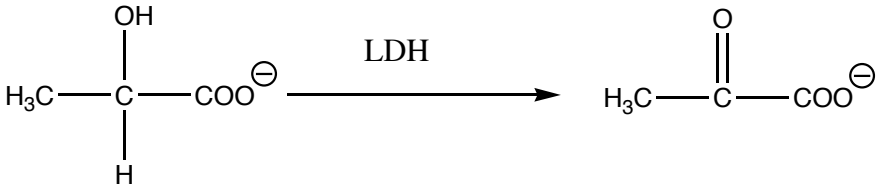
Problem Set B (PS B)

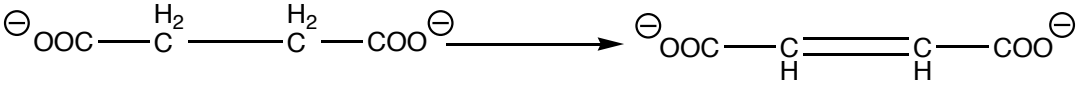
1. List the coenzymes that:
a) participate in oxidation/reduction reactions.
b) act as acyl transfer carriers.

2. In the oxidation of lactate to pyruvate by lactate dehydrogenase (LDH), NAD^+ is reduced in a two-electron transfer process from lactate. Since two protons are also removed from lactate when it is converted to pyruvate, is it correct to write the reduced form of the coenzyme as $NADH_2$? Explain.



Lactate Pyruvate

3. Succinate dehydrogenase requires FAD to catalyze the oxidation of succinate to fumarate in the citric acid cycle. Draw the isoalloxazine ring system of the cofactor reduced from the oxidation of succinate to fumarate and indicate which hydrogens in $FADH_2$ are lacking in FAD.



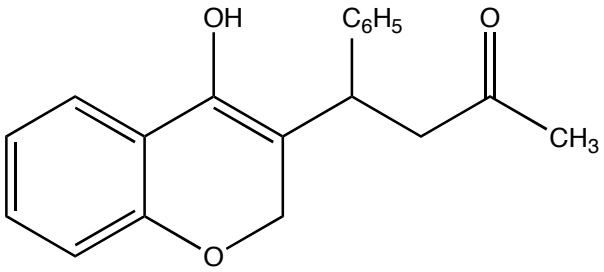
Succinate Fumarate

4. What is the common structural feature of NAD^+, FAD, and Coenzyme A?

5. Name the fat-soluble vitamins. What role does is each fat-soluble vitamin play in human health?

6. Many Americans could eliminate the fat-soluble vitamins from their diets for several months without developing deficiency symptoms. In contrast, deficiency symptoms would be likely to surface within a week or two if you were completely deprived of dietary water-soluble vitamins. Explain this fact.

7. Warfarin is used to kill rodents, and is toxic to animals in general because it causes abnormal bleeding to occur. Warfarin can interfere with the action of a vitamin derived coenzyme by virtue of the structural similarity of their ring systems. Name the coenzyme.



Warfarin