



PROTEOMICS LECTURE 4

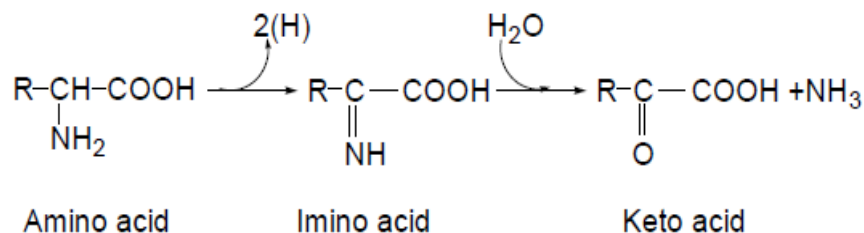
إعداد

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General reactions of amino acids

1. Deamination:

Deamination means removal of the amino groups from amino acids. This is the mechanism where in the amino acids lose two hydrogen atoms (dehydrogenation) to form keto acids and ammonia.



General reactions of amino acids

Deamination reaction needs:

Enzymes called amino acid oxidases and coenzymes (FAD or FMN) to take up the hydrogen.

There are two types of amino acid oxidases depending upon the substrate, on which they act, namely,

1. L-amino acid oxidases which act on L-amino acids (FMN acts as coenzyme).
2. D-amino acid oxidases which act on D-amino acids (FAD acts as coenzyme).

FMN occurs only in the liver and kidney and FAD occurs in all animal tissues. The major site of oxidative deamination is liver but kidney and other tissues also have a role.

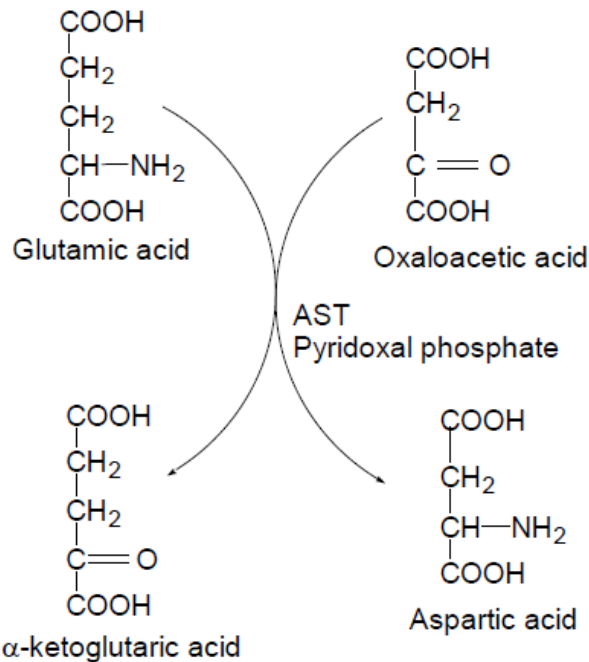
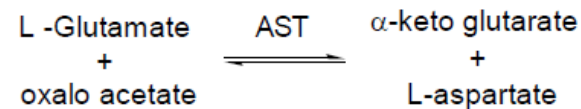
General reactions of amino acids

2. Transamination:

The process of transfer of an amino group from an amino acid to a keto acid, resulting in the formation of a new amino acid and keto acid is known as transamination. In other words, it is deamination of an amino acid, coupled with amination of a keto acid. Transamination is catalyzed by transaminases or aminotransferases with pyridoxal phosphate functioning as coenzyme.

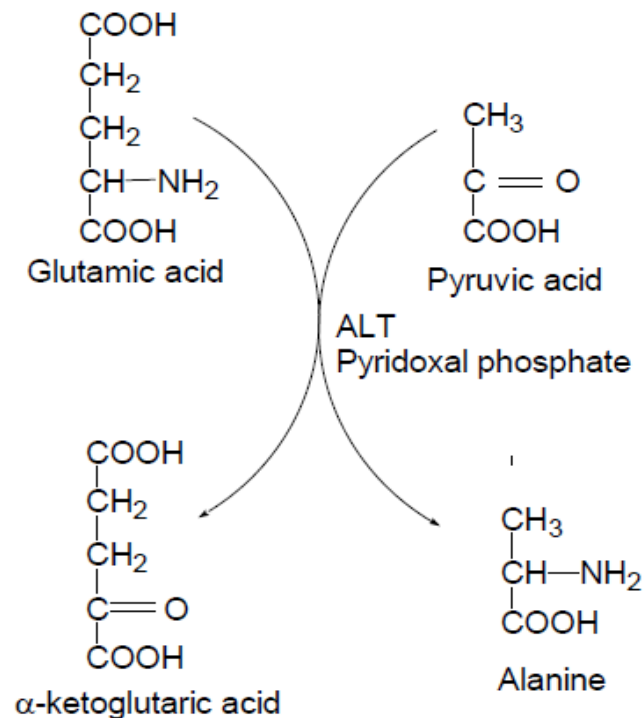
General reactions of amino acids

Aspartate aminotransferase (AST) is also known as Glutamate - oxalo acetate transaminase (GOT).



General reactions of amino acids

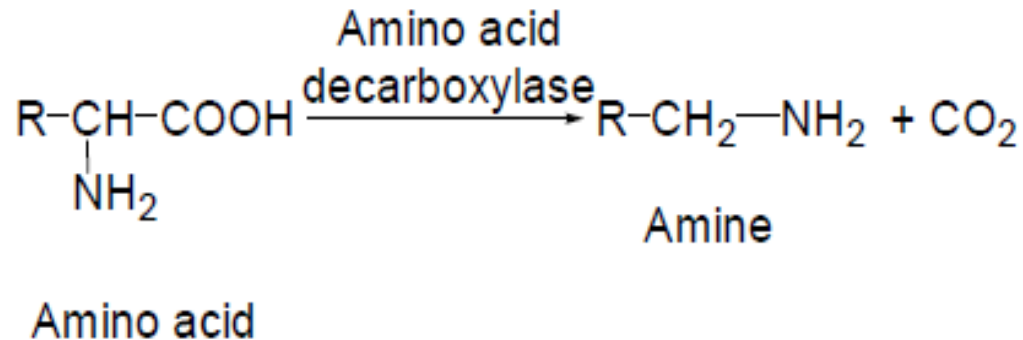
Alanine aminotransferase (ALT) is also known as Glutamate - pyruvate transaminase (GPT).



General reactions of amino acids

3. Decarboxylation:

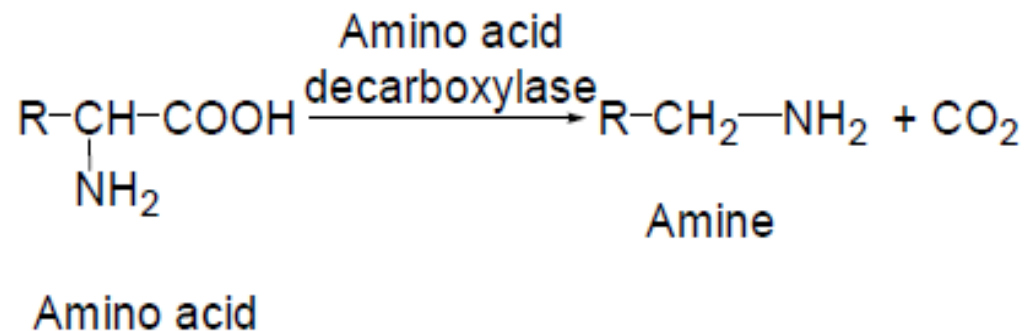
This refers to the removal of CO₂ from the carboxyl group of amino acids. The removal of CO₂ needs the catalytic action of enzymes decarboxylases and the pyridoxal phosphate coenzyme.



General reactions of amino acids

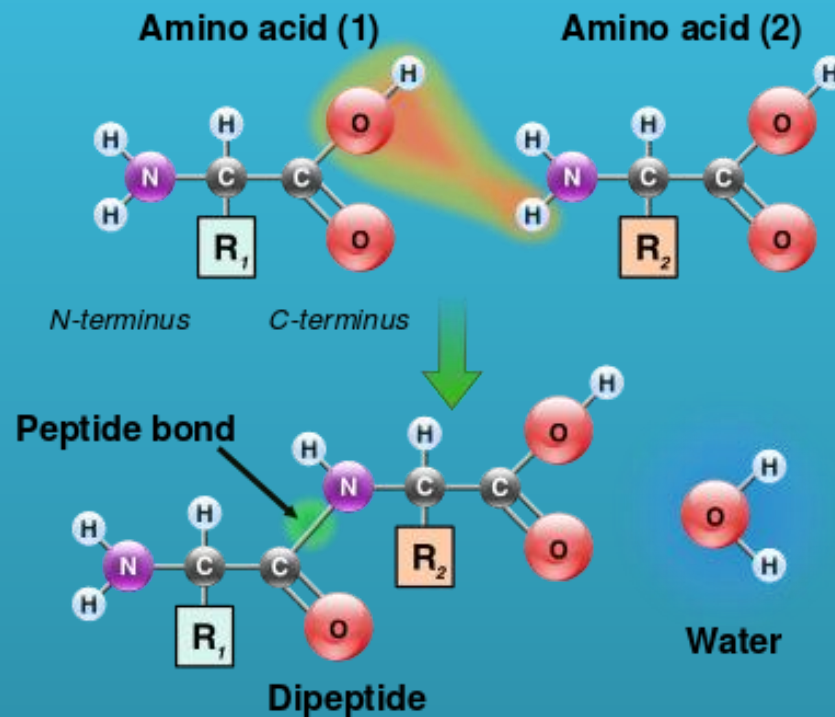
3. Decarboxylation:

- This refers to the removal of CO_2 from the carboxyl group of amino acids to form amines. The removal of CO_2 needs the catalytic action of enzymes decarboxylases and the pyridoxal phosphate coenzyme



Peptides

Peptides are short chains of amino acids, typically between two and 50 amino acids in length. Peptides are formed through covalent bonding between two or more amino acids' molecules.



Difference between peptide and protein:

No.	Peptide	Protein
1	Peptides are short chains of amino acids.	Proteins are longer chains of amino acids.
2	They contain approximately 2 or less than 50 amino acids.	They contain more than 50 amino acids.
3	molecular weight less than 10000 <u>daltons</u>	molecular weight greater than 10000 <u>daltons</u>
4	They are not that well defined in their structure.	They have a well - defined structure.
5	Polypeptide is a class of peptides.	Protein is formed by joining two or more polypeptides.
6	It plays a key role in the functioning of many molecules and proteins as well.	It plays a key role as enzyme and structural molecule.

Biologically active peptides

1. Hormones:

Insulin* and glucagon from pancreas.

Vasopressin and oxytocin from posterior pituitary gland.

ACTH from anterior pituitary gland.

2. **β -Lipotropin:** It is a polypeptide produced from anterior pituitary gland and has analgesic effect powerful 18-30 times than morphine.

3. **Bradykinin:** It acts as a potent smooth muscle relaxant and produces vasodilatation and hypotension.

4. **Antibiotics:** e.g. Valinomycin.

5. **Antitumoragents:** e.g. Bleomycin.

6. **Aspartame:** It is a dipeptide serves as sweetening agent, being used in replacement of cane sugar.

Biologically active peptides

- 7. Natriuretic factor:** It is released by muscle cells in the upper chambers (atria) of the heart (atrial myocytes) in response to high blood volume. Acts to reduce the water and sodium loads on the circulatory system, thereby reducing blood pressure.
- 8. Glutathione:** It is a tripeptide formed of three amino acids: glutamate, cysteine and glycine.

Functions of glutathione:

Glutathione combine with certain toxic compounds to produce nontoxic compounds.

Glutathione has a role in transport of amino acids across intestinal cell membrane.

Glutathione breakdown the hydrogen peroxide (H_2O_2) which causes cell damage and hemolysis (it acts as antioxidant).

Glutathione activities of some enzymes.



مع تمنياتي لكم بالنجاح والتوفيق

لمزيد من المعلومات

<http://www.bu.edu.eg/staff/doaamohamed7-courses>