

DEAMINATION

The removal of amino group from the amino acid as NH_3 is called deamination. Transamination involves only the shuffling of amino groups among the amino acids. On the other hand, deamination result in the liberation of ammonia for urea synthesis. Simultaneously, the carbon skeleton of amino acid is converted to keto acid. Deamination may be either oxidative or non oxidative.

Oxidative deamination:

Oxidative deamination is the liberation of free ammonia from the amino group of amino acid coupled with oxidation. This takes place mostly in liver and kidney. The purpose of oxidative deamination is to provide NH_3 for urea synthesis and α -keto acid for a variety of reactions, including energy generation.

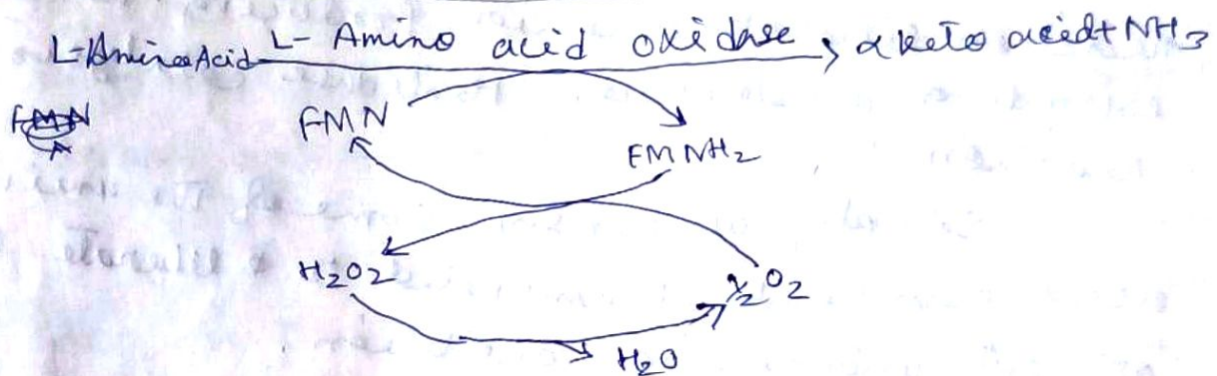
Importance/significant

Oxidative deamination is an important step in the catabolism of ~~metabolism~~ amino acid, generating a more metabolizable form of the amino acid and also generating ammonia as a toxic byproduct. The ammonia generated in this process can then be

neutralized into urea via the urea cycle.

Deamination is used to break down amino acid for energy.

Oxidative deamination by amino acid oxidases:



From Oxidative deamination of amino acid.

L-Amino acid oxidases and D-amino acid oxidase are flavoproteins, possessing FMN and FAD, respectively. They act on the corresponding amino acid (L or D) to produce α -keto acids and NH_3 . In this reaction oxygen is reduced to H_2O_2 , which is later decomposed by catalase (Fig. A).

The activity of L-amino acid oxidase is much low while that of D-amino acid oxidase is high in tissue (mostly liver & kidney). L-amino acid does not act on glycine & decarboxylic acid. This enzyme due to its very low activity, does not appear to play any significant role in the amino acid metabolism.

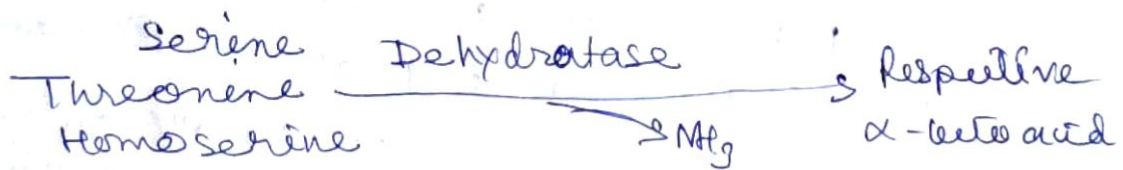
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NON Oxidative deamination

Non oxidative deamination is a type of deamination reaction in which the removal of the amino group occurs without proceeding through an oxidation reaction. This type of deamination reaction liberates ammonia, producing the corresponding α -keto acid. Hydrolase catalyses this reaction.

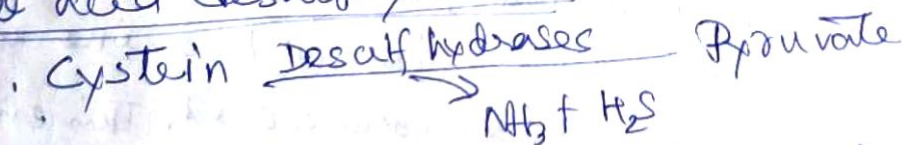
Simply we can say, some of the amino acid can be deaminated to liberate NH_3 without undergoing oxidation.

Ex. (a) Amino acid dehydratases:



Serine, Threonine and homoserine are the hydroxy amino acid. They undergo non-oxidative deamination catalyzed by PLP-dependent dehydratases (dehydratases).

(b) Amino acid desulfhydratases:



The sulfur amino acid, namely cysteine and homocysteine, undergo deamination coupled with desulfhydration to give keto acids.