

*Circle the letter corresponding to the **best** answer for each of the following:*

- The urea cycle takes place primarily in the?
 - brain
 - muscle
 - liver
 - adipose tissue
 - kidney
- Which of the following enzymes is located in the mitochondrial matrix?
 - Arginase
 - Argininosuccinate Lyase
 - Argininosuccinate Synthetase
 - Ornithine Transcarbamoylase
 - More than one of the above
- Which of the following cofactors is required by alanine transaminase?
 - biotin
 - lipoic acid
 - pyridoxalphosphate
 - cobalamin
 - thiaminepyrophosphate
- Which of the following is a positive modulator of carbamoylphosphate synthetase I?
 - GTP
 - ATP
 - ADP
 - Citrate
 - N-acetylglutamate
- Which of the following amino acids forms a stable free radical in the active site of ribonucleotide reductase?
 - Tyr
 - Phe
 - Trp
 - His
 - Ser
- Which of the following is a substrate for ribonucleotide reductase?
 - TMP
 - UMP
 - GDP
 - CTP
 - all of the above
- Which of the following is the physiological nitrogen donor in the reaction catalyzed by CTP synthetase?
 - ammonia
 - alanine
 - carbamoylphosphate
 - glutamine
 - aspartate

8. In mammalian cells, pyrimidine synthesis occurs in the?

- a) cytosol
- b) mitochondrial matrix
- c) endoplasmic reticulum
- d) peroxisome
- e) nucleus

9. Which of the following is associated with folic acid deficiency?

- a) beriberi
- b) megaloblastic anemia
- c) pernicious anemia
- d) pellagra
- e) scurvy

10. Which of the following is an inhibitor of the reaction catalyzed by thymidylate synthase?

- a) Allopurinol
- b) FdUMP
- c) dATP
- d) hydroxyurea
- e) methotrexate

11. Which of the following factors is required by thymidylate synthase?

- a) 5-formyltetrahydrofolate
- b) 10-formyltetrahydrofolate
- c) 5-methyltetrahydrofolate
- d) 5,10-methylenetetrahydrofolate
- e) 5-formiminotetrahydrofolate

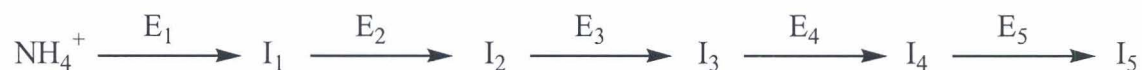
12. Amino acids considered to be glucogenic are degraded to any of the following except?

- a) acetyl CoA
- b) α -ketoglutarate
- c) fumarate
- d) oxaloacetate
- e) pyruvate

13. Nitrogen from the degradation of muscle protein is carried through the blood stream to the liver as?

- a) Aspartate
- b) Alanine
- c) Glutamate
- d) Glutamine
- e) Urea

Consider the following reactions from the Urea Cycle in answering questions 14 - 17.



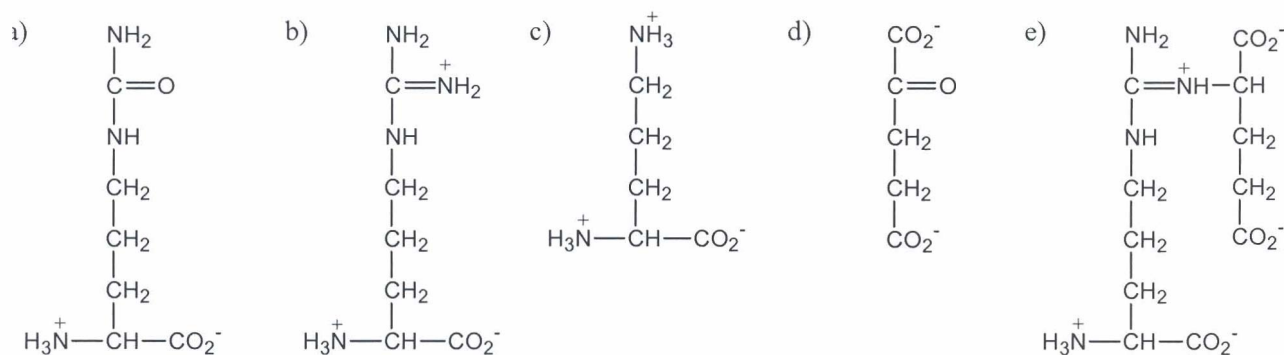
14. The reaction catalyzed by E₁ involves?

- a) hydrolysis of 1ATP to ADP
- b) hydrolysis of 1ATP to AMP
- c) hydrolysis of 2ATPs to 2ADPs
- d) hydrolysis of 1 ATP to ADP and hydrolysis of 1ATP to AMP
- e) hydrolysis of 2ATPs to 2AMPs

15. Which of the following enzymes requires ATP?

- a) E₂
- b) E₃
- c) E₄
- d) E₅
- e) None of the above

16. Which of the following is I₂?



17. Which of the following is not a product or a substrate of these enzymes?

- a) ornithine
- b) arginine
- c) urea
- d) succinate
- e) fumarate

18. Citrulline is transported out of the mitochondria in exchange for?

- a) arginine
- b) pyruvate
- c) α-ketoglutarate
- d) aspartate
- e) ornithine

23. Which enzyme requires ATP?

- a) E₁
- b) E₂
- c) E₃
- d) E₄
- e) E₅

24. Which enzyme catalyzes the committed-step in the pathway in mammals?

- a) E₁
- b) E₂
- c) E₃
- d) E₄
- e) E₅

25. Phosphoribosylpyrophosphate (PRPP) is a substrate for which of the enzymes?

- a) E₁
- b) E₂
- c) E₃
- d) E₄
- e) E₅

26. Which of the following is a positive modulator of E₁?

- a) OMP
- b) UTP
- c) PRPP
- d) ADP
- e) CTP

27. The nitrogens in the product of the pathway are donated by?

- a) Glutamate and Aspartate
- b) Glycine and Aspartate
- c) Glutamine and Alanine
- d) Glycine and Glutamine
- e) Glutamine and Aspartate

28. Which of the following does not occur during the reaction catalyzed by transaminases?

- a) decarboxylation
- b) transamination
- c) hydrolysis
- d) tautomerization
- e) all of the above do occur

29. Which of the following is an excreted form of excess nitrogen in organisms?

- a) uric acid
- b) urea
- c) ammonia
- d) a and b above
- e) a, b and c above

30. Which of the following amino acids is an integral component of folic acid?

a) lysine

b) histidine

c) aspartic acid

d) glutamic acid

e) tyrosine