

1. Ischemia and other toxic injuries increase the accumulation of intracellular calcium as a result of:
  - A) release of stored calcium from the mitochondria.
  - B) improved intracellular volume regulation.
  - C) decreased influx across the cell membrane.
  - D) attraction of calcium to fatty infiltrates.
  
2. The patient is found to have liver disease, resulting in the removal of a lobe of his liver. Adaptation to the reduced size of the liver leads to \_\_\_\_\_ of the remaining liver cells.
  - A) metaplasia
  - B) organ atrophy
  - C) compensatory hyperplasia
  - D) physiologic hypertrophy
  
3. A person eating peanuts starts choking and collapses. His airway obstruction is partially cleared, but he remains hypoxic until he reaches the hospital. The prolonged cell hypoxia caused a cerebral infarction and resulting \_\_\_\_\_ in the brain.
  - A) caspase activation
  - B) coagulation necrosis
  - C) rapid phagocytosis
  - D) protein p53 deficiency
  
4. Bacteria and viruses cause cell damage by \_\_\_\_\_, which is unique from the intracellular damage caused by other injurious agents.
  - A) disrupting the sodium/potassium ATPase pump
  - B) interrupting oxidative metabolism processes
  - C) replicating and producing continued injury
  - D) decreasing protein synthesis and function
  
5. The patient has a prolonged interruption in arterial blood flow to his left kidney, causing hypoxic cell injury and the release of free radicals. Free radicals damage cells by:
  - A) destroying phospholipids in the cell membrane.
  - B) altering the immune response of the cell.
  - C) disrupting calcium storage in the cell.
  - D) inactivation of enzymes and mitochondria.

6. Injured cells have impaired flow of substances through the cell membrane as a result of:
- A) increased fat load.
  - B) altered permeability.
  - C) altered glucose utilization.
  - D) increased surface receptors.
7. Reversible adaptive intracellular responses are initiated by:
- A) stimulus overload.
  - B) genetic mutations.
  - C) chemical messengers.
  - D) mitochondrial DNA.
8. Injured cells become very swollen as a result of:
- A) increased cell protein synthesis.
  - B) altered cell volume regulation.
  - C) passive entry of potassium into the cell.
  - D) bleb formation in the plasma membrane.
9. A diabetic patient has impaired sensation, circulation, and oxygenation of his feet. He steps on a piece of glass, the wound does not heal, and the area tissue becomes necrotic. The necrotic cell death is characterized by:
- A) rapid apoptosis.
  - B) cellular rupture.
  - C) shrinkage and collapse.
  - D) chronic inflammation.
10. A 99-year-old woman has experienced the decline of cell function associated with age. A group of theories of cellular aging focus on programmed:
- A) changes with genetic influences.
  - B) elimination of cell receptor sites.
  - C) insufficient telomerase enzyme.
  - D) DNA mutation or faulty repair.

11. An 89-year-old female patient has experienced significant decreases in her mobility and stamina during a 3-week hospital stay for the treatment of a femoral head fracture. Which of the following phenomena most likely accounts for the patient's decrease in muscle function that underlies her reduced mobility?
- A) Impaired muscle cell metabolism resulting from metaplasia
  - B) Dysplasia as a consequence of inflammation during bone remodeling
  - C) Disuse atrophy of muscle cells during a prolonged period of immobility
  - D) Ischemic atrophy resulting from vascular changes while on bedrest
12. A 20-year-old college student has presented to her campus medical clinic for a scheduled Papanicolaou (Pap) smear. The clinician who will interpret the smear will examine cell samples for evidence of:
- A) changes in cell shape, size, and organization.
  - B) the presence of unexpected cell types.
  - C) ischemic changes in cell samples.
  - D) abnormally high numbers of cells in a specified field.
13. Which of the following pathophysiologic processes is most likely to result in metastatic calcification?
- A) Benign prostatic hyperplasia
  - B) Liver cirrhosis
  - C) Impaired glycogen metabolism
  - D) Hyperparathyroidism
14. Despite the low levels of radiation used in contemporary radiologic imaging, a radiology technician is aware of the need to minimize her exposure to ionizing radiation. What is the primary rationale for the technician's precautions?
- A) Radiation stimulates pathologic cell hypertrophy and hyperplasia.
  - B) Radiation results in the accumulation of endogenous waste products in the cytoplasm.
  - C) Radiation interferes with DNA synthesis and mitosis.
  - D) Radiation decreases the action potential of rapidly dividing cells.
15. The parents of a 4-year-old girl have sought care because their daughter has admitted to chewing and swallowing imported toy figurines that have been determined to be made of lead. Which of the following blood tests should the care team prioritize?
- A) White blood cell levels with differential
  - B) Red blood cell levels and morphology
  - C) Urea and creatinine levels
  - D) Liver function panel

16. A 70-year-old male patient has been admitted to a hospital for the treatment of a recent hemorrhagic stroke that has left him with numerous motor and sensory deficits. These deficits are most likely the result of which of the following mechanisms of cell injury?
- A) Free radical injury
  - B) Hypoxia and ATP depletion
  - C) Interference with DNA synthesis
  - D) Impaired calcium homeostasis
17. Which of the following processes associated with cellular injury is most likely to be reversible?
- A) Cell damage resulting from accumulation of fat in the cytoplasm
  - B) Cellular changes as a result of ionizing radiation
  - C) Cell damage from accumulation of free radicals
  - D) Apoptosis
18. The extrinsic pathway of apoptosis can be initiated by:
- A) damage to cellular DNA.
  - B) decreased ATP levels.
  - C) activation of the p53 protein.
  - D) activation of death receptors on the cell surface.
19. A patient with severe peripheral vascular disease has developed signs of dry gangrene on the great toe of one foot. Which of the following pathophysiologic processes most likely contributed to this diagnosis?
- A) Inappropriate activation of apoptosis
  - B) Bacterial invasion
  - C) Impaired arterial blood supply
  - D) Metaplastic cellular changes
20. Which of the following facts underlies the concept of replicative senescence?
- A) Genes controlling longevity are present or absent in varying quantities among different individuals.
  - B) Telomeres become progressively shorter in successive generations of a cell.
  - C) The damaging influence of free radicals increases exponentially in later generations of a cell.
  - D) Aging produces mutations in DNA and deficits in DNA repair.

## Answer Key

1. A
2. C
3. B
4. C
5. A
6. B
7. C
8. B
9. B
10. A
11. C
12. A
13. D
14. C
15. B
16. B
17. A
18. D
19. C
20. B