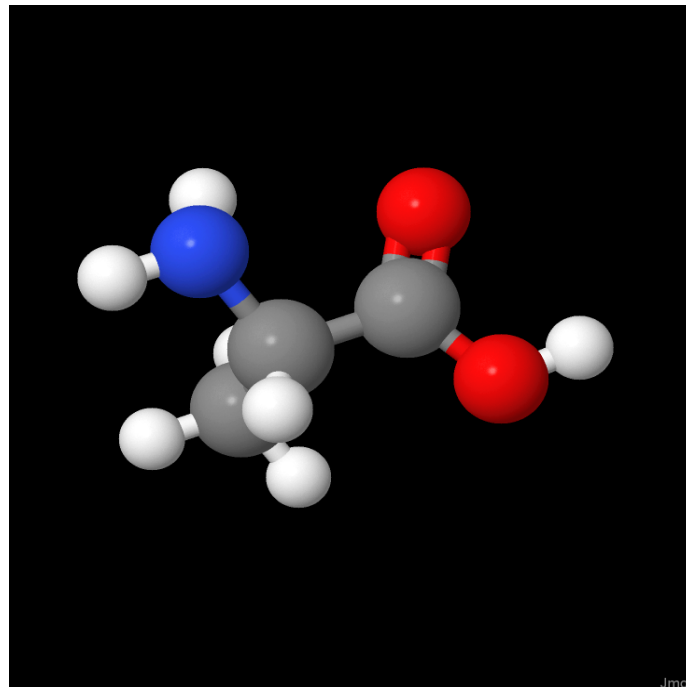


Alanine

Alanine (symbol Ala or A), or α -alanine, is an α -amino acid that is used in the biosynthesis of proteins. It contains an amine group and a carboxylic acid group, both attached to the central carbon atom which also carries a methyl group side chain. Consequently it is classified as a nonpolar, aliphatic α -amino acid. Under biological conditions, it exists in its zwitterionic form with its amine group protonated (as $-\text{NH}_3^+$) and its carboxyl group deprotonated (as $-\text{CO}_2^-$). It is non-essential to humans as it can be synthesized metabolically and does not need to be present in the diet. It is encoded by all codons starting with GC (GCU, GCC, GCA, and GCG).

The L-isomer of alanine (left-handed) is the one that is incorporated into proteins. L-alanine is second only to L-leucine in rate of occurrence, accounting for 7.8% of the primary structure in a sample of 1,150 proteins. The right-handed form, D-alanine, occurs in peptides in some bacterial cell walls: 131 (in peptidoglycan) and in some peptide antibiotics, and occurs in the tissues of many crustaceans and molluscs as an osmolyte.



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Alanine is an aliphatic amino acid, because the side-chain connected to the α -carbon atom is a methyl group ($-\text{CH}_3$). Alanine is the simplest α -amino acid after glycine. The methyl side-chain of alanine is non-reactive and is therefore hardly ever directly involved in protein function. Alanine is a nonessential amino acid, meaning it can be manufactured by the human body, and does not need to be obtained through the diet. Alanine is found in a wide variety of foods, but is particularly concentrated in meats.