Hematolymphatic System

Midterm Exam Test Bank

Total Questions: 42

June 11, 2026

Hematolymphatic Test Bank

1. Which of the following is not a feature associated with hemolytic anemia?
A. Increased reticulocyte count
B. Increased lactate dehydrogenase levels
C. Splenomegaly
D. Increased red blood cell lifespan
Answer: Increased red blood cell lifespan

2. A patient presents with low hemoglobin and hematocrit levels and a very low red blood cell count. The peripheral reticulocyte percentage is 0.5%. Which of the following is the most likely cause?
A. Acute blood loss
B. Iron deficiency anemia
C. End-stage kidney disease
D. Hereditary spherocytosis
Answer: End-stage kidney disease

3. A patient has low hemoglobin and hematocrit. A peripheral smear shows irregular cells with an MCV of 117 fL. Which is the most likely cause?
A. Iron deficiency
B. Folate deficiency
C. Deficiency of intrinsic factor (pernicious anemia)
D. Anemia of chronic disease
Answer: Deficiency of intrinsic factor (pernicious anemia)

4. Which of the following is not typically found in anemia associated with Mycoplasma pneumonia infection?
A. Cold agglutinin disease
B. IgM-mediated hemolysis
C. Association with Mycoplasma pneumoniae infection
D. Chronic persistent hemolytic anemia
Answer: Chronic persistent hemolytic anemia

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5. Perl's Prussian blue stain is used to detect which of the following in tissues?
A. Calcium
B. Iron
C. Copper
D. Lipids
Answer: Iron

6. Which type of cells are most likely seen in the peripheral blood of a boxing fighter who experiences repeated head trauma?
A. Spherocytes
B. Target cells
C. Schistocytes (fragmented red blood cells)
D. Teardrop cells
Answer: Schistocytes (fragmented red blood cells)

7. Which of the following statements about secondary polycythemia is false?
A. It is often associated with increased erythropoietin levels
B. Arterial oxygen saturation is low
C. Splenomegaly is common
D. It can occur at high altitude or due to chronic lung disease
Answer: Splenomegaly is common

8. Which of the following statements about polycythemia vera is false?
A. It is associated with low or suppressed erythropoietin levels
B. It causes elevated hematocrit
C. It features high erythropoietin levels
D. Bone marrow shows panmyelosis
Answer: It features high erythropoietin levels

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9. An anemia characterized by normocytic, normochromic red blood cells with an increased reticulocyte count is most consistent with which of the following?
A. Anemia of acute blood loss
B. Iron deficiency anemia
C. Aplastic anemia
D. Anemia of chronic disease
Answer: Anemia of acute blood loss

10. During granulopoiesis in bone marrow, which stage is when the granulocytic precursor cell appears the largest?
A. Myeloblast
B. Promyelocyte
C. Myelocyte
D. Metamyelocyte
Answer: Promyelocyte

11. At which stage of granulocytic development do precursors stop dividing?
A. Myeloblast
B. Promyelocyte
C. Myelocyte
D. Metamyelocyte
Answer: Metamyelocyte

12. During the second trimester of fetal development, which organ is the predominant site of hematopoiesis?
A. Yolk sac
B. Liver
C. Bone marrow
D. Lymph nodes
Answer: Liver

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13. On histologic examination, which feature best distinguishes a lymph node?
A. Presence of Hassall's corpuscles
B. Cortical follicles with germinal centers and medullary cords/sinuses
C. Presence of red and white pulp
D. Presence of pseudostratified ciliated epithelium
Answer: Cortical follicles with germinal centers and medullary cords/sinuses

14. Which characteristic distinguishes the thymus from lymph nodes?
A. Presence of afferent lymphatic vessels
B. Presence of germinal centers
C. No afferent lymphatic vessels
D. Presence of medullary sinuses
Answer: No afferent lymphatic vessels

15. In the spleen's open circulation, blood flows from the capillaries through which of the following?
A. Splenic cords before re-entering sinusoids
B. Directly into venous sinuses without passing cords
C. White pulp to red pulp to venous sinuses
D. Trabecular artery to central arteriole to marginal zone
Answer: Splenic cords before re-entering sinusoids

16. Which statement about the palatine tonsils is true?
A. They are covered by keratinized stratified squamous epithelium
B. They lack crypts
C. They have deep crypts lined with non-keratinized stratified squamous epithelium
D. They are encapsulated and drained by efferent lymphatics only
Answer: They have deep crypts lined with non-keratinized stratified squamous epithelium

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17. Which cell type is the precursor to tissue macrophages?
A. Neutrophils
B. Monocytes (large cells with C-shaped nucleus and azurophilic granules)
C. Basophils
D. Eosinophils
Answer: Monocytes (large cells with C-shaped nucleus and azurophilic granules)

18. Which description characterizes eosinophils?
A. Trilobed nucleus with small pale granules
B. Bilobed nucleus with large pink (eosinophilic) granules
C. Kidney-shaped nucleus with azurophilic granules
D. Small anuclear cell with purple granules
Answer: Bilobed nucleus with large pink (eosinophilic) granules

19. Which description best fits platelets?
A. Small anuclear cell fragments containing granules
B. Largest white blood cells with a horseshoe-shaped nucleus
C. Cells with dense basophilic granules that contain histamine
D. Cells with a round nucleus and scant cytoplasm
Answer: Small anuclear cell fragments containing granules

20. Which statement about major histocompatibility complex (MHC) molecules is true?
A. MHC class I molecules present endogenous peptides to cytotoxic T cells
B. MHC class II molecules present endogenous peptides to cytotoxic T cells
C. MHC class I molecules present exogenous peptides to B cells
D. MHC class II molecules present endogenous peptides to natural killer cells
Answer: MHC class I molecules present endogenous peptides to cytotoxic T cells

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21. What is the direct effect of antigen recognition via MHC class II molecules?
A. Activation of cytotoxic T cells
B. Activation of T helper (CD4+) cells
C. Activation of B cells
D. Suppression of macrophages
Answer: Activation of T helper (CD4+) cells

22. During erythropoiesis, what causes the cytoplasm to become less basophilic as the cell matures?
A. Accumulation of lysosomes
B. Increase in ribosomes
C. Reduction of ribosomes and increasing hemoglobin synthesis
D. Increase in nucleus size
Answer: Reduction of ribosomes and increasing hemoglobin synthesis

23. At which stage of erythroid maturation do both hemoglobin and ribosomes stain together, giving the cytoplasm a gray-blue color?
A. Pronormoblast (proerythroblast)
B. Basophilic erythroblast
C. Polychromatophilic erythroblast
D. Orthochromatic erythroblast (normoblast)
Answer: Polychromatophilic erythroblast

24. Reticulocytes differ from mature erythrocytes by the presence of which of the following?
A. A nucleus
B. Mitochondria
C. Ribosomal RNA remnants that appear as a reticulofilamentous network
D. Hemoglobin
Answer: Ribosomal RNA remnants that appear as a reticulofilamentous network

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25. Which statement best describes the cortex of the thymus?
A. It contains mature B cells and plasma cells
B. It contains numerous immature T lymphocytes supported by thymic epithelial cells
C. It contains Hassall's corpuscles
D. It contains germinal centers
Answer: It contains numerous immature T lymphocytes supported by thymic epithelial cells

26. Which of the following best describes the effect of the hepcidin hormone?
A. It upregulates ferroportin and increases iron absorption
B. It downregulates ferroportin and decreases iron release into the circulation
C. It activates transferrin receptor expression
D. It increases intestinal iron absorption
Answer: It downregulates ferroportin and decreases iron release into the circulation

27. Which cellular response occurs when cellular iron levels are low?
A. Iron-responsive proteins (IRP) dissociate from iron-responsive elements (IRE) on mRNA
B. IRPs bind to IREs on mRNA to regulate iron metabolism gene expression
C. Ferritin translation increases
D. Transferrin receptor translation is suppressed
Answer: IRPs bind to IREs on mRNA to regulate iron metabolism gene expression

28. What is the function of the distal histidine residue in hemoglobin?
A. It binds 2,3-bisphosphoglycerate
B. It prevents oxidation of iron between Fe^{2+} and Fe^{3+} states
C. It transports carbon dioxide
D. It binds to the distal oxygen molecule directly
Answer: It prevents oxidation of iron between Fe^{2+} and Fe^{3+} states

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29. Which of the following describes the role of the pentose phosphate pathway in red blood cells?

A. It generates ATP via oxidative phosphorylation
B. It produces NADPH to keep glutathione in a reduced state protecting against oxidative damage
C. It synthesizes ribose-5-phosphate for nucleotide production
D. It reduces methemoglobin back to hemoglobin using NADH

Answer: It produces NADPH to keep glutathione in a reduced state protecting against oxidative damage

30. Which statement about hemoglobin H (HbH) disease is incorrect?

A. Deletion of three alpha-globin genes leads to formation of HbH
B. Production of beta-chain tetramers known as hemoglobin H
C. Moderate anemia
D. Microcytic hypochromic red blood cells with hemolysis

Answer: Moderate anemia

Usually it is sever but it could be moderate, so i think the wrong answer should be **mild anemia**

31. Which of the following statements about fetal hemoglobin (HbF) compared with adult hemoglobin (HbA) is correct?

A. HbF contains two alpha and two delta chains
B. HbF lacks the histidine residue at position 143 of the beta chain, replaced by serine in the gamma chain
C. HbF binds 2,3-bisphosphoglycerate more strongly than HbA
D. HbF has a lower affinity for oxygen than HbA

Answer: HbF lacks the histidine residue at position 143 of the beta chain, replaced by serine in the gamma chain

32. Which of the following describes the effect of carbon dioxide and chloride ions on hemoglobin?

A. Carbon dioxide binds to the heme iron and chloride binds oxygen
B. Carbon dioxide forms carbamate by binding to the globin chains, and chloride ions increase electrostatic interactions stabilizing the T (tense) state
C. Carbon dioxide and chloride both stabilize the R (relaxed) state of hemoglobin
D. Chloride replaces iron in the heme group

Answer: Carbon dioxide forms carbamate by binding to the globin chains, and chloride ions increase electrostatic interactions stabilizing the T (tense) state

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33. How does increased acidity (low pH) affect hemoglobin's oxygen affinity?
A. It increases oxygen affinity by stabilizing the R state
B. Protons bind to hemoglobin, stabilizing the T (tense) state via salt bridge formation
C. It has no effect on hemoglobin structure
D. It causes oxidation of iron to the ferric state (Fe^{3+})
Answer: Protons bind to hemoglobin, stabilizing the T (tense) state via salt bridge formation

34. Which enzyme catalyzes the conversion of carbon dioxide and water to carbonic acid in red blood cells?
A. Carbonic anhydrase
B. Carbonic dehydrogenase
C. Carboxylase
D. Aldolase
Answer: Carbonic anhydrase

35. During the mid-trimester of fetal development, which organ is primarily responsible for erythropoiesis?
A. Yolk sac
B. Liver
C. Bone marrow
D. Spleen
Answer: Liver

36. How are folic acid and vitamin B_{12} important in red blood cell production?
A. They enhance heme synthesis
B. They facilitate globin chain assembly
C. They are required for synthesis of thymidine triphosphate necessary for DNA replication
D. They are needed for iron absorption
Answer: They are required for synthesis of thymidine triphosphate necessary for DNA replication

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37. A patient presents with macrocytic, bizarrely shaped red blood cells and low erythropoietin levels. Which of the following conditions is the most likely cause of this anemia?
A. Iron deficiency
B. Intrinsic factor deficiency (pernicious anemia)
C. Chronic kidney disease
D. Folate deficiency
Answer: Intrinsic factor deficiency (pernicious anemia)

38. During heme catabolism, the tetrapyrrole ring of heme is ultimately converted into which pigment before excretion?
A. Biliverdin
B. Bilirubin
C. Urobilinogen
D. Stercobilin
Answer: Bilirubin

39. Why does fetal hemoglobin (HbF) have a higher affinity for oxygen than adult hemoglobin (HbA)?
A. HbF binds 2,3-bisphosphoglycerate more strongly than HbA
B. HbF has a higher concentration of iron
C. HbF binds 2,3-bisphosphoglycerate less strongly than HbA
D. HbF has a different heme structure containing cobalt instead of iron
Answer: HbF binds 2,3-bisphosphoglycerate less strongly than HbA

40. Which of the following is not a characteristic of polycythemia vera?
A. Low erythropoietin levels due to negative feedback
B. Splenomegaly
C. Increased erythropoietin levels
D. Elevated red blood cell mass
Answer: Increased erythropoietin levels

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41. Removal of the thymus in a dog during prenatal development would most likely result in which of the following consequences?

A. Deficiency in innate immunity
B. Deficiency in the acquired immune response due to absence of T cells
C. Anemia due to lack of erythropoietin
D. Increased production of B cells

Answer: Deficiency in the acquired immune response due to absence of T cells

42. Which immunoglobulin class is primarily responsible for mediating immediate hypersensitivity (allergic) reactions?

A. IgG
B. IgA
C. IgE
D. IgM

Answer: IgE

Hematolymphatic System Final Exam Test Bank

1. Type of CD presented on Reed-Sternberg cells?
A. CD3
B. CD5
C. CD20
D. CD30
Correct Answer: D

2. Hand-Schuller-Christian disease is associated with cells expressing which CD marker?
A. CD30
B. CD1a
C. CD19
D. CD4
Correct Answer: B

3. Which of the following is incorrect about primary myelofibrosis?
A. It causes bone fibrosis
B. It is associated with splenomegaly
C. Patients have the Philadelphia chromosome
D. It can transform to acute myeloid leukemia
Correct Answer: C

4. Which statement about Warburg metabolism is correct?
A. It occurs mainly in myeloblasts
B. It is associated with a slow cell mitosis rate
C. It is associated with lymphomas and is common in extranodal sites
D. It is associated with the t(11;14) mutation
Correct Answer: C Warburg metabolism is a general feature of many cancers characterized by increased aerobic glycolysis. C is the best answer because it is commonly observed in lymphomas, especially extranodal lymphomas, but it is not exclusive to them.

5. What is the mechanism of action of heparin sulfate?
A. It inhibits vitamin K epoxide reductase
B. It activates antithrombin to inhibit thrombin and other factors
C. It directly inhibits the thrombin receptor on platelets
D. It inhibits factor VIII and fibrin formation
Correct Answer: B

6. Which of the following activates factor X in the extrinsic pathway?
A. Factor V and its cofactor
B. Factor VII, tissue factor, and calcium
C. Thrombin and fibrin
D. Factor VIII and von Willebrand factor
Correct Answer: B

7. Which drug is used to eradicate tissue hypnozoites of Plasmodium vivax and Plasmodium ovale?
A. Chloroquine
B. Primaquine
C. Atovaquone-proguanil
D. Artemisinin
Correct Answer: B

8. A patient with chronic myeloid leukemia has a T315I mutation. Which drug is used?
A. Imatinib
B. Dasatinib
C. Nilotinib
D. Ponatinib
Correct Answer: D

9. A patient with thalassemia major receiving recurrent blood transfusions is at risk of developing which complication?
A. Folic acid deficiency
B. Iron overload
C. Leukocytosis
D. Hypocalcemia
Correct Answer: B

10. A female patient has frequent epistaxis and an INR of 7 due to warfarin therapy. After stopping warfarin, which agent should be administered?
A. Protamine sulfate
B. Vitamin K
C. Aspirin
D. Tissue plasminogen activator
Correct Answer: B

11. Why does thrombosis increase when warfarin treatment is initiated?
A. Because of late reduction of protein C levels
B. Because of early reduction of protein C levels
C. Because of increased platelet production
D. Because of activation of tissue factor
Correct Answer: B

12. A bone marrow smear filled with adipocytes indicates which condition?
A. Aplastic anemia
B. Myelodysplastic syndrome
C. Myelophthisic anemia
D. Polycythemia vera
Correct Answer: A

13. The t(15;17) translocation is characteristic of which leukemia?
A. Acute lymphoblastic leukemia
B. Acute promyelocytic leukemia
C. Chronic myelogenous leukemia
D. Hairy cell leukemia
Correct Answer: B

14. Mutation of the viral endonuclease enzyme results in resistance to which antiviral agent?
A. Azidothymidine
B. Baloxavir marboxil
C. Oseltamivir
D. Acyclovir
Correct Answer: B

15. A patient presents with acute ischemic stroke. Which agent will help?
A. Dabigatran
B. Clopidogrel
C. Tissue plasminogen activator
D. Aspirin
Correct Answer: C

16. Which agent has the shortest half-life among the following?
A. Ticagrelor
B. Clopidogrel
C. Ticlopidine
D. Cangrelor
Correct Answer: D

17. What is the mode of inheritance of von Willebrand disease?
A. Autosomal dominant
B. Autosomal recessive
C. X-linked recessive
D. Mitochondrial inheritance
Correct Answer: A

18. Deficiency of the ADAMTS13 enzyme results in which condition?
A. Hemolytic uremic syndrome
B. Thrombotic thrombocytopenic purpura
C. Idiopathic thrombocytopenic purpura
D. Hemophilia A
Correct Answer: B

19. After acute iron toxicity, which agent should be administered?
A. Deferasirox
B. Deferoxamine
C. Desmopressin

D. Ethylenediaminetetraacetic acid (EDTA)
Correct Answer: B

20. Cholesterol embolization due to warfarin therapy leads to which syndrome?
A. Heparin-induced thrombocytopenia
B. Purple toe syndrome
C. Torsades de pointes
D. Grey Turner syndrome
Correct Answer: B

21. What type of mutations are commonly seen in myelodysplastic syndrome?
A. Chromosome aberrations
B. Point mutations in the alpha-globin gene
C. JAK2 V617F mutation
D. BCR-ABL fusion gene
Correct Answer: A

22. In an osmotic fragility test, if red cells start to lyse at a concentration of 0.48% saline, what is the diagnosis?
A. Hereditary spherocytosis
B. Normal red cells
C. Glucose-6-phosphate dehydrogenase (G6PD) deficiency
D. Thalassemia minor
Correct Answer: B

23. In sickle cell anemia, which hemoglobin abnormality is observed on electrophoresis?
A. Elevated HbF
B. Elevated HbF and HbA2
C. Absence of HbA
D. Four bands of HbA, HbA2, HbF, and HbS
Correct Answer: C

24. Which agent causes bone marrow suppression?
A. Mercaptopurine
B. Vincristine
C. Prednisone
D. Dexamethasone
E. L-asparaginase
Correct Answer: A

25. Which type of white blood cell will be elevated following a myocardial infarction?

A. Neutrophils
B. Eosinophils
C. Basophils
D. Lymphocytes
Correct Answer: A

26. Which of the following is incorrect about hemophagocytic lymphohistiocytosis (HLH)?
A. Abnormal B-cell function
B. Perforin gene mutation
C. Associated with Epstein-Barr virus infection
D. Cytokine storm
Correct Answer: A

27. Which protein inhibits coagulation by directly inactivating clotting factors?
A. Antithrombin III
B. Protein C
C. Tissue factor pathway inhibitor
D. Protein S
Correct Answer: B

28. Which of the following increases erythrocyte sedimentation rate (ESR)?
A. Increased rouleaux formation
B. Decreased fibrinogen level
C. Microcytosis
D. Hypovolemia
Correct Answer: A

29. Proton pump inhibitors are given in the case of gastrointestinal complications with which of the following drugs?
A. Heparin
B. Enoxaparin
C. Dabigatran
D. Rivaroxaban
Correct Answer: C

30. Why do we give an antiplatelet agent sometimes after using a thrombolytic?
A. When a thrombus dissolves, antibodies are formed against streptokinase
B. When a thrombus dissolves, reperfusion arrhythmia happens
C. When a thrombus dissolves, hypotension happens
D. When a thrombus dissolves, local thrombin level decreases
E. When a thrombus dissolves, platelet aggregation increases
Correct Answer: E

31. Relapse of malaria occurs because dormant hypnozoites are formed in which Plasmodium species?
A. Plasmodium falciparum only
B. Plasmodium vivax and Plasmodium ovale
C. All Plasmodium species
D. Plasmodium malariae
Correct Answer: B

32. Which drug is used to eliminate hypnozoites and prevent relapse of malaria?
A. Chloroquine
B. Primaquine
C. Atovaquone
D. Doxycycline
Correct Answer: B

33. Babesia infection shows a "Maltese cross" on blood smear. Which statement is correct regarding its transmission?
A. The tick must feed for at least 2 hours
B. The tick must feed for at least 12 hours
C. The tick must feed for at least 36 hours
D. Transmission occurs via mosquito bites
Correct Answer: C

34. When anti-A, anti-B, and anti-Rh sera are added to separate drops of a person's blood and no agglutination occurs, what is the most likely blood type of this individual?
A. AB-
B. O-
C. O+
D. AB+
E. B-
Correct Answer: B

35. Predictable spread from one lymph node region to adjacent nodes is characteristic of which type of lymphoma?
A. Hodgkin lymphoma
B. Diffuse large B-cell lymphoma
C. Follicular lymphoma
D. Mantle cell lymphoma
Correct Answer: A