

INJURY AND ADAPTATIONS.

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You are asked to review an electron micrograph of a section of liver from a chronic alcoholic. Which of the following is an indicator of irreversible injury?

- a. Cellular edema
- b. Chromatin clumping
- c. Mitochondrial swelling
- d. Myelin figures
- e. Rupture of plasma membrane

You are asked to participate in a research project on myocardial infarctions in a rat. Which of the following occurs in ischemic cell injury?

- a. Efflux of  $K^+$  and  $Na^+$
- b. Influx of  $K^+$  and  $Na^+$
- c. Influx of  $K^+$  and  $H_2O$
- d. Influx of  $Na^+$  and  $Ca^{++}$
- e. Influx of  $Na^+$  and  $K^+$

A 10 year old boy with known history of sickle cell disease presents to the emergency department complaining of left hypochondrial pain suggestive of a splenic infarct. Microscopic examination of the spleen would most likely reveal which of the following?

- a. Caseous necrosis
- b. Coagulative necrosis
- c. Fibrinoid necrosis
- d. Gangrenous necrosis
- e. Liquefactive necrosis

A 3rd year medical student is asked to write a microscopic description of a coagulative necrosis that was found in the heart of a patient who died of a heart attack. Which of the following best describes coagulative necrosis?

- a. Central amorphous, acellular eosinophilic material.
- b. Eosinophilic cytoplasm with cell outlines preserved.
- c. Granular, friable mass of material devoid of cell outlines.
- d. Localized, solid, basophilic lesion with calcification
- e. Necrosis in which tissue is converted into a fluid

5) A patient is suffering from stroke and has left sided weakness and paralysis in the extremity. The type of necrosis associated with well-developed infarct of the brain is:

- a. Caseous necrosis
- b. Coagulative necrosis
- c. Fibrinoid necrosis
- d. Gangrenous necrosis
- e. Liquefactive necrosis

6) Neutrophils have short half-lives in tissues and die within a few hours after leaving blood. Which of the following mechanisms is responsible for their death?

- a. Autophagy
- b. Apoptosis
- c. Autolysis
- d. Necrosis
- e. Ischemia

7) A 16 years old motor cyclist boy sustained blunt trauma to his abdomen. At laparotomy a small portion of injured left lobe of liver was removed. Two months later, a CT scan of the abdomen showed that the liver had nearly regained its normal size. Which of the following processes best explains this CT scan finding?

- a. Apoptosis
- b. Dysplasia
- c. Hyperplasia
- d. Hypertrophy
- e. Metaplasia

8) A 20 year old woman breastfeeds her infant. On examination, her breasts are slightly increased in size. Which of the following processes that occurred in her breasts during pregnancy enables her to breastfeed the infant?

- a. Ductal metaplasia
- b. Epithelial dysplasia
- c. Intracellular lipid deposition
- d. Lobular hyperplasia
- e. Stromal hypertrophy

A 54-year-old obese woman has experienced heartburn from gastric reflux for the past 5 years after eating large meals. She undergoes upper gastrointestinal endoscopy, and a biopsy specimen of the distal esophagus is obtained. Which of the following microscopic changes has most likely occurred?

- a. Columnar metaplasia
- b. Goblet cell hyperplasia
- c. Lamina propria atrophy
- d. Mucosal hypertrophy
- e. Squamous dysplasia

In an experiment, a large amount of a drug is administered to experimental organisms. The drug is converted by cytochrome P-450 to a toxic metabolite. Accumulation of this metabolite results in increased intracellular lipid peroxidation. Depletion of which of the following cellular substances within the cytosol exacerbates this form of cellular injury by this mechanism?

- a. ADP
- b. Glutathione
- c. mRNA
- d. NADPH oxidase
- e. Nitric oxide synthase

A 65-year-old man experienced severe substernal chest pain for 3 hours. An ECG showed changes consistent with an acute myocardial infarction. After thrombolytic therapy with tissue plasminogen activator (t-PA), his serum creatine kinase level increased. Which of the following tissue events most likely occurred in the myocardium after t-PA therapy?

- a. Cellular regeneration
- b. Drug toxicity
- c. Increased synthesis of CK
- d. Myofiber atrophy
- e. Reperfusion injury

A 77-year-old man has a lung carcinoma with metastases. After one month of chemotherapy cycle, histologic examination of a metastatic lesion shows many foci in which individual tumor cells appear shrunken and deeply eosinophilic. Their nuclei exhibit condensed aggregates of chromatin under the nuclear membrane. The pathologic process affecting these shrunken tumor cells is most likely triggered by release of which of the following substances into the cytosol?



- a. BCL2
- b. Catalase
- c. Cytochrome c
- d. Lipofuscin
- e. Phospholipase

13) In a study of viral hepatitis infection, it is observed that cytotoxic T lymphocytes (CTLs) induce death in virally infected hepatocytes. The CTLs release perforin to allow entry of their granules. Which of the following substances is found in those granules that directly activates programmed cell death?

- a. BCL2
- b. Endonuclease
- c. Granzyme B
- d. Nitric oxide
- e. p53

14) While in a home improvement center warehouse buying paint, a 35-year-old man hears "Look out below!" and is then struck on the leg by a falling pallet rack, which strikes him on his left leg in the region of his thigh. The skin is not broken. Within 2 days there is a 5 x 7 cm purple color to the site of injury. Which of the following substances has most likely accumulated at the site of injury to produce a yellow-brown color 16 days after the injury?

- a. Lipofuscin
- b. Bilirubin
- c. Melanin
- d. Hemosiderin ✓
- e. Glycogen

15) A 70-year-old man with hypercalcemia died suddenly. At autopsy, microscopic examination showed noncrystalline amorphous deposits of calcium salts in gastric mucosa, renal interstitium, and alveolar walls of lungs. Which of the following underlying conditions would most likely explain these findings?

- a. Chronic active hepatitis
- b. Diffuse parathyroid hyperplasia
- c. Disseminated tuberculosis
- d. Generalized atherosclerosis
- e. Normal aging process