CHAPTER 17 ab
Blood

2. Blood Composition
• Blood: a ___________________ composed of
  • __________
  • __________
  • ______________ (red blood cells, or RBCs)
  • ____________ (white blood cells, or WBCs)
  • ____________

3. Blood Composition
• ______________
  • __________ of blood ___________ that is __________
  • ___________ for males
  • ___________ for females

4. Figure 17.1; page 635

5. Physical Characteristics and Volume
• Color __________ to __________
• pH ______________
• __________
• ~________ of body weight
• Average volume: _______ for males, and ______ L for females
6. Functions of Blood
1. Distribution of
   • ____________ to body cells
   • ____________ to the ______ and ________ for elimination
   • ________ from __________ organs to target organs

7. Functions of Blood
2. Regulation of
   • __________ by absorbing and distributing heat
   • ____________ using _________

8. Functions of Blood
3. Protection against
   • Blood loss
     • Plasma proteins, ________________ initiate ________ formation
   • Infection
     • __________
     • _______ defend against ________ invaders

9. Blood Plasma
   • __________
   • Proteins are mostly produced by the ________
     • 60% __________
     • 36% __________
     • 4% __________
10. Blood Plasma
- __________________________—lactic acid, urea, creatinine
- _____________—glucose, carbohydrates, amino acids, fatty acids
- ________—Na\(^+\), K\(^+\), Ca\(^{2+}\), Cl\(^-\), HCO\(_3^{-}\)
- Respiratory gases—____________

11. Formed Elements
- Only WBCs are ______________
- RBCs have no _____________________s
- Platelets are cell _____________
- Most formed elements _________ in the bloodstream for only a __________
- Most blood cells originate in ______________ and do not ________

12. Fig. 17.2  pg. 637

13. Erythrocytes
- ______________, __________, essentially no __________
- Filled with ______________ for ________ transport
- Contain the plasma membrane proteins
  - Provide _____________________ as necessary
- Are the major factor contributing to blood viscosity

14. Fig. 17.3   pg. 637
15. Erythrocytes
• Structural characteristics contribute to gas transport
  • ____________—huge surface area relative to volume
  • >97% hemoglobin (not counting water)
  • ____________; ATP production is anaerobic; no \( \text{O}_2 \) is used in generation of ATP
  • ______________ per cubic mm

16. Erythrocyte Function
• RBCs are dedicated to ______________________
• Hemoglobin binds ______________________

17. Erythrocyte Function
• Hemoglobin structure
  • Protein globin: ______________________
  • ____________bonded to each _______ chain (4)
  • _______ in each heme can bind to one _______. Each Hb molecule can transport _______

18. Figure 17.4  pg. 637

19. Hemoglobin (Hb)
• \( \text{O}_2 \) loading in the _______
  • Produces ______________ (ruby red)
• \( \text{O}_2 \) unloading in the ____________ Produces deoxyhemoglobin or reduced hemoglobin (dark red)
• \( \text{CO}_2 \) loading in ______________ Produces carbaminohemoglobin (carries 20% of \( \text{CO}_2 \) in the blood)

20. Hematopoiesis
• Hematopoiesis (hemopoiesis): ______________________
  • Occurs in ______ bone marrow of ______________, _________ and proximal epiphyses of _______________
21. Hematopoiesis
• Hemocytoblasts (hematopoietic _______ cells)
  • Give rise to all ______________________
  • _____________ push the cell toward a specific _________ of blood cell ________________

22. Fig. 17.5; pg. 639

23. Fig. 17.12 pg. 648

24. Fate and Destruction of Erythrocytes
• Life span: ______________ Old RBCs become _______, and Hb begins to degenerate
  • ______________ engulf dying RBCs in the _________

25. Erythrocyte Disorders
• ___________: blood has abnormally _______________________
  A sign rather than a disease itself
  • Blood O₂ levels cannot support ______________
  • Accompanied by___________________________________, and chills

26. Causes of Anemia
• ____________
  • Low hemoglobin content
    ▪ Secondary result of _____________ anemia or
    ▪ Inadequate ______________ of iron-containing foods
    ▪ Impaired iron _____________ – ______________
    ▪ Hemorrhaging: __________
    ▪ _______ stool vs. _______ blood
27. Causes of Anemia
• ____________ anemia
  • Defective _____ codes for abnormal ____________ (HbS)
  • Causes RBCs to become _______________ in ______________ situations

28. Fig. 17.8 pg.642

29. Leukocytes
• Make up _______ of total blood volume
• Normal: ______________________ / 1 cubic mm.
• Can leave capillaries via _________ - move
  ______________________ by _________ motion
• _________: WBC count over__________
  Normal response to ____________________________

30. Fig. 17.8 pg 642

31. Granulocytes
• Granulocytes: _______________________________
  Cytoplasmic ________________ specifically with Wright’s stain
  • ______________________________ than RBCs
  • __________________
  • __________________
32. Neutrophils
- Most ______________ WBCs
- ______________ leukocytes (PMNs)
- Fine granules take up both acidic and basic dyes
- Give the cytoplasm a ______________
- Very phagocytic—“bacteria slayers”

33. Eosinophils
- ______________, ________ nuclei
- Red to crimson (acidophilic) coarse, lysosome-like granules (phobic/philic)?
- Digest ______________ that are too large to be phagocytized
- Modulators of the ______________

34. Basophils
- ______________
- Large, ______________ (basophilic) granules contain __________
  - Histamine: an ________________ that acts as a
    __________ and __________ other WBCs to __________ sites
  - Are functionally similar to __________ cells

35. Figure 17,10 pg. 644

36. Agranulocytes
- ______________
- Lack visible ______________
- Have ______________ nuclei
37. Lymphocytes
- Large, dark-purple, ______________ with a ______________ of blue cytoplasm
- Mostly in ______________ tissue; few circulate in the blood
- Crucial to ______________

38. Lymphocytes
- Two types
  - T cells: Regulatory Ts: ______________
    Killer Ts: ______________
  - B cells: Produce ______________ - ______________ in blood

39. Monocytes
- The ___________ leukocytes
- Abundant ___________ cytoplasm
- Dark ___________, _____________ nuclei

40. Monocytes
- ____________, enter tissues, and _____________ into _____________
  - Actively _____________ cells; crucial against ___________, intracellular ___________ ____________, and chronic _____________
  - __________ ___________ to mount an __________ response

41. Never let monkeys eat bananas

42 Figure 17.10 a & b pg. 644

43 Figure 17.10 c pg. 644

44 Figure 17.10 d& e pg. 644
47. Leukopoiesis
- _____________ of WBCs
- Stimulated by __________________ from bone marrow and mature WBCs
- All ___________ originate from ______________

48. Fig. 17.11 pg. 647

49. Leukocyte Disorders
- __________
  - Abnormally low WBC count—drug induced
  - Leukemias
    - ___________ conditions involving ______
    - Named according to the abnormal WBC clone __________
      __________ leukemia involves ______________
      __________ leukemia involves ______________
    - ___________ involves ______________ cells and primarily affects __________
    - ________ leukemia is more prevalent in _________ people

50. Platelets
- _____________ of ______________
- Formation is regulated by ______________
- Blue-staining outer region, purple granules
51. Platelets
• Form a temporary ______________ that helps seal _______ in blood ____________
• Circulating platelets are kept _________ and mobile by _________
  ____________ from ___________ cells of blood vessels

52  Fig. 17.12  pg 648

53. Diagnostic Blood Tests
• ______________
  • Hemoglobin: _____________________________
  • Blood _________ tests
  • Microscopic examination reveals variations in size and shape of RBCs, indications of anemias

54. Diagnostic Blood Tests
• ______________ WBC count
• ______________ and platelet counts assess ______________
  • SMAC, a blood chemistry profile
  • Complete blood count___________________