Temple University School of Medicine
Department of Pathology and Laboratory Medicine
Pathology (D305) Lecture Examination I
September 24, 2007

IMPORTANT: Read the following instructions.

1. Fill in your name and the last four digits of your Temple identification number on your answer sheet and darken the corresponding circles.

2. There are 50 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.

3. Use a number two pencil to mark your answers on your answer sheet. Mark your answer right after you have chosen one. There is no extra time at the end of the examination. The examination time is one hour.

4. 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.

5. Students are not allowed to bring electronic devices or other miscellaneous items to the examination.

6. Proctors are not allowed to explain questions during examinations.

1. Which of the following cells can undergo simultaneous hypertrophy and hyperplasia?
   (1) myocardial cells, (2) smooth muscle cells, (3) skeletal muscle cells, (4) brain neurons, (5) prostate glandular cells

   A. (1), (2), and (3) only
   B. (1) and (4) only
   C. (2) and (5) only
   D. (3) and (4) only
   E. (3), (4), and (5) only

2. Which of the following events in the nucleus indicates cell death?

   A. Mitosis
   B. Meiosis
   C. Multinucleated cells
   D. Multilobulated nuclei
   E. Karyolysis

3. What is the critical event occurring in injured cells that determines the injury is irreversible?

   A. Enlargement of the nucleus
   B. Increased number of polyribosomes
   C. Decreased production of ATP
   D. Breakage of cell membrane
   E. Increased production of cytoskeleton

4. How does radiation energy cause cell injury?

   A. It lyses cellular water molecules into free radicals, which damage cellular elements.
   B. It activates production of excess ATP and exhausts mitochondrial function.
   C. It stimulates synthesis of cytoskeletal proteins, resulting in accumulation of proteins.
   D. It increases cellular intake of glucose, resulting in lysosomal storage of glucose.
   E. It decreases the influx of potassium and efflux of calcium.

5. What is the most common type of metaplasia resulting from heavy cigarette smoking?

   A. Transitional cell metaplasia of cuboidal epithelium
   B. Squamous metaplasia of columnar epithelium
   C. Osseous metaplasia of fibrous connective tissue
   D. Chondroid metaplasia of bone tissue
   E. Striated muscle cell metaplasia of smooth muscle cells

6. What is the pigment present in brown atrophy?

A. Melanin
B. Lipofuscin
C. Carbon dust
D. Hemosiderin
E. Carotene

7. What is the name for those rounded, eosinophilic bodies resulting from accumulation of immunoglobulins in plasma cells observed in chronic periodontal inflammation and periapical inflammation?

A. Councilman bodies
B. Aschoff bodies
C. Civatte bodies
D. Russell bodies
E. Mallory bodies

8. What is the most common cause for metastatic calcification?

A. Tissue necrosis
B. Vitamin D deficiency
C. Avitaminosis A
D. Hyperparathyroidism
E. Atherosclerosis

9. Which of the following results from apoptosis of cells?

A. Civatte bodies
B. Verocay bodies
C. Mallory bodies
D. Intranuclear inclusion bodies
E. Nissl bodies

10. What type of necrosis is usually observed in tissues due to focal pyogenic bacterial infections?

A. Coagulative necrosis
B. Fibrinous necrosis
C. Caseous necrosis
D. Fat necrosis
E. Liquefactive necrosis

11. Rolling and tumbling of leukocytes on the surface of activated endothelial cells is mediated by:
A. selectins.
B. C3b.
C. IL-1.
D. integrins.
E. activated factor XII.

12. What type of cell characterizes granulomatous inflammation?
A. Epithelioid macrophages
B. Fibroblasts
C. Lymphocytes
D. Eosinophils
E. Neutrophils

13. Binding of chemotactic factors to receptors on the surface of neutrophils causes chemotaxis and:
A. stasis of blood flow.
B. margination.
C. diapedesis.
D. rolling/tumbling.
E. leukocyte activation.

14. The complement component that mediates opsonization is:
A. C1.
B. C3a.
C. C3b.
D. C5a.
E. C5b-9.

15. Aspirin affects the inflammatory response principally by inhibiting:
A. lipoxygenase, thereby decreasing leukotriene production.
B. cyclooxygenase, thereby decreasing prostaglandin production.
C. plasmin, thereby decreasing production of fibrin split products.
D. C3b, thereby inhibiting formation of the membrane attack complex.
E. kallikrein, thereby inhibiting formation of bradykinin.

16. The swelling of tissues in acute inflammation is caused principally by:
A. proliferation of fibroblasts.
B. an exudate.
C. a transudate.
D. scar.
E. proliferation of lymphocytes.

17. The clotting system is one of several plasma protease systems that can generate chemical mediators of inflammation. Which of the following molecules is/are a common starting point that directly activates two of the plasma protease systems?
A. Factor VII
B. Factor VIII
C. Factor XII
D. Fibrinogen
E. Fibrin split products

18. A hallmark of chronic inflammation is:
A. a large buildup of neutrophils.
B. local tissue destruction.
C. pus.
D. complete resolution.
E. rapid emigration of very large numbers of basophils from the bloodstream.

19. Which of the following molecules plays a direct role in the non-oxygen dependent mechanism of bacterial killing in phagocytic cells?
A. OH (the hydroxyl free radical)
B. Bacterial permeability-increasing protein
C. Superoxide free radical
D. Substance P
E. Serotonin

20. A 64-year-old man has a myocardial infarct. How would the wound healing process best be described?
A. Healing with scar formation complete by 7-8 days.
B. Healing without formation of granulation tissue.
C. Healing without involvement of myofibroblasts.
D. Healing by first intention (primary union).
E. Healing by second intention (secondary union).

21. Multinucleated giant cells are most characteristic of which of the following types of inflammation?
A. Suppurative inflammation
B. Abscess rich in neutrophils and pyogenic bacteria
C. Purulent inflammation within a dental pulp
D. Fibrinous inflammation of the peritoneal cavity
E. Granulomatous inflammation associated with a foreign body.

22. The principal cells making up granulation tissue are:
A. mast cells and basophils.
B. fibroblasts and macrophages.
C. neutrophils, and lymphocytes differentiating into plasma cells.
D. epithelioid macrophages and multinucleated giant cells.
E. fibroblasts, and endothelial cells forming new blood vessels.

23. What type of inflammation does the organism *Mycobacterium tuberculosis* typically cause in the lung?
A. Suppurative inflammation
B. Granulomatous inflammation
C. Gangrene
D. Purulent inflammation
E. Granulation tissue

24. Which of the following chemical mediators of inflammation is a cytokine?
A. Prostaglandin D_2
B. Leukotriene B_4
C. Platelet activating factor
D. Tumor necrosis factor (TNF)
E. Nitric oxide

25. A mixture of a patient's neutrophils and platelets produced an inhibitor of leukocyte recruitment and other aspects of inflammation. Production of this inhibitor appeared to require transcellular biosynthesis. This substance is most likely:
A. a lipoxin.
B. thromboxane A_4.
C. complement 3a.
D. vascular endothelial growth factor (VEGF).
E. complement 5a.

26. In the surgery clinic, following a small skin biopsy, the wound is closed with sutures. At the end of one month of healing of this wound one would expect:
A. the epidermis just beginning to migrate over the wound.
B. neutrophils just beginning to migrate into the area of tissue damage.
C. granulation tissue filling the incision with neovascularization maximal.
D. many fibroblasts and active collagen synthesis, with vascularity much in decline.
E. a dense fibrous scar with minimal vascularity, some fibroblasts and no inflammatory cells.

27. Which of the following mediators of inflammation is a principal cause of pain?
A. Histamine
B. Nitric oxide
C. IL-1
D. Prostaglandins
E. Leukotrienes

28. A delay in wound healing caused by inadequate collagen crosslinking is due to which of the following?
A. fragments of amalgam or wood in the wound site.
B. infection at the site.
C. a one week prescription of glucocorticoids.
D. prolonged lack of vitamin C in the diet.
E. lack of vitamin A in the diet.

29. Wound contraction is mediated directly by which cell type?
A. Mast cells
B. Eosinophils
C. Smooth muscle cells
D. Macrophages
E. Myofibroblasts

30. Chronic granulomatous disease is the result of a defect in which of the following enzymes?
A. Lysozyme
B. Myeloperoxidase
C. Superoxide dismutase
D. NADPH oxidase
E. Collagenase

31. A chronic alcoholic develops liver cirrhosis and a distended abdomen due to accumulation of watery fluid in the abdominal cavity. This phenomenon of accumulation of fluid in the abdominal (peritoneal) cavity is called:

A. Anasarca
B. Hydrothorax
C. Hydrocele
D. Ascites
E. Hydropericardium

32. What is the major pathogenic mechanism for accumulation of fluid in the peritoneal cavity of a patient with liver cirrhosis?

A. Increased hydrostatic pressure in blood vessels
B. Increased plasma osmotic pressure
C. Lymphatic obstruction
D. Sodium and water retention
E. Increased vascular permeability

33. Which of the following pathologic conditions does melena indicate a patient may have?

A. Malignant melanoma
B. Tuberculosis
C. Ulcerative colitis
D. Olfactory neuroblastoma
E. Pneumonia

34. Which of the following is the most likely cause of "nutmeg liver"?

A. Chronic alcoholism
B. Hepatitis B virus infection
C. Right-sided heart failure
D. Protein deficiency
E. Obstruction of portal circulation

35. Which of the following is most likely caused by vitamin C deficiency?

A. Petechiae on the gingiva
B. Ecchymoses on the eyelids and lips
C. Purpura of the skin and oral mucosa
D. Hematoma in the tongue
E. Bruise on the hand

36. Which of the following is the most important and most frequent predisposing condition for thrombosis in an artery?

A. Artherosclerosis
B. Terminal stage of cancer
C. Stasis of blood flow in pregnant women
D. Genetic mutation of coagulation factor V
E. Turbulence of blood flow in aneurysms

37. In which of the following do lines of Zhan appear most prominent?

A. Venous thrombus
B. Postmortem clot
C. Vegetations
D. Hematoma
E. Arterial thrombus

38. Which of the following produced by the endothelium can dissolve a thrombus?

A. Endothelin
B. Von Willebrand factor
C. Thromboplastin
D. Prostacyclin
E. Tissue plasminogen activator

39. Which type of necrosis occurs in the brain when a cerebral artery is occluded by a thrombus?

A. Coagulative necrosis
B. Liquefactive necrosis
C. Caseous necrosis
D. Fibrinous necrosis
E. Gangrenous necrosis

40. Where do most thromboemboli in the lung derive from?

A. Mural thrombus in the left ventricle
B. Venous thrombus in the lower extremities
C. Occlusive thrombus in the coronary artery
D. Vegetations on the mitral valve
E. Mural thrombus in the abdominal aortic aneurysm

41. A young family has two boys and two girls. The two boys and one girl developed hypercholesterolemia, along with their mother. The father's cholesterol level is within normal limit. What is the chance for the other (baby) girl to have hypercholesterolemia?

A. 100%
B. 75%
C. 50%
D. 25%
E. 0%

42. In which pathologic condition does aortic dissection occur most often?

A. Tay-Sachs disease
B. Hunter syndrome
C. Ehlers-Danlos syndrome
D. Pompe disease
E. Marfan syndrome

43. Which of the following is characterized by muscle cramps after exercise and failure of exercise to induce an elevation in blood lactate level?

A. McArdle disease
B. Von Recklinghausen disease
C. Angelman syndrome
D. Niemann-Pick diasease
E. Hurler syndrome

44. In Tay-Sachs disease, the undigested Gm2 ganglioside is stored in which organelle?

A. Mitochondria
B. Smooth endoplasmic reticulum
C. Rough endoplasmic reticulum
D. Lysosomes
E. The Golgi apparatus

45. What is the most significant oral finding in patients with Ehler-Danlos syndrome?

A. Rampant dental caries
B. Xerostomia
C. Multiple impacted teeth
D. Periodontal disease with mobile teeth
E. Multiple odontomas and associated cysts

46. A female patient with Down syndrome. How many Barr bodies in each somatic cell nucleus does she have?

47. XX -21

A. 0
B. 1
C. 2
D. 3
E. 4

47. What characterizes DiGeorge syndrome?

A. Severe mental retardation
B. High risk of coronary atherosclerosis
C. T-cell immunodeficiency and hypocalcemia
D. Long arms and long legs
E. Large testicles

48. What is the most common cause of inherited mental retardation?

A. Tay-Sachs disease
B. Down syndrome
C. Fragile X syndrome
D. Prader-Willi syndrome
E. Turner syndrome

49. What is the transmission pattern of fragile X syndrome?

A. Autosomal dominant with incomplete penetrance
B. Autosomal recessive with mosaicism
C. X-linked dominant with incomplete expressivity
D. X-linked recessive with successive amplification
E. Autosomal co-dominant with genomic imprint

50. What is the most characteristic feature of Klinfelter syndrome?

A. Short stature
B. Testicular atrophy
C. Amenorrhea
D. Mental retardation
E. Vision impairment