
The National Medical Series for Independent Study

pathology

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Preface

Pathology is fundamentally a review of anatomic pathology; it is not intended to be a primary textbook of pathology. Much of the information is based on current teachings and the discussions covered in the major pathology textbooks. As in all fields of medicine, controversies in pathology exist. Rather than adhere to any single reference, we have gathered material from many sources, including our own publications and lecture notes.

Pathology encompasses all of medicine. The amount of material to be learned is awesome, yet the time devoted to pathology courses has decreased in many medical schools. If this book helps the student learn the essentials of anatomic pathology, it will have served its intended purpose.

Ronald D. Neumann

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Introduction

Pathology is one of seven basic science review books in a series entitled, *The National Medical Series for Independent Study*. This series has been designed to provide students, house officers, as well as physicians, with a concise but comprehensive instrument for self-evaluation and review within the basic sciences. Although *Pathology* would be most useful for students preparing for the National Board of Medical Examiners examinations (Part I, FLEX, VQE, and ECFMG), it should also be useful for students studying for course examinations. These books are not intended to replace the standard basic science texts, but, rather, to complement them.

The books in this series present the core content of each basic science area using an outline format and featuring a total of 300 study questions. The questions are distributed throughout the book at the end of each chapter and in a pretest and posttest. In addition, each question is accompanied by the correct answer, a paragraph-length explanation of the correct answer, and specific reference to the outline points under which the information necessary to answer the question can be found.

We have chosen an outline format to allow maximum ease in retrieving information, assuming that the time available to the reader is limited. Considerable editorial time has been spent to ensure that the information required by all medical school curricula has been included and that each question parallels the format of the questions on the National Board examinations. We feel that the combination of the outline format and board-type study questions provides a unique teaching device.

We hope you will find this series interesting, relevant, and challenging. The authors, as well as the John Wiley and Harwal staffs, welcome your comments and suggestions.

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STUDY QUESTIONS

Directions: Each question below contains five suggested answers. Choose the **one best** response to each question.

1. The most common type of malignancy that is found in a pleural effusion cytology in a man without a known primary cancer is
 - (A) lymphoma
 - (B) mesothelioma
 - (C) carcinoma of the colon
 - (D) carcinoma of the lung
 - (E) carcinoma of the pancreas
2. The term used to describe the unidirectional migration of leukocytes toward a target is
 - (A) diapedesis
 - (B) chemotaxis
 - (C) meiosis
 - (D) endocytosis
 - (E) margination
3. Permanent myocardial damage due to irreversible myocardial ischemia is identified best by which of the following terms?
 - (A) Myocardial infarction
 - (B) Angina pectoris
 - (C) Ischemic heart disease
 - (D) Paroxysmal nocturnal dyspnea
 - (E) Ventricular aneurysm
4. The most serious common complication of lower extremity thrombophlebitis is
 - (A) cerebral infarction
 - (B) kidney infarction
 - (C) myocardial infarction
 - (D) pulmonary infarction
 - (E) intestinal infarction
5. Glomus tumors or glomangiomas originate in structures that are responsible for which of the following functions?
 - (A) Blood pressure regulation
 - (B) Temperature regulation
 - (C) Taste sensation
 - (D) Tactile sensation
 - (E) Temperature sensation
6. The hereditary form of multiple aneurysmal telangiectasias is called
 - (A) Mönckeberg's disease
 - (B) Takayasu's disease
 - (C) Buerger's disease
 - (D) Lindau-von Hippel disease
 - (E) Osler-Rendu-Weber disease
7. What is the term given to the group of lung diseases that result from the chronic inhalation of particulate or gaseous agents as a result of occupational exposure?
 - (A) Granulomatous disease
 - (B) Pneumoconiosis
 - (C) Mycobacteriosis
 - (D) Pseudolymphoma
 - (E) Bronchiectasis
8. Which of the carcinomas listed below grows as well-differentiated cells that line the respiratory air spaces without invading the stroma of the lung?
 - (A) Squamous cell
 - (B) Anaplastic
 - (C) Large cell
 - (D) Small cell
 - (E) Bronchioalveolar

9. What is the most common cause of chronic obstructive pulmonary disease in the United States?

- (A) Pneumoconiosis
- (B) Pneumonia
- (C) Interstitial lung diseases
- (D) Emphysema
- (E) Cystic fibrosis

10. A 58-year-old man was hospitalized for evaluation of intermittent upper abdominal pain. His history disclosed a 15-lb weight loss over the preceding months. Physical examination revealed upper abdominal tenderness, but neither masses nor ascites were present. The diagnostic approach and preliminary diagnosis would include

- (A) oral cholecystogram: chronic cholecystitis with cholelithiasis
- (B) measurement of serum bilirubin: chronic cholecystitis with cholelithiasis
- (C) endoscopy: carcinoma of the ampulla of Vater
- (D) celiotomy: carcinoma of the head of the pancreas
- (E) computed axial tomography scan: carcinoma of the body of the pancreas

11. Of the tumors of the liver listed below, which is the most common?

- (A) Hepatocellular carcinoma
- (B) Angiosarcoma
- (C) Cholangiocarcinoma
- (D) Hamartoma
- (E) Hemangioma

12. Which of the following liver tumors has been most frequently associated with the use of oral contraceptives?

- (A) Bile duct adenoma
- (B) Hepatocellular adenoma
- (C) Nodular hyperplasia
- (D) Hepatoma
- (E) Cholangiocarcinoma

13. Malacoplakia of the renal pelvis occurs following infection by which of the following organisms?

- (A) *Mycoplasma pneumoniae*
- (B) *Cryptococcus neoformans*
- (C) *Escherichia coli*
- (D) *Streptococcus viridans*
- (E) *Staphylococcus aureus*

14. A kidney biopsy specimen that shows sub-endothelial granular electron-dense deposits is characteristic of which of the following disease states?

- (A) Rapidly progressive glomerulonephritis
- (B) Poststreptococcal glomerulonephritis
- (C) Membranous glomerulonephritis
- (D) Systemic lupus erythematosus
- (E) Goodpasture's syndrome

15. The best 5-year survival rate is found in patients with which of the following tumors?

- (A) Choriocarcinoma
- (B) Seminoma
- (C) Embryonal cell carcinoma
- (D) Teratoma
- (E) Yolk sac tumor

16. The most common type of testicular germ cell tumor is termed

- (A) seminoma
- (B) embryonal cell tumor
- (C) yolk sac tumor
- (D) choriocarcinoma
- (E) teratoma

17. Which of the following conditions probably is the most common cause of recurrent urinary tract infections in males?

- (A) Immune deficiency disease
- (B) Malacoplakia
- (C) Chronic prostatitis
- (D) Kidney stones
- (E) Syphilis

18. Which of the following is the most common type of breast carcinoma?

- (A) Intraductal
- (B) Medullary
- (C) Papillary
- (D) Mucinous
- (E) Infiltrating ductal

19. A 16-month-old boy presents with a right-sided abdominal mass, which examination discloses to be associated with the liver. X-rays show a partially calcified tumor occupying most of the right abdomen. The correct diagnosis is

- (A) Wilms' tumor
- (B) hepatoblastoma
- (C) pancreatoblastoma
- (D) neuroblastoma
- (E) islet cell carcinoma

20. A 38-year-old man is injured in a head-on automobile collision. When he is brought to the emergency room, he is in shock, is unconscious, and requires mechanical respiratory assistance. Despite heroic efforts, he dies. Neuropathologic examination most likely will disclose

- (A) ruptured basilar artery aneurysm
- (B) Duret's hemorrhage
- (C) severed medulla oblongata
- (D) cerebral infarct
- (E) arteriovenous malformation

21. An 8-year-old girl has a 3-month history of intermittent right lower quadrant pain. Two previous visits to the emergency room ruled out acute appendicitis. At this visit, a mass is palpated in the lower abdomen. The differential diagnosis includes each of the following conditions EXCEPT

- (A) periappendiceal abscess
- (B) Burkitt's lymphoma
- (C) Crohn's disease
- (D) ovarian cyst
- (E) Hodgkin's disease

22. Acute leukemia is found with higher than expected frequency in each of the following conditions EXCEPT

- (A) mongolism
- (B) Fanconi's anemia
- (C) Wiskott-Aldrich syndrome
- (D) sideroblastic anemia
- (E) sickle cell disease

23. Megaloblastic anemia results from each of the following EXCEPT

- (A) *Diphyllobothrium latum* infection
- (B) intestinal bypass surgery
- (C) gastric atrophy
- (D) oral contraceptive use
- (E) chronic pancreatitis

24. What is the most common fungal infection of the oral mucosa occurring in young children and in immunocompromised adults?

- (A) Actinomycosis
- (B) Histoplasmosis
- (C) Moniliasis
- (D) Mucormycosis
- (E) Nocardiosis

25. The most common benign bone tumor affecting individuals under the age of 21 years is

- (A) chondromyxoid fibroma
- (B) osteochondroma
- (C) giant cell tumor
- (D) aneurysmal bone cyst
- (E) osteogenic sarcoma

Directions: Each question below contains four suggested answers of which **one or more** is correct. Choose the answer

- A** if 1, 2, and 3 are correct
- B** if 1 and 3 are correct
- C** if 2 and 4 are correct
- D** if 4 is correct
- E** if 1, 2, 3, and 4 are correct

26. Host inflammatory response includes which of the following functions?

- (1) Isolation of infected tissues
- (2) Inactivation of causative agents
- (3) Neutralization of toxins
- (4) Removal of devitalized tissue debris

27. Autopsy shows which of the following findings in the heart of a patient with long-standing hypertension?

- (1) Left ventricular hypertrophy
- (2) Papillary muscle hypertrophy
- (3) Decreased left ventricle volume
- (4) Endocardial fibrous thickening

28. Adult respiratory distress syndrome (ARDS) shows which of the following anatomic signs?

- (1) Pulmonary edema
- (2) Hyaline membrane formation
- (3) Proliferation of type II pneumonocytes
- (4) Alveolar wall damage

29. The various forms of viral hepatitis are transmitted by which of the following routes?

- (1) Fecal-oral contamination
- (2) Injection of antihemophilic factor
- (3) Ingestion of contaminated raw shellfish
- (4) Use of contaminated hypodermic needles

30. Chronic congestive heart failure produces which of the following hepatic morphologic changes?

- (1) Biliary duct proliferation
- (2) Formation of Mallory's bodies
- (3) Lymphocytic infiltration of the triads
- (4) Central lobular congestion and necrosis

31. Amyloid deposition is a part of the histopathologic process in which of the following diseases?

- (1) Plasmacytoma
- (2) Medullary carcinoma of the thyroid
- (3) Chronic infection of the kidney
- (4) Kimmelstiel-Wilson lesion

32. Acute orchitis refers to an acute inflammation of the testicular parenchyma. True statements concerning this condition include

- (1) it is a common complication of mumps
- (2) it results in a relatively high incidence of testicular cancer
- (3) it is more frequent in patients with cryptorchidism
- (4) it may result from epididymal infection

33. True statements concerning squamous cell carcinoma of the cervix include which of the following?

- (1) It can be detected by cytologic screening tests
- (2) It has an incidence equal to that of endometrial carcinoma
- (3) It begins in the junction between the cervix and endocervix
- (4) It is treated by hysterectomy and radiation therapy

34. Complications of gonorrheal infections in women that can cause sterility include

- (1) permanent damage of the tubular epithelium
- (2) extensive peritoneal and tubo-ovarian adhesions
- (3) chronic salpingitis
- (4) cervical stenosis

35. The epidemiology of squamous cell carcinoma of the cervix includes

- (1) a low socioeconomic status
- (2) a history of multiple sex partners
- (3) early age at first coitus
- (4) multiparity

36. Factors that carry an increased risk for the development of breast carcinoma include

- (1) nulliparity
- (2) fibrocystic disease
- (3) family history of breast cancer
- (4) amastia

37. Characteristics of laryngeal papillomatosis include

- (1) occurrence at any age
- (2) viral etiology
- (3) positive response to surgical treatment
- (4) malignant transformation

38. Conditions that predispose to the development of osteosarcoma include

- (1) Paget's disease of the bone
- (2) trauma to the bone
- (3) previous radiation therapy involving bone
- (4) multiple enchondromatoses

39. True statements concerning tuberculosis of the bone include

- (1) it affects both children and adults
- (2) vertebrae and the long bones are most commonly affected
- (3) it often occurs via hematogenous spread of the organism
- (4) bone can be the primary focus of infection

40. A patient complains that his hat size is increasing frequently; he walks bowlegged due to tibial deformities. Bone biopsy shows which of the following findings?

- (1) Increased rate of calcification
- (2) Mosaic pattern of bone
- (3) Marked medullary fibrosis
- (4) Increased number of osteoclasts

41. The main forms of leprosy include which of the following?

- (1) Lepromatous
- (2) Granulomatoid
- (3) Tuberculoid
- (4) Lupoid

Directions: The groups of questions below consist of lettered choices followed by several numbered items. For each numbered item select the **one** lettered choice with which it is **most** closely associated. Each lettered choice may be used once, more than once, or not at all.

Questions 42–45

For each manifestation of hypercalcemia listed below, match the causative agent.

- (A) Primary hyperparathyroidism
- (B) Renal cell carcinoma
- (C) Multiple myeloma
- (D) Paget's disease of the bone
- (E) Metastatic breast cancer

42. Osteoclast activation

43. Excessive bone resorption resulting from excessive production of parathyroid hormone

44. Bone destruction and calcium release

45. Hyperactivity of the bone resorption-formation sequence

Questions 46–50

For each tumor that is listed below, match the causative agent.

- (A) External irradiation
- (B) Herpesvirus
- (C) Estrogen
- (D) Epstein-Barr virus
- (E) Ultraviolet light

46. Papillary carcinoma of the thyroid

47. Squamous cell carcinoma of the cervix

48. Burkitt's lymphoma

49. Clear cell carcinoma of the cervix and vagina

50. Malignant melanoma

Questions 51–55

Match the following tumor-associated antigens with the tumors in which they are most likely to be found.

- (A) Carcinoma of the pancreas
- (B) Hepatoma
- (C) Oat cell carcinoma of the lung
- (D) Fibrous mesothelioma
- (E) Hydatidiform mole

- 51. Alpha-fetoprotein
- 52. Chorionic gonadotropin
- 53. Carcinoembryonic antigen
- 54. Antidiuretic hormone
- 55. Hypoglycemic principle

Questions 56–60

For each tumor that is listed below, match the purported causative agent.

- (A) Dietary fat
- (B) Vinyl chloride
- (C) Asbestos
- (D) Cigarette smoking
- (E) Cyclamates

- 56. Angiosarcoma of the liver
- 57. Cancer of the urinary bladder
- 58. Carcinoma of the colon
- 59. Mesothelioma
- 60. Carcinoma of the lung

ANSWERS AND EXPLANATIONS

1. The answer is D. (*Chapter 3 III A, B*) Numerous studies have shown that most pleural effusions that are caused by malignant disease in patients without known cancer contain adenocarcinoma cells. Statistically, the usual primary sites for such tumors are the breast in women and the lung in men.

2. The answer is B. (*Chapter 1 I D 3*) During the vascular stasis stage of hyperemia, neutrophils and monocytes adhere to the vascular endothelium prior to migration into the extravascular space in a process known as margination. Leukocytes emigrate (diapedesis) through gaps between the endothelial cells. Chemotaxis is the process by which leukocytes undergo unidirectional migration toward a specific target. Various chemotactic substances or factors influence the rate of movement of the cells. Several chemotactic factors have an apparently specific action on selected cell types.

3. The answer is A. [*Chapter 4 II A 3 a (3)*] Significant irreversible myocardial ischemia causes myocardial infarction, which is death of myocardial muscle fibers. Angina pectoris refers to the severe chest pain that may accompany myocardial ischemia but is not always associated with permanent myocardial damage. Ischemic heart disease is an inclusive term for all types of cardiac disease due to insufficient blood supply and, again, is not exclusive for permanent myocardial damage. Paroxysmal nocturnal dyspnea is sudden difficulty in breathing, occurring during the night when the patient is usually asleep and lying flat. While a ventricular aneurysm may be the eventual outcome of myocardial infarction, it is not the best descriptor of permanent ischemic myocardial damage.

4. The answer is D. (*Chapter 5 III B 1*) When thrombi form in the veins of the lower extremities and embolize, the emboli travel to the right side of the heart and enter the pulmonary arterial tree. Pulmonary emboli can cause pulmonary infarction, leading to necrosis of the lung tissue that is served by the occluded pulmonary artery branch. These emboli could not cause infarction of the brain, kidney, heart, or intestines unless a right-to-left shunt is present to allow emboli access to the systemic circulation.

5. The answer is B. (*Chapter 5 V B*) Glomus tumors originate from a structure known as the neuro-myioarterial glomus, which is an arteriovenous structure rich in autonomic nerves of the related artery. The cutaneous glomus organ has a function in temperature regulation.

6. The answer is E. (*Chapter 5 V C*) Osler-Rendu-Weber disease is the hereditary form of multiple aneurysmal telangiectasias. This condition is inherited as an autosomal dominant trait. Patients typically have telangiectasias of the lips, tongue, and nasal mucosa. Bleeding from these lesions is a common clinical presentation.

7. The answer is B. (*Chapter 6 IV H*) Pneumoconiosis is a pathologic condition of the lungs produced by chronic inhalation of particulate or gaseous matter, which generally occurs in the course of certain occupations. Anthracosis (black lung) is observed in miners and occasionally in dwellers of congested urban environments. Silicosis is seen in miners, metal grinders, and others who are chronically exposed to silica particles. Asbestosis is a particularly widespread form of pneumoconiosis and can lead to the development of malignant mesotheliomas.

8. The answer is E. (*Chapter 6 VIII B 2 b*) Bronchioalveolar carcinoma is a special type of adenocarcinoma that is composed of tall columnar or cuboidal epithelial malignant cells. The cells line respiratory spaces without invading the stroma of the lung. This tumor usually arises from bronchiolar epithelium, including that comprised of the Clara cells, and then spreads to and intermixes with the alveolar epithelium. The tumor can present radiographically as a single peripheral nodule, multiple nodules, or as a diffuse, pneumonia-like infiltrate.

9. The answer is D. (*Chapter 6 V A*) Emphysema is the most common cause of chronic obstructive pulmonary disease in the United States. It is characterized by over-distended lung alveoli with variable amounts of alveolar septal wall destruction. Although the exact mechanism that produces emphysema

is unclear, there is a strong association with cigarette smoking and living in an urban environment with its attendant air pollution.

10. The answer is E. (Chapter 9 IV C 1 a) This history is suggestive of pancreatic cancer with abdominal pain and weight loss, and the least invasive technique likely to yield the most diagnostic information is the computed axial tomography scan, which has been shown to detect small mass lesions (tumors) with great accuracy. The diagnosis of chronic cholecystitis is unlikely in view of the relatively recent onset of symptoms and the weight loss. Carcinoma of the ampulla of Vater and the head of the pancreas would most likely produce clinical evidence of jaundice, which was not present in this patient.

11. The answer is E. (Chapter 10 VII A) Hemangiomas are the most common tumors of the liver and are found in all age groups. Only rarely do these lesions reach sufficient size to cause problems due to rupture and hemoperitoneum. Usually, liver hemangiomas are incidental findings at surgery or autopsy.

12. The answer is B. (Chapter 10 V C) Hepatocellular adenoma is a very rare neoplasm of the liver, occurring in women with a peak incidence between the third and fourth decades of life. Liver cell adenoma is a recognized complication of oral contraceptive use. The neoplasm is prone to hemorrhage and necrosis, which lead to pain in the right upper quadrant of the abdomen. Sometimes it ruptures and results in intraperitoneal bleeding, requiring emergency surgery.

13. The answer is C. (Chapter 11 IX B 3) The term malacoplakia originally referred to a distinctive type of cystitis of the urinary bladder. However, the condition has been shown to occur in several locations along the urinary tract where *Escherichia coli* (*E. coli*) infects the lining epithelial layers. Grossly, these focal thickenings of the mucosa (and sometimes submucosa) may be mistaken for cancer. Microscopically, these lesions are seen to be produced by accumulation of granular histiocytes beneath the surface epithelial cell layer.

14. The answer is D. (Chapter 11 III C 3) Granular subendothelial immune deposits and proliferation of mesangial and endothelial cells is nearly diagnostic of systemic lupus erythematosus. In systemic lupus erythematosus the immune complexes are located between the endothelial cells and the glomerular basement membrane. Later in the course of this disease, the immune complexes may also be seen subepithelially.

15. The answer is B. (Chapter 12 II E) Of patients with testicular malignancies, those with seminomas have the best prognosis for survival. Survival of patients with seminomas is 90 to 98 percent at 5 years; with teratomas, 70 percent at 2 years; with embryonal cell carcinomas, 35 percent at 5 years; infantile embryonal cell or yolk sac tumors, 50 percent at 5 years; and choriocarcinoma, less than 5 percent at 2 years.

16. The answer is A. (Chapter 12 II E 3) Seminomas are the most common of the testicular tumors and account for approximately 70 percent of primary germ cell neoplasms of the testes. Teratomas are the next most common testicular tumor; however, they account for only 20 to 25 percent. Yolk sac tumors, choriocarcinomas, and embryonal cell tumors occur with much less frequency.

17. The answer is C. (Chapter 12 IV C 1, 2, 3, 4) Chronic prostatitis, resulting usually from extension of an inflammatory process in the urethra or bladder, is a troublesome condition because it is frequently recurrent and is probably the most common cause of relapsing urinary tract infections in males. Immune deficiency diseases are relatively rare in the population; however, when they are present in individuals, they may cause recurrent urinary tract infections. Malacoplakia is an unusual inflammatory reaction produced by *Escherichia coli* (*E. coli*) infections of the urinary bladder and prostate; it is characterized by large numbers of histiocytes and Michaelis-Gutmann bodies.

18. The answer is E. (Chapter 14 VIII B 2) Infiltrating ductal carcinoma is the most common form of breast carcinoma, encompassing nearly 70 percent of breast cancers. Intraductal carcinoma constitutes only 5 to 10 percent of cancers of the breast; medullary carcinoma also constitutes about 5 to 10

percent. Papillary and mucinous carcinomas each account for less than 3 percent of malignant breast tumors.

19. The answer is D. (Chapter 15 VI F 2) Because of the age of the patient, islet cell carcinoma can be virtually eliminated as a diagnosis. Calcification is diagnostic of neuroblastoma; Wilms' tumor, hepatoblastoma, and pancreatoblastoma do not show this finding.

20. The answer is B. (Chapter 16 II H 1 e) Severe head trauma, as would be expected to have occurred in this patient, leads to bruising of the brain against the bony skull. Cerebral edema ensues with consequent caudal displacement of the midbrain and pons; transtentorial herniation then takes place. The latter results in stretching and tearing of brainstem arteries and veins, producing parenchymal hemorrhages (Duret's). Although a ruptured aneurysm and malformation could result in findings similar to Duret's lesion, these diagnoses would not apply in this instance. Neither a severed medulla oblongata nor a cerebral infarct are reasonable expectations.

21. The answer is E. (Chapter 17 IV C) Hodgkin's disease almost never involves the gastrointestinal tract or the reproductive (pelvic) organs. However, the possibility of a smoldering periappendiceal abscess must be considered. Burkitt's lymphoma is a lymphoma that commonly involves the gastrointestinal tract, especially in children. Crohn's disease can produce inflammatory fibrous masses. Finally, ovarian cysts occur in young girls and must be considered in the diagnosis of this case.

22. The answer is E. (Chapter 17 IV B) Mongolism, Fanconi's anemia, Wiskott-Aldrich syndrome, and sideroblastic anemia all show high incidences of acute leukemia. Genetic (and chromosomal) abnormalities are found in patients with mongolism, Fanconi's anemia, and Wiskott-Aldrich syndrome and may predispose to neoplastic transformation. Sideroblastic anemia has a prolonged smoldering phase, which in many cases ultimately blossoms into acute leukemia. No higher incidence of leukemia is noted in sickle cell patients.

23. The answer is E. [Chapter 17 II A 3 b (1)] Megaloblastic anemia is characterized by intestinal malabsorption of vitamin B₁₂, and *Diphyllobothrium latum* infection, intestinal bypass surgery, gastric atrophy, and oral contraceptives all interfere with vitamin B₁₂ or folate absorption or metabolism. The parasite *Diphyllobothrium latum* interferes with absorption of vitamin B₁₂. Patients who undergo intestinal bypass surgery have part of the ileum bypassed, which is the site of vitamin B₁₂ and folate absorption. Severe gastric atrophy demonstrates an absence of intrinsic factor, a substance that is needed for vitamin B₁₂ absorption. Ingestion of oral contraceptives may result in megaloblastic anemia via interference with folate metabolism. However, none of these abnormalities is found in chronic pancreatitis.

24. The answer is C. (Chapter 18 II B 2) Moniliasis, commonly called thrush, is an acute infection of the oral cavity caused by *Candida albicans*. This oral fungal infection typically occurs in infants but can occur in immunocompromised, debilitated, and diabetic adults. The acute infection produces white elevated patches distributed through the oral mucosa. The mucosa is eroded beneath these patches, producing a bleeding superficial erosion.

25. The answer is B. (Chapter 19 I H 2 c) Osteochondroma is also referred to as exostosis. It is a benign new bone growth that often protrudes from the outer contour of bones and is capped by growing cartilage. The multifocal and clearly hereditary form of this lesion is known as hereditary multiple cartilaginous exostosis. Whether multiple or isolated, nearly 80 percent of these lesions are noted prior to the age of 21 years.

26. The answer is E (all). (Chapter 1 I A 1) The inflammatory response is a direct reaction against injurious agents or organisms threatening the homeostasis of the host. It has multiple actions, including isolation of infected tissues, inactivation of noxious agents and organisms, neutralization of toxins, and cleanup of devitalized tissues in preparation for tissue repair.

27. The answer is E (all). (Chapter 7 II B 2) Long-standing hypertension leads to anatomic changes in the heart, involving, in part, concentric hypertrophy of the left ventricle, including hypertrophy of the

papillary muscles. Until later decompensation causes ventricular dilatation, ventricular wall hypertrophy decreases the intraventricular volume. Endocardial fibrous thickening also is noted occasionally.

28. The answer is E (all). (Chapter 6 II B 3 b) Adult respiratory distress syndrome (ARDS) is a model of acute alveolar injury with pulmonary edema and respiratory failure. A number of preexisting conditions can lead to ARDS, particularly if high concentrations of oxygen are used as supportive respiratory therapy. Focal atelectasis and alveolar collapse occur with the development of pulmonary edema; hyaline membranes appear, type II pneumocytes proliferate, and there is variable damage to the alveolar walls. The mechanisms of ARDS are not completely understood.

29. The answer is E (all). (Chapter 10 IV A 1) The fecal-oral route is a known mode of transmission of hepatitis A virus infection. Ingestion of raw shellfish from contaminated waters is also reported to cause outbreaks of hepatitis. Hepatitis B infection is more often acquired from viral contamination of blood or blood products (fibrinogen and antihemophilic factor). Drug abusers who share hypodermic needles are at risk of acquiring hepatitis from a contaminated needle.

30. The answer is D (4). (Chapter 10 III B 2) Severe prolonged right-sided heart failure produces chronic venous congestion of the liver, which can progress to cardiac cirrhosis. The result is a firm liver, which shows the characteristic nutmeg pattern when cut surfaces are examined. This pattern is produced by congested and hemorrhagic centrilobular areas alternating with paler midzones with a yellowish tinge produced by fatty changes.

31. The answer is A (1, 2, 3). (Chapter 11 III B 4) Amyloid is a pink, eosinophilic, acellular material produced as part of several disease processes. Plasmacytoma, medullary carcinoma of the thyroid, and chronic infection of the kidney may lead to amyloidosis or be associated with amyloid deposition in various tissues. However, the Kimmelstiel-Wilson lesions that are found in the glomeruli of diabetic patients are composed of an acellular hyaline material in the glomerulus.

32. The answer is D (4). (Chapter 12 II D 1) Acute orchitis commonly involves the testis and often also the epididymis when infectious organisms, particularly *Escherichia coli* (*E. coli*), staphylococci, and streptococci, enter the testis via the vas deferens or via lymphatics. Acute orchitis is actually a rare complication of mumps. The condition does not increase the likelihood of later testicular malignancy.

33. The answer is E (all). (Chapter 13 V B 6 b) Squamous cell carcinoma of the cervix usually originates at the squamo-columnar junction, which is the dividing line between the endo- and exocervix. Because the tumor arises in this site, it can be detected by cytologic recovery screening tests, such as Papanicolaou's (Pap) test. Early detection has decreased the incidence of invasive squamous cell carcinoma of the cervix over the past 25 years so that it now occurs with an incidence equal to that of endometrial cancer. The treatment for squamous cell cervical carcinoma includes hysterectomy for the microinvasive form and radiotherapy for frankly invasive forms.

34. The answer is A (1, 2, 3). (Chapter 13 IV C 2; II C 3) Gonorrhea produces an extensive purulent infection when a fallopian tube becomes involved. The infection destroys the tubal epithelium, causing the tubal plicae to adhere together, effectively blocking the fallopian tube. If the infection extends outside the tube, both paratubal and tubo-ovarian abscesses and adhesions can occur. These adhesions and tubal stenoses are a major cause of sterility. Cervical stenosis is not a complication of gonorrheal infection.

35. The answer is E (all). (Chapter 13 V B 6) Epidemiologic studies of large populations of patients with cervical carcinoma show a higher incidence in individuals who engaged in early, promiscuous intercourse. A higher incidence has been noted in groups of low socioeconomic status. Having a large number of children also seems to increase the likelihood of developing squamous cell carcinoma. These epidemiologic findings have led to an ongoing search for a transmissible causative agent, which as yet has not been clearly identified.