OWL Ch19 Q16-20

16.The oxidative decarboxylation of pyruvate to acetyl-CoA is catalyzed by:

|  |  |  |
| --- | --- | --- |
|  |  | pyruvate carboxylase |
|  |  | pyruvate decarboxylase |
|  |  | pyruvate dehydrogenase complex |
|  |  | acetyl-CoA synthetase |

17. The number of carbon atoms of acetate lost as CO2 during the first turn of the TCA cycle is/are:

|  |  |  |
| --- | --- | --- |
|  |  | zero |
|  |  | 0.5 because of randomization of the carboxyl group of acetate in the formation of citrate, a symmetrical compound, by citrate synthase |
|  |  | 1 -- the carboxyl group comes off at isocitrate dehydrogenase |
|  |  | 2 -- the carboxyl group comes off at isocitrate dehydrogenase and the methyl group at α-ketoglutarate dehydrogenase |

18. Which enzyme in the citric acid cycle proceeds by a similar mechanism and with similar cofactors as pyruvate dehydrogenase?

|  |  |  |
| --- | --- | --- |
|  |  | succinate dehydrogenase |
|  |  | succinyl-CoA synthetase |
|  |  | α-ketoglutarate dehydrogenase |
|  |  | citrate synthase |
|  |  | isocitrate dehydrogenase |

19. The succinate dehydrogenase reaction is stereospecific. The mechanism involves the removal of:

|  |  |  |
| --- | --- | --- |
|  |  | both pro-*R* hydrogens |
|  |  | both A and B depending on how the substrate enters the active site |
|  |  | both pro-*S* hydrogens |
|  |  | the pro-*S* hydrogen of one carbon and the pro-*R* hydrogen of the other carbon |

20. The essential feature of thiamine pyrophosphate chemistry is:

|  |  |  |
| --- | --- | --- |
|  |  | a one electron transfer to form a semiquinone |
|  |  | the ring strain of the oxidized dithio form |
|  |  | a cationic imine N that acts as an electron sink |
|  |  | the resonance stabilized hydroxyethyl carbanion |

Ch 20 Q1

1. The glycerophosphate shuttle transfers 2e- from:

|  |  |  |
| --- | --- | --- |
|  |  | dihydroxyacetone phosphate in the matrix to NADH in the cytosol. |
|  |  | cytosolic NADH to malate in the matrix. |
|  |  | cytosolic NADH to coenzyme Q in the matrix. |
|  |  | cytosolic glycerol-3-phosphate to malate in the matrix. |