Current Sum

MC 36 points

SA 39 points

Total 75 points

1. A patient has a genetic defect in the generation of apolipoprotein B48, a component of chylomicrons. What process would be most directly affected by this defect?
2. Liberation of free fatty acids by Lipoprotein Lipase
3. Reverse cholesterol transport
4. Transport of fat from the liver to the adipose
5. **Transport of fat from the gut to adipose**
6. Cholesterol serves as a precursor for what hormone?
7. Insulin
8. Glucagon
9. **Estrogen**
10. All of the above
11. Which statement is **false** regarding phospholipids?
12. **Found within the lipid core of lipoproteins**
13. Forms an amphipathic bilayer
14. Digested by phospholipases
15. Can be a dietary source of choline
16. How would you describe eicosopentaneoic acid, also known as 20:5(n-3)?
    1. Humans can make this fatty acid from glucose
    2. This fatty acid is essential and must be ingested as is
    3. **This fatty acid is conditionally essential on alpha linoleic acid also known as 18:33**
    4. None of the above
17. The best definition for cellulose fiber as part of a fresh yam and beet salad is:
    1. **Dietary**
    2. Highly fermentable
    3. Soluble
    4. Functional
18. In what organ does lingual lipase function most effectively?
    1. Mouth
    2. Esophagus
    3. **Stomach**
    4. Small Intestine
19. Which lipase would be the least effective in the stomach?
    1. Lingual Lipase
    2. Gastric Lipase
    3. **Pancreatic Lipase**
    4. Colipase
20. What **would not** be a useful treatment for cholestasis?
    1. Exogenous bile salts
    2. Reduce the amount of long chain fatty acids in diet
    3. **Statins**
    4. Intravenous Vitamin D/K supplementation
21. A long chain saturated fatty acid, such as that in palm oil is ingested and directly stored in adipose tissue, without experiencing any liver metabolism. How many rounds of lipolysis would this fatty acid undergo before getting to the adipocyte?
    1. 1
    2. **2**
    3. 3
    4. None
22. If triglyceride synthesis in the enterocyte was impaired, what would be the repercussions?
    1. Long chain fatty acid absorption
    2. Runny stool
    3. Impaired chylomicron synthesis
    4. **All of the above**
23. Where are chylomicron remnants removed from circulation?
    1. Adipose tissue
    2. Enterocytes
    3. **Liver**
    4. Muscle
24. A patient has a Low Density Lipoprotein Receptor (*LDLR*) loss of function mutation. Which statement is true?
    1. **They would have increased LDL in the blood and increased cholesterol synthesis**
    2. They would have increased LDL in the blood and decreased cholesterol synthesis
    3. They would have decreased LDL in the blood and increased cholesterol synthesis
    4. They would have decreased LDL in the blood and decreased cholesterol synthesis
25. How would citrate levels affect fatty acid oxidation?
    1. It would promote oxidation by increasing malonyl CoA
    2. **It would decrease oxidation by increasing malonyl CoA**
    3. It would promote oxidation by inactivating SREBP1
    4. It would decrease oxidation by inactivating SREBP1
26. What fatty acid is normally made by fatty acid synthase?
    1. **C16:0**
    2. C18:0
    3. C16:1
    4. C18:1
27. Which fatty acid metabolism would be most affected by a defect in peroxisomal function such as Zellwegger syndrome?
    1. C16:0
    2. C8:0
    3. **C22:0**
    4. C20:46
28. Which statement is true of nutritional ketosis?
    1. **It is enhanced by active gluconeogenesis**
    2. It is decreased by active lipolysis
    3. It occurs primarily in the muscle
    4. Ketone levels will be higher after exercise
29. Brain trauma such as whiplash can impair vasopressin (also known as ADH) secretion. What would this result in?
    1. Excessive water retention
    2. **Excessive urination**
    3. Hyponatria
    4. Hypokalemia
30. Addison’s disease, which involves immune destruction of the adrenal glands would result in which of the following?
    1. **Hyponatria and hypertension**
    2. Hyponatria and hypotension
    3. Hypernatria and hypertension
    4. Hypernatria and hypertension

Short Answer

1. Describe at least three important roles of triglycerides in human health (3 points).
2. An individual has a deficiency in the secretion of cholecystokinin. Name three digestive processes that may be affected, and explain how this would affect lipid absorption (3 points).
3. Referencing the fatty acid below, what is the delta and omega nomenclature of this fatty acid (2 points)? Can it be synthesized by humans, why or why not (2 point; 4 points total)?



1. Adrenaline phosphorylates acetyl-coA carboxylase in the muscle, in a manner similar in effect to AMPK. How would this affect *de novo* lipogenesis and lipolysis (2 points)? Draw out the key intermediates that would be affected by this phosphorylation and what protein activities would be altered (2 points). Describe how this would affect energy availability in the muscle (1 point; 5 points total).
2. Describe how mutations in the Low Density Lipoprotein Receptor (*LDLR)* cause familial hypercholesterolemia, including effects on cholesterol biosynthesis and transport (2 points). Would a statin (HMG-CoA reductase inhibitor) be an effective treatment? Why or why not (2 points; 4 points total).
3. Describe the process by which triglycerides in the liver can be used by muscle. What are the key enzymes and particles involved in this trafficking (2 points)? How are lipids trafficked from adipose tissue to muscle and how is this process controlled by hormones (2 points, 4 points total)?
4. Describe the relative order in efficiency by which these fatty acids would be oxidized and why: 22:6(n-3), C18:1, C16:0, C6:0 (4 points total).
5. Draw a triglyceride with these fatty acids: Docosahexaenoic acid (22:64 all cis), Palmitoeic Acid (C18:1 9) and Palmitic Acid (C18:0) showing any kinks in the molecular structures (8 points). Would you expect this lipid to be solid or liquid at room temperature and why (1 point). Are humans able to synthesize these fatty acid from either glucose or others precursors. If so, what would it be (1 point; 4 points total)
6. An individual eats a serving of oatmeal on a daily basis. Please *describe*: (8 points total)
7. The type of fiber this person may be eating and the basic structure of the type of fiber (2 points)
8. A specific property the fiber holds (2 points)
9. A physiological affect *resulting in* a health benefit on the human *given this property* (4 points)