

MCB 102 Citric Acid Cycle Worksheet Answer Key

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- Which of the following is *not* true of the reaction catalyzed by the pyruvate dehydrogenase complex?
 - Biotin participates in the decarboxylation. *
 - Both NAD^+ and a flavin nucleotide act as electron carriers.
 - The reaction occurs in the mitochondrial matrix.
 - The substrate is held by the lipoyl-lysine "swinging arm."
 - Two different cofactors containing —SH groups participate.
- Glucose labeled with ^{14}C in C-3 and C-4 is completely converted to acetyl-CoA via glycolysis and the pyruvate dehydrogenase complex. What percentage of the acetyl-CoA molecules formed will be labeled with ^{14}C , and in which position of the acetyl moiety will the ^{14}C label be found?
 - 100% of the acetyl-CoA will be labeled at C-1 (carboxyl).
 - 100% of the acetyl-CoA will be labeled at C-2.
 - 50% of the acetyl-CoA will be labeled, all at C-2 (methyl).
 - No label will be found in the acetyl-CoA molecules. *
 - Not enough information is given to answer this question.
- Which of the following is *not* true of the citric acid cycle?
 - All enzymes of the cycle are located in the cytoplasm, except succinate dehydrogenase, which is bound to the inner mitochondrial membrane. *
 - In the presence of malonate, one would expect succinate to accumulate.
 - Oxaloacetate is used as a substrate but is not consumed in the cycle.
 - Succinate dehydrogenase channels electrons directly into the electron transfer chain.
 - The condensing enzyme is subject to allosteric regulation by ATP and NADH.
- Malonate is a competitive inhibitor of succinate dehydrogenase. If malonate is added to a mitochondrial preparation that is oxidizing pyruvate as a substrate, which of the following compounds would you expect to decrease in concentration?
 - Citrate
 - Fumarate *
 - Isocitrate
 - Pyruvate
 - Succinate
- Oxaloacetate uniformly labeled with ^{14}C (i.e., with equal amounts of ^{14}C in each of its carbon atoms) is condensed with unlabeled acetyl-CoA. After a single pass through the citric acid cycle back to oxaloacetate, what fraction of the original radioactivity will be found in the oxaloacetate?
 - all
 - $1/2$ *
 - $1/3$
 - $1/4$
 - $3/4$
- Conversion of 1 mol of acetyl-CoA to 2 mol of CO_2 and CoA via the citric acid cycle results in the net production of: