YR 2 PATHOLOGY UNIT EXAMINATION 1 -- October 13, 1997.

CHOOSE THE SINGLE BEST ANSWER FOR QUESTIONS 1 - 100.

QUESTIONS 1 - 16 ARE RELATED TO THE PHOTOGRAPHS PROVIDED.

Match each statement 1-5 with its corresponding histopathologic lesion from those represented in A-E below. Use each alternative once only.

A. Figure 1

B. Figure 2

C. Figure 3

D. Figure 4

E. Figure 5

1. Characteristic of Staphylococcus aureus

2. Characteristic of Mycobacterium tuberculosis

3. Characteristic of acute pancreatitis

4. Characteristic of occlusive thromboembolism

5. Characteristic of an immune/autoimmune disease

Match each statement 6 - 11, with its corresponding photomicrograph A-E below. Use each alternative once only.

A. Figure 6

B. Figure 7

C. Figure 8

D. Figure 9

E. Figure 10

6. A consequence of prior remote ischemic cell death

7. A consequence of uptake and breakdown of protein by cells

8. Derived partly by excess basal lamina (basement membrane) material

9. Possibly derived from immunoglobulin monoclonal light chain and causes a protein leak

10. Results from alcoholism

11. What is the MOST LIKELY explanation for the pulmonary lesion denoted by the arrow in **Figure 11**?

    A. "Healed" granuloma with hyalinized collagen

    B. Pompe's disease

    C. Viral pneumonia

    D. Pulonary infarct

    E. Infection with anaerobic bacteria

12. What is the best diagnosis for **Figure 12**? (arrow denotes alveolar space)

    A. Chronic inflammation

    B. Congestive heart failure

    C. Pulmonary infarct

    D. Amyloidosis

    E. Gaucher's disease

13. What is the best diagnosis for **Figure 13**?

A. Bacterial infection

B. Prolonged ischemia

C. Viral infection

D. Amyloidosis

E. Hypertension

14. What is the best diagnosis for **Figure 14**?

A. Viral infection

B. Caseous necrosis

C. Chronic silicosis

D. Pulmonary infarct

E. Bacterial infection

15. What is the most likely diagnosis/explanation for **Figure 15**?

A. Bacterial infection

B. Abnormal hydrostatic pressure

C. Hyalinization

D. Abnormal osmotic pressure

E. Abnormal secretory activity by cells present in section

16. What is the best diagnosis for **Figure 16**?

A. Hyperplasia

B. Liquefactive necrosis

C. Hypertrophy

D. Hemochromatosis

E. Mallory hyalin

17. Which of the following is identified in tissue by green birefringence following congo red staining:

A. Glycogen

B. Amyloid

C. Lipid

D. Iron

E. Lipofuscin

18. Dystrophic calcification is seen:

A. With excess parathormone secreted by parathyroid glands.

B. With bone destruction by seeding with a cancer

C. From excess vitamin D administration

D. With mobilization of calcium from bone by a cancer secreting a polypeptide that mimics parathormone activity.

E. As calcific intimal plaques in aortic atherosclerosis.

19. The FALSE statement regarding Marfans syndrome is:

A. It is an autosomal dominantly inherited disease.

B. Affected individuals are short.

C. There is a predisposition to aortic dissection.

D. Affected individuals may develop floppy mitral valves

E. The occular lens is prone to dislocate.

20. An increased susceptibility to the toxic effects of carbon tetrachloride exposure of a chronic alcoholic who has been prescribed the sedative Phenobarbital is best attributed to an intrahepatic increase of:

A. Rough endoplasmic reticulum

B. Mitochondria

C. Polyribosomes

D. Primary lysosomes

E. Smooth endoplasmic reticulum

21. In idiopathic hemochromatosis, which is LEAST likely to occur:

A. Hepatic fatty change

B. Hepatic parenchymal deposits of hemosiderin

C. Hepatic cirrhosis

D. Diabetes mellitus

E. Hepatic cancer

22. At an ultrastructural (electronmicroscopic) level, the intracellular accumulation that is filamentous is:

A. Glycogen

B. Hemosiderin

C. Mallory bodies

D. Bilirubin

E. Amyloid

23. In alcohol (ethanol) induced liver injury, fat accumulation in hepatocytes is contributed by each of the following EXCEPT:

A. Increased synthesis of triglycerides

B. Decreased fatty acid synthesis from acetate

C. Increased mobilization and hepatic delivery of free fatty acid from peripheral tissues.

D. Decreased mitochondrial oxidation of free fatty acid to ketone

E. Decreased export of lipoprotein from hepatocytes.

24. Each of the following is a feature of apoptosis but not of necrosis EXCEPT:

A. May occur as part of normal physiology or development.

B. May involve activation of the ICE (Interleukin-l$ converting enzyme) gene.

C. Specific cleavage of nuclear DNA at linker regions between nucleosides.

D. Characteristically involves autolysis by lysosomal enzyme release and activation.

E. May be initiated by the binding of TNFRl (tissue necrosis factor receptor)with its ligand.

25. Ferric iron is converted to ferrous ion by:

A. The Fenton reaction

B. Ionizing radiation

C. The Prussian blue reaction

D. The Haber-Weiss reaction

E. The DOPA reaction

26. Which of the following is LEAST likely to constitute liver parenchymal injury via free radicals as a major mechanism:

A. Hemochromatosis

B. Carbon tetrachloride poisoning

C. Acute ingestion of a large quantity of ethanol

D. Acute inflammation with abscess formation

E. Acute exposure to ionizing radiation

27. Which of the following does NOT by itself, signify cell necrosis:

A. Autolysis

B. Karyorrhexis

C. Nuclear pyknosis

D. Karyolysis

E. Polyribosomal disaggregation

28. Sublethal (reversible) hypoxic cellular injury is characterized by:

A. Plasmalemmal gaps

B. Autolysis

C. Lactic acid generation

D. Dystrophic (mitochondrial) calcification

E. Karyorrhexis

29. The primary (initial) cell derived mediator of septic shock:

A. LTC4, D4, E4

B. PGI2

C. TXA2

D. TNF

E. Bradykinin

30. Not a feature of acute phase reactions:

A. Dermal vasoconstriction

B. Hyperphagia (increased appetite)

C. Anemia

D. Increased protein catabolism

E. Synthesis of serum amyloid A protein

31. Wound contraction is mediated by:

A. Monocytes/macrophages

B. Polymorphonuclear neutrophilic leukocytes

C. Smooth muscle cells

D. Myofibroblasts

E. Platelets

32. Aspirin acts as an anti-inflammatory agent by:

A. Decreasing perfusion of blood through affected areas.

B. Inhibiting the cyclooxygenase pathway of arachidonate metabolism.

C. Causing lysis of bacteria.

D. Decreasing peripheral white blood cell count.

E. Promoting platelet aggregation.

33. The tensile strength of a wound is primarily related to which constituent of the extracellular matrix?

A. Laminin

B. Thrombospondin

C. Collagen

D. Fibronectin

E. Heparan sulfate

34. Granulomatous inflammation is characterized by all of the following EXCEPT:

A. Aggregates of epithelioid cells

B. The development of type I (anaphylactic type) hypersensitivity

C. A response to particulate agents

D. The presence of multinucleated giant cells

E. A rim of fibrous tissue

35. Which of the following statements about Hemophilus influenzae is most likely CORRECT?

A. It is gram positive

B. It secretes a potent exotoxin which damages cardiac myocytes

C. Infections may cause airway obstruction

D. Antibodies to neuraminidase prevent or blunt reinfection

E. Infections cause granulomatous inflammation

36. Which of the following statements about measles is least likely CORRECT?

A. Clinically detectable evidence of oropharyngeal infection precedes the exanthem

B. Infection of the central nervous system occurs

C. Vitamin A deficient individuals develop more serious infections

D. The exanthem is due to infection of cutaneous keratinocytes by virus

E. The catarrhal stage precedes the exanthem stage

37. Which of the following statements about M.tuberculosis is INCORRECT?

A. It is aerobic

B. It grows slowly in culture (compared to other bacteria)

C. It is nonmotile

D. It is able to inhibit the fusion of lysosomes and phagosomes in infected cells

E. It secretes an exotoxin which degrades extracellular matrix glycoproteins.

38. A positive PPD test most reliably indicates which of the following?

A. Histologically, the site of injection would show edema, fibrin deposition and mononuclear cell infiltrates.

B. Acid fact bacilli are present at the injection site

C. The patient has cleared their infection

D. The patient has an active infection

39. Which of the following statements about atypical mycobacteria is INCORRECT?

A. They may cause pulmonary infections

B. Infection is most often acquired from a human source

C. Culture isolates may represent saprophytes or contaminants

D. They may cause severe infections in AIDs patients

E. Their colonies (in culture) may contain pigment

40. Which of the following statements about polymorphonuclear leukocytes (PMN's) is INCORRECT?

A. They are derived from the bone marrow

B. They contain specialized lysosomal granules

C. They are phagocytic

D. They proliferate (undergo mitosis) at sites of inflammation

E. They contain a "segmented" nucleus with 2-5 lobes

41. What cell type initiates the syndrome of septic shock by CD 14 receptor interaction with the lipopolysaccharide-serum binding protein complex?

A. Polymorphonuclear leukocyte (PMN)

B. Endothelial cell

C. Monocyte/macrophage

D. Sympathetic ganglion cell

E. Hypothalamic neuron

42. You examine an H & E stained section of tissue which shows widespread necrosis with loss of cytoplasmic detail but lacks significant inflammatory infiltration. Which of the following organisms is the most likely pathogen?

A. *Clostridium perfringens*

B. *Influenza virus*

C. *E. coli*

D. *Hemophilus influenzae*

E. *Salmonella typhi*

43. A pathologist tells you there is fibrin in a specimen you submitted. Which of the following is the MOST LIKELY specimen?

A. A myocardial scar

B. A lung biopsy with chronic silicosis

C. A kidney from a patient with long standing "benign" hypertension of many years duration

D. A granuloma

E. A kidney from a patient with malignant hypertension

44. Histologic cell/tissue alterations associated with viral infections least likely include which of the following?

A. Cell proliferation

B. Purulent exudates

C. Cytoplasmic inclusions

D. Nuclear inclusions

E. Apoptosis

45. Which of the following is least likely in granulomatous inflammation caused by secondary (re-activated) infection with Mycobacterium tuberculosis?

A. Lymphocytes

B. Complete resolution of tissue architecture following eradication of the pathogen

C. Caseous necrosis

D. Activated macrophages

E. Intracellular organisms

46. Pathologic findings in a patient with uncomplicated influenza least likely includes which of the following?

A. Viral inclusions

B. Denuded upper respiratory tract epithelium

C. Mononuclear infiltration of upper respiratory mucosa

D. Positive viral culture from upper respiratory secretions

E. Normal peripheral polymorphonuclear leukocyte cell count

47. The host response to infection with influenza includes/causes each of the following EXCEPT:

A. Production of interferon by macrophages

B. Killing of virus-infected cells by cytotoxic T lymphocytes

C. Respiratory tract obstruction

D. Production of antibodies to hemagglutinin

E. Fever

48. Non-inflammatory edema may occur under each of the following conditions EXCEPT:

A. Arterial hypertension

B. Renal failure

C. Cirrhosis of the liver

D. Venous thrombosis

E. Increased intravascular hydrostatic pressure

49. Which of the following statements regarding edema and/or its pathophysiology is FALSE?

A. A decrease in oncotic pressure results in systemic edema

B. Edema of the brain is potentially life threatening

C. Colloid oncotic pressure gradually falls from the arterial to the venular end of a capillary

D. Lymphatic obstruction usually causes localized edema

E. The primary mechanism of dependent edema is increased hydrostatic pressure

50. All of the following are TRUE statements EXCEPT:

A. Passive congestion of the liver results in a characteristic groos appearance called "nutmeg" liver

B. The clinical signfiicance of hemorrhage is simply related to the volume and rate of blood loss

C. Congenital defects in coagulation can cause clinically significant hemorrhage

D. Small amounts of hemorrhage can cause significant clinical problems

E. Edema and congestion often coexist

51. All of the following are capable of producing shock EXCEPT:

A. Endotoxin-producing gram negative bacteria

B. Massive myocardial infarct

C. Prolonged vomiting

D. Massive pulmonary embolus

E. Cirrhosis of the liver

52. Regarding shock, which of the following statements is TRUE?

A. The severity of hypotension is the most important prognostic factor in predicting the clinical outcome of an episode of shock

B. Developing tissue acidosis does not contribute to decreasing cardiac output characteristic of the latter stages of shock

C. Lipopolysaccharide causes shock through direct and indirect mechanisms

D. The body lacks physiologic capacity to respond to shock

E. Lung tissue will remain normal in cases of septic shock

53. Which of the following statements regarding endothelium is NOT CORRECT?

A. Endothelium exerts prothrombotic effects

B. Endothelium synthesizes a substance which specifically inhibits the action of t-PA

C. Congenital diseases affecting substances made by the endothelium result in bleeding disorders

D. Endothelium exerts antithrombotic effects

E. Endothelium is an important source of histamine and serotonin which are important in clotting

54. True statements regarding platelets include all of the following EXCEPT:

A. Alpha granules are a source of fibrinogen, fibronectin, and other important cofactors for coagulation

B. Platelets normally adhere to endothelium

C. Important stimuli for platelet aggregation include ADP, thromboxane A2, and thrombin

D. The phospholipid complex present on the surface of activated platelets is important in containing hemostasis to the local site of injury

E. von Willebrand's factor is necessary for platelet binding to subendothelial collagen

55. All of the following statements are TRUE EXCEPT:

A. Clots that persist for a few days usually spontaneously dissolve

B. Thrombi can become emboli

C. A left ventricular mural thrombus can be a source of arterial emboli

D. Organization of a clot refers to ingrowth of granulation tissue and mesenchymal cells into a thrombus

E. Fibrinolysis is important in dissolution of a thrombus

56. All of the following statements regarding pulmonary emboli are TRUE EXCEPT:

A. Pulmonary emboli can cause immediate death

B. Most pulmonary emboli cause clinical symptoms

C. Most pulmonary emboli arise from deep leg and pelvic veins

D. Occlusion of medium sized pulmonary vessels is more likely to cause hemorrhage than infarction (in the absence of heart failure or underlying pulmonary disease)

E. Pulmonary embolism is a major clinical problem in the U.S.

57. Sub-lethal (reversible) hypoxic cellular injury is characterized by:

A. Nuclear pyknosis

B. Cytocavitary dilatation

C. Mitochondrial calcification

D. Plasmalemmal gaps

E. Autolysis

MATCHING ITEMS

In each of the following groups there are two lists. Mark on the answer sheet in the line corresponding to each question number in the lower list (58-100) the letter of the related item of the upper list.

Match each distribution of amyloid deposits 58-62 with its appropriate clinical condition from those provided A-E. Use each alternative once, more than once or not at all.

A. Alzheimers disease

B. Normal aging (without dementia)

C. Rheumatoid arthritis

D. Calcitonin secreting tumor

E. Prolonged dialysis for renal failure

58. Parenchymal organs (liver, spleen, kidney, adrenals, blood vessels).

59. Cerebral cortex (in plaques) and cerebral blood vessels.

60. Tissues around joints, carpal tunnel and gastro-intestinal tract.

61. Thyroid gland only.

62. Islets of Langerhans in the pancreas.

Match each statement 63-67 with the process it best corresponds to from the alternatives A-E. Use each alternative once, more than once or not at all.

A. Hypertrophy

B. Metaplasia

C. Hyperplasia

D. Atrophy

E. Cancer induction (neoplasia)

63. A typical response of an endocrine organ to increased blood levels of its trophic hormone.

64. A typical response of the biceps to exercising by push-ups.

65. A typical response of parenchymal tissue to a decreased blood flow.

66. A response of epithelium subjected to an irritant and enacted via genetic reprogramming of the basal (generative) cell layer but still under homeostatic (physiologic) control.

67. An undesirable consequence post-metaplasia.

Match each statement 68-72 with its corresponding pigment from those provided A-E. Use each alternative once, more than once or not at all.

A. Melanin

B. Bilirubin

C. Lipofuscin

D. Hemosiderin

E. Coal dust

68. Causes kernicterus.

69. Discolors healthy lungs in city dwellers.

70. Associated with brown atrophy.

71. Derived from tyrosine.

72. Accumulates in lungs of patients with chronic heart failure.

Match each statement 73-77 with its appropriate intracellular constituent from those provided A-K. Use each alternative once, more than once or not at all.

A. Euchromatin

B. Primary lysosomes

C. Mitochondria

D. Heterochromatin

E. Smooth endoplasmic reticulum

F. Nucleolus

G. Secondary lysosomes

H. Rough endoplasmic reticulum

I. Golgi apparatus

J. Lipofuscin

K. Polyribosomes

73. The location of steroid hormone synthesis

74. The location of the Krebs cycle.

75. The location of storage of acid hydrolases.

76. That which represents active DNA.

77. That which represents oxidized (indigestible) lipid.

Match each disease 78-82 with the defect in leukocyte function from those listed A-E. Use each defect once only.

A. Neutropenia

B. Phagocytosis

C. Receptor for selectins

D. Defective oxygen dependent bacterial killing

E. Membrane component of NADPH oxidase

78. Chronic granulomatous disease

79. Chediak - Higashi syndrome

80. Leukocyte adhesion deficiency 2

81. Myeloperoxidase deficiency

82. Diabetes

Match each mediator 83-85 with its function in the inflammatory response from those listed A-F. Each alternative may be used once, more than once, or not at all.

A. Fever

B. Pain

C. Increased vascular permeability

D. Leukocyte chemotaxis

E. Tissue damage

F. Vasodilation

83. Leukotriene B_4

84. Histamine

85. IL-1

Match each inflammatory cell with a feature from those listed A-E. Use each feature once only.

A. Granules contain major basic protein.

B. Continually recirculate

C. Two types of cytoplasmic granules

D. Derived from monocyte/macrophage

E. Abundant rough endoplasmic reticulum

86. Polymorphonuclear neutrophilic leukocyte

87. Epithelioid cell

88. Eosinophilic leukocyte

89. Plasma cell

90. Lymphocyte

Match each statement with its characteristic vasculature from those provided A-E. Use each item once only.

A. Necrosis of endothelium following severe burns

B. Possess anchoring filaments

C. Endothelial cell cylinder.

D. Capable of serotonin mediated contraction.

E. Exhibit delayed, prolonged leakage frominterendothelial gaps.

91. Lymphatic capillary

92. Capillary sprout

93. Arteriole, capillary and venule

94. Capillary and venule

95. Venule

Match the toxin effect (A-E) to the correct pathogen 96-100.

A. Blocks release of inhibitory neurotransmitters

B. Increases intracellular cAMP

C. Colonic mucosa covered with "psuedomembranes" of inflammatory cells/exudate

D. Impairs ribosomal protein synthesis

E. Inhibits pre-synaptic release of acetyl choline

96. Clostridium difficile

97. Clostridium botulinum

98. Vibrio cholerae

99. Corynebacterium diptheriae

100. Clostridium tetani

What cell type initiates the syndrome of septic shock by directly interacting with the lipopolysaccharide-serum binding protein complex?

A. polymorphonuclear leukocyte (PMN)
B. basophil
C. monocyte/macrophage
D. sympathetic ganglion cell
E. hypothalamic neuron

Ans. C correct

Which of the following statements about polymorphonuclear leukocytes (PMN s) is incorrect?

A. they are derived from the bone marrow
B. they contain specialized lysosomal granules
C. they are phagocytic
D. they proliferate (undergo mitosis) at sites of inflammation
E. they contain a segmented nucleus with 2-5 lobes

Ans. D correct

What is the best diagnosis?
(myocardial hypertrophy)

A. hyperplasia
B. active viral infection
C. hypertrophy
D. hemochromatosis
E. coagulation necrosis

Ans. C correct

What is the best diagnosis?
(bronchopneumonia)

A. viral infection
B. tuberculosis
C. chronic silicosis
D. pulmonary infarct
E. bacterial infection

Ans. E correct

What is the best diagnosis?
(AMI)

A. abscess
B. prolonged ischemia
C. viral infection
D. amyloidosis
E. hypertension

Ans. B correct

What is the best diagnosis? (arrow denotes alveolar space)
(viral pneumonia)

A. chronic inflammation
B. congestive heart failure
C. pulmonary infarct
D. amyloidosis
E. Gaucher s disease

Ans. A correct

What is the most likely explanation for the pulmonary lesion (abscess)
denoted by the arrow?

A. tuberculosis
B. Pompe s disease
C. viral pneumonia
D. pulmonary embolism
E. infection with anaerobic bacteria

Ans. E correct