

## Pathology Sample Items

1. A 16-year-old boy is undergoing evaluation for jaundice. Laboratory studies show normal hepatic enzyme activities, a negative direct antiglobulin (Coombs) test, increased mean corpuscular hemoglobin concentration, and increased osmotic fragility of erythrocytes. Which of the following types of erythrocyte is most likely to be seen on a peripheral blood smear?
  - (A) Ovalocyte
  - (B) Schistocyte
  - (C) Spherocyte
  - (D) Target cell
  - (E) Teardrop cell
  
2. A 34-year-old woman is brought to the emergency department by her husband because of confusion for 2 hours. She is unconscious on arrival. Her husband says that she has a 1-year history of episodes of nervousness, light-headedness, and dizziness that resolve after she eats a meal. Physical examination shows no other abnormalities. Her serum glucose concentration is 25 mg/dL. After an intravenous infusion of 0.9% saline and glucose, she regains consciousness. Which of the following is the most likely diagnosis?
  - (A) Cushing syndrome
  - (B) Insulinoma
  - (C) Multiple endocrine neoplasia syndrome
  - (D) Pancreatic gastrinoma
  - (E) Pheochromocytoma
  
3. A 60-year-old man comes to the physician because of a cough for 2 months. He says that he has noticed changes in his face during the past 3 months. He has smoked 2 packs of cigarettes daily for 30 years. His temperature is 37°C (98.6°F), pulse is 72/min, respirations are 19/min, and blood pressure is 160/95 mm Hg. Physical examination shows a round face, central obesity, excess fat over the posterior neck and back, and abdominal striae. His serum calcium concentration is 9 mg/dL. Urine dipstick of a clean-catch midstream specimen shows 3+ glucose. A chest x-ray shows a 3-cm mass in the left upper lobe with enlargement of hilar nodes. A biopsy specimen of the mass shows small cell carcinoma. Further serum studies are most likely to show an increased concentration of which of the following proteins?
  - (A) Adrenocorticotrophic hormone
  - (B) Epidermal growth factor
  - (C) IgM
  - (D) Parathyroid hormone-related protein
  - (E) Serotonin
  
4. A 45-year-old man with chronic pancreatitis has a 9-kg (20-lb) weight loss and diarrhea. Analysis of a 24-hour stool sample shows 28 g of fat. A deficiency of which of the following enzymes is the most likely cause?
  - (A) Amylase
  - (B) Carboxypeptidase
  - (C) Lactase
  - (D) Lipase
  - (E) Lipoprotein lipase
  
5. A 70-year-old man comes to the physician because of a 2-year history of shortness of breath and progressive chest pain. He worked as a carpenter installing insulation from the ages of 21 to 31 years. Physical examination shows absent breath sounds and dullness to percussion over the right lung base. A chest x-ray shows thickened pleura on the right side and a medium-sized pleural effusion. Pleural fluid studies show a protein concentration greater than 3 g/dL (N=1–2). A pleural biopsy specimen shows spindle cells. Which of the following is the most likely diagnosis?
  - (A) Emphysema
  - (B) Lung abscess
  - (C) Mesothelioma
  - (D) Small cell carcinoma of the lung
  - (E) Viral pneumonia

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6. A previously healthy 28-year-old man dies in a motor vehicle collision. At autopsy, the kidneys are enlarged bilaterally, and each weighs 3 kg. The external surface of the kidneys appears to be a mass of cysts. Microscopic examination of the kidneys shows intact nephrons interspersed between the cysts. The most likely cause of these changes in the kidneys involves which of the following modes of inheritance?
- (A) Autosomal dominant
  - (B) Autosomal recessive
  - (C) Chromosome 22q11.2 deletion
  - (D) Mitochondrial
  - (E) X-linked
7. An autopsy of a 24-year-old woman shows pleuritis, membranous thickening of glomerular capillary walls, concentric rings of collagen around splenic arterioles, and excrescences on the underside of the mitral valve. Analysis of blood is most likely to show which of the following?
- (A) Antinuclear antibody
  - (B) Increased C3 concentration
  - (C) Lymphocytosis
  - (D) Monoclonal gammopathy
  - (E) Positive bacterial culture
8. At autopsy, the heart of a 30-year-old man weighs 550 g. The left ventricle is dilated and hypertrophied. The aortic root is markedly dilated, and the aortic valve cusps are intact. The external iliac arteries contain irregular, focal cystic areas within the media with pools of mucopolysaccharide and fraying fragmentation of the elastica. Which of the following is the most likely diagnosis?
- (A) Ankylosing spondylitis
  - (B) Cardiovascular syphilis
  - (C) Marfan syndrome
  - (D) Osteogenesis imperfecta, type II (recessive)
  - (E) Systemic lupus erythematosus
9. A 10-year-old boy is brought to the emergency department 15 minutes after he sustained abdominal injuries in a motor vehicle collision. Physical examination shows massive ecchymoses over the trunk and abdomen. A CT scan shows internal bleeding. The patient undergoes operative removal of a portion of the lower left lobe of the lung, the left lobe of the liver, half of the left kidney, half of the spleen, and a 2-foot section of the small intestine. Assuming survival of the acute trauma, which of the following organs is likely to have the most complete regeneration in this patient?
- (A) Kidney
  - (B) Liver
  - (C) Lung
  - (D) Small intestine
  - (E) Spleen

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10. A previously healthy 2-year-old boy is brought to the emergency department because of bloody stools for 2 days. His vital signs are within normal limits. Abdominal examination shows no abnormalities. Laboratory studies show:

Hemoglobin	11 g/dL
Hematocrit	37%
Leukocyte count	9500/mm <sup>3</sup>
Platelet count	250,000/mm <sup>3</sup>

Test of the stool for occult blood is positive. During an emergency laparotomy, a 3 × 2-cm protrusion is found on the antimesenteric border of the small intestine approximately 50 cm proximal to the ileocecal valve. Which of the following is the most likely cause of this patient's condition?

- (A) Carcinoid tumor
  - (B) Ectopic adrenal gland
  - (C) Meckel diverticulum
  - (D) Retrocecal appendix
  - (E) Umbilical hernia
11. A 50-year-old man comes to the physician because of progressive fatigue and darkening of his skin during the past 2 years. He has not spent much time in the sun during this period. Physical examination shows slate-gray skin and hepatomegaly. Serum studies show:

Ferritin	500 ng/mL
Transferrin saturation	70% (N=20%–60%)
AST	41 U/L
ALT	45 U/L

A liver biopsy specimen stained with Prussian blue is positive. Which of the following best describes the altered function of mutated HFE gene product in this patient?

- (A) Decreased lysozyme synthesis
  - (B) Decreased NADPH production
  - (C) Decreased oxidase activity
  - (D) Increased fatty acid absorption
  - (E) Increased iron absorption
12. A 69-year-old woman is brought to the emergency department because of progressive difficulty with her vision during the past day. She also has a 3-month history of headache and scalp tenderness. She says, "This morning I had a blind spot in my left eye, and it just grew bigger as the day went on." Her vital signs are within normal limits. Ophthalmologic examination shows visual acuity of 20/100 in the left eye and 20/40 in the right eye. Physical examination shows no other abnormalities. Laboratory studies show an erythrocyte sedimentation rate of 129 mm/h. Which of the following is the most likely diagnosis?
- (A) Acute occipital infarction
  - (B) Glaucoma
  - (C) Left carotid dissection
  - (D) Systemic lupus erythematosus
  - (E) Temporal arteritis

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13. A 30-year-old woman comes to the physician because of a 2-month history of unsteady gait and numbness of both legs. Eight years ago, she underwent resection of the terminal ileum because of severe Crohn disease. Physical examination shows mild spastic weakness. Sensation to pinprick, vibration, and fine touch is decreased in the upper and lower extremities. A deficiency of which of the following is the most likely underlying cause of these findings?
- (A) Folic acid
  - (B) Iron
  - (C) Protein
  - (D) Vitamin B<sub>1</sub> (thiamine)
  - (E) Vitamin B<sub>12</sub> (cobalamin)
14. A 10-month-old girl is brought to the physician by her father because she does not seem to be gaining weight despite an increased appetite. He says that she passes 8 to 10 stools daily. She has no history of major medical illness, but during the past winter she had several infections of the ear and respiratory tract that were treated with antibiotics. She appears malnourished but is in no apparent distress. She is at the 5th percentile for length and weight. Diffuse crackles are heard over the lower lung fields on auscultation. Her sweat chloride concentration is 69 mmol/L. Which of the following is the most likely underlying cause of these findings?
- (A) Abnormal cystic fibrosis transmembrane conductance regulator gene function
  - (B) Acid phosphatase deficiency
  - (C) Atypical conjugation of arylsulfatase A, B, and C
  - (D)  $\alpha$ -1-Fucosidase deficiency
  - (E) Impaired production of phosphatidylcholine (lecithins)
15. The chairman of a large pathology department is planning for the personnel that he will need in the future. He is trying to decide whether his department will have more need for a dermatopathologist or a cytopathologist. He decides against the cytopathologist because he expects the number of Pap smears to fall off dramatically in the future. The development of which of the following is the most likely reason for this expected decrease in the number of Pap smears?
- (A) Highly effective oral drugs that prevent dysplasia of the uterine cervix
  - (B) Operative guidelines requiring the amputation of the cervix for mild squamous dysplasia
  - (C) Three-dimensional conformal radiation treatment
  - (D) A vaccine against high-risk human papillomaviruses
  - (E) Vaginal suppositories that markedly reduce the number of bacteria in the vagina
16. A 22-year-old woman comes to the physician because of a 1-day history of fever and right flank pain. Her temperature is 39°C (102.2°F). Physical examination shows right flank tenderness. Urinalysis shows bacteria, numerous WBC/hpf, and WBC casts. Complete blood count shows leukocytosis. Which of the following is the most likely diagnosis?
- (A) Cervicitis
  - (B) Cystitis
  - (C) Pyelonephritis
  - (D) Urethritis
  - (E) Vaginitis

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17. A previously healthy 30-year-old woman comes to the physician for a follow-up visit after a chest x-ray shows bilateral hilar adenopathy and a calcified 1-cm nodule in the periphery of the right lower lobe. Physical examination shows no abnormalities. Her serum calcium concentration is 11 mg/dL. Pulmonary function test results are within normal limits. Bronchoscopy with bronchoalveolar lavage yields 40% lymphocytes and 60% macrophages, with a CD4:CD8 T-lymphocyte ratio of 10:1. A bronchial biopsy specimen shows a nonnecrotizing granuloma. Specially stained sections of a bronchial biopsy specimen show no acid-fast bacilli or fungi. Cultures of lung tissue grow no organisms. Which of the following is the most likely diagnosis?
- (A) Coccidioidomycosis
  - (B) Hypersensitivity pneumonitis
  - (C) Sarcoidosis
  - (D) Silicosis
  - (E) Tuberculosis
  - (F) Granulomatosis with polyangiitis
18. A 3-year-old girl is brought to the emergency department 30 minutes after she tripped and fell. Physical examination shows blue sclera and edema and tenderness over the right proximal lower extremity. X-rays show a fracture of the right femur, as well as several fractures of varying ages of the left clavicle, right humerus, and right fibula. Which of the following is the most likely diagnosis?
- (A) Achondroplasia
  - (B) Ehlers-Danlos syndrome
  - (C) Hurler syndrome
  - (D) Marfan syndrome
  - (E) Osteogenesis imperfecta
19. A 50-year-old man with type 2 diabetes mellitus has a 1-week history of swelling and a feeling “like electric shocks” in his right wrist and hand. He is a computer programmer, and the shock-like feeling is worse with activity and at the end of the day. There is atrophy of the right thenar eminence. With the hand hyperextended, pain radiates into the fingers when the examiner taps the flexor surface of the distal wrist. Which of the following nerves is most likely compressed in this patient?
- (A) Deep radial
  - (B) Median
  - (C) Musculocutaneous
  - (D) Radial ulnar
  - (E) Superficial radial
20. A 3-year-old boy is brought to the physician because of a 2-day history of fever and an itchy rash. The rash began on his face and then spread to his trunk, arms, and legs. Several children at his day-care center have had similar symptoms. His temperature is 38.9°C (102°F), pulse is 100/min, respirations are 20/min, and blood pressure is 110/60 mm Hg. Physical examination shows multiple red papules and vesicles over the face, trunk, and upper and lower extremities. Some vesicles contain clear fluid, whereas others are crusted. Which of the following is the most likely causal virus?
- (A) Cytomegalovirus
  - (B) Epstein-Barr virus
  - (C) Herpes simplex virus 2
  - (D) Human papillomavirus
  - (E) Varicella-zoster virus

**Pathology Sample Items**

**Answer Form for Pathology Sample Questions**

**(Questions 1–20)**

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**Pathology Sample Items**

**Answer Key for Pathology Sample Questions**

**(Questions 1–20)**

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