7.05 Spring 2002
Practice Exam for Exam 4

Exam 3, 2001

1. (20 points)

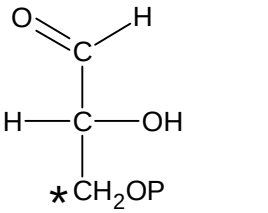
Show how an organism with an inactive isomerase (involved in the pentose cycle) can produce ribose-5-P from as many mols of glucose-6-P that may be needed to produce one mol of ribose-5-P. What other end products would be formed? No need to give structural formulas. Use only enzymes that were discussed in class and be sure to identify each enzyme used and each proposed intermediate compound.

2. (30 points)

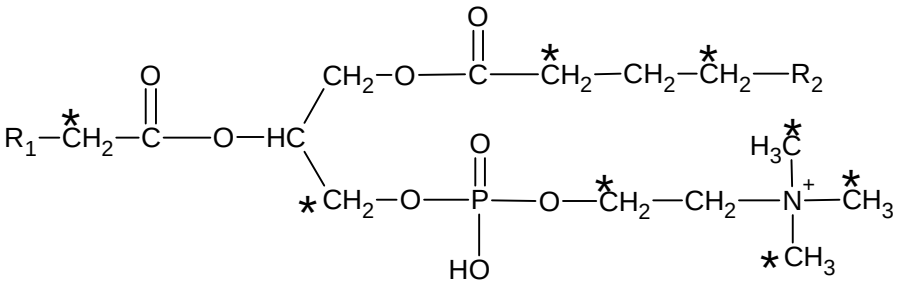
Explain how 2 mols of threonine can be converted enzymatically to 2 mols of succinyl CoA and, in the process, can provide the 2 nitrogen atoms needed for the synthesis of one mol of urea. Please give mechanisms for any enzymatic reaction(s) in which pyridoxal-P is involved (except for transamination). No need to give structural formulas except where pyridoxal-P (transamination excepted) is involved. Hint: threonine is not involved in any transamination reaction.
Note: You should show the incorporation of the 2 nitrogens into urea

3. (25 points)

Explain how the carbon of glyceraldehyde-3-P labeled with an asterisk (*), shown below, can be converted to the carbons labeled with asterisks of of the phospholipid shown below. No need to use structural formulas or to present mechanisms of the enzymatic reactions in giving your answer. Also, there is no need to present comprehensive pathways. Word explanations are sufficient.



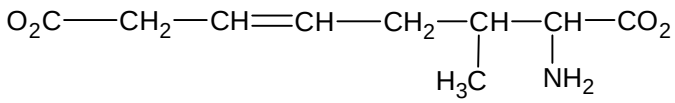
Glyceraldehyde-3-P



A Phospholipid

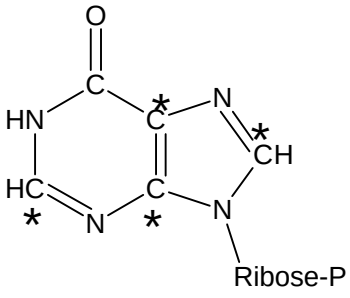
4. (25 points)

Show how the hypothetical compound shown below can be metabolized to yield glycogenic and ketogenic products. Please use structural formulas in giving your answer and identify any coenzymes that may be needed. (Mechanism not required)



5. **BONUS QUESTION:** (10 points)

Explain how serine could be used as a source of the carbons marked with an asterisk (*) in the nucleotides shown below. No need to use structural formulas in giving your answer.



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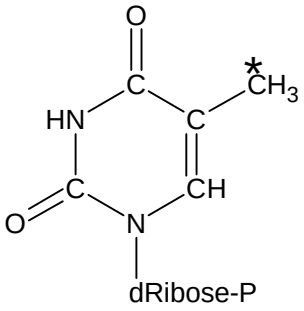

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