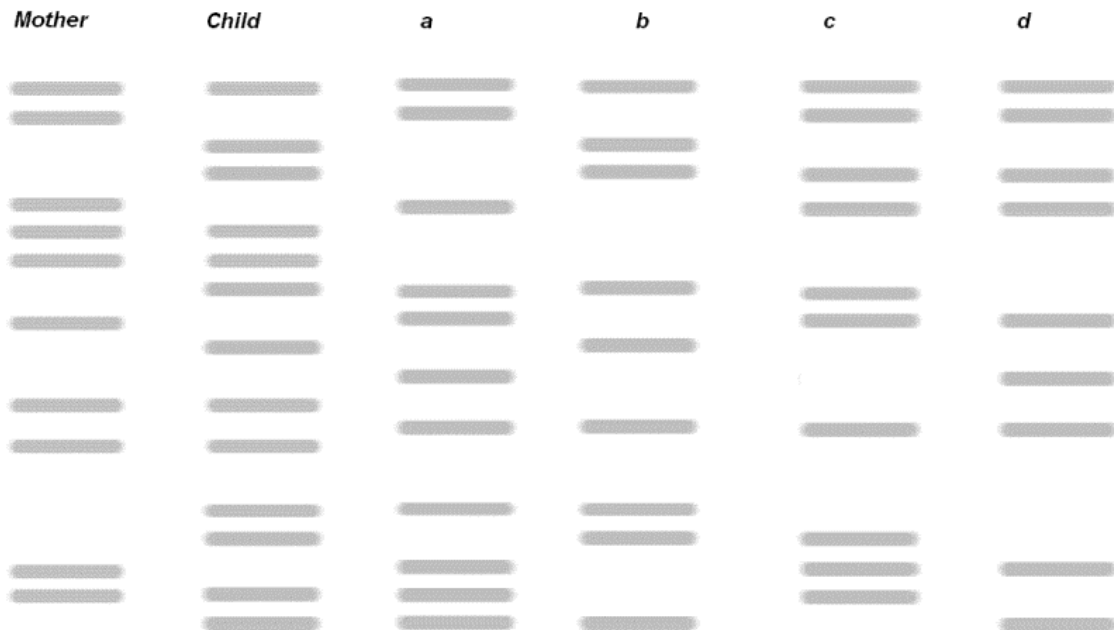
The Polymerase chain reaction (PCR) is a method that:

- A. Uses restriction enzymes to split the DNA into smaller pieces
- B. **Amplifies small amounts of DNA into several thousand copies**
- C. Separates DNA fragments based on size
- D. Visualise DNA fragments in a gel by a fluorescence dye

The method called restriction fragment length polymorphism (RFLP) is used to:

- A Increase the amount of DNA found in a small sample
- B Increase the amount of DNA found in a degraded samples
- C **Break up the DNA-strand into smaller pieces to compare DNA from different sources**
- D To sequence the DNA on a base to base manner

In a paternity case, there are four possible fathers (a, b, c and d). A DNA test is done, which of the four candidates is the most probable father?



- a) a
- b) b**
- c) c
- d) d

What makes the cell differentiation possible?

- a) The genes are different in different tissues.
- b) Different translation mechanisms in different tissues
- c) Different replication mechanisms in different tissues
- d) Different genes are active in different tissues.**

The main part of the DNA in the cell is found in the nucleus. What other organelles do also contain DNA?

- a) The Golgi apparatus
- b) The endoplasmic reticulum
- c) The centrosomes
- d) The mitochondria**

One of these factors is of central importance in the development of all cancer tumours.

- A. Changed cellular metabolism
- B. Changed cellular glucose uptake
- C. Accumulation of mutations**
- D. Accumulation of waste products

What is an oncogene?

- A A gene that codes for enzymes that repair damaged DNA
- B A gene that regulates cell growth and death
- C A mutated growth regulator gene**
- D A gene giving the cancer cells ability to break down connective tissue to facilitate metastasis.

Proteins are large, complex molecules that are made continuously in every cell. Each of them is made up of many amino acids that must be joined together in the correct sequence in order to function properly. What instructs this sequence for a particular protein?

- A) The available tRNAs in the cell
- B) The post-transcriptional modifications of mRNA
- C) The DNA base sequence in the gene
- D) The type of ribosomes produced in the nucleolus

What do we call the process by which an initial immature cell develops specialized structures and functions?

- A) Cell differentiation
- B) Gene expression
- C) Cell organization
- D) Gene transcription

Membrane proteins are important parts of the cell surface membrane. Which of these functions is a membrane protein function?

- A Mechanical support of the cell surface, maintaining the cell shape.
- B Binding of oxygen for the cell metabolism
- C Binding of peptide hormones
- D Protein synthesis

What is correct about an action potential?

- A An action potential is triggered by an increase in calcium in the extracellular fluid
- B An action potential is triggered by an increase in calcium in the cytoplasm
- C An action potential is triggered by a partial depolarisation of the cell membrane.
- D An action potential is triggered by a partial hyperpolarisation of the cell membrane

How is genetic information transmitted in the cells?

- A. RNA – DNA – protein
- B. RNA – protein – DNA
- C. DNA – RNA – protein
- D. DNA – protein – RNA

Where is DNA located in the cell?

- 1 Only in the cell nucleus
- 2 In the cell nucleus and the ribosomes
- 3 In the cell nucleus and the sarcoplasmic reticulum
- 4 In the cell nucleus and the mitochondria