

BMB EXAM 3A

1. Fatty acid synthesis...
 - a. takes place in the mitochondrion.
 - b. relies on the synthesis of mevalonate as an intermediate.
 - c. Uses NADPH as a source of electrons for the reduction of intermediates.**
 - d. All of these are correct.
 - e. None of these are correct.
2. The reaction catalyzed by alpha-ketoglutarate dehydrogenase complex...
 - a. uses a mechanism similar to that of the pyruvate dehydrogenase complex.
 - b. requires NAD⁺ and FAD.
 - c. requires CoEnzyme A
 - d. All of these are correct.**
 - e. None of these is correct.
3. Which of the following catalyzes the main pace-setting reaction of the TCA cycle?
 - a. Citrate synthase
 - b. Fumarase
 - c. Isocitrate dehydrogenase**
 - d. Alpha-ketoglutarate dehydrogenase
 - e. None of these is correct.
4. Which of the following is a sphingolipid?
 - a. Cholesterol
 - b. Ceramide**
 - c. Phosphatidyl inositol
 - d. All of these are sphingolipids.
 - e. None of these is a sphingolipid.
5. Which of the following uses phosphatidate as an intermediate?
 - a. Cardiolipin**
 - b. Cholesterol
 - c. Ceramide
 - d. All of these use phosphatidate as an intermediate.
 - e. None of these use phosphatidate as an intermediate
6. Phosphatidate is an intermediate in the synthesis of triacylglycerols and glycerolipids. **True False.**
7. In ATP synthase...
 - a. a half channel in the c-ring allows protons from the matrix to enter intermembrane space.
 - b. the alpha-beta hexameric ring is stationary.**
 - c. both the alpha and beta subunits of the hexameric ring are catalytic.
 - d. All of these are correct.
 - e. None of these is correct.
8. The final direct products of the last thiolytic cleavage in odd-numbered fatty acid catabolism
 - a. are 2 acetyl CoA molecules.
 - b. are 2 succinyl CoA molecules.
 - c. are a propionyl CoA molecule and an acetyl CoA molecule.**

d. are a succinyl CoA molecule and an acetyl CoA molecule.

9. Chylomicrons...

- a. are formed in the liver.
- b. contain apolipoprotein B100.
- c. enter the bloodstream directly from enterocytes.
- d. primarily carry cholesterol and cholesterol esters derived from the diet.
- e. None of these is correct.

10. In beta-oxidation...

- a. the first committed step is catalyzed by carnitine acyl-transferase I.
- b. uses two oxidations, one hydrolysis and one thiolysis for each round of oxidation.
- c. requires FADH and NADH as reactants
- d. All the above are correct.
- e. None of these is correct.

11. 2,4-dinitrophenol, has what effect?

- a. The pH of the matrix is raised.
- b. More ATP is produced.
- c. The electron transport chain is shut down.
- d. Heat is generated.
- e. All the above are correct.

12. Which of the following is true?

- a. Antimycin inhibits Complex I
- b. Complex III is reduced by Cytochrome C
- c. Ubiquinone is reduced by Complex III
- d. Complex C is hydrophobic, whereas ubiquinone/ubiquinol is hydrophilic.
- e. None of these is correct.

13. The non-oxidative pentose phosphate pathway...

- a. uses glucose 6-phosphate as a direct reactant.
- b. produces glucose 6-phosphate under normal cellular conditions, when this pathway goes in the reverse direction.
- c. can be used to produce fructose 6-phosphate and glyceraldehyde 3-phosphate.
- d. All the above are correct.
- e. None of these is correct.

14. If a cell is engaged in building DNA, but not cell membranes, and does not need ATP, how would the pentose phosphate pathway (PPP) be used?

- a. Only the oxidative PPP would be used so that ribose 5-P is made.
- b. Both the oxidative and non-oxidative PPP would be used in the forward direction.
- c. Both the oxidative and non-oxidative PPP would be used in the reverse direction
- d. Only the non-oxidative PPP would be used and in reverse; the oxidative PPP would not be used.

15. During beta-oxidation, an 18C saturated fatty acid will directly produce 10 acetyl CoA. **True False**

16. When citrate synthase slows down, and acetyl CoA and NADH build up, pyruvate is used to produce oxaloacetate for gluconeogenesis. **True False**

17. Select the **true** statement.

- a. In a downstream response to glucagon signaling, glycogen synthase in the liver becomes phosphorylated, and therefore activated.
- b. In a downstream response to insulin signaling, glycogen phosphorylase in the liver becomes phosphorylated, and therefore activated.
- c. In a downstream response to glucagon signaling, PKA in the liver phosphorylates phosphorylase b to form the more active phosphorylase a.
- d. None of these is true.

18. The debranching enzyme...

- a. cleaves glycogen alpha 1,4 branchpoints.
- b. releases glycogen branchpoints as free glucose.
- c. removes single terminal glucose molecules from glycogen.
- d. None of these is correct.

19. In the synthesis of membrane lipids, sugar head groups are activated by CTP for addition to phosphatidate whereas alcohols are activated by UTP. True False

20. Select the **"FALSE"** statement.

- a. The primary organs for glycogen storage and free glucose release are the liver and kidney.
- b. In total, the muscles store more glycogen in the body than any other tissue.
- c. The product of straight chain glycogen breakdown can directly enter glycolysis or gluconeogenesis.
- d. Glycogen phosphorylase requires the vitamin B derivative, pyridoxal phosphate.

21. Select the **true** statement.

- a. Glucose 6-phosphate dehydrogenase is a mitochondrial enzyme.
- b. NADPH is a potent reductant and is used to reduce oxidized glutathione.
- c. Both these statements are true.
- d. There is no true statement.

22. Favism is a type of glucose 6-phosphate deficiency that can be aggravated by reducing conditions such as eating fava beans, infection or antibiotic treatment. True False

23. Acetyl CoA carboxylase...

- a. is inhibited by citrate.
- b. is activated by phosphorylation.
- c. is a mitochondrial enzyme.
- d. None of these are true.

24. Very low density lipoprotein particles...

- a. primarily contain cholesterol and cholesterol esters.
- b. are released from the small intestines.
- c. are more dangerous to health than low density lipoprotein particles.
- d. release triacylglycerols with the help of CII and lipoprotein lipase.
- e. All the above are true.

25. **From one acetyl CoA being oxidized in the TCA cycle, and subsequent use of the electron transport chain and ATP synthase, how many ATP will be produced?**

- a. 8, b. 9, c. 10, d. 12, e. 14, f. 15, g. None of these is correct.

26. Select the **true** statement.

- a. The transamination of oxaloacetate yields aspartate.
- b. The transamination of pyruvate yields alanine
- c. The transamination of alpha-ketoglutarate yields glutamate.
- d. All the above are true.