

المستوي الثالث / برنامج البيولوجيا الجزيئية
مقرر: الأسس الجزيئية للأمراض (308 ح)

Date: 04-06-2023

Time: 2 Hours

Marks: 90

الإمتحان في صفتان:

Answer ALL the following questions:

QUESTION (1):

(20 Marks)

Which of the following statements are probably true (✓) and which are probably false (x).

DO NOT copy the sentences to your answer sheet

- 1- All forms of disease start with molecular or structural alterations in cells.
- 2- Once the stress is removed, a stressed cell can recover to its original state without having suffered any harmful consequences.
- 3- Beyond a certain point, hypertrophy of the heart can lead to heart failure, arrhythmias and sudden death.
- 4- Glucose or salt in hypertonic concentrations may cause cell injury directly.
- 5- Excess of cholesterol can cause cell injury.
- 6- Cells may become rapidly nonfunctional after the start of injury, although they may still be viable, with potentially reversible damage.
- 7- In necrotic cells, the phosphatidylserine is expressed on the outer layer of the membrane, where it is recognized by several macrophage receptors.
- 8- Depletion of ATP and rupture of lysosomal and plasma membranes are typically associated with apoptosis.
- 9- Hypertrophy results in an increase in the size of affected cell but not the organ.
- 10- Apoptosis can be considered an accidental and unregulated form of cell death.
- 11- Common forms of cancer in the respiratory tract are composed of squamous cells.
- 12- Vitamin A promotes the expression of genes that influence the differentiation of progenitor cells derived from tissue stem cells.
- 13- Atrophy may result from increased autophagy.
- 14- During apoptosis cell is fragmented without complete loss of membrane integrity, and cellular debris are rapidly removed.
- 15- Detachment of ribosomes from the ER and clumping of nuclear chromatin are characteristics of reversible cell injury.
- 16- Acute inflammation in response to bacterial infections produces a very similar reaction in most tissues.
- 17- Hyperplasia and hypertrophy can't be triggered by the same external stimulus.
- 18- Notochord and thyroglossal duct undergo hypertrophy during fetal development.
- 19- GATA4, NFAT, and MEF2 factors work coordinately to decrease the synthesis of muscle proteins in hypertrophy.
- 20- Necrosis acts as a backup mechanism in host defense against certain viruses that encode caspase inhibitors.

QUESTION (2):

(20 Marks)

Complete the following with suitable words:

DO NOT copy the sentences to your answer sheet

- ____ (1) ____ are reversible functional and structural responses to changes in physiologic states and some pathologic stimuli allowing the cell to survive and continue to function.
- There are several morphologically distinct patterns of tissue necrosis, for example: ____ (2) ____, ____ (3) ____, and ____ (4) ____.
- ____ (5) ____ is a term that refers to a decrease in the size and metabolic activity of cells.
- ____ (6) ____ is a deficiency of oxygen, which causes cell injury by reducing aerobic oxidative respiration.
- The release of mitochondrial pro-apoptotic proteins is tightly controlled by the ____ (7) ____ family of proteins.
- The intracellular ratio of ____ (8) ____ to GSH is an important indicator of the cell's ability to detoxify ROS.
- Proliferation of cells during liver regeneration is an example of ____ (9) ____ hyperplasia.
- Brown atrophy results from the accumulation of ____ (10) ____ granules, which impart a brown discoloration to the tissue.
- Apoptotic cells secrete soluble factors that recruit ____ (11) ____ to help in removing dead cells.
- In ____ (12) ____ syndrome, a defect in DNA helicase causes premature aging.
- Normal cell is able to handle physiologic demands and maintain a steady state called ____ (13) ____.
- ____ (14) ____ is a reversible change in which one differentiated cell type is replaced by another cell type.
- In people with gastric acid reflux, the esophageal squamous epithelium is replaced by ____ (15) ____ cells.
- ____ (16) ____ factor is a peptide hormone that causes salt secretion by the kidney, decreases blood volume and pressure.
- O₂ is unstable and decays spontaneously to oxygen and ____ (17) ____ in the presence of water.
- Defects in membrane permeability results from ____ (18) ____ depletion and calcium-mediated activation of phospholipases.
- ____ (19) ____ proteins have 4 BH domains and they reside in the outer mitochondrial membranes as well as the cytosol and ER membranes.
- ____ (20) ____ either block free radical formation or inactivate (e.g., scavenge) free radicals.

QUESTION (3):

(25 Marks)

Answer the following:

- (A) List the cases in which death occurs by pathologic apoptosis. (5 marks)
- (B) Describe the 4 aspects of any disease process. (6 marks)
- (C) Give 3 examples for pathologic hyperplasia. (6 marks)
- (D) List the common causes of atrophy. (8 marks)

QUESTION (4):

(25 Marks)

Answer the following:

- (A) Define necroptosis and summarize how cells die by this pathway. (8 marks)
- (B) Explain how apoptosis occurs by the extrinsic pathway. (8 marks)
- (C) Discuss how the accumulation of oxygen-derived free radicals contributes to cell injury and necrosis. (9 marks)

Best Wishes

Examiner: Prof. Ahmed M. Ghoneim