Study Questions Lipid and Lipoproteins

1. What is meant by the term ‘lipoproteins’?

2. Lipids are generally water (soluble / insoluble); but soluble in (polar / nonpolar) solvents.

3. Which of the following lipids consists of a basic 4 ring structure called the cyclopentanoperhydrophenanthrene ring, with a single side chain of carbons and hydrogens?
   a. Cholesterol
   b. Glycolipid
   c. Phospholipid
   d. Triglyceride

4. List at least 6 functions of lipids:

5. Describe the transport function of lipoproteins.

6. The lipid that is the precursor of steroid hormone synthesis is:
   a. Cholesterol
   b. Glycolipid
   c. Phospholipid
   d. Triglyceride

7. The primary lipid component stored in adipose tissue is:
   a. Cholesterol
   b. Glycolipid
   c. Phospholipid
   d. Triglyceride

8. The body acquires the greater amount of its cholesterol primarily by:
   a. liver synthesis
   b. dietary sources

9. Match the following area of migration on a normal serum protein electrophoresis to the appropriate lipid component.
   
   ____ very low density lipoprotein (VLDL)   a. alpha lipoprotein
   ____ low density lipoprotein (LDL)        b. beta lipoprotein
   ____ chylomicrons                         c. pre-beta lipoprotein
   ____ high density lipoprotein (HDL)       d. uncharged particles: do not migrate on electrophoresis
10. Match the major lipid component with the following lipoproteins.

<table>
<thead>
<tr>
<th>Lipoprotein</th>
<th>Major lipid component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chylomicrons</td>
<td>a. Cholesterol</td>
</tr>
<tr>
<td>HDL</td>
<td>b. Endogenous triglycerides</td>
</tr>
<tr>
<td>LDL</td>
<td>c. Exogenous triglycerides</td>
</tr>
<tr>
<td>VLDL</td>
<td>d. Phospholipid and protein</td>
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</tbody>
</table>

11. You are requested to draw an out-patient for a triglyceride level. List the collection requirements for this test.

12. Current methods for cholesterol analysis use reagents that contain specific enzymes that increase the specificity of cholesterol measurement. Which of the following enzymes is used in the reagent that makes the method specific for cholesterol?
   a. Amylase
   b. Cholesterol esterase
   c. Glycerol kinase
   d. Lipoprotein lipase

13. Current methods for triglyceride analysis have a common enzymatic first step. What is the purpose of this first step and what enzyme is used?

14. Which of the following tests can be directly measured? (more than one correct answer)
   a. Chylomicrons
   b. VLDL
   c. HDL
   d. LDL

15. List recommended adult serum reference ranges for the following:
   - Total cholesterol:
   - Total triglyceride:
   - HDL cholesterol:
   - LDL cholesterol:

16. Lipid studies are most commonly ordered to evaluate:
   a. Liver function
   b. Risk of coronary heart disease
   c. Renal disease
   d. Endocrine disorders

17. The form of cholesterol considered beneficial in regard to risk of coronary heart disease is (LDL / HDL).
18. Which of the following is associated more with increased risk for developing coronary artery disease?
   a. Low HDL
   b. High HDL
   c. Low LDL
   d. High triglyceride

19. Absorbed lipids are released from the intestine into the blood in the form of chylomicrons made up mostly of triglyceride. These chylomicrons are classified as an (endogenous / exogenous) triglyceride form because the triglyceride is obtained primarily from the (diet / liver).

   The chylomicrons are transported to the (kidney / liver) where they are degraded to (LDL / VLDL) which is classified as an (endogenous / exogenous) triglyceride form.

20. a. The turbid or milky appearance of serum following a fat containing meal is most likely due to the presence of (cholesterol / chylomicrons).

   What would you expect the appearance of this serum to be after the serum sample was allowed to stand overnight in the refrigerator?
   a. Clear serum
   b. Hazy serum
   c. Creamy layer on top of serum

   b. Generally, lipemic appearance of serum is due to increased levels of (cholesterol / triglyceride).

21. Serum cholesterol = 200 mg/dl; triglyceride = 150 mg/dl; and HDL = 40 mg/dl.

   The calculated VLDL would be ____ mg/dl; the calculated LDL would be ____ mg/dl.

   (True/False): The calculated LDL value will be valid for any triglyceride level.

22. Name the five test components of a lipid profile, as defined by current CPT codes.

23. Identify the following factors associated with increased risk of developing coronary heart disease (CHD) as either primary or secondary factors.
   ____ Age  
   ____ Hypercholesterolemia  
   ____ Poor stress management  
   ____ Obesity  
   ____ Family history of CHD  
   ____ Sedentary lifestyle  
   ____ Male sex  
   ____ Low HDL, High LDL  
   ____ Hypertension  
   ____ Smoking  
   ____ Diabetes mellitus  
   a. Primary  
   b. Secondary
24. **True/False:** Determine whether each of the following statements is true or false.

   ____ a. Triglycerides are composed of glycerol and 3 fatty acid molecules.
   ____ b. Cholesterol has no beneficial functions in the body.
   ____ c. The body produces most of its cholesterol in the liver.
   ____ d. Chylomicrons are absorbed from the intestine into the lymphatics before they enter the peripheral blood.
   ____ e. Apolipoproteins bind with lipids to decrease the solubility of lipids in the blood.
   ____ f. The major stored form of fat in tissues is cholesterol.
   ____ g. Lipoproteins separated by electrophoresis are designated as Alpha, pre-Beta, Beta, and Chylomicrons.
   ____ h. LDL contains a relatively large percentage of protein and a relatively small amount of lipid.
   ____ i. Very Low Density Lipoprotein (VLDL) contains a relatively large amount of exogenous triglycerides.
   ____ j. HDL has a greater percentage of cholesterol than LDL does.
   ____ k. Fasting samples are required for triglyceride assays.
   ____ l. Lipase is used as a reagent for enzymatic methods for measuring serum cholesterol.
   ____ m. Serum HDL is commonly measured by addition of a precipitating reagent to the sample in order to precipitate the HDL out of solution.
   ____ n. Increased serum LDL cholesterol values can be associated with a lower risk for development of coronary heart disease (CHD).
   ____ o. An HDL result of 29mg/dl in a serum sample would be associated with a normal risk for development of Coronary Heart Disease.
   ____ p. High amounts of triglycerides will cause turbidity in plasma samples.
   ____ q. Cholesterol/HDL Ratio is 5:1 when the total serum cholesterol is 200 mg/dl and the serum HDL is 40 mg/dl.
   ____ r. Increased serum cholesterol values can be associated with hypothyroidism and decreased serum cholesterol values can be associated with hyperthyroidism.
   ____ s. Increased serum triglyceride values can be associated with diabetes mellitus.
   ____ t. Hypolipoproteinemia is the general term indicating increased levels of lipids and/or lipoproteins caused by genetic defects or secondary causes.
   ____ u. Lipid storage disorders are caused by an accumulation of fatty material in lysosomes of critical organs due to a high fat diet.
   ____ v. Lack of the active pulmonary surfactant sphingomyelin, is the major cause of respiratory distress syndrome in the pre-term infant.
   ____ w. Fetal lung maturity tests are performed to assess the overall maturity and size of the infant.