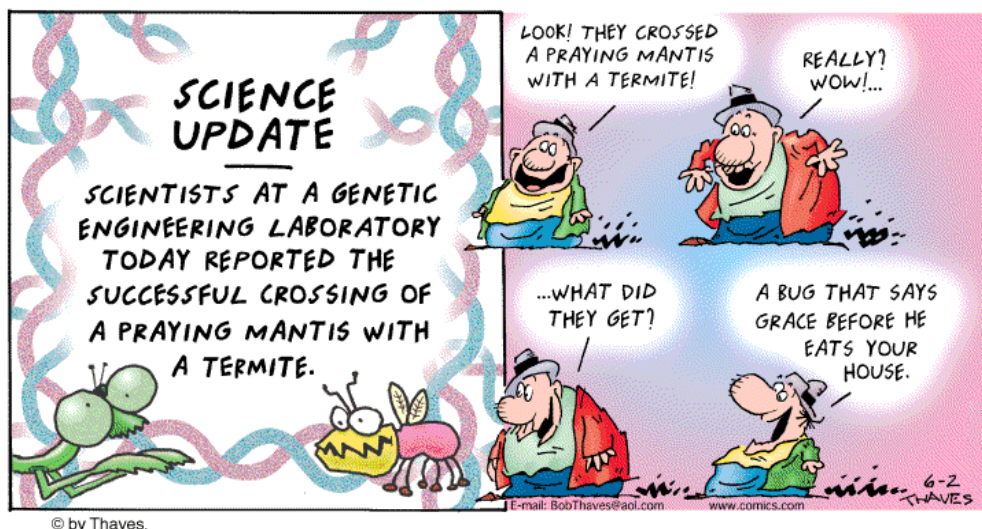


Exam 4 Review Problems



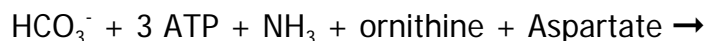
(The questions below are from Exam 3, 2000)

1. (25 points)

In an enzyme system lacking glucose-6-P dehydrogenase and transaldolase the observation is made that it takes three mols of glyceraldehyde to make one mol of ribose-5-P. However, if the system is supplemented with sedoheptulose-7-P, the observation is that three mols of ribose-5-P can be made per four mols of glyceraldehyde-3-P provided. Present a set of enzymatic reactions to explain these observations. No need to use structural formulas, but clearly identify the enzymes used, proposed intermediates, and any other product(s) made.

2. (25 points)

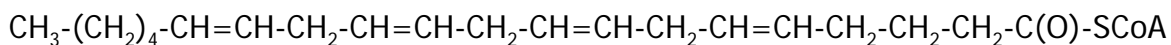
In the overall transformation shown below, it can be observed that ^{18}O provided as ^{18}O -labeled HCO_3^- can be found in the following products: both inorganic phosphates and AMP. Write the mechanisms for the enzymatic reactions involved that account for the observation. Please use structural formulas and include any proposed enzyme-bound intermediates.



Exam 4 Review Problems

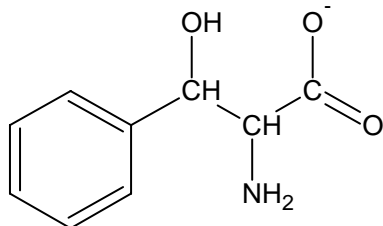
3. (25 points)

Which of the four unsaturated fatty acids that are precursors of all other unsaturated fatty acids in animal systems would be used as the precursor of the unsaturated fatty acid shown below (as the CoA thioester)? Give the enzymatic reactions that would allow the CoA thioester of the precursor to be converted to the compound shown. Assume that the enzymatic reactions that take place in the cytosol of the animal cells. All of the double bonds shown are of the cis variety.

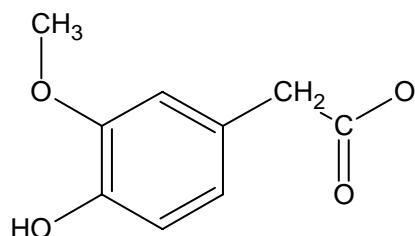


4. (25 points)

Indicate how the compound shown below could be produced enzymatically from β -hydroxyphenylalanine and any other compounds that may be needed. Please use only enzymes of the type discussed in class. In giving your answer, use structural formulas for any proposed intermediates and identify any coenzymes that may be needed. If you believe that a derivative of vitamin B6 is needed, please include the mechanism of any proposed reaction. Hint: α -ketoglutarate is not needed.



B-Hydroxyphenylalanine



5. Bonus Question, (10 points)

When the compound shown below was incubated with an extract of yeast (as a source of enzymes) rich in NADH, the products that were identified were ethanol and alanine. Show how these products could be formed. Use only enzymes of the type discussed in class and, with the use of structural formulas, give the mechanisms of the postulated reactions. Include any proposed enzyme-bound intermediates.

