

Question 1

A 48-year-old male with a history of chronic alcoholism who is continuing to perform adequately on the job will most often have which of the following findings in liver:

- A Cholestasis
- B Fatty change
- C Hemochromatosis
- D Hypertrophy of smooth endoplasmic reticulum
- E Coagulative necrosis

Question 2

A 53-year-old male who is developing an acute myocardial infarction from coronary occlusion has an irreversible injury to the myocardium when:

- A Glycogen is depleted
- B Cytoplasmic sodium increases
- C Nuclei undergo karyorrhexis
- D Intracellular pH diminishes
- E Blebs form on cell membranes

Question 3

While in a home improvement center warehouse buying paint, a 35-year-old male hears "Look out below!" and is then struck on the leg by a falling pallet rack. The yellow-brown color of the bruise to his thigh a couple of weeks after injury is due to accumulation of:

- A Lipofuscin
- B Bilirubin
- C Melanin
- D Hemosiderin
- E Glycogen

Question 4

After years of breathing dirty city air, your lungs have accumulated:

- A Anthracotic pigment
- B Lipofuscin
- C Melanin
- D Hemosiderin
- E Biliverdin

Question 5

Even after thrombolytic therapy to restore coronary blood flow early in the course of a myocardial infarction, a reperfusion injury occurs because of:

- A Cytoskeletal intermediate filament loss
- B A decreased intracellular pH from anaerobic glycolysis
- C An increase in toxic oxygen radicals
- D Mitochondrial swelling
- E Nuclear chromatin clumping and decreased protein synthesis

Question 6

The best microscopic evidence for remote hemorrhage in the joint space of a hemophiliac would be the presence of:

- A Lipofuscin
- B Russell bodies
- C Neutrophils
- D Cholesterol crystals
- E Anthracotic pigment

Question 7

The presence of squamous epithelium in the lower trachea of a 42-year-old female with a history of smoking is called:

- A Dysplasia
- B Aplasia
- C Anaplasia
- D Hyperplasia
- E Metaplasia

Question 8

A 59-year-old female had a cerebral infarction. Months later, a computed tomographic (CT) scan shows a cystic area in her cerebral cortex. The CT finding is a lesion that is the consequence of resolution from:

- A Liquefactive necrosis
- B Atrophy
- C Coagulative necrosis
- D Caseous necrosis
- E Apoptosis

Question 9

Features of hypoxic cell injury include all of the following EXCEPT:

- A Cell swelling
- B Lack of ATP generation
- C Mitochondrial calcium deposition
- D Lactic acidosis
- E Apoptosis

Question 10

The light brown perinuclear pigment seen on H&E staining of the cardiac muscle fibers in the heart of an 80 year old male is:

- A Hemosiderin resulting from iron overload
- B Lipochrome from "wear and tear"
- C Glycogen resulting from a storage disease
- D Cholesterol as a consequence of atherosclerosis
- E Calcium deposition following necrosis

Question 11

An immunohistochemical stain that microscopically identifies the presence of intermediate filaments within cells is useful because:

- A Cytoskeletal alterations are seen with impending cell death
- B A neoplasm can be determined to be a carcinoma
- C Contractile properties of the cells can be determined
- D A history of chronic alcoholism can be confirmed
- E The degree of metaplasia or dysplasia can be assessed

Question 12

A 20-year-old female who was 165 cm tall and weighed 55 kg had Goodpasture's syndrome which progressed to chronic renal failure with hypertension. At autopsy, her heart weighed 540 gm primarily because of:

- A Myocardial hypertrophy
- B Fatty infiltration
- C Myocardial hyperplasia
- D Fatty degeneration
- E Edema



Question 13

Cellular injury through generation of free radicals is LEAST typical for:

- A Pulmonary diffuse alveolar damage from oxygen toxicity
- B Acute purulent inflammation
- C Accumulation of lipochrome pigment in myocardium with aging
- D Radiation therapy for breast carcinoma
- E Acute myocardial infarction

Question 14

In which of the following situations is epithelial metaplasia most likely to have occurred:

- A Tanning of the skin following sunlight exposure
- B Lactation following pregnancy
- C Vitamin A deficiency
- D Acute myocardial infarction

E Urinary obstruction from an enlarged prostate

Question 15

Cellular apoptosis plays a significant role in the histopathologic appearance of:

- A Viral hepatitis
- B Brown atrophy of the heart
- C Renal transplant rejection
- D Chronic alcoholic liver disease
- E Barbiturate overdose

Question 16

The appearance of gangrenous necrosis in the big toe necessitating amputation is most typical for a patient with:

- A Complications of diabetes mellitus
- B Monckeberg's arteriosclerosis
- C Blunt force trauma
- D Complications of AIDS
- E Type III hypersensitivity reaction

Question 17

Hypertrophy is best illustrated by:

- A The uterine myometrium in pregnancy
- B The female breast at puberty
- C The liver following partial resection
- D The ovary following menopause

E The cervix with chronic inflammation

Question 18

Of the following cells and tissues in the body, the LEAST sensitive to the effects of radiation are:

- A Ovarian follicles
- B Small intestinal epithelium
- C Erythropoietic cells of bone marrow
- D Spermatogonia of testicular tubules
- E Neurons of cerebral cortex

Question 19

Karyorrhexis refers to:

- A Disintegration of the cell cytoplasm
- B Cell membrane lysis
- C Disintegration of the cell nucleus
- D Mitochondrial swelling and lysis
- E Oxygen toxicity

Question 20

A 40-year-old schizophrenic male drank a pint of Geritol (containing vitamins with iron) each day for 20 years. His liver would most likely show:

- A Severe fatty change
- B Coagulative necrosis
- C Hemochromatosis
- D Anthracosis

E Sphingolipidosis

Question 21

Which of the following tissues is most likely to withstand hypoxia with the least damage in a patient with loss of blood pressure and resultant shock:

- A Skeletal muscle
- B Small intestinal epithelium
- C Retina
- D Myocardium
- E Hippocampus

Question 22

Focal fat necrosis is most often associated with which of the following clinical conditions:

- A Fibrinous pericarditis
- B Chronic salpingitis
- C Acute pancreatitis
- D Hepatitis
- E Acute gastritis

Question 23

The spleen at autopsy on sectioning shows a tan to white, wedge-shaped lesion with base on the capsule. This most likely represents the result of:

- A Coagulative necrosis
- B Abscess formation
- C Metaplasia
- D Caseous necrosis

E Liquefactive necrosis

Question 24

A 3500 gm liver from a 35-year-old female has a yellow, greasy cut surface. This appearance most likely resulted from:

- A Galactosemia
- B Iron accumulation
- C Mycobacterium tuberculosis infection
- D Alcoholism
- E Hypoxia



Question 25

In which of the following patients would calcification be least harmful:

- A A 55-year-old male undergoing coronary artery angioplasty
- B Nephrocalcinosis in a 60-year-old female with hyperparathyroidism
- C Aortic valvular calcification in a 70-year-old male
- D Alveolar wall calcification in a 41-year-old female with breast cancer metastatic to bone
- E Aortic arch calcification in a 62-year-old male

Question 26

A below-the-knee amputation specimen from a 55-year-old male with diabetes mellitus shows extensive black discoloration of skin and soft tissue of the foot. This process is best characterized as:

- A Neoplasia
- B Gangrenous necrosis
- C A coagulation disorder

D Hemosiderosis

E Caseation

Question 27

A 35-year-old who eats a lot of pizza and gets very little exercise will develop:

A Fatty metamorphosis of liver

B Hyperplasia of steatocytes

C Fatty degeneration of myocardium

D Hypertrophy of steatocytes

E Metaplasia of muscle to adipose tissue

Question 28

Characteristics of cellular injury from free radicals include all of the following statements EXCEPT:

- A Glutathione peroxidase is one enzyme that helps to defend cells against them
- B Catalases in peroxisomes decompose them
- C DNA is not damaged by them
- D They can be generated in tissues subjected to radiation therapy
- E Vitamin E provides an antioxidant effect against them

Question 29

The marked enlargement of the uterus that occurs with pregnancy is accompanied by histopathologic evidence for an increase in:

- A Myometrial cell numbers
- B Nuclear anaplasia
- C Cellular DNA content

- D Myometrial cell size
- E Fibroblasts and collagen

Question 30

Following infarction of the anterior pituitary, the adrenal glands are found to weigh only 2.2 grams each (normal 4 to 6 grams). This alteration of the adrenals is primarily due to:

- A Metaplasia of the cortex
- B Lipid depletion of the cortex
- C Atrophy of the medulla
- D Atrophy of the cortex
- E Adrenal infarction

Question 31

Thin (actin), thick (myosin), or intermediate filaments within cell cytoplasm contribute to all of the following cellular findings EXCEPT:

- A Mallory bodies in liver
- B Neutrophil phagocytosis
- C Neurofibrillary tangles in neurons
- D Russell bodies in plasma cells
- E Respiratory epithelial ciliary function

Question 32

In which of the following cases will the greatest degree of permanent damage result:

- A Tuberculosis infection with solitary caseating granuloma of lung
- B A 50-year-old male surviving a myocardial infarction

- C Human papillomavirus infection with cervical dysplasia
- D Adult revived after being at the bottom of a swimming pool for 10 minutes
- E Multiple transfusions of red blood cells for chronic anemia

Question 33

Which of the following cellular changes represents the best evidence for irreversible cellular injury:

- A Epithelial dysplasia
- B Cytoplasmic fatty metamorphosis
- C Nuclear pyknosis
- D Atrophy
- E Anaerobic glycolysis

Question 34

A 73-year-old male suffers a "stroke" with loss of blood supply to cerebral cortex in the distribution of the middle cerebral artery. The most likely consequence of this is:

- A Infarction with liquefactive necrosis
- B Pale infarction with coagulative necrosis
- C Predominant loss of glial cells
- D Recovery of damaged neurons if the vascular supply is reestablished
- E Wet gangrene with secondary bacterial infection

Question 35

A 30-year-old woman is claiming in a civil lawsuit that her husband abused her. A workup by her physician revealed a breast mass that on biopsy showed fat necrosis. This biopsy result is most consistent with:

- A Physiologic atrophy

- B Probable trauma to the breast
- C Lactation
- D Radiation injury
- E Hypoxic injury

Question 36

As a physician, you should be concerned about a surgical pathology report that describes "metaplasia" in a biopsy because:

- A This change indicates irreversible tissue damage
- B It may be due to an irritant that can be avoided
- C The patient will probably develop cancer
- D The etiology is probably a viral infection that can be treated
- E The patient will probably develop a dysplasia



Question 37

A below-the-knee amputation for gangrenous necrosis was most likely to be performed on which of the following patients:

- A A 30-year-old female with protein S deficiency
- B A 55-year-old male with type I diabetes mellitus
- C A 25-year-old female with systemic lupus erythematosus
- D A 15-year-old male hours after a motorcycle accident
- E A 61-year-old male with congestive heart failure

Question 38

All of the following findings represent changes seen within cells that represent potentially reversible cellular injury EXCEPT:

- A Fatty change in hepatocytes

- B Neuronal cell swelling
- C Skeletal muscle fiber anaerobic glycolysis
- D Renal tubular cell nuclear pyknosis
- E Kupffer cell iron deposition

Question 39

A 55 year old male has sudden onset of chest pain and a myocardial infarction is suspected. Which of the following laboratory tests is most useful in this situation:

- A Total serum cholesterol with HDL cholesterol
- B Creatine phosphokinase (CPK)
- C Serum triglyceride
- D Serum amylase
- E Sedimentation rate

Question 40

Physical examination on a 42 year old female reveals scleral icterus. Which of the following underlying conditions is most likely to contribute to this finding:

- A Hypercholesterolemia
- B Thrombocytopenia
- C Metastatic carcinoma
- D Hepatitis
- E Diabetes mellitus

Question 41

A 56 year old female has smoked 2 packs of cigarettes per day for the past 35 years. She has a chronic cough, but recently has noted sputum streaked with blood. Bronchoscopy with biopsy is performed. The biopsy reveals bronchial epithelium with squamous metaplasia. This most strongly suggests that:

- A This is a physiologic process of aging
- B This process is irreversible, even if she stops smoking
- C She has metastases to lung from a primary somewhere else
- D She has an increased risk for pulmonary infection
- E A pulmonary thromboembolus caused pulmonary infarction

Question 42

Increased lipochrome (lipofuscin) within the myocardial fibers of a 90 year old female results from which of the following cellular mechanisms:

- A Nuclear pyknosis
- B Myocardial fiber hypertrophy
- C Coagulative necrosis
- D Autophagocytosis
- E Anaerobic glycolysis

Question 43

Liquefactive necrosis is most likely to play a role in development of which of the following pathologic lesions:

- A Acute renal infarction
- B Acute viral hepatitis
- C Pneumocystis carinii pneumonia
- D Remote cerebral infarction
- E Brown atrophy of the heart

Question 44

The best example of dystrophic calcification is seen in a(an):

- A 55 year old female with metastases from breast carcinoma and hypercalcemia
- B Healing granuloma in a 41 year old male with pulmonary tuberculosis
- C Gangrenous lower extremity in a 50 year old female with diabetes mellitus
- D 62 year old female with a recent cerebral infarction
- E Abscess of the left fallopian tube in a 19 year old female with Neisseria gonorrhoeae infection

Question 45

The appearance of fat necrosis is most often seen in which of the following settings:

- A A 31 year old male has an acute abdomen with marked abdominal pain and an elevated serum amylase
- B A 66 year old female with chronic alcoholism has an elevated serum AST
- C A 23 year old female with a decreased total serum complement has a history of systemic lupus erythematosus
- D A 70 year old female with adenocarcinoma of the colon and metastases to liver has an elevated LDH
- E A 49 year old male with sudden onset of chest pain has an elevated serum creatine kinase

Questions 46 and 47: Click on the checkbox first, then the lettered item.

(46) Which of the following is an example of dystrophic calcification:

(47) Which of the following is an example of metastatic calcification:

- A Healing M. tuberculosis granuloma
- B Fatty metamorphosis of liver
- C Parathyroid adenoma with hyperparathyroidism
- D Viral hepatitis with apoptosis
- E Coronary atherosclerosis

Questions 48 and 49: Click on the checkbox first, then the lettered item:

(48) Compensatory hyperplasia.

(49) Physiologic hypertrophy.

- A Breast late in pregnancy
- B Weightlifter's skeletal muscle
- C Liver after partial hepatectomy
- D Postmenopausal uterus
- E Bronchial mucosa of a smoker

Question 50 and 51: Click on the checkbox first, then the lettered item:

(50) A 45-year-old male has been drinking a quart of vodka a day for the past 25 years.

(51) A 25-year-old female with a seizure disorder has been taking phenobarbital.

- A Giant mitochondria in hepatocytes
- B Increased hepatocyte lipofuscin
- C Hypertrophy of hepatic smooth endoplasmic reticulum
- D Apoptosis of hepatocytes
- E Fatty infiltration of myocardium



Question 52

Several months following an acute myocardial infarction in a 48 year old male physician, he is found to have evidence for a left ventricular aneurysm with decreased cardiac output and congestive heart failure (CHF). He is stable and does not have chest pain. Which of the following findings is LEAST likely to be found at the time he presents with CHF:

- A Elevated serum creatine kinase
- B Collagenous scar tissue in the myocardium
- C Chronic passive congestion of the liver
- D Organizing mural thrombus in left ventricle
- E Recanalization of a coronary artery thrombosis

Question 53

A 53 year old male suffers a cardiac arrest and his wife calls 911. The paramedics arrive a few minutes later and begin resuscitative measures. A regular heart rate is established after about 40 minutes of resuscitative efforts as he is being transported to the hospital. A thrombolytic agent is administered, but the following process occurs in the myocardium at that time:

- A Apoptosis
- B Free radical injury
- C Heterophagocytosis
- D Squamous metaplasia
- E Accumulation of cytokeratins

**Answer Key:**

**(1-5) BCDAC**

**(6-10) DEAEB**

**(11-15) BAECA**

**(16-20) AA ECC**

**(21-25) ACADE**

**(26-30) BDCDD**

**(31-35) DDCAB**

**(36-40) BBDBD**

**(41-45) DDDBA**

**(46-52) ACCBACA**