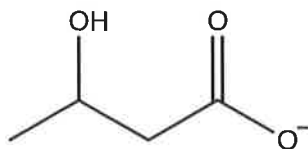


NAME: Key

Quiz 28

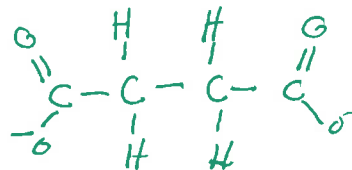
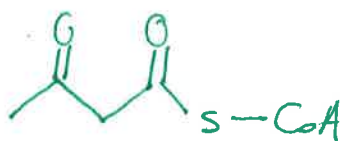
Given  $\beta$ -hydroxybutyrate:



1. Estimate the number of redox steps for the complete oxidation by counting C-C and C-H bonds. 9
2. Convert the  $\beta$ -hydroxyl group to a carbonyl (in this case a ketone).



- a. How many total C-C and C-H bonds? 8
  - b. Name the enzyme class that catalyzes this reaction. dehydrogenase
  - c. What is the additional product? NADH
3. 3-ketoacyl-CoA transferase moves the CoA cofactor from succinyl-CoA to form a thioester out of the carboxylate of C1. This enzyme is expressed in tissues that can utilize ketone bodies. The liver and fat cells generally don't express this enzyme. Draw all the products of this reaction.



4. The product is broken into two acetyl-CoA. Name the enzyme that catalyzes this reaction. thiolase
5. What redox enzymes are used to completely oxidize the two acetyl-CoA to  $\text{CO}_2$ ? How many times is each used?

isocitrate dehydrogenase (2x)  
 $\alpha$ -ketoglutarate dehydrogenase (2x)  
succinate dehydrogenase (2x)  
malate dehydrogenase (2x)

7 NADH  
2 FADH<sub>2</sub> } 20 ATP

8