Basic Blood Chemistry, by Sharlene Peterson

CLASS: G610

This is your test but… do not try to fill in the blanks! We created a Test Answer Sheet which is easy to download, fill in the answer, and email.

1. The level of sugar (glucose) in the bloodstream is primarily controlled by the _____ (gluconeogenesis), adrenal glands (cortisol), and the pancreas (insulin).

2. Nutritional factors that influence cellular resistance include _____ chromium, zinc, magnesium, vitamin D, omega-3 fatty acids, adequate protein, and vitamin C.

3. As a normal component of the vascular system, triglycerides are continually in circulation ready to be metabolized to provide a source of _____.

4. Through activation of various signaling pathways, _____ regulate not only their own synthesis and enterohepatic circulation, but also triglyceride, cholesterol, glucose, and energy homeostasis.

5. Oxidation of cholesterol is damaging to all cells but particularly our heart and blood vessels. Unoxidized cholesterol is a free radical scavenger that _____ our cell membranes.

6. Ammonia generated by _____ metabolism is converted to urea.

7. The degradation of creatine is of particular clinical interest. The only end product of creatine degradation is _____, which diffuses into the bloodstream from the muscle.

8. Uric acid is commonly deposited in the ankle, hand, knees, tendons, and kidneys. Sub-acute gout is often mistaken for _____ or fibromyalgia.

9. In acidemia (acidosis), calcium becomes ionized and _____ from serum proteins. In alkalemia (alkalosis), more calcium is bound to proteins.

Note: ”An increase in pH, alkalosis, promotes increased protein binding, which decreases free calcium levels. Acidosis, on the other hand, decreases protein binding, resulting in increased free calcium levels.” - www. emedicine.medscape.com/article/2087469-overview

10. Chloride has an inverse relationship with carbon dioxide (CO_2). Metabolic acidosis is likely when CO_2 is decreased while chloride is _____.

11. On a blood test, adrenal hypo-function is indicated by the following: potassium levels greater than 4.5, sodium less than 136 and chloride values 101 or less. Because there is excess potassium and decreased sodium, this is a major marker for metabolic _____. It is wrong to assume that only acidosis is pathological. Alkalosis is just as common as acidosis, if not more so.

12. Assessing magnesium status is difficult because most magnesium is in _____ cells or in bone.

13. Magnesium in the form of aspartate, citrate, lactate, and chloride are better _____ and more bioavailable than magnesium oxide and magnesium sulfate.

14. Phosphorus is primarily stored in the _____ (85%) and is essential for bone matrix and hydroxyapatite metabolism.

15. Phosphorus and calcium have an inverse relationship when taking _____. When calcium levels increase the phosphorus levels will decrease. When phosphorus is ingested from whole foods it is “naturally buffered” with minerals and vitamins that act as synergistic co-factors to increase calcium metabolism.

16. Like calcium, phosphorus levels are regulated by the _____ hormone (PTH). If the blood levels are high it usually indicates kidney issues or dehydration.

17. Potassium is vital for the proper functioning of nerves and _____. The heart muscle is sensitive to both high and low levels of potassium.

18. Potassium: If blood levels are high it usually indicates kidney issues or dehydration. Acute infections, tissue destruction, and asthma will also lead to a _____ of potassium into the blood.

19. The role of _____ hormones should not be overlooked with high sodium levels. Aldosterone is the main mineralocorticoid secreted by the adrenal cortex, and it stimulates sodium absorption and potassium excretion.

20. The _____, as a reaction to metabolic acidosis, will eliminate CO2 and preserve bicarbonate. With alkalosis, the lungs will decrease the loss of CO2 while the kidneys excrete bicarbonate.

21. A _____ total protein is possible even if the albumin or globulin levels are abnormal, for example, a condition that causes a decreased albumin and an increased globulin level will result in a normal total serum protein.

22. In humans, _____ is the most abundant plasma protein, accounting for 55–60% of the measured serum protein. It is used by the body for growth and tissue repair. Low albumin concentrations in the elderly increases the risk of functional decline.

23. Total serum globulin includes alpha 1, alpha 2, beta and gamma fractions. Globulins are proteins that include gamma globulins (antibodies) and a variety of enzymes and transport proteins (they also transport vitamins, hormones, amino acids, waste products, calcium, and more). Gamma globulins, _____, are the most abundant.

24. Alanine aminotransferase (ALT) is an enzyme found mainly in the _____ but also in smaller amounts in the kidneys, heart, muscles, and pancreas.

25. Vitamin _____ , in its active form of pyridoxal-5-phosphate, is required for the activity of the transferase enzymes.

26. The AST/SGOT enzyme is found in highly metabolic tissues like muscles, kidneys, lungs, and the heart. In the event of cell _____ or cell death the enzyme may be released into the blood.

27. AST/SGOT is more specific for the detection of problems of _____ origin than for biliary tree or liver problems.

28. Use of many other prescription and non-prescription drugs, including nonsteroidal anti-inflammatory drugs (NSAIDs), lipid-lowering drugs, antibiotics, histamine receptor blockers, antifungal agents, antidepressants, and hormones such as testosterone, can _____GGT levels.

29. Levels of GGT increase with age in women, but not in men, and are always somewhat _____ in men than in women.

30. ALP is an enzyme produced by a variety of cells in response to rapid cellular proliferation and repair. Besides the obvious phosphorus need, _____ and B6 are also required for the formation of ALP.

31. Bilirubin is formed from the breakdown of hemoglobin from red blood cells. Breakdown occurs in the spleen and bone marrow, and the bilirubin is transported to the liver where it is made water soluble and excreted in the _____.

32. Symptoms associated with biliary stasis/_____, a condition where bile cannot flow from the liver to the duodenum, include: pain between shoulder blades, stomach upset by greasy foods, greasy or shiny stools, nausea, light colored stools, and gallbladder attacks.

33. Hemoglobin is a protein present mainly in red blood cells. Hematocrit is a _____ related to total blood count. Both of these are used to diagnose anemia and are often mistaken to be the same thing.

34. Ferritin is a protein found inside cells that _____ iron so your body can use it later. Ferritin is found in the cells of the liver, spleen, skeletal muscles, and bone marrow.

35. The body requires iron to make hemoglobin for blood and myoglobin for muscles. About _____ of the iron is stored in the ferritin protein but, this percentage can be significantly higher or lower in cases of iron overload or deficiency.

36. Most of the body’s iron (about 60%) is found in hemoglobin. Hemoglobin is the protein molecule in _____ cells that carries oxygen from the lungs to the body's tissues and returns carbon dioxide from the tissues back to the lungs.

37. RBC (red blood cells) are produced in the _____ and then released into the bloodstream as they mature. RBCs have a lifespan of about 120 days and are continuously renewed and replaced as they age and degrade or are lost through bleeding.

38. The RBC count may be used to detect a problem with red blood cell production and/or lifespan but it cannot determine the underlying _____.

39. RDW describes the size of the red blood cells. Newly-made red blood cells are called reticulocytes. Reticulocytes, B12 deficient cells, and folic acid-deficient cells are _____ than iron-deficient red blood cells.

40. Platelets play a critical role in the control of bleeding and _____ of blood vessel walls.

41. There are five major types of white blood cells/_____.

42. The physiologic role of basophils remains unknown, although they are thought to play a role in host defense, particularly against _____.

43. Basophils activated by IgE and antigen can help to induce the development of acute _____ reactions, such as anaphylaxis to bee stings or peanut products, and also chronic allergic reactions, such as in asthma or atopic dermatitis.

44. Lymphocytes are the cells that determine the _____ of the immune response to infectious microorganisms and other foreign substances. They are found in the blood, spleen, tonsils, and lymph nodes.

45. It is the long-lived T and B cells that provide immunologic "_____," to provide a fast response to a second encounter with the same antigen/infectious agent/foreign substance.

46. Natural killer (NK) cells are a frontline defense system. They do not attack invading organisms _____, they destroy the body's own cells that have either become cancerous or are infected with a virus.

47. This type of white blood cell is important for fighting infections. They release a lysozyme able to dissolve bacterial walls. For serious infections they require the support of monocytes, macrophages, antibodies, etc. This white blood cell is called a _____.

48. The major thyroid hormone secreted by the thyroid gland is thyroxine, also called T4 because it contains four _____ atoms.

49. To exert its effects, T4 is converted to triiodothyronine (T3) by the removal of an iodine atom. This occurs mainly in the _____ and in certain tissues where T3 acts, such as in the brain.

50. The amount of TSH that the pituitary sends into the blood stream depends on the amount of T4 that the pituitary “sees”. If the pituitary “sees” very little T4, then it produces _____ TSH to tell the thyroid gland to produce more T4.

Note: When TSH is high a person may have hypothyroid function. The pituitary does not detect enough T4 in the system so it keeps sending more thyroid stimulating hormone (TSH). TSH tells the thyroid to produce T4.

51. Occasionally, a low TSH may result from an abnormality in the _____ gland, which prevents it from making enough TSH to stimulate the thyroid (secondary hypothyroidism).

_____ END OF TEST