TIME: 40 minutes

MICROSCOPIC ANATOMY
CHEST PAIN SUPERQUIZ
NOVEMBER 21, 2003

MULTIPLE CHOICE
DIRECTIONS: Each of the numbered items or incomplete statements in this section is followed by answers or by completions of the statement. Select the ONE lettered answer or completion that is BEST in each case.

1. While examining a glass slide of the skin, you notice an unusually large number of basophils and eosinophils in the connective tissue of the dermis. In which of the following conditions are basophils and eosinophils likely to be the dominant cell types:
   A. Allergic skin disease
   B. Bacterial infection
   C. Humoral immune response
   D. Late phase of an inflammatory response
   E. Viral infection

2. Which of the following statements about peripheral blood is true:
   A. Eosinophils are more common in peripheral blood than in connective tissue
   B. Erythrocytes represent about 70% of all the formed elements of the blood
   C. Lymphocytes are the most common type of granulocyte
   D. Platelets are normally more numerous than all the types of leukocytes combined

3. Multinucleated foreign body giant cells develop from:
   A. Epithelial cells
   B. Macrophages
   C. Megakaryocytes
   D. Neutrophils
   E. Osteoclasts

4. When neutrophils engage in phagocytosis, there is an increase in the rate of oxygen consumption (the respiratory burst) that is a consequence of the production of superoxide anion radical by:
   A. Carbonic anhydrase
   B. Lysozyme
   C. Myeloperoxidase
   D. NADPH oxidase
   E. Phospholipase A₂
5. Which of the following cell types converts angiotensin I to angiotensin II, and also inactivates norepinephrine, thrombin and certain prostaglandins:
A. Endothelial cells
B. Mast cells
C. Neutrophils
D. Pericytes
E. Smooth muscle cells of the vascular wall

6. An arteriovenous shunt is a(n):
A. Alternative route to a capillary bed
B. Complete bypass of a capillary bed
C. Portal system
D. Thoroughfare channel through a capillary bed

7. Longitudinally oriented bundles of smooth muscle are a characteristic feature of the adventitia of:
A. Aorta
B. Inferior vena cava
C. Muscular arteries such as the radial artery
D. Postcapillary venules
E. Pulmonary artery

8. In which type of vessel does diapedesis (the migration of leukocytes from the blood into surrounding tissues) usually occur:
A. Arterioles
B. Fenestrated capillaries
C. Large veins
D. Postcapillary venules
E. Pre-capillary sphincters

9. Which of the following cells has receptors on its plasma membrane that are specific for the Fc portion of IgE (immunoglobulin E):
A. Basophils
B. Eosinophils
C. Neutrophils
D. Platelets
E. T lymphocytes
10. The external elastic membrane separates the:
   A. Pericytes from the endothelial cells in post-capillary venules
   B. Tunica media from the tunica adventitia in muscular arteries
   C. Adventitia from the vasa vasorum in large veins
   D. Epicardium from the myocardium in the heart

11. The surface of the valves of the heart is formed by:
   A. Dense regular connective tissue
   B. Endothelium
   C. Fibroelastic tissue
   D. Mesothelium
   E. Smooth muscle

12. The cardiac skeleton:
   A. Consists of hyaline cartilage that surrounds the orifices of the heart valves
   B. Coordinates the cardiac cycle by electrically coupling ordinary atrial & ventricular myocytes
   C. Includes the chordae tendineae and the pectinate muscles
   D. Provides attachment for the atrial and ventricular myocytes

13. Purkinje fibers are best described as:
   A. Specialized cardiac muscle cells that are smaller than atrial myocytes and have abundant adrenergic nerve terminals ending on them
   B. Specialized cardiac muscle cells that contain abundant glycogen and are the largest cells in the wall of the heart
   C. Specialized connective tissue cells that coordinate the synchrony of contraction of atrial and ventricular cardiac myocytes
   D. Specialized nerve cells that contain abundant glycogen and Nissl substance

14. In which of the following locations would you be able to most easily obtain hematopoietic marrow from an adult?
   A. Vertebral body
   B. Sternum
   C. Femoral shaft
   D. Tibial shaft
   E. Humeral shaft
15. A patient was found to have had continuous GI bleeding for some time. A blood smear, stained with brilliant cresyl blue, revealed many anucleate erythrocytes that had clumps of blue-stained material in their cytoplasm. What are these cells?
   A. Basophilic erythroblasts
   B. Polychromatophilic erythroblasts
   C. Orthochromatic erythroblasts
   D. Reticulocytes
   E. Normal mature erythrocytes

16. The peripheral blood smear of a neonate being treated for a systemic bacterial infection showed a dramatic increase in the number of cells with the following characteristics: a few azurophilic granules, many small poorly staining specific granules, and a nucleus shaped like a curved dumbbell. What are these cells?
   A. Basophilic myelocytes
   B. Mature neutrophils
   C. Monocytes
   D. Neutrophilic myelocytes
   E. Neutrophilic band cells

17. What happens to the nuclei of orthochromatic erythroblasts?
   A. They are picked up by megakaryocytes and contribute to their multiple nuclei.
   B. They are ingested and broken down by macrophages in the marrow.
   C. They travel in the blood to the spleen, where they are removed.
   D. They become pyknotic and fragment; the fragments are destroyed by the lysosomes of the developing erythrocyte.

18. What is the earliest stage of development at which the different granulocyte lines can be distinguished from one another?
   A. Myeloblast
   B. Promyelocyte
   C. Myelocyte
   D. Metamyelocyte
19. The graph shown below illustrates the relative activity of each of four sites of hematopoiesis during the 9 months of gestation. Which of the lettered sites (A, B, C or D) corresponds to hematopoiesis in the liver?

![Graph](image)

Figure 9.17. Dynamics of hematopoiesis in embryonic and fetal life.

**DIRECTIONS:** Each of the numbered items or incomplete statements in this section is negatively phrased, as indicated by a capitalized word such as NOT, LEAST, or EXCEPT. Select the ONE lettered answer or completion that is BEST in each case.

20. All the following play a significant role in the functioning of platelets EXCEPT:
   A. Actin and myosin
   B. Fibrinogen
   C. Major basic protein
   D. Thromboxane A₂
   E. Von Willebrand factor

21. Identify the FALSE statement. Azurophilic granules:
   A. Are abnormal in cases of Chediak-Higashi syndrome
   B. Are found only in granulocytes
   C. Are lysosomes
   D. Contain enzymes that can break down components of the extracellular matrix
   E. Contain myeloperoxidase in neutrophils
22. Platelets and many types of leukocytes undergo an activation process that includes enzymatic cleavage of lipids from the cell membranes and conversion of these lipids to biologically active mediators. All of the following substances are synthesized in this manner EXCEPT:
   A. Histamine
   B. Platelet-activating factor (PAF)
   C. The mixture of leukotrienes formerly known as “slow-reacting substance of anaphylaxis” or SRS-A
   D. Thromboxane A₂

23. All the following are derived from the same multipotential progenitor cell EXCEPT:
   A. Basophils
   B. Eosinophils
   C. Erythrocytes
   D. Lymphocytes
   E. Monocytes
   F. Platelets

MATCHING: These sets of matching questions consist of a list of lettered options followed by several numbered items. For each numbered item, select the ONE lettered option that is most closely associated with it. Each lettered option may be used once, more than once, or not at all.

   A. Basophil
   B. Endothelial cell
   C. Eosinophil
   D. Lymphocyte
   E. Macrophage
   F. Megakaryocyte
   G. Neutrophil
   H. Plasma cell
   I. Platelet
   J. Reticulocyte

24. Is characteristic of the early stages of an acute inflammation
25. Lacks a nucleus and has a cytoskeleton based on spectrin
26. Synthesizes von Willebrand factor and stores it in Weibel-Palade bodies
A. Band cell
B. Basophilic erythroblast
C. CFU-E
D. CFU-GEMM
E. Megakaryocyte
F. Metamyelocyte
G. Myelocyte
H. Orthochromatic erythroblast
I. Polychromatophilic erythroblast
J. Promyelocyte

27. Developmental stage that immediately follows a metamyelocyte
28. A multipotential progenitor cell