

25.5: Amino Acid Catabolism - The Carbon Atoms

Learning Objectives

- Objective 1
- Objective 2

Any amino acid can be converted into an intermediate of the citric acid cycle. Once the amino group is removed, usually by transamination, the α -keto acid that remains is catabolized by a pathway unique to that acid and consisting of one or more reactions. For example, phenylalanine undergoes a series of six reactions before it splits into fumarate and acetoacetate. Fumarate is an intermediate in the citric acid cycle, while acetoacetate must be converted to acetoacetyl-coenzymeA (CoA) and then to acetyl-CoA before it enters the citric acid cycle.

 File:Amino acid catabolism revised.png

Figure 25.5.1: Fates of the Carbon Skeletons of Amino Acids (https://commons.wikimedia.org/wiki/File:Amino_acid_catabolism_revised.png)

Those amino acids that can form any of the intermediates of carbohydrate metabolism can subsequently be converted to glucose via a metabolic pathway known as gluconeogenesis. These amino acids are called **glucogenic** amino acids. Amino acids that are converted to acetoacetyl-CoA or acetyl-CoA, which can be used for the synthesis of ketone bodies but not glucose, are called **ketogenic** amino acids. Some amino acids fall into both categories. Leucine and lysine are the only amino acids that are exclusively ketogenic. Figure 25.5.1 summarizes the ultimate fates of the carbon skeletons of the 20 amino acids.

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