

Biochemistry Homework 3

1. As we studied before, metabolic pathways are either catabolic or anabolic. Nevertheless, there are other types of pathways; they are called amphibolic, which can be an energy-yielding (Anabolic) pathway or an energy-requiring (Catabolic) pathway. Which type of these pathways is the TCA cycle? Explain your answer.
2. There are many cases of human diseases in which one or another enzyme activity is lacking due to genetic mutation. However, cases of deficiency which involve the enzymes in the TCA cycle are very rare. Explain the reason.
3. All the dehydrogenases of glycolysis and the TCA cycle use NAD^+ as an electron acceptor except Succinate Dehydrogenase which uses a covalently bound FAD. Suggest why FAD is a more appropriate electron acceptor than NAD^+ in the dehydrogenation of Succinate.

E° for $\text{NAD}^+/\text{NADH} = -0.32 \text{ V}$

E° for FAD/FADH_2 in Succinate Dehydrogenase = 0.050 V

E° for Fumarate/Succinate = 0.031