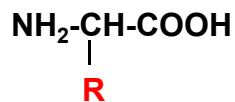


## Generalities

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- Proteins are the polypeptides formed by sequences of amino acids
- General formula of the  $\alpha$ -amino acids

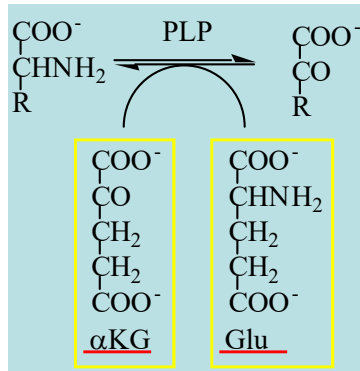


- The amino acids occupy a central position in the metabolism of nitrogenous compounds

## Main amino acid reactions

- TRANSAMINATION
  - DEAMINATION
  - DECARBOXYLATION
- 
- The degradation of the amino acids occurs in the mitochondria.
  - By a **transamination reaction** (1) the amino group is transferred to a-ketoglutarate to form glutamate in a reversible way.
  - Glutamate release ammonia through an oxidation reaction
  - Most amino acids have their specific transaminase, and those that do not have can be transformed into other that has.
  - (1) Transaminations are reactions involved in both, anabolism and catabolism.

▪ Transamination reaction



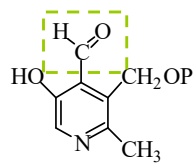
▪ Reaction : transamination  
(exchange of amine group)

▪ Enzyme: transaminase  
(aminotransferase) in cytosol

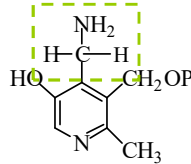
▪ Coenzyme activateur:  
Pyridoxal Phosphate (PLP)

▪ Reversible

**Pyridoxal phosphate (PLP)**



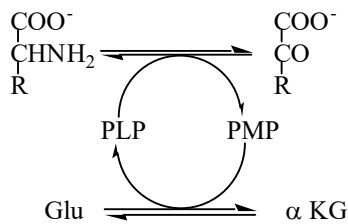
Pyridoxal phosphate  
(PLP)



Pyridoxamine phosphate  
(PMP)

Coenzyme associated  
with numerous  
enzymes acting on  
nitrogen compounds  
- transaminases  
- isomerase  
- decarboxylase...

**Mechanisme**



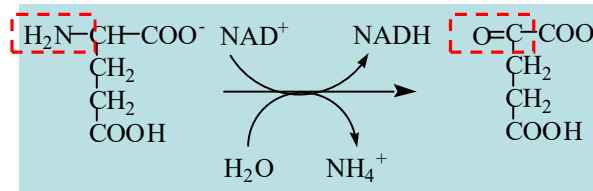
▪ Ping-pong reaction:

1 - fixation of the substrate 1 to the active site of the enzyme, then formation of the product which is detached from the active site

2 - fixation of the substrate 2 to the active site of the enzyme

## ▪ Oxidative deamination

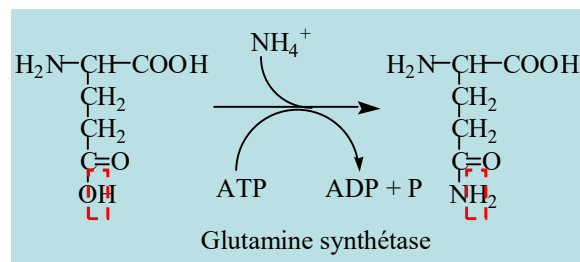
### ↳ Elimination of nitrogenous from glutamate



- Transformation of glutamate (formed by protein degradation or by AA transamination) in  $\alpha$ -ketoglutarate and  $\text{NH}_4^+$
- **Oxidation** coupled to **hydrolysis**
- Enzyme: Dehydrogenase (Glutamate dehydrogenase)

## ▪ Amoniac fate

### ↳ Stored as glutamine



- Coupled reaction: **hydrolysis** of ATP and **condensation** of  $\text{NH}_4^+$  on glutamate (double transfer)

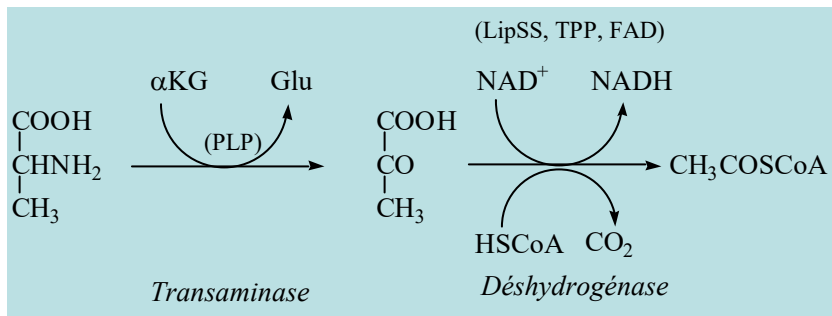
### ↳ Elimination by urea cycle

## Lateral chain degradation

▪ In general, N elimination occurs by transamination, then CO<sub>2</sub> is liberated by an oxidative decarboxylation :

- Formed α-ketoacides are Krebs or glycolysis intermediates : pyruvate, α-ketoglutarate, OAA...

### Example



## Aminoacids catabolism and anabolism are linked to glycolysis and Krebs intermediates

