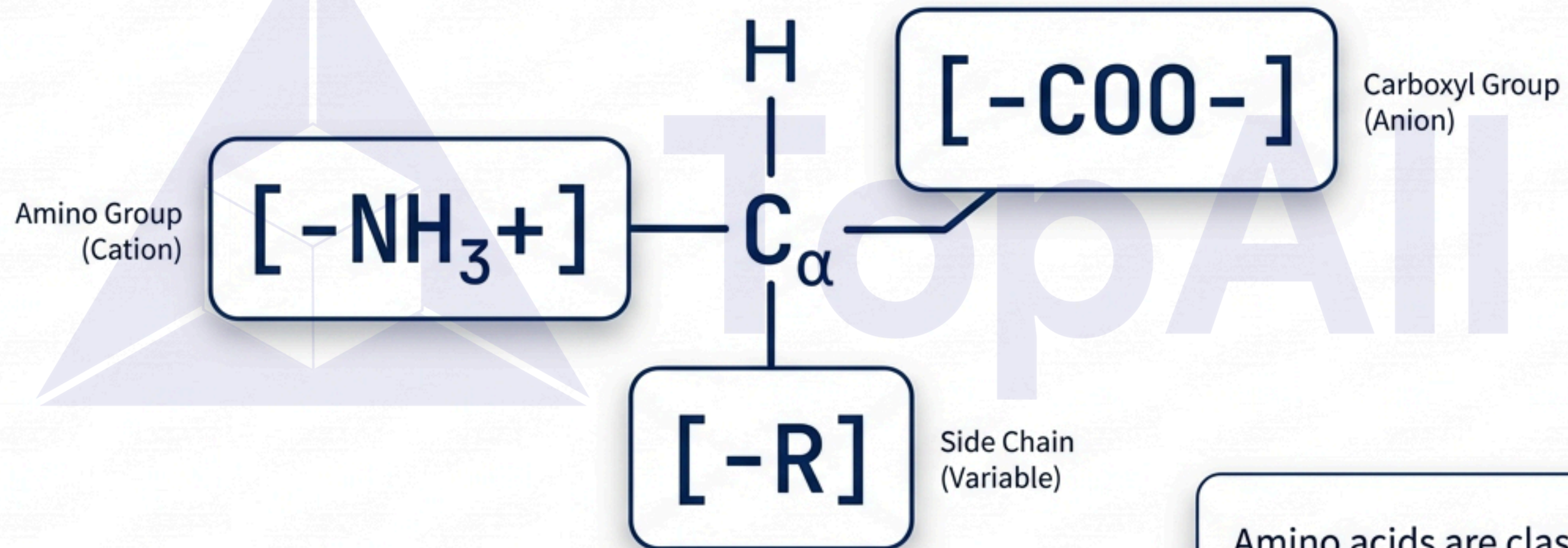


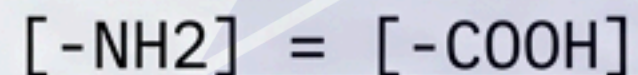
10.2.2 Classification of Amino Acids



Amino acids are classified by two distinct paradigms: their chemical functional groups and their biological synthesis.

Classification by Functional Groups

Neutral



Equal number of amino and carboxyl groups.

Glycine (G)

Alanine (A)

Acidic

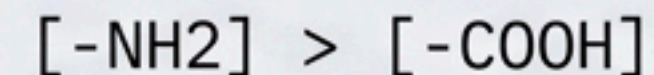


More carboxyl groups compared to amino groups.

Glutamic acid (E)

Aspartic acid (D)

Basic



More amino groups compared to carboxyl groups.

Lysine (K)

Arginine (R)

Essential vs. Non-Essential Amino Acids

Non-Essential Amino Acids



The body can manufacture these on its own.

No Dietary Requirement

Essential Amino Acids



The body cannot synthesize these molecules.

Strict Dietary Requirement

Exam-Smart Notation In standard chemical tables (like Table 10.2), essential amino acids are strictly denoted with an asterisk.

Valine*

Leucine*

Histidine*

Tryptophan*



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$$E=mc^2$$



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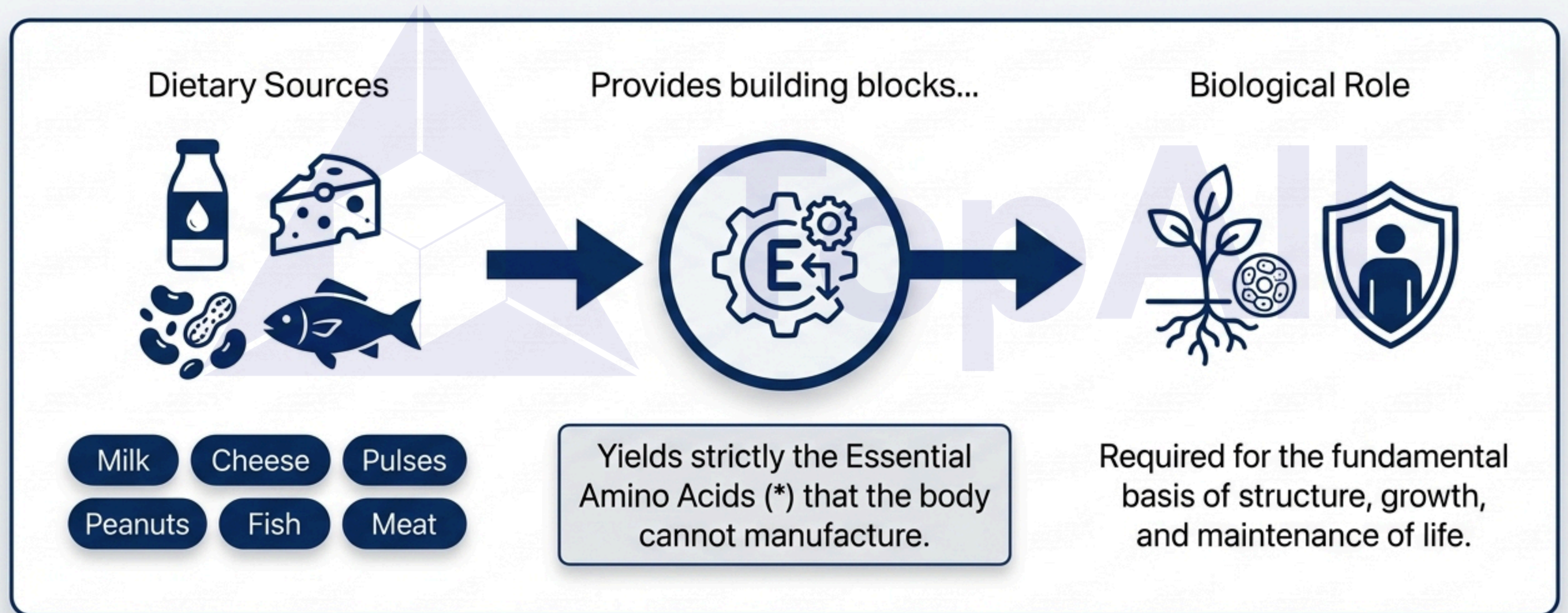
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The Dietary Imperative of Essential Amino Acids



Chemistry and Nutrition, United

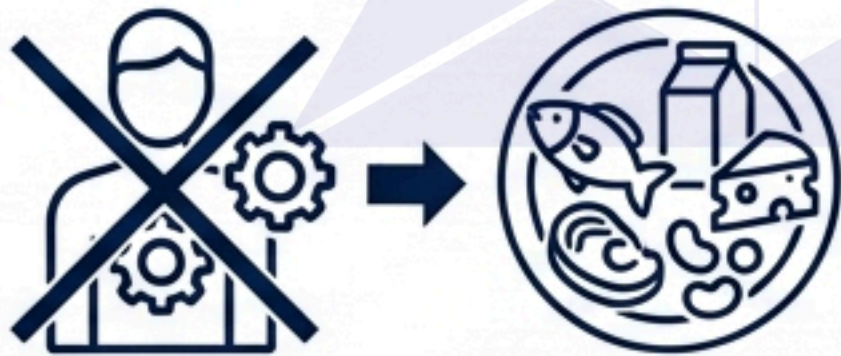
Structure Analysis



$$2 \times [-\text{NH}_2] + 1 \times [-\text{COOH}]$$

[BASIC]

Biosynthesis Analysis



Cannot be synthesized by the human body.

[ESSENTIAL *]

Recap Panel

Every amino acid sits at the intersection of chemistry and biology. Its functional groups dictate its chemical behavior, while human evolution dictates its nutritional necessity.



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