

Chapter 6 – Acetate–Malonate Pathway

30 Multiple-Choice Questions (MCQs)

1. Which compound is the key two-carbon building block in the acetate–malonate pathway?

- A. Malonyl-CoA
- B. Acetyl-CoA
- C. Pyruvate
- D. Oxaloacetate

Answer: B

2. Acetate is formed from carbohydrates through which intermediate?

- A. Citrate
- B. Lactate
- C. Pyruvic acid
- D. Succinate

Answer: C

3. The acetate–malonate pathway mainly leads to the biosynthesis of:

- A. Fatty acids and polyketides
- B. Amino acids only
- C. Steroids only
- D. Proteins

Answer: A

4. The mevalonic acid pathway mainly produces:

- A. Fatty acids
- B. Terpenes and steroids
- C. Prostaglandins
- D. Waxes

Answer: B

5. Acetyl-CoA is described as a:

- A. One-carbon building block
- B. Two-carbon building block
- C. Three-carbon building block
- D. Four-carbon building block

Answer: B

6. Conversion of acetyl-CoA to malonyl-CoA requires:

- A. NADH only
- B. Biotin and ATP
- C. FAD only
- D. CoASH only

Answer: B

7. Malonyl-CoA contains how many carbons?

- A. 2
- B. 3
- C. 4
- D. 6

Answer: B

8. The enzyme that converts acetyl-CoA to malonyl-CoA is:

- A. Pyruvate dehydrogenase
- B. Acetyl-CoA carboxylase
- C. Lipoxygenase
- D. Cyclooxygenase

Answer: B

9. Pyruvate dehydrogenase converts pyruvate into:

- A. Malonyl-CoA
- B. Acetyl-CoA (AcSCoA)
- C. Arachidonic acid
- D. Glycerol

Answer: B

10. Which vitamin-derived cofactor is associated with pyruvate dehydrogenase in the chapter?

- A. Vitamin B1
- B. Vitamin C
- C. Vitamin K
- D. Vitamin B12

Answer: A

11. Thioesters are more reactive toward nucleophilic acyl substitution than:

- A. Acid chlorides
- B. Anhydrides
- C. Esters
- D. Ketones

Answer: C

12. Fatty acids are generally described as:

- A. Short branched-chain acids
- B. Long straight-chain saturated or unsaturated acids
- C. Aromatic acids only
- D. Amino acids

Answer: B

13. Palmitic acid contains:

- A. 12 carbons
- B. 14 carbons
- C. 16 carbons
- D. 18 carbons

Answer: C

14. Stearic acid contains:

- A. 16 carbons
- B. 18 carbons
- C. 20 carbons
- D. 22 carbons

Answer: B

15. Arachidic acid contains:

- A. 16 carbons
- B. 18 carbons
- C. 20 carbons
- D. 24 carbons

Answer: C

16. Oleic acid is represented as:

- A. 18:1 (9c)
- B. 18:2 (9c,12c)
- C. 18:3 (9c,12c,15c)
- D. 20:4

Answer: A

17. Linoleic acid is classified as a:

- A. Monounsaturated omega-3 fatty acid
- B. Polyunsaturated omega-6 fatty acid
- C. Saturated omega-6 fatty acid
- D. Polyunsaturated omega-9 fatty acid

Answer: B

18. Alpha-linolenic acid (ALA) is:

- A. An omega-3 fatty acid
- B. An omega-6 fatty acid
- C. A saturated fatty acid
- D. A steroid

Answer: A

19. ALA is considered essential because it:

- A. Is produced in large amounts by humans
- B. Cannot be produced within the human body and must be obtained from diet

- C. Is found only in animal fat
- D. Contains no double bonds

Answer: B

20. Triglycerides are tri-esters of:

- A. Glycerol and fatty acids
- B. Glucose and amino acids
- C. Acetyl-CoA and glycerol
- D. Cholesterol and glycerol

Answer: A

21. In a triglyceride, the R groups can be:

- A. Only saturated and identical
- B. Only unsaturated and identical
- C. Saturated or unsaturated, same or different
- D. Aromatic only

Answer: C

22. Complete hydrogenation of fatty acids produces:

- A. Only unsaturated fatty acids
- B. Only saturated fatty acids
- C. Only trans fatty acids
- D. Steroids

Answer: B

23. Castor oil is mainly composed of:

- A. Linoleic acid
- B. Ricinoleic acid
- C. Arachidonic acid
- D. Palmitic acid

Answer: B

24. Approximately what percentage of castor oil is ricinoleic acid?

- A. 30%
- B. 50%
- C. 70%
- D. 90%

Answer: D

25. The toxic constituent associated with castor seeds is:

- A. Linamarin
- B. Ricin
- C. SDG
- D. EPA

Answer: B

26. The precursor of the natural acetylenic substances presented in the chapter is:

- A. Oleic acid
- B. Palmitic acid
- C. Stearic acid
- D. Linolenic acid

Answer: A

27. Prostaglandins are derived enzymatically from:

- A. Palmitic acid
- B. Arachidonic acid
- C. Oleic acid
- D. Lauric acid

Answer: B

28. Every prostaglandin contains:

- A. 10 carbon atoms
- B. 15 carbon atoms
- C. 20 carbon atoms, including a 5-carbon ring
- D. 30 carbon atoms

Answer: C

29. Which enzyme catalyzes a key step in prostaglandin biosynthesis?

- A. Acetyl-CoA carboxylase
- B. Cyclooxygenase (COX-1 or COX-2)
- C. Pyruvate dehydrogenase
- D. Lipase

Answer: B

30. Which is a non-selective inhibitor of COX according to the chapter?

- A. Celecoxib
- B. Aspirin
- C. Vioxx
- D. Brextra

Answer: B