Temple University School of Medicine
Department of Pathology and Laboratory Medicine
Pathology (D305) Examination II Version 2
October 19, 2009

IMPORTANT: Read the following instructions.

1. Write examination version number in the space of section number on the examination answer sheet.

2. Fill in your name and the last four digits of your Temple identification number on your answer sheet and darken the corresponding circles with a #2 pencil.

3. There are seventy (70) items (questions) on this examination. There is only one answer to each item. Choose the best correct answer to a question or response to finish the statement of each item.

4. Use a #2 pencil to mark your answers on your answer sheet. Mark your answer right after you chose one. There is no extra time at the end of the examination. The examination time is one and a half hours.

5. Keep your eyes on your own examination paper and answer sheet. Place your own examination paper and answer sheet on your table top and prevent them from being exposed to others.

6. Students are not allowed to bring electronic devices including cell phones or other miscellaneous items to the examination.

7. Proctors are not allowed to explain questions during examination.

1. Clinically, what is the most reliable indicator of malignant tumors?

A. Ulcerated surface
B. Movable tumor mass
C. Encroachment upon vital organs
D. Firmness of the tumor mass
E. Metastasis

2. A 75-year-old male had a bronchogenic squamous cell carcinoma 8 years ago. Now this same patient develops squamous cell carcinoma at the right border of the tongue. What is the most likely social behavior of this patient that causes these two cancers?

A. He loves outdoor activities.
B. He is a heavy drinker.
C. He likes eating preserved foods.
D. He smokes daily.
E. He meditates regularly.

3. The crucial difference between neoplasia and hyperplasia is that neoplasia shows which of the following manner?

A. Persistent growth after cessation of stimuli
B. Increase in mitosis and cell number
C. Increase in cell size and cellular substance
D. Intermittent phagocytosis of adjacent cells
E. Proliferation controlled by multiple hormones

4. Which of the following tumor is usually encapsulated?

A. Oral papilloma
B. Squamous cell carcinoma
C. Osteosarcoma
D. Melanoma
E. Lipoma

5. What of the following is a malignant tumor of glandular tissue origin in the mouth?

A. Malignant lymphoma
B. Chondrosarcoma
C. Adenocarcinoma
D. Fibroma
E. Glandulosarcoma

6. Which of the following is a feature of anaplastic malignant cells?

A. Uniformity of cell size and shape
B. Karyolysis
C. Decreased nuclear/cytoplasmic ratio
D. Tripolar mitosis
E. Well organized growth pattern

7. Microscopic examination of an ovarian mass removed from a 35-year-old woman reveals hair follicles, malformed teeth, gastrointestinal epithelium, cartilage, skeletal muscle, neurons, and glial cells. What is the most likely diagnosis?

A. Glioma
B. Hamartoma
C. Choristoma
D. Teratoma
E. Mesothelioma

8. What is most likely carcinogenic agent for the development of oral and lung squamous cell carcinomas?

A. Benz[a]pyrene
B. Polyvinal chloride
C. Ultraviolet light
D. Aflatoxin B1
E. Epstein-Barr virus

9. In order to invade the extracellular matrix, cancer cells express increased numbers of which receptors on their cell surface?

A. Laminin
B. Epidermal growth factor
C. Platelet-derived growth factor
D. Von Willebrand factor
E. Transforming growth factor-beta

10. Which one of the following is reported to be the most commonly mutated protooncogene in human tumors?

A. PDGF receptor gene
B. RAS gene
C. P53 gene
D. RB gene
E. BCL-2 gene

11. What are the major functions of normal p53 gene?

A. Stimulates cell proliferation and secretion activity
B. Activates cell cycle arrest and triggers apoptosis
C. Causes cellular hypertrophy and increases cellular substance
D. Initiates dysplasia and lyses the basement membrane
E. Induces secretion of growth factors and their receptors

12. Which one of the following is the most commonly mutated cancer suppressor gene found in virtually every type of cancer?

A. BCL-2 gene
B. ABL gene
C. P53 gene
D. EGF gene
E. MYC gene

13. Which signal-transduction gene is translocated from chromosome 9 to chromosome 22 of Philadelphia chromosome?

A. RB gene
B. APC gene
C. ABL gene
D. TGF-b gene
E. P53 gene

14. In 80% to 100% of oral squamous cell carcinomas, which one of the following is reported to be over-expressed?

A. EGF receptor
B. DNA repair enzymes
C. Cyclin-dependent kinase inhibitors
D. Cytokeratins
E. Cadherin molecules

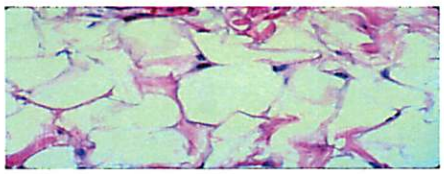
15. In current vaccination for the prevention of cervical squamous cell carcinoma, the vaccine is directed against which one of the following?

A. Human T-cell leukemia virus type 1
B. Hepatitis B virus
C. Herpes virus type 2
D. Epstein-Barr virus
E. Human papilloma virus type 16 and 18

16. Staging of an oral squamous cell carcinoma on the right side of the floor of the mouth is designated as T1N3M0. What does this most likely indicate?

A. The tumor mass is greater than 4 cm in the largest dimension.
B. The tumor mass is 3 cm in diameter and it invades the submandibular gland.
C. Tumor cells have spread to three lymph nodes on the right neck, each <1 cm.
D. A single lymph node on the left neck is involved by tumor cells, =1 cm.
E. Tumor cells have metastasized to the lung forming a small nodule, <1 cm.

17. Histology of a movable, yellowish tumor in the right mandibular mucobuccal fold is shown in the picture below. What is the most likely diagnosis?



A. Papilloma
B. Adenocarcinoma
C. Leiomyoma
D. Hemangioma
E. Lipoma

18. Which of the following is a screening procedure for prostate cancer?

A. Measure the serum alkaline phophatase levels
B. Detect occult blood in the feces
C. Measure the serum prostate-specific antigen levels
D. Measure the serum carcinoembryonic antigen levels
E. Measure the serum fetoprotein levels

19. What is the progressive loss of body fat and lean body mass in terminal stage cancer patients?

A. Anorexia
B. Cachexia
C. Anaplasia
D. Dysplasia
E. Metaplasia

20. Which one of the following most commonly causes paraneoplastic hypercalcemia?

A. Metastasizing ameloblastoma of the jaw
B. Squamous cell carcinoma of the lung
C. Adenoma of the parathyroid gland
D. Metastatic breast carcinoma in the jaw
E. Malignant calcifying epithelioma of the skin

21. Which of the following is observed in obese people?

A. High HDL cholesterol levels
B. Increased cellular sensitivity to insulin
C. Decreased blood pressure
D. Increased incidence of cholelithiasis
E. Decreased risk of developing breast cancer in women

22. Clinical symptoms of vitamin D deficiency and vitamin K deficiency can be observed in which of the following conditions?

A. Pulmonary tuberculosis
B. Liver cirrhosis
C. Myocardial infarction
D. Chronic pancreatitis
E. Acute renal failure

23. What is the pathogenic mechanism for a marked systemic edema in kwashiorkor patients?

A. Increased sodium retention
B. Decreased capillary permeability
C. Increased lymphatic obstruction
D. Increased hydrostatic pressure in the blood
E. Decreased osmotic pressure in the blood

24. Which vitamin deficiency most likely causes xerostomia?

A. Vitamin D
B. Vitamin B3
C. Vitamin A
D. Vitamin K
E. Vitamin C

25. Epithelial hyperplasia with hyperparakeratosis is most commonly caused by deficiency of what?

A. Zinc
B. Dietary fiber
C. Selenium
D. Copper
E. Iron

26. Esophageal varices occur most frequently with which of the following conditions?

A. Chronic coughing
B. Thrombosis in the superior vena cava
C. Thoracic aortic aneurysm
D. Peptic ulcer
E. Liver cirrhosis

27. Which anatomic site is most commonly involved by lymphangiomas?

A. Lymph nodes
B. The spleen
C. The liver
D. The tongue
E. The legs

28. Monckeberg medial calcific sclerosis (medial calcinosis) occurs most frequently in which of the following?

A. Ascending aorta
B. Facial artery
C. Thoracic aorta
D. Small arteriole in the kidney
E. Abdominal aorta

29. Among the four major modifiable risk factors for atherosclerosis, which one is considered to be the most important after the age of 45 years?

A. Hypercholesterolemia
B. Hypertension
C. Smoking
D. Diabetes
E. Smoking with alcohol consumption

30. The lesion of established atherosclerosis is called what?

A. Fatty streak
B. Dystrophic calcinoma
C. Cholesteatoma
D. Fatty change
E. Atheroma

31. During the development of an atherosclerotic lesion, foam cells derive from monocytes and which of the following?

A. Endothelial cells
B. Adventitial fibroblasts
C. Medial smooth muscle cells
D. Infiltrating neutrophils
E. Intimal fibroblasts

32. Which one of the complications of atherosclerosis leads directly to myocardial infarct?

A. Cholesterol crystal formation
B. Dystrophic calcification of cell debris
C. Ulceration of the luminal surface
D. Thrombosis
E. Hemorrhage

33. In long-standing benign essential hypertension, arterioles undergo what kind of change?

A. Hyaline thickening of the wall
B. Hyperplasia of endothelial cells
C. Exudation of fibrin
D. Emigration of leukocytes
E. Hyperplasia of smooth muscle cells

34. Which one of the following vascular disorders should be included in the differential diagnosis of facial pain?

A. Temporal arteritis
B. Facial hemangioma
C. Lingual varix
D. Berry aneurysm in the brain
E. Carotid artery atherosclerosis

35. What is the most common cause of aortic dissection?

A. Syphilis
B. Atherosclerosis
C. Hypertension
D. Smooth muscle cell defect
E. Tuberculosis

36. A 62-year-old man has a long history of rheumatoid arthritis. He has been having symptoms related to dysfunction of the small intestine and the kidneys. A biopsy revealed a homogeneous extracellular deposit that demonstrated green birefringence under polarized light after staining with Congo red dye. Which of the following statements is true?

A. The deposits probably consist of misfolded immunoglobulin light chain.
B. The deposits probably consist of misfolded SAA protein produced by the liver.
C. The deposits consist of branching fibrils of protein that show extensive alpha-helix secondary structure.
D. The deposits consist of thickened collagen fibers.
E. The deposits are probably not the cause of the organ dysfunction noted.

37. A 41-year-old man has been infected with HIV for the past 10 years. He has had several bouts of extensive oral candidiasis that extends into the esophagus. Kaposi's sarcoma has been diagnosed recently and he has had a 23 pound loss of weight in the past 4 months. Which of the following cells is most depleted in his lymph nodes at this stage of the infection?

A. Macrophages
B. Plasma cells
C. B lymphocytes
D. CD8(+) lymphocytes
E. CD4(+) lymphocytes

38. In genetically susceptible individuals, antigenic stimulation of T_H2 cells and subsequent production of IgE forms the basis of which type of hypersensitivity reaction?

A. Type I hypersensitivity reaction
B. Type II hypersensitivity reaction
C. Type III hypersensitivity reaction
D. Type IV hypersensitivity reaction
E. Delayed-type hypersensitivity reaction

39. Which of the following inflammatory mediators is the most important cause of the late phase of a type I hypersensitivity reaction?

A. Histamine
B. Bradykinin
C. Thrombin
D. Leukotriene D_4
E. Thromboxane A_2

40. A 27-year-old woman has been experiencing increasing skeletal muscle weakness over the past 9 months and often has blurred vision later in the day. After a night's sleep her symptoms are reduced. She has no rash or fever and no serum anti-nuclear antibodies of any type. A biopsy of her muscle shows no lymphocyte/macrophage infiltrates causing muscle damage. Which of the following is the most likely mechanism for the muscle weakness?

A. Type IV hypersensitivity reaction
B. Free radical release by chronic inflammatory cells
C. Antibody-mediated dysfunction of receptors at the neuromuscular junction
D. X-linked agammaglobulinemia
E. Systemic lupus erythematosus

41. IgG antibodies bound to self antigens on platelets results in thrombocytopenic purpura. What type of hypersensitivity reaction is occurring in this case?

A. Type I hypersensitivity reaction
B. Type II hypersensitivity reaction
C. Type III hypersensitivity reaction
D. Type IV hypersensitivity reaction
E. Delayed-type hypersensitivity reaction

42. Immune complexes are deposited in small arteries resulting in an acute necrotizing vasculitis. Which of the following best describes the role of immune complexes in the pathogenesis of the vasculitis?

A. They stimulate endothelial cells to release large quantities of free radicals
B. They stimulate endothelial cell apoptosis
C. They activate substance P release from adjacent nerves
D. They activate complement which recruits and activates neutrophils to secrete mediators
E. They stimulate macrophages to produce large quantities of fibroblast growth factor

43. Acute serum sickness following injection of foreign antiserum to induce passive immunity is a prototypical example of:

A. a type I hypersensitivity reaction.
B. a cell-mediated hypersensitivity reaction.
C. graft versus host disease.
D. CREST syndrome.
E. a type III hypersensitivity reaction.

44. Immunologic attack of a recipient's tissues after receiving an allogeneic bone marrow transplant is the basis of:

A. CREST syndrome.
B. graft versus host disease.
C. DiGeorge's syndrome.
D. Arthus reaction.
E. Graves disease.

45. A 32-year-old woman presents with sacroiliitis that has become progressively worse over the past year. Blood work indicates she does not have anti-nuclear antibodies or rheumatoid factor, but she is found to be HLA-B27 (+). The woman most likely has:

A. Sjogren's syndrome.
B. reumatoid arthritis.
C. ankylosing spondylitis.
D. systemic lupus erythematosus.
E. CREST syndrome.

46. A 48-year-old woman has had an autoimmune disease for a number of years. Her kidneys are failing due to increased glomerular fibrosis, and fibrosis of her heart muscle and conduction system is causing increasing circulatory problems. She has a high titer of antibodies against DNA topoisomerase. Which of the following diseases does she most likely have?

A. Systemic sclerosis
B. Rheumatoid arthritis
C. Systemic lupus erythematosus
D. Sjogren's syndrome
E. Polymyositis

47. A 39-year-old woman presents with a skin rash on her face and arms, arthritis and pericarditis. A kidney biopsy indicates glomerulonephritis with complement activation and microinfarcts due to microthrombi. She has a large number of circulating auto-antibodies including antibodies to double-stranded DNA and Smith antigen. Which of the following diseases does she most likely have?

A. CREST syndrome
B. Infectious mononucleosis
C. Graves disease
D. Systemic lupus erythematosus
E. Systemic sclerosis

48. The principal mechanism of immune damage of tissues in tuberculosis is:

A. type I hypersensitivity reaction
B. type II hypersensitivity reaction
C. type III hypersensitivity reaction
D. type IV hypersensitivity reaction
E. necrotizing vasculitis.

49. Hyperacute transplant rejection is mediated by:

A. CD8(+) lymphocytes during the first 3 months post-transplant.
B. CD4(+) lymphocytes and macrophages during the first 3 months post-transplant.
C. parenchymal cells of the donor graft.
D. lymphocytes of the donor graft.
E. pre-existing anti-graft antibodies in the recipient's serum.

50. Rheumatoid factor:

A. is a glycolipid that occurs in high concentration in a pannus.
B. occurs most frequently in women with spondyloarthropathies.
C. is a high titer of IgM antibodies produced against self IgG molecules.
D. is a breakdown product of articular cartilage.
E. is an anti-centromere antibody that occurs most commonly in rheumatoid arthritis.

51. A 26-year-old man is trying to repair an electrical appliance when his hand touches a frayed electrical cord carrying 120 volt, 10 ampere alternating current. Which of the following is most likely to develop as a consequence of his electrical injury?

A. Cerebral artery thrombosis
B. Gastric hemorrhage
C. Ventricular fibrillation
D. Bronchoconstriction
E. Progressive massive fibrosis

52. A significant complication of heat stroke is:

A. bronchitis.
B. infective endocarditis.
C. blindness and hearing loss.
D. ischemia of tissues and cardiac arrythmias.
E. myasthenia gravis.

53. A 47-year-old man presented with dyspnea and auscultation revealed decreased breathing sounds in the left lung. A chest radiograph showed a large pleural mass encasing much of the left lung. A biopsy specimen of the mass revealed the presence of ferruginous bodies. The pleural mass is most likely to be:

A. an infection caused by Staphylococcus aureus.
B. a benign vascular tumor.
C. a malignant mesothelioma.
D. a malignant melanoma.
E. metastatic prostate adenocarcinoma.

54. A 56-year-old woman has long-standing rheumatoid arthritis and now suffers from salicylism and experiences headaches, nausea and diarrhea. Which of the following manifestations of salicylism is this woman also most likely to have?

A. Acute erosive gastritis with ulceration and bleeding
B. Blindness
C. Glomerulonephritis due to type I hypersensitivity reaction
D. Chronic bronchitis
E. Malignant mesothelioma

55. The most significant macromolecule damaged by ionizing radiation is:

A. cytochrome c in the mitochondria.
B. DNA.
C. collagen.
D. integrins in the cell membrane.
E. Na/K ATPase.

56. Long-term estrogen therapy (HRT) in post-menopausal women gives rise to greatest risk for:

A. osteoporosis.
B. cardiovascular disease.
C. cervical cancer.
D. thromboembolism.
E. renal carcinoma.

57. A 50-year-old man has long been a highway construction worker and for the past 18 years has spent time building tunnels for roads through the mountains. He has begun to experience dyspnea. Lab tests reveal pulmonary hypertension and a chest radiograph shows multiple radiodense nodules in both lungs and an enlarged heart. A biopsy of a nodule reveals dense fibrosis with scattered inflammatory cells and many small foreign particles observed using polarized light. He most likely suffers from:

A. bronchogenic carcinoma.
B. anthracosis.
C. berylliosis.
D. salicylism.
E. silicosis.

58. A 62-year-old man presents to your dental office for routine treatment. His medical history suggests he has suffered from chronic alcohol abuse for many years and that he has a number of signs and symptoms caused by cirrhosis of the liver. Which of the following is most commonly related to cirrhosis due to chronic alcohol abuse?

A. Colon adenocarcinoma
B. Portal hypertension
C. The CREST syndrome
D. Metabolic acidosis
E. Malignant melanoma

59. Alcohol abuse is believed to cause metabolic and morphologic abnormalities due to the formation of:

A. acetaldehyde.
B. pyruvic acid.
C. glucose.
D. amyloid.
E. lipofuscin.

60. Radon gas is:

A. a highly reactive gas that binds hemoglobin, rapidly leading to asphyxiation.
B. an inert gas that is metabolized in the liver to carbon tetrachloride, rapidly inducing extensive liver necrosis.
C. a highly reactive gas that quickly leads to kidney necrosis at any concentration.
D. an inert gas that does not affect the health of individuals at any level.
E. a radioactive derivative of uranium present in soil.

61. A 36-year-old woman was recently diagnosed with severe epithelial dysplasia of her uterine cervix. Koilocytes were identified in the biopsy specimen. Which microorganism is responsible for these findings?

A. Herpes simplex virus, type II
B. Human papilloma virus, type 2
C. Human papilloma virus, type 11
D. Human papilloma virus, type 18
E. Herpes simplex virus, type VIII

62. A 23-year-old male presented with swelling of the left posterior cheek with a central fistulous tract exuding pus. Pressure to the inflamed area yields more pus together with small yellow firm nodules. Your clinical diagnosis is:

A. actinomycosis.
B. disseminated histoplasmosis.
C. mucormycosis.
D. aspergilloma.
E. infectious mononucleosis.

63. A 36-year-old woman has a very painful vesiculo-ulcerative rash that forms a 3-inch-wide band extending from the midline of her back to the midline of her chest below the sternum on the right side of her body. Her medical history includes various childhood infections, one of which included skin blisters and ulcers that were very itchy. At this point she is most probably suffering from:

A. infectious mononucleosis.
B. primary syphilis.
C. secondary syphilis.
D. actinomycosis.
E. herpes zoster.

64. Epstein-Barr virus has been implicated in which of the following diseases?

A. Burkitt lymphoma
B. Cervical carcinoma
C. Sjogren's syndrome
D. Verrucous carcinoma
E. Scarlet fever

65. The most common type of candidiasis that occurs in cases of immunosuppression is:

A. angular cheilitis.
B. median rhomboid glossitis.
C. chronic hyperplastic of the anterior buccal mucosa.
D. acute pseudomembranous.
E. denture stomatitis.

66. A 10-year-old boy develops swollen, erythematous soft palate, pharynx and tonsils, a fever, and after several days, a white coating on the surface of his tongue that covers all but enlarged fungiform papillae. His pediatrician decides to treat the boy with penicillin to prevent:

A. further spread of an already dangerous mucormycosis infection.
B. developing herpetic neuralgia when he is older.
C. a possible complication of rheumatic fever.
D. spread of candidiasis into the lungs.
E. developing disseminated histoplasmosis.

67. Which of the following diseases gives rise to aneurysmal changes to the aortic root affecting the aortic valve and coronary arteries?

A. Actinomycosis
B. Infectious mononucleosis
C. Cytomegalovirus infection
D. Scarlet fever
E. Tertiary syphilis

68. A 58-year-old woman with poorly controlled diabetes and in poor general health, develops an ulcer in the left posterior maxillary vestibule that exposes dark, black colored necrotic material. Much of the lateral wall of the maxillary sinus is destroyed. A biopsy reveals organisms in and around small blood vessels leading to ischemic necrosis. The woman most likely has:

A. allergic fungal sinusitis.
B. mucormycosis.
C. secondary syphilis.
D. actinomycosis.
E. chronic hyperplastic candidiasis.

69. In children, a symptomatic primary infection with herpes simplex virus, type I, typically presents as:

A. acute herpetic gingivostomatitis.
B. chickenpox.
C. shingles.
D. herpes labialis.
E. herpes zoster.

70. A 17-year-old male developed fever, pharyngitis, cervical lymphadenopathy and had palatal petechiae. The lymphadenopathy persisted. His physician made the diagnosis and told the boy to refrain from sports or heavy exertion to prevent splenic rupture. The boy most likely has an infection with which of the following microorganisms?

A. *Mycobacteria tuberculosis*
B. Cytomegalovirus
C. Epstein-Barr virus
D. *Histoplasma capsulatum*
E. *Candida albicans*