

## All amino acids participate in these reactions at some point in their catabolism

\*\*\* This is **false**; serine and threonine **are not** transaminated — they are oxidatively deaminated (*release  $NH_3$* ) by a **dehydratase** enzyme to form pyruvate and propionyl coA respectively.

The **first step** in the catabolism of most amino acids involves the removal of the  $\alpha$ -amino group. Once removed, this nitrogen can be incorporated into other compounds or excreted.

**Nitrogen is transferred** from one amino acid to another by **transamination reactions**, which always involve two different pairs of amino acids and their corresponding  $\alpha$ -keto acids.

**Note: Glutamate** and  **$\alpha$ -ketoglutarate** usually serve as one of the pairs; **transaminases** (*aminotransferases*) catalyzed the transfer of amino groups; **all transaminases** require the coenzyme **pyridoxal phosphate**.

In contrast to transamination reactions that transfer amino groups, **oxidative deamination** reactions result in the liberation of the amino group as free ammonia ( $NH_3$ ). These reactions occur primarily in the liver and kidney and provide  **$\alpha$ -ketoacids** (*for energy*) and **ammonia** (*which is a source of nitrogen in urea synthesis*). **Note:** Enzymes involved in deamination reactions include **glutamate dehydrogenase** (*for glutamate*), **histidase** (*for histidine*), and **serine dehydratase** (*for serine and threonine*).

**All aminotransferases** (*transaminases*) share a common prosthetic group, **pyridoxal phosphate** (*PLP*). PLP is the coenzyme form of pyridoxine or vitamin B<sub>6</sub>. It functions as an intermediate carrier of amino groups at the active site of aminotransferases. PLP undergoes reversible transformations between its aldehyde form, **pyridoxal phosphate** (*PLP*), which can accept an amino group, and its **aminated** form, **pyridoxamine phosphate** (*PMP*), which can donate its amino acid to an  $\alpha$ -keto acid.