

Chapter 7 – Mevalonate Pathway & Terpenes

30 Multiple Choice Questions (MCQs)

1. Terpenes are structurally related to which basic unit?

- A. Acetyl-CoA
- B. Isoprene
- C. Glucose
- D. Pyruvate

Answer: B

2. Isoprene is also known as:

- A. 2-methyl-1,3-butadiene
- B. 3-methyl-1,2-butadiene
- C. 2-methyl-2-butene
- D. 1,3-pentadiene

Answer: A

3. How many carbons are present in one isoprene unit?

- A. C3
- B. C4
- C. C5
- D. C6

Answer: C

4. Which compound contains two isoprene units?

- A. Myrcene
- B. Squalene
- C. Cholesterol
- D. Lanosterol

Answer: A

5. The isoprene units of myrcene are joined:

- A. Tail-to-tail
- B. Head-to-head
- C. Head-to-tail
- D. Randomly

Answer: C

6. Monoterpenes contain how many carbons?

- A. C5

- B. C10
- C. C15
- D. C20

Answer: B

7. Sesquiterpenes contain how many carbons?

- A. C10
- B. C15
- C. C20
- D. C25

Answer: B

8. Diterpenes contain how many carbons?

- A. C15
- B. C20
- C. C25
- D. C30

Answer: B

9. Triterpenes contain how many carbons?

- A. C20
- B. C25
- C. C30
- D. C40

Answer: C

10. Tetraterpenes contain how many carbons?

- A. C30
- B. C35
- C. C40
- D. C45

Answer: C

11. Mevalonic acid is the biosynthetic precursor of:

- A. Actual C5 isoprene units
- B. Glucose
- C. Fatty acids only
- D. Amino acids

Answer: A

12. The two biological isoprene units are:

- A. IPP and DMAPP
- B. HMG-CoA and acetyl-CoA
- C. Squalene and cholesterol
- D. Lanosterol and cholesterol

Answer: A

13. IPP stands for:

- A. Isopentyl diphosphate
- B. Isopropyl phosphate
- C. Isopentyl monophosphate
- D. Isobutyl diphosphate

Answer: A

14. DMAPP is described as the:

- A. Tail group
- B. Head group
- C. C15 unit
- D. C20 unit

Answer: B

15. The precursor to C10 monoterpenoids is:

- A. Farnesyl diphosphate
- B. Geranyl diphosphate
- C. Squalene
- D. Phytocene

Answer: B

Chapter 7 – MCQs (16–30)

16. Farnesyl diphosphate consists of how many C5 isoprene units?

- A. Two
- B. Three
- C. Four
- D. Five

Answer: B

17. Geranylgeranyl diphosphate consists of how many C5 units?

- A. Two
- B. Three
- C. Four
- D. Six

Answer: C

18. Squalene consists of two units of:

- A. Geranyl diphosphate
- B. Farnesyl units
- C. Isoprene only
- D. Mevalonate

Answer: B

19. Squalene is formed by a:

- A. Head-to-tail linkage
- B. Tail-to-tail linkage
- C. Head-to-head linkage
- D. C5-to-C5 linkage

Answer: B

20. C40 tetraterpenoids are derived from:

- A. Squalene
- B. Phytocene
- C. Farnesyl diphosphate
- D. Geraniol

Answer: B

21. Taxol is classified as a:

- A. Monoterpenoid
- B. Sesquiterpenoid
- C. Taxane diterpenoid

D. Triterpenoid

Answer: C

22. Taxol can naturally be isolated from the bark of:

- A. *Taxus brevifolia*
- B. *Aspergillus terreus*
- C. *Penicillium citrinum*
- D. *Taxus* only

Answer: A

23. The enzyme that converts HMG-CoA to mevalonate is:

- A. Squalene synthase
- B. HMG-CoA reductase
- C. HMG-CoA synthase
- D. Epoxidase

Answer: B

24. HMG-CoA reductase catalyzes the:

- A. Rate-determining step
- B. Final step of cholesterol synthesis
- C. Formation of IPP directly
- D. Formation of squalene directly

Answer: A

25. Which cofactor is used in the reduction of HMG-CoA to mevalonate?

- A. NADPH
- B. FAD
- C. ATP only
- D. NAD⁺

Answer: A

26. Statins are competitive inhibitors of:

- A. Squalene cyclase
- B. HMG-CoA reductase
- C. HMG-CoA synthase
- D. Squalene epoxidase

Answer: B

27. Lovastatin was isolated from:

- A. *Taxus baccata*
- B. *Aspergillus terreus*

C. *Penicillium citrinum*

D. Eucalyptus

Answer: B

28. Which of the following is a natural statin listed in the chapter?

A. Atorvastatin

B. Fluvastatin

C. Lovastatin

D. None of the above

Answer: C

29. Cholesterol biosynthesis involves squalene being converted first to:

A. Mevalonate

B. 2,3-oxidosqualene

C. IPP

D. Farnesyl diphosphate

Answer: B

30. Vitamin D₃ can be formed from 7-dehydrocholesterol by:

A. ATP

B. NADPH

C. Sunlight

D. HMG-CoA reductase

Answer: C