

UNIT 10 • BIOMOLECULES

Amino Acids

The structural and functional building blocks of life.

α -Amino Acid

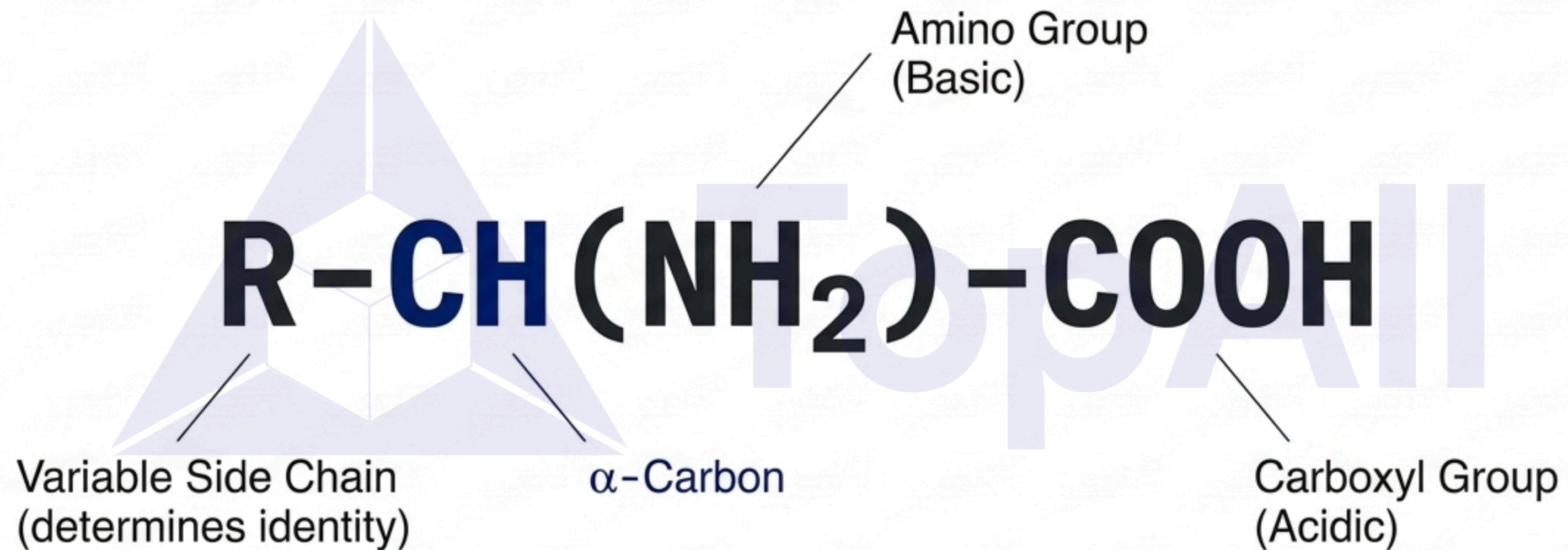
Amino (-NH₂) and carboxyl (-COOH) groups attached to the same central carbon.

Essential

Cannot be synthesized in the body; must be obtained through diet.

Non-Essential

Can be readily synthesized internally by the human body.



Trivia: Many retain trivial names based on source or property (e.g., Glycine from glykos, meaning sweet; Tyrosine from tyros, meaning cheese).



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$$E=mc^2$$



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Amino Acid	R-Group Structure	3-Letter	1-Letter
Glycine	H	Gly	G
Alanine	-CH ₃	Ala	A
Valine*	(H ₃ C) ₂ CH-	Val	V

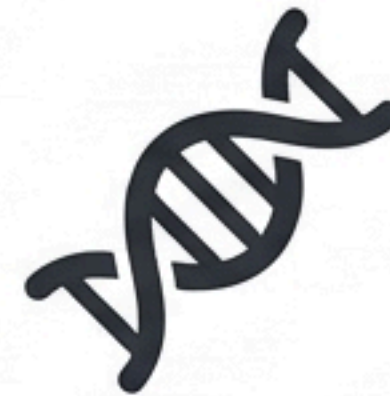
* = Essential Amino Acid



Essential

Must be obtained through diet. The body cannot synthesize these.

Val, Leu, Lys



Non-Essential

Readily synthesized internally by the human body.

Gly, Ala, Glu

Watch for this: The α -Position Rule

While amino acids can be classified as α , β , γ , or δ depending on the relative position of the amino group to the carboxyl group...

ONLY α -amino acids are obtained on the hydrolysis of proteins.

Don't get tricked! If an exam question asks about the building blocks of human proteins, always look for the α -carbon linkage.

Key Takeaways

- All proteins are polymers of α -amino acids containing both an amino ($-\text{NH}_2$) and a carboxyl ($-\text{COOH}$) group attached to the same central carbon.
- They are classified biogenically as **essential** (diet-dependent) or **non-essential** (body-synthesized), typically represented by standardized 3-letter and 1-letter codes.



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