

1. Under appropriate stimulation the mature lymphocytes of the peripheral lymphoid organs undergo
  - A) Antigen-dependent effect on cell proliferation
  - B) Kinin or antibody production
  - C) Antibody production only
  - D) A and B
  - E) All of the above
2. Which of the following nondividing cells comprise the granulocytic maturation storage pool in the bone marrow?
  - A) Segmented neutrophils
  - B) Bands
  - C) Metamyelocytes
  - D) All of the above
  - E) None of the above
3. Which blood cell aids hematopoiesis by the direct transfer of iron to erythroid precursors?
  - A) Monocyte
  - B) Macrophage
  - C) Erythrocyte
  - D) Lymphocyte
  - E) None of the above
4. At what age do fat cells begin to increase in the bone marrow?
  - A) 10 years
  - B) 6 months
  - C) 4 years
  - D) 2 years
  - E) None of the above
5. The average life span of a circulating neutrophil is:
  - A) 6 to 10 hours
  - B) 6 to 10 days
  - C) 1 to 3 hours
  - D) 1 to 3 days
  - E) 24 hours
6. What is the main function of the bone marrow?
  - A) To provide oxygenated cells to the tissues
  - B) Self-renewal of stromal cells
  - C) To maintain a steady supply of mature hematopoietic cells to circulation
  - D) To regulate iron storage and transfer
  - E) None of the above

7. What is the site of erythropoietin production?
  - A) Spleen
  - B) Kidney
  - C) Liver
  - D) Bone marrow
  - E) None of the above
8. One-third of all circulating platelets are sequestered in which organ?
  - A) Bone marrow
  - B) Lymph nodes
  - C) Spleen
  - D) Thymus
  - E) Liver
9. The most appropriate site for a successful bone marrow aspiration in an adult patient would be:
  - A) Calvariae
  - B) Scapula
  - C) Iliac crest
  - D) Long bones
  - E) None of the above
10. Which would be the appropriate site for marrow studies in a young child?
  - A) Upper tibial bone
  - B) Lower tibial bone
  - C) Iliac crest
  - D) Sternum
  - E) None of the above
11. Why is a clotted marrow specimen unacceptable for hematologic smears?
  - A) Cells would not stain.
  - B) Fibrin threads would impede spreading.
  - C) Fluid would be discolored.
  - D) All of the above
  - E) None of the above
12. Hematogones are thought to be committed progenitor cells of what lineage?
  - A) Granulocytic
  - B) Platelets
  - C) Erythrocytic
  - D) Monocytic
  - E) Lymphoid

13. Which cells have the two unique biologic characteristics of self-renewal and multilineage differentiation?
- A) Pronormoblasts
  - B) Stem cells
  - C) Myeloblasts
  - D) Lymphoblast
  - E) Eosinophil
14. In adults, fat cells average about what percentage of the total volume in the vertebrae and flat bones of the pelvis?
- A) 20%
  - B) 80%
  - C) 50%
  - D) 10%
  - E) 90%
15. Under which magnification should bone marrow initially be examined?
- A)  $\times 40$
  - B)  $\times 4$
  - C)  $\times 10$
  - D)  $\times 100$
  - E) None of the above
16. Why is the bone biopsy the most reliable assessment of cellularity?
- A) A large amount of tissue is evaluated.
  - B) A small amount of tissue is evaluated.
  - C) It offers a more sterile procedure.
  - D) Marrow iron can be demonstrated with appropriate stain.
  - E) None of the above
17. How many nucleated cells must be classified in a bone marrow differential count?
- A) 50–100
  - B) 100–500
  - C) 500–1000
  - D)  $>1000$
  - E) None of the above
18. The hematopoietic system consists of which of the following?
- A) Bone marrow
  - B) Lymph node
  - C) Spleen
  - D) Liver
  - E) All of the above

19. The myeloid-to-erythroid ratio represents:
- A) The ratio of granulocytic and their precursors to nucleated erythrocytes and their precursors
  - B) The ratio of myeloid to non-nucleated erythroid cells
  - C) The ratio of myeloid to eosinophilic cells
  - D) The ratio of monocytoïd to erythroid cells
  - E) None of the above
20. In a normal adult hematopoiesis is observed primarily in which location?
- A) Liver
  - B) Spleen
  - C) Yolk sac
  - D) Bone marrow
  - E) Lymph nodes
21. The normal myeloid-to-erythroid ratio in a bone marrow aspirate from a normal adult is approximately:
- A) 1:1
  - B) 2:1
  - C) 4:1
  - D) 6:1
  - E) None of the above
22. The presence of megakaryocytes clusters and promegakaryocytes in every field of a bone marrow differential is indicative of:
- A) Megakaryocytic hypoplasia
  - B) Thrombocytopenia
  - C) Megakaryocytic hyperplasia
  - D) Christmas disease
  - E) None of the above
23. An increase in erythroid cellularity without disruption of the normal myeloid-to-erythroid ratio is termed:
- A) Erythrocytic hypoplasia
  - B) Erythrocytic hyperplasia
  - C) Granulocytic hyperplasia
  - D) Granulocytic hypoplasia
  - E) None of the above
24. How is iron stored in the bone marrow?
- A) Hemosiderin
  - B) Transferrin
  - C) Ferritin
  - D) Erythropoietin
  - E) None of the above

25. On Wright's stain hemosiderin will stain as:
- A) Brownish-blue
  - B) Golden-yellow
  - C) Reddish-orange
  - D) Purple
  - E) None of the above
26. Which of the following granulocytic cells are included in the proliferating pool of the bone marrow?
- A) Myeloblasts
  - B) Promyelocytes
  - C) Myelocytes
  - D) All of the above
  - E) None of the above
27. The EDTA chelation method is used for iron studies in bone biopsy. What purpose does it serve?
- A) Binds hemosiderin
  - B) Binds magnesium
  - C) Binds calcium
  - D) Binds ferritin
  - E) None of the above
28. Marrow erythroblasts containing bright-blue iron specks when stained are called:
- A) Sideroblasts
  - B) Siderocytes
  - C) Histiocytes
  - D) Erythrocytes
  - E) None of the above
29. What bone marrow interpretation would be assessed to a complete count that showed neutrophilia with an increase in bone marrow cellularity, and increased myeloid-to-erythroid ratio?
- A) Granulocytic hypoplasia
  - B) Marrow hypoplasia
  - C) Granulocytic hyperplasia
  - D) Marrow hyperplasia
  - E) None of the above

## **Answer Key**

1. C
2. D
3. B
4. C
5. A
6. C
7. B
8. C
9. C
10. A
11. B
12. E
13. B
14. C
15. C
16. A
17. C
18. E
19. A
20. D
21. C
22. C
23. B
24. A
25. A
26. D
27. C
28. A
29. C