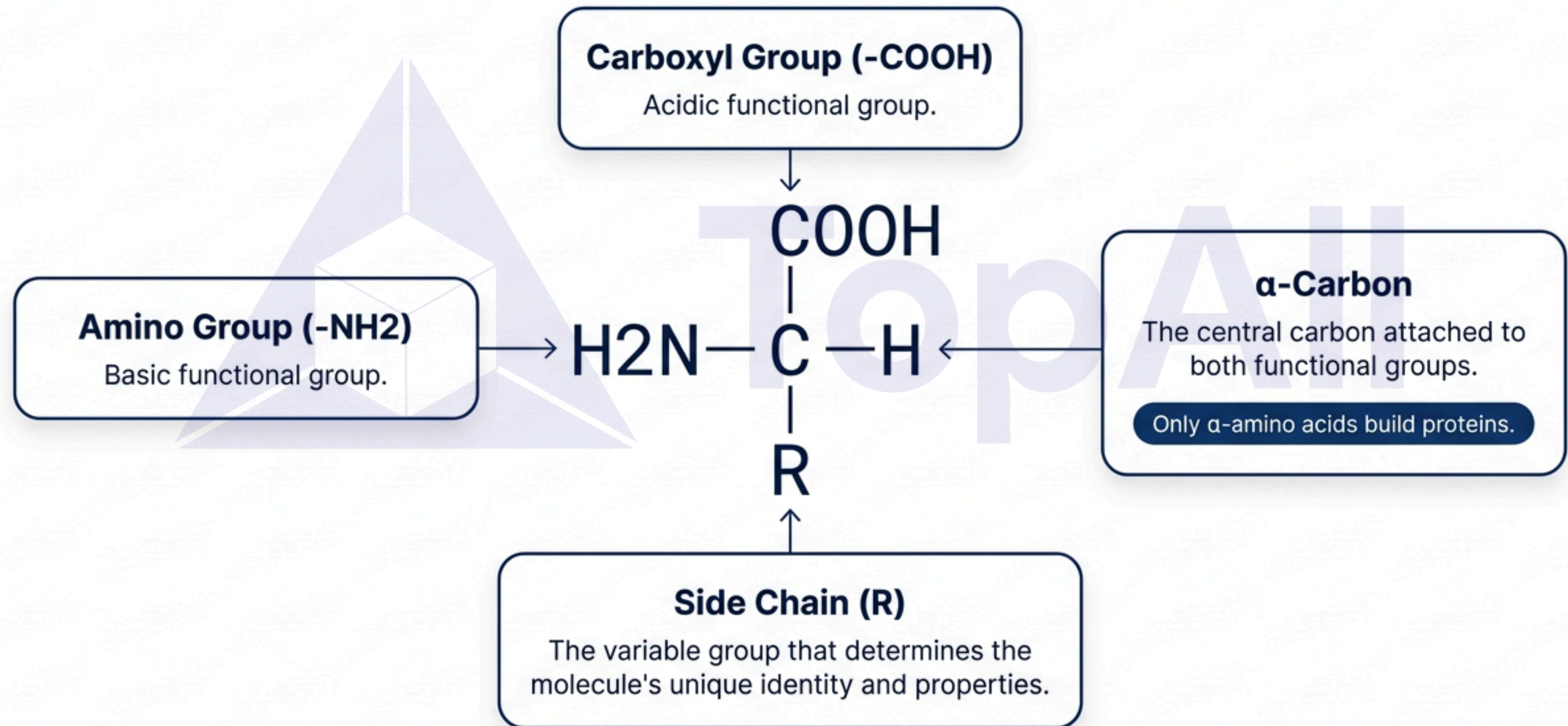


Amino Acids

The Chemical Profile of Protein Monomers



General Structure of α -Amino Acids



The Chemical Nature of Side Chains



Neutral

Equal number of -NH_2 and -COOH groups.

[Glycine]

[Alanine]

[Valine]



Acidic

More -COOH groups than -NH_2 groups.

[Aspartic acid]

[Glutamic acid]



Basic

More -NH_2 groups than -COOH groups.

[Arginine]

[Lysine]



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$$E=mc^2$$



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Overview of Common Amino Acids

Naming Conventions

Trivial names reflect molecular properties or natural sources.

Glycine (Gly, G) → derived from glykos
(Greek for sweet).

Tyrosine (Tyr, Y) → derived from tyros
(Greek for cheese).

Nutritional Source

Essential

Cannot be synthesised in the body. Must be obtained through diet.

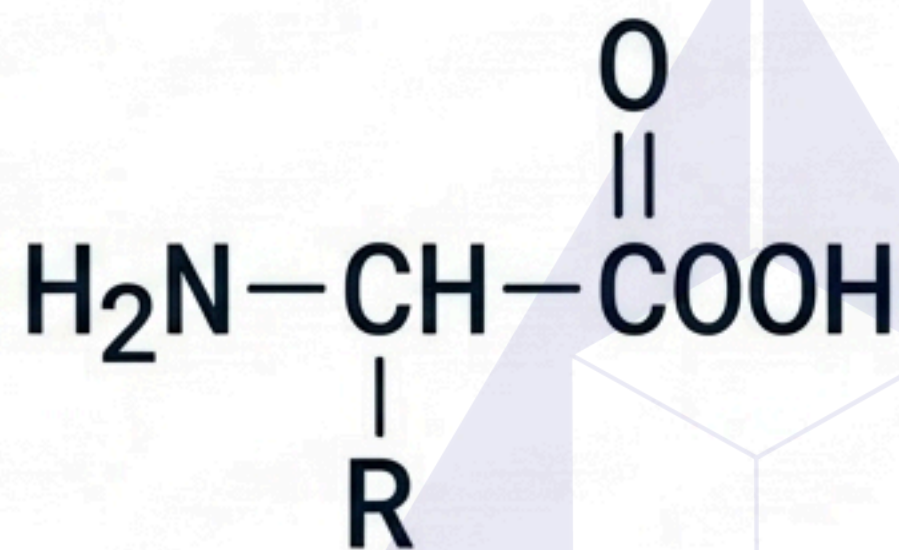
Examples: Valine, Leucine, Lysine

Non-Essential

Can be synthesised naturally within the human body.

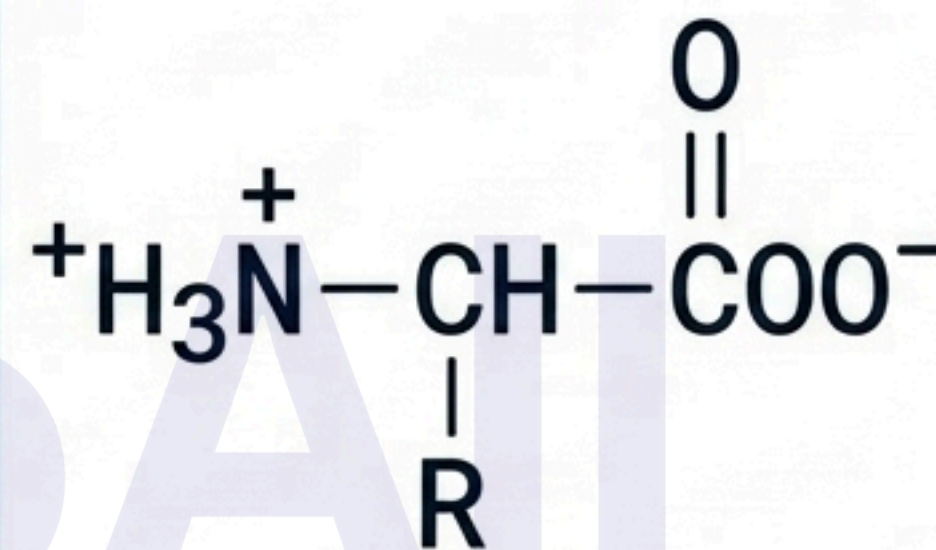
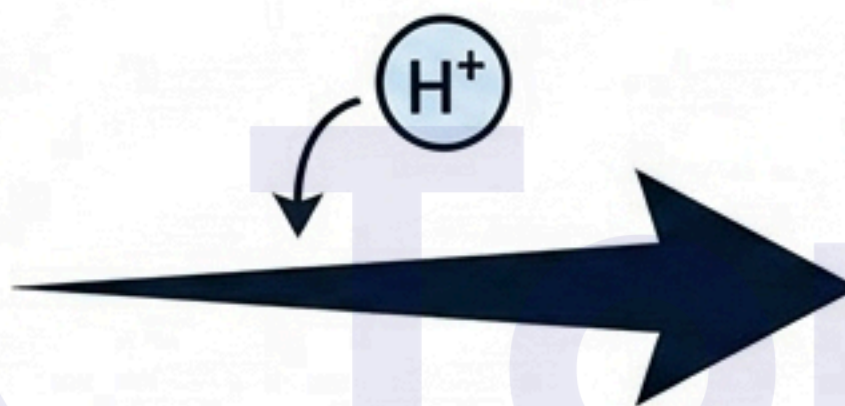
Examples: Glycine, Alanine, Aspartic acid

Zwitter Ion and Amphoteric Nature



Standard Form

In aqueous solution



Zwitterion Form

[Neutral Overall]
Contains both positive
and negative charges.

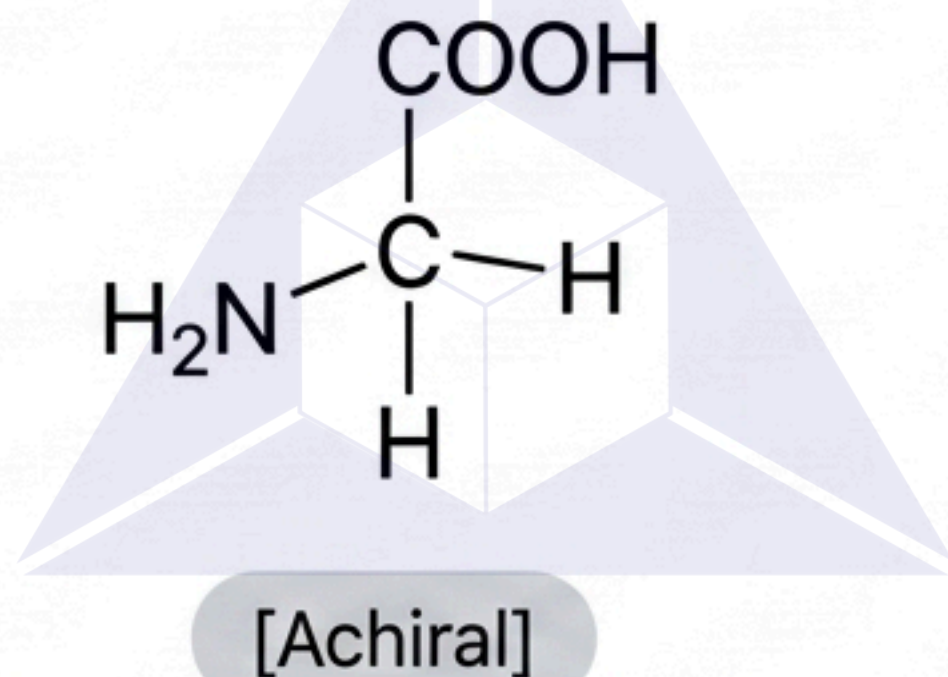
[Amphoteric Behavior]
Reacts with both
acids and bases.

[Salt-like Properties]
Water-soluble,
high-melting solid.

Optical Activity and L-Configuration

The Exception

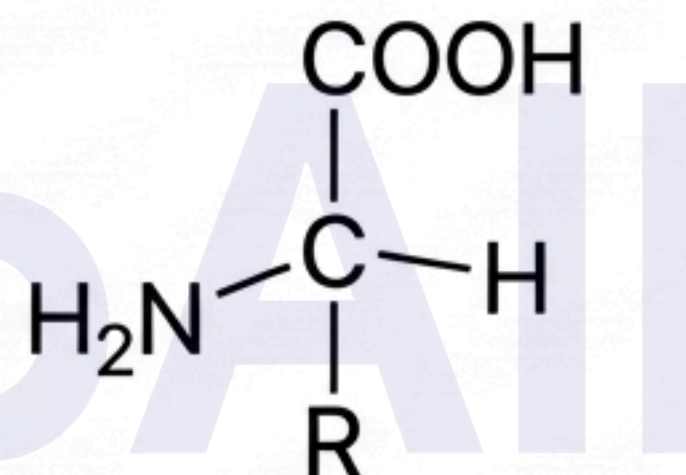
Glycine



The only naturally occurring α -amino acid without an asymmetric carbon. Optically inactive.

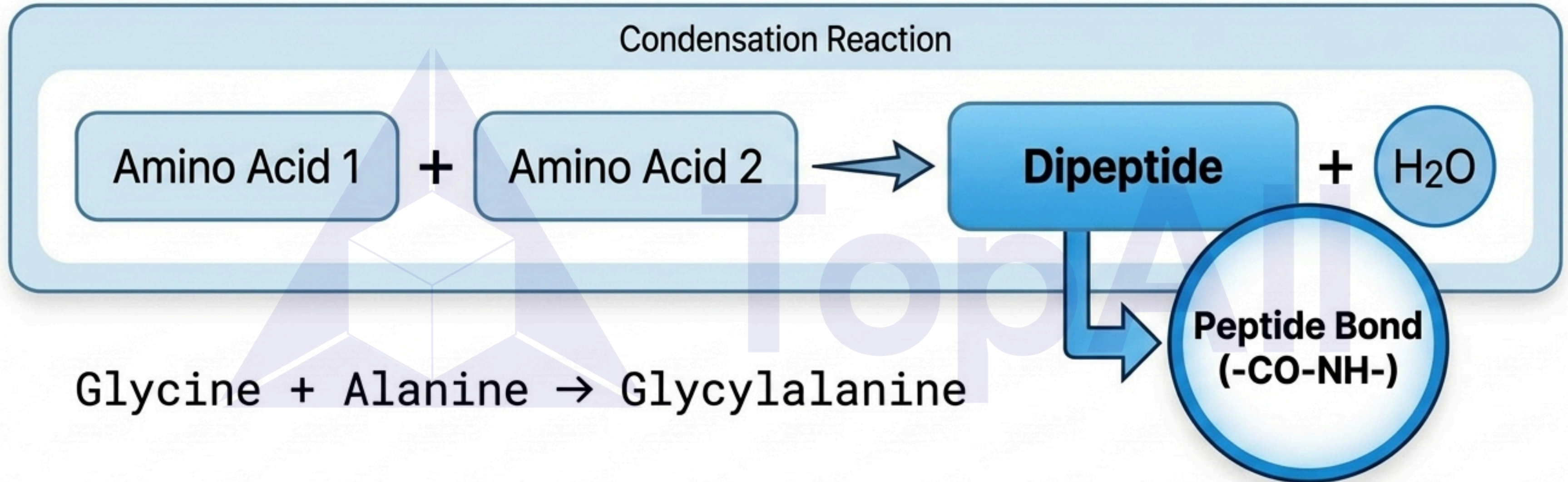
The Rule

Generic L-Amino Acid



Most naturally occurring amino acids have L-configuration. In L-Amino acids, the -NH₂ group is written on the left hand side.

Final Recap: Amino Acids as Protein Monomers



[Building Blocks]

α -amino acids are the primary polymers of proteins.

[Zwitterionic]

They exist as dipolar, amphoteric ions in aqueous environments.

[L-Configuration]

Almost all are chiral and biologically active in the L-form.



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