Test bank from USMLE step Cell injury 2

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DOPAMINE

SCIENTIFIC TEAM

- 1-A 58-year-old man with a history of chronic hypertension presents with severe chest pain. Laboratory tests reveal elevated cardiac enzymes. A biopsy of the heart tissue would most likely show which of the following types of necrosis?

- A) Caseous necrosis

- B) Coagulative necrosis

- C) Fibrinoid necrosis

- D) Fat necrosis

- 2-A 45-year-old man with a history of poorly controlled diabetes presents with black discoloration on his toes. Examination reveals a dry, shrunken, and blackened appearance of the affected area. What is the most likely type of necrosis in this patient?

- A) Gangrenous necrosis

- B) Liquefactive necrosis

- C) Fibrinoid necrosis

- D) Caseous necrosis

- 3-A 35-year-old woman presents with abdominal pain and elevated serum amylase and lipase levels. Imaging reveals inflammation around the pancreas. Which type of necrosis is most likely present?

- A) Caseous necrosis

- B) Liquefactive necrosis

- C) Fat necrosis

- D) Coagulative necrosis

- 4-A 50-year-old man with a longstanding history of hypertension develops a vasculitis involving his renal arteries. Histology of the vessel wall reveals pink deposits that stain with fibrin. What type of necrosis is most likely seen in this patient’s blood vessels?

- A) Fibrinoid necrosis

- B) Caseous necrosis

- C) Liquefactive necrosis

- D) Gangrenous necrosis

- 5-A 70-year-old patient with a history of tuberculosis presents with a chronic cough and weight loss. A chest X-ray reveals cavitary lesions in the lung. A biopsy would most likely show which type of necrosis?

- A) Coagulative necrosis

- B) Caseous necrosis

- C) Fat necrosis

- D) Liquefactive necrosis

- 6-A 27-year-old male suffers a stroke resulting in ischemia to part of his brain. Autopsy findings reveal a liquefied, cystic area in the brain tissue. Which type of necrosis is most likely present?

- A) Coagulative necrosis

- B) Liquefactive necrosis

- C) Fat necrosis

- D) Fibrinoid necrosis

- 7-A patient presents with liver damage due to chronic alcohol consumption. The hepatocytes show lipid droplets in their cytoplasm. Which type of reversible injury is most likely present?

- A) Hydropic swelling

- B) Fatty change

- C) Coagulative necrosis

- D) Caseous necrosis

- 8-An autopsy of a patient who suffered from a prolonged period of ischemia reveals myocardial tissue with pale areas and preserved tissue architecture. Which of the following best describes this type of necrosis?

- A) Liquefactive necrosis

- B) Coagulative necrosis

- C) Caseous necrosis

- D) Fat necrosis

- 9-Which of the following changes would most likely be seen in a cell experiencing reversible injury?

- A) Mitochondrial densities and rupture

- B) Detachment of ribosomes from the ER

- C) Nuclear fragmentation

- D) Increased cytoplasmic eosinophilia

- 10-In a patient with viral hepatitis, serum tests reveal elevated AST and ALT levels. Which cellular process accounts for these elevated levels?

- A) Cell swelling

- B) Cellular enzyme leakage

- C) Increased protein synthesis

- D) Decreased apoptosis

- 11-A biopsy from a liver with reversible injury shows hepatocytes with a pale and swollen appearance. What is the most likely underlying cause of this cellular swelling?

- A) Lipid accumulation

- B) Water accumulation due to Na/K ATPase pump failure

- C) Protein accumulation in lysosomes

- D) Calcium influx

- 12-Which of the following changes indicates irreversible cell injury?
- A) Cellular swelling and chromatin clumping
- B) Detachment of ribosomes from the endoplasmic reticulum
- C) Nuclear fragmentation and leakage of cellular enzymes
- D) Plasma membrane blebbing

- 13-A 55-year-old patient with chronic heart disease experiences myocardial ischemia, resulting in necrotic tissue with preserved architecture. What type of necrosis is most likely present?

- A) Liquefactive necrosis

- B) Caseous necrosis

- C) Coagulative necrosis

- D) Fibrinoid necrosis

- 14-A patient’s biopsy shows increased cytoplasmic eosinophilia and disruption of cell membranes. Which stain could help visualize this feature, and what does it indicate?

- A) Hematoxylin; cellular swelling

- B) Eosin; protein denaturation in necrosis

- C) Hematoxylin-eosin; decreased RNA in reversible injury

- D) Prussian blue; iron accumulation

- 15-In reversible cell injury, electron microscopy of hepatocytes reveals dilation of the endoplasmic reticulum and mitochondrial swelling. Which of the following is NOT a feature typically seen in this phase?

- A) Blebbing of the plasma membrane

- B) Detachment of ribosomes from the ER

- C) Nuclear dissolution

- D) Accumulation of myelin figures

- 16-A biopsy from a brain infarct shows a region of soft, liquefied tissue. What accounts for the difference in the type of necrosis in the brain compared to other organs?

- A) Brain cells are highly susceptible to apoptosis

- B) The brain lacks coagulative factors

- C) Enzymatic digestion outpaces protein denaturation in the brain

- D) Ischemic injury in the brain initiates gangrenous necrosis

- 17-In a case of polyarteritis nodosa, a biopsy of the affected blood vessel wall shows pink, fibrin-like deposits. This finding suggests which type of necrosis?
- A) Coagulative necrosis
- B) Liquefactive necrosis
- C) Caseous necrosis
- D) Fibrinoid necrosis

- 18-A 38-year-old patient with a history of tuberculosis has a lung biopsy revealing a granuloma with an acellular, cheese-like center. What characterizes this type of necrosis, and why does it appear this way?

- A) Coagulative necrosis due to protein denaturation

- B) Liquefactive necrosis from enzymatic digestion

- C) Caseous necrosis from lipid-rich bacterial walls

- D) Fat necrosis from released pancreatic enzymes

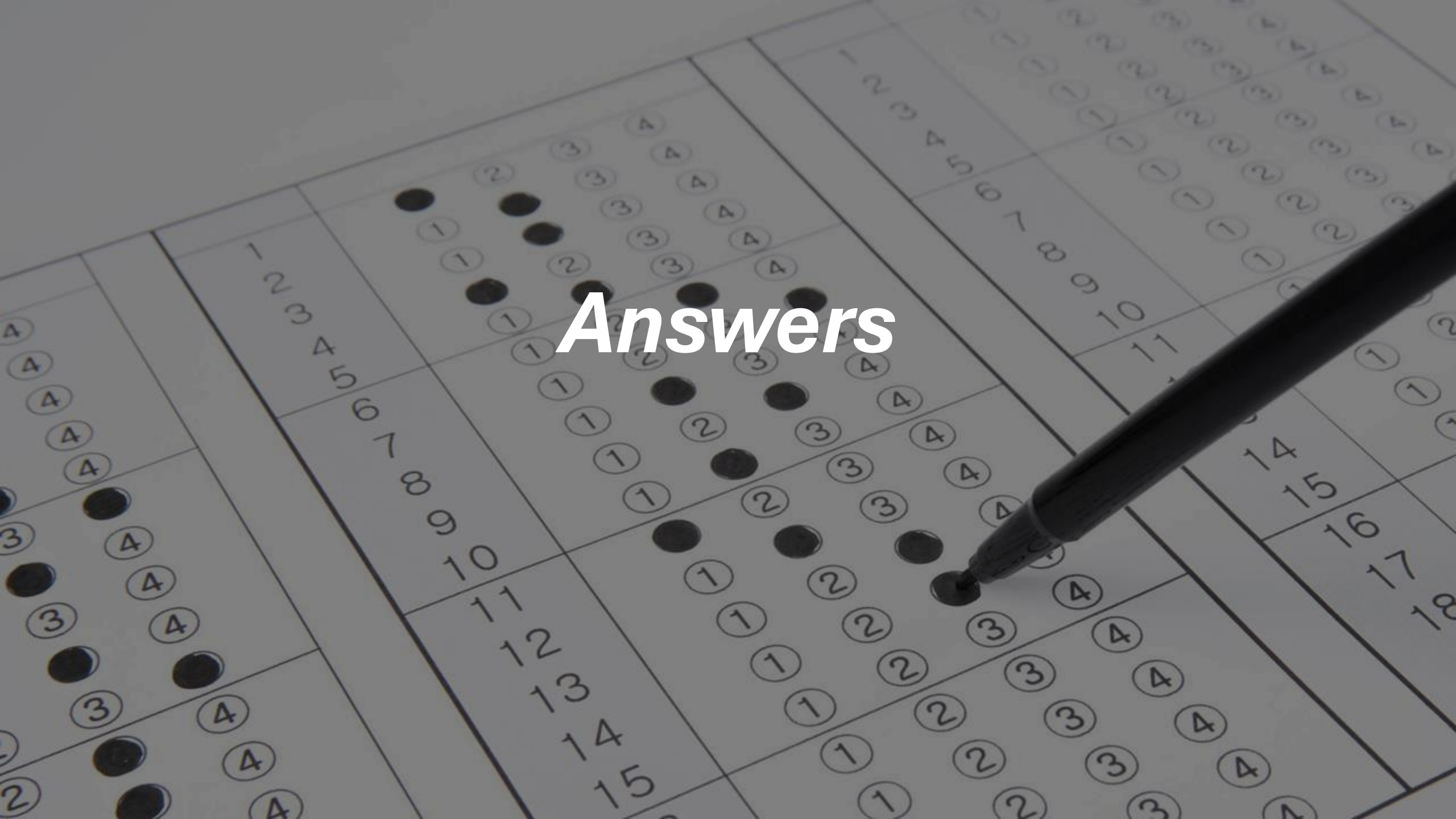
- 19-A biopsy shows cells with extensive mitochondrial swelling, ruptured lysosomes, and disrupted plasma membranes. Which step signifies the transition from reversible to irreversible injury in this case?

- A) Detachment of ribosomes from the ER

- B) Chromatin clumping

- C) Mitochondrial density increase

- D) Mitochondrial membrane rupture and lysosomal enzyme release


Answers

- 1-Answer: B) Coagulative necrosis
- Explanation: Coagulative necrosis is characteristic of ischemic injury in solid organs like the heart, due to events such as myocardial infarction .

- 2-Answer: A) Gangrenous necrosis
- Explanation: In diabetics, reduced blood flow often leads to dry gangrene, a form of coagulative necrosis seen in ischemic tissues with superimposed infection potentially leading to wet gangrene

- 3-Answer: C) Fat necrosis
- Explanation: Acute pancreatitis causes release of pancreatic lipases that lead to fat necrosis by breaking down adipocytes, resulting in saponification and a chalky white appearance in the surrounding tissue

- 4-Answer: A) Fibrinoid necrosis
- Explanation: Fibrinoid necrosis is typical in vasculitis and severe hypertension, with immune complexes and fibrin deposits appearing in vessel walls

- 5-Answer: B) Caseous necrosis
- Explanation: Caseous necrosis is a characteristic finding in tuberculosis, marked by a cheese-like appearance in granulomatous infections

- 6-Answer: B) Liquefactive necrosis
- Explanation: The brain undergoes liquefactive necrosis in response to ischemia, resulting in a soft, liquid-filled cavity due to rapid enzymatic digestion of tissue

- 7-Answer: B) Fatty change
- Explanation: Fatty change, or steatosis, is a common reversible injury in the liver due to lipid accumulation, often seen in alcohol-induced liver damage

- 8-Answer: B) Coagulative necrosis
- Explanation: Coagulative necrosis is typical in ischemic injury of solid organs like the heart, where the cellular architecture is preserved initially

- 9-Answer: B) Detachment of ribosomes from the ER
- Explanation: Ribosome detachment from the ER occurs in reversible injury due to impaired protein synthesis

- 10-Answer: B) Cellular enzyme leakage
- Explanation: Liver cell damage leads to enzyme leakage into the blood, a sign of irreversible injury with disrupted cell membranes

- 11-Answer: B) Water accumulation due to Na/K ATPase pump failure
- Explanation: Cellular swelling in reversible injury occurs due to the failure of the Na/K ATPase pump, leading to water accumulation

- 12-Answer: C) Nuclear fragmentation and leakage of cellular enzymes
- Explanation: Irreversible injury is characterized by nuclear fragmentation and the leakage of cellular enzymes, indicating cell death

- 13-Answer: C) Coagulative necrosis
- Explanation: Coagulative necrosis is common in ischemic conditions in solid organs like the heart, where the tissue architecture remains intact initially

- 14-Answer: B) Eosin; protein denaturation in necrosis
- Explanation: Eosin stains degraded proteins in necrotic cells, leading to increased eosinophilia due to protein denaturation and loss of basophilic RNA

- 15-Answer: C) Nuclear dissolution
- Explanation: Nuclear dissolution is a hallmark of irreversible injury, while the other features are indicative of reversible injury

- 16-Answer: C) Enzymatic digestion outpaces protein denaturation in the brain
- Explanation: The brain undergoes liquefactive necrosis due to rapid enzymatic digestion that breaks down tissue faster than coagulative processes

- 17-Answer: D) Fibrinoid necrosis
- Explanation: Fibrinoid necrosis is associated with immune complexes and fibrin deposits in vessel walls, common in vasculitis like polyarteritis nodosa

- 18-Answer: C) Caseous necrosis from lipid-rich bacterial walls
- Explanation: Caseous necrosis, common in tuberculosis, appears “cheese-like” due to lipid-rich mycobacterial components and granulomatous inflammation

- 19-Answer: D) Mitochondrial membrane rupture and lysosomal enzyme release
- Explanation: The rupture of mitochondrial membranes and release of lysosomal enzymes mark the transition to irreversible injury and cell death

The End
Good luck everyone