

1) Protein, in plasma of a normal animal, constitutes approximately what percentage?

- * A. 7
- B. 12
- C. 3
- D. 20

2) Normal blood cells of birds could be described as follows :

A. Anucleate, oval erythrocytes; thrombocytes; neutrophils, eosinophils, basophils; lymphocytes, monocytes, azurophils

* B. Nucleate, oval erythrocytes; thrombocytes; heterophils, eosinophils, basophils; lymphocytes, monocytes

C. Nucleate, oval erythrocytes; thrombocytes; heterophils, eosinophils, basophils; lymphocytes, monocytes, azurophils

D. Anucleate, biconcave erythrocytes; thrombocytes; heterophils, eosinophils, basophils; lymphocytes, monocytes

3) Hematopoiesis, the development of blood cells occurs

A. Prenatally, in the yolk sac and bone marrow; in adults, in the liver

B. Prenatally, in the spleen; in adults, in the bone marrow

* C. Prenatally, in the yolk sac and liver; in adults, in the bone marrow

D. Prenatally, in the liver; in adults, in the liver and bone marrow

4) The precursor of red blood cells is

A. BFU-Meg

B. CFU-GM

* C. Erythroid Burst Forming Unit

D. Lymphoid Colony Forming Unit

5) Which of the following is/are particularly responsive to erythropoietin?

A. Both Colony and Burst forming units

B. Burst forming units

* C. Colony forming units

D. Neither Colony or Burst forming units

6) Reticulocytes are

A. Smaller than erythrocytes

B. The same size as erythrocytes

* C. Larger than erythrocytes

D. formed from erythrocytes that are ageing

7) When interpreting reticulocyte count, which of the following statement is INCORRECT?

A. In anemic ruminants, reticulocytes are released into the blood stream in proportion to the severity of anemia

B. In cats, mild anemia results in only punctate reticulocytes being released from marrow. These persist in the blood for 10- 12 days.

* C. Anemic horses show a dramatic increase in reticulocytes in circulating blood with even mild anemia

D. Aggregate reticulocytes (in cats) are larger and more immature than punctate reticulocytes

8) Most of the destruction of red blood cells occurs in the

A. Liver

B. Intestine

C. Lymph nodes

* D. Spleen

9) The key trigger for increased Erythropoietin (EPO) production in the kidney is :

A. Reduced hematocrit

* B. Hypoxia

C. Increased carbon dioxide in blood

D. Reduced red blood cell count

10) The hormonal influence on the production of erythropoietin is carried out by

* A. Pituitary, adrenal, thyroid and gonads

B. Pituitary, liver, kidney and adrenal

C. Adrenal, thyroid, gonads and pancreas

D. Pituitary, thymus, parathyroid and adrenal

11) Heinz bodies in erythrocytes are

A. abnormal aggregations of RNA that usually only stains with new methylene blue, usually caused by heavy metal poisoning.

B. an indicator of regenerative anemia

* C. particles of denatured hemoglobin protein that may be caused by oxidant drugs and chemicals

D. nuclear remnants observed in young erythrocytes

12) Howell-Jolly bodies in erythrocytes :

A. are abnormal aggregations of RNA that usually only stains with new methylene blue, usually caused by heavy metal poisoning.

B. are particles of denatured hemoglobin protein that may be caused by oxidant drugs and chemicals

* C. are nuclear remnants observed in young erythrocytes

D. may be observed in 2-3% of the erythrocytes of normal cats.

13) Basophilic stippling of erythrocytes

- A. are nuclear remnants observed in young erythrocytes
- * B. are abnormal aggregations of RNA that usually only stains with new methylene blue, often caused by heavy metal poisoning.
- C. are particles of denatured hemoglobin protein that may be caused by oxidant drugs and chemicals
- D. may be observed in 2-3% of the erythrocytes of normal cats.

14) Polychromasia of erythrocytes

- A. is a result of nuclear remnants observed in young erythrocytes
- B. is a result of particles of denatured hemoglobin protein that may be caused by oxidant drugs and chemicals
- * C. is a faint bluish tint due to an admixture of the colors of hemoglobin and the basophilic erythrocyte cytoplasm.
- D. is a result of abnormal aggregations of RNA that usually only stains with new methylene blue, often caused by heavy metal poisoning.

15) Hypochromasia of erythrocytes

- A. is a faint bluish tint due to an admixture of the colors of hemoglobin and the basophilic erythrocyte cytoplasm.
- B. is a result of abnormal aggregations of RNA that usually only stains with new methylene blue, often caused by heavy metal poisoning.
- * C. is frequently observed in iron deficiency anemia as caused by chronic blood loss or parasitism
- D. is a result of nuclear remnants observed in young erythrocytes

16) Polycythemia of erythrocytes

- * A. is characterized by the presence of too many red cells in the circulation
- B. is a result of abnormal aggregations of RNA that usually only stains with new methylene blue, often caused by heavy metal poisoning.
- C. is a result of nuclear remnants observed in young erythrocytes
- D. is frequently observed in iron deficiency anemia as caused by chronic blood loss or parasitism

17) Normocytic, microcytic and macrocytic are descriptions that are relevant when discussing

- A. Hematocrit
- * B. MCV
- C. MCHC
- D. MCH

18) If a blood sample statistic is reported in picograms, it could be reporting on which of the following?

- A. Hematocrit
- B. MCHC
- * C. MCH
- D. MCV

19) A hypochromic erythrocyte has a low

- * A. MCHC
- B. MCH
- C. elasticity
- D. MCV

20) When classifying anemia, anemia due to high RBC turnover is termed

- A. Hypercytic
- B. Cytometric
- * C. Erythrokinetic
- D. Biochemical

21) Neutrophils in the intramedullary phase are divided into 3 pools : proliferative, maturative, and storage reserve. A band neutrophil would usually be classified within which pool?

- * A. Maturative
- B. Storage reserve
- C. Can belong to any of the phases, depending on its maturity
- D. Proliferative

22) Neutrophils that have been released into circulation can be within the "circulating pool" or the "marginal pool". The marginal pool consists of neutrophils margined

- A. within the spleen
- * B. along the walls of capillaries
- C. within the kidney
- D. within the liver

23) Band cells are seen in the developmental stage of the

- A. Neutrophil; during this stage the nucleus is segmented
- B. Red blood cell; during this stage the nucleus is not segmented
- C. Eosinophil; during this stage the nucleus is segmented
- * D. Neutrophil; during this stage the nucleus is not segmented
- E. Basophil; during this stage the nucleus is 'banded'

24) When referring to a blood sample, the term 'left shift' refers to

- A. the presence of excessive basophils
- B. neutrophilia
- * C. the presence of excessive immature neutrophils
- D. neutropenia
- E. the presence of excessive eosinophils

25) Epinephrine causes

- A. Neutropenia, by reducing the marginal pool of neutrophils
- * B. Neutrophilia, by reducing the marginal pool of neutrophils
- C. Neutrophilia, by increasing the release of neutrophils from bone marrow
- D. Neutropenia, by increasing the marginal pool of neutrophils

26) Another name for cyclic neutropenia is

- A. Right shift
- * B. Gray Collie Syndrome
- C. Left shift
- D. White Collie Syndrome

27) The key function of neutrophils is

- * A. Phagocytosis of bacteria
- B. Blood clotting
- C. Formation of pus
- D. Phagocytosis of viruses

28) Diapedesis is

- A. the final step in maturation of a monocyte into a macrophage
- * B. the movement of leukocytes across the endothelial lining of blood vessels to interstitial fluid
- C. the process by which a bacterium is phagocytosed by a neutrophil
- D. a movement process that involved two "legs"

29) 'Lazy leukocyte' syndrome is a defect in neutrophils related to

- A. anti-parasitical activity
- B. anti-viral activity
- C. microbicidal activity
- D. phagocytosis
- * E. locomotion and chemotaxis

30) The lifespan of a macrophage is

- * A. months to years
- B. minutes to hours
- C. about the same as a neutrophil
- D. hours to days

31) Parasites infecting a dog are most likely going to be disposed of by

- A. macrophages
- * B. eosinophils
- C. basophils
- D. neutrophils
- E. monocytes

32) The least common granulocyte is the

- A. neutrophil
- * B. basophil
- C. monocyte
- D. eosinophil

33) Petechia is defined as

- * A. a minute red or purple spot as the result of tiny hemorrhages of blood vessels
- B. the escape of blood from ruptured blood vessels into the surrounding tissue to form a purple or black-and-blue spot
- C. the final product of the blood coagulation step in hemostasis
- D. a mass, such as an air bubble, a detached blood clot, or a foreign body, that travels in the bloodstream and lodges in a blood vessel, thus serving to obstruct or occlude such a vessel

34) Primary hemostasis is the

- A. process that creates pus around a splinter
- B. formation of a fibrin clot
- C. formation of a platelet plug stabilized by fibrin
- * D. formation of the platelet plug

35) With respect to primary hemostasis, which of the following statements is FALSE?

- A. During platelet activation, thromboxane A₂ recruits and activates other platelets, thus promoting aggregation
- * B. Fibrin binds to receptor, GPIIb-IIIa, effectively crosslinking platelets to form a platelet plug
- C. When endothelial cell injury occurs, platelets adhere to von Willebrand factor (vWf) in the subendothelium via the platelet membrane receptor GPIb-IX
- D. When platelets bind to von Willebrand factor, the shape change induced activates the platelet membrane integrin receptor, GPIIb-IIIa
- E. Under normal physiologic conditions, hemostasis is prevented by the endothelium, which provides a physical barrier and secretes platelet inhibitory products, such as prostacycline (PGI₂) and nitric oxide (NO)

36) With regards to secondary hemostasis, which of the following statements is FALSE?

- A. It involves circulating coagulation factors, which act as enzymes [which require activation] and cofactors (factors V and VIII), calcium and platelets
- B. It is defined as the formation of fibrin through the coagulation cascade
- C. Calcium is critical for secondary hemostasis
- D. The role of platelets is to provide a source of phospholipid [PF₃] and a binding surface upon which the coagulation cascade can proceed
- E. It is responsible for stabilizing the soft clot and maintaining vasoconstriction
- * F. Fibrin adheres to von Willebrand factor (vWf) in the subendothelium via the platelet membrane receptor GPIb-IX

37) With regards to Tertiary Hemostasis, which of the following statements is FALSE?

- A. tPA Release is stimulated by a variety of factors, including hypoxia and bradykinin
- B. Tissue plasminogen activator (tPA) is released from endothelial cells
- * C. Calcium is critical for tertiary hemostasis
- D. Tissue plasminogen activator (tPA) binds to plasminogen within the clot, converting it into plasmin
- E. Plasmin lyses both fibrinogen and fibrin in the clot, releasing fibrin(ogen) degradation products (fdp)

38) Prostacyclin and nitric oxide are inhibitors of

- * A. Primary hemostasis
- B. Secondary hemostasis
- C. Primary and Secondary hemostasis
- D. The Common Pathway

39) When testing for platelet numbers (primary hemostasis) in dogs or cats, the normal count is

- A. 30,000 /uL or more
- B. 10,000 /uL or more
- * C. 200,000 /uL or more
- D. 100,000 /uL or more

40) All the following are tests for PRIMARY hemostasis, EXCEPT

- * A. Prothrombin Time (PT)
- B. Tests for von Willebrand factor (vWf)
- C. Buccal Mucosa Bleeding Time (BMBT)
- D. Platelet count

41) All the following are tests for SECONDARY hemostasis, EXCEPT

- A. Activated Coagulation Time (ACT)
- B. Activated partial thromboplastin time (APTT)
- * C. Buccal Mucosa Bleeding Time (BMBT)
- D. Fibrinogen tests
- E. Prothrombin Time (PT)
- F. Specific factor assays

42) Gray Collie syndrome (Cyclic Hematopoiesis) is characterized by fluctuations in circulating

- A. T-cells
- B. B-cells
- * C. Neutrophils, reticulocytes, and platelets
- D. Red blood cells

43) Acquired disorders of hemostasis include all of the following, EXCEPT

- A. Increased platelet function due to lymphoma
- * B. von Willebrand disease
- C. Decreased platelet function due to neoplasia
- D. Disseminated intravascular coagulation