BIOSCI 1820
Quiz #6
APR 2002

KEY

I. Name two of the three ways that ammonia (NH_3) is produced in nature (i.e. what is the precursor and how is the conversion catalyzed)?

1) N_2 -> NH_3 by nitrogen-fixing bacteria: Nitrogenase (eg Klefsiella, Agobacter, Rhizobium).

2) NO_2^- -> NH_3 by plants & bacteria: Nitrite Reductase

3) Amino acid, nucleotide, amino sugar (etc.) breakdown

II. What are the two molecular "carriers" in the blood that are used to transport ammonia to the liver for detoxification?

Alanine

Glutanime

(Fig 20.14)

III. Which of the following is NOT one of the proteolytic activities housed in the proteasome?

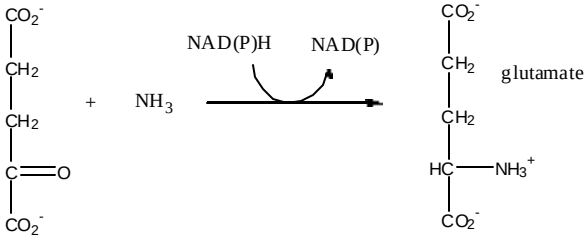
1. chymotryptic
2. acidic
3. calpain-like caclium activated in cytoplasm
4. tryptic
5. none of the above (the proteasome utilizes all of these activities)

IV. Which of the following will NOT be inter-converted by a transaminase reaction?

1. pryuvate and alanine
2. oxaloacetate and aspartic acid
3. a-ketoglutarate and glutamic acid
4. malate and serine
5. none of the above (they can all be interconverted by the enzyme)

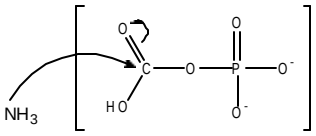
V. Besides using a transaminase, there is another way to create glutamic acid from a precursor lacking nitrogen. What is the name of the enzyme that catalyzes this reaction? Also, draw the structures of ALL of the reactants and products and be sure to indicate the cofactor required.

Glutamate Dehydrogenase

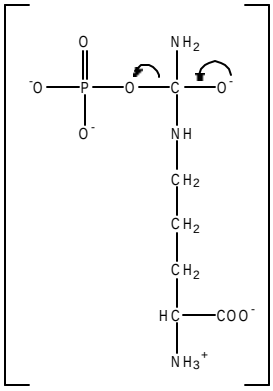


VI. What are the names of the enzymes that catalyze the reactions containing the following intermediates?

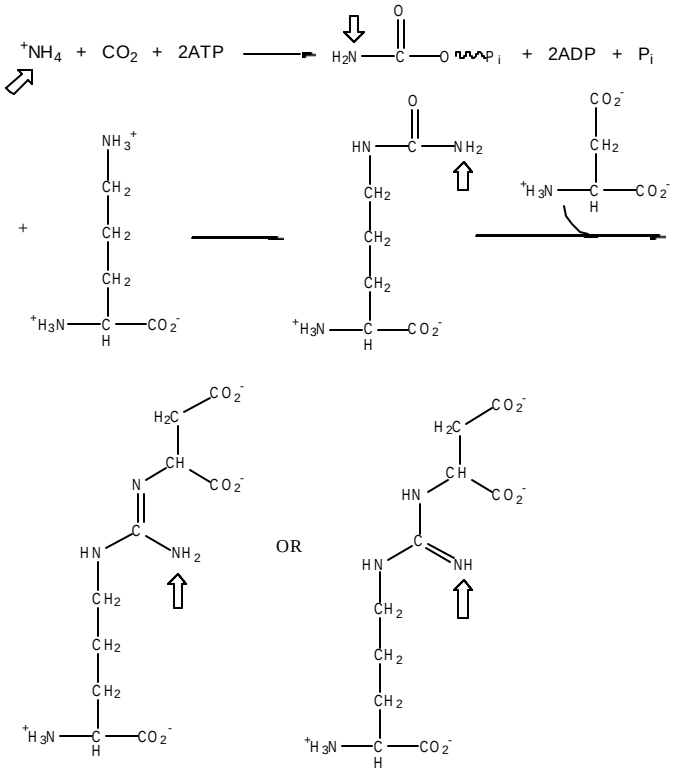
A. Carbamoyl phosphate synthetase



B. ___Ornithine Transcarbamoylase___



VII. A radioactive NH_3 molecule (labled at the nitrogen) is added to a cell lysate capable of undergoing the urea cycle, where it condenses with CO_2. Draw the structure of arginosuccinate and indicate at which position(s) the radiolabled nitrogen would reside.



VIII. How many ATPs are required to conjucate ubiquitin onto an E2 (also known as a Ubiquitin Conjucating Enzyme)?

2 (AMP created)

IX. Onto which amino acid is ubiquitin conjugated in substrate proteins that are targeted for degredation by the proteasome?

Lysine