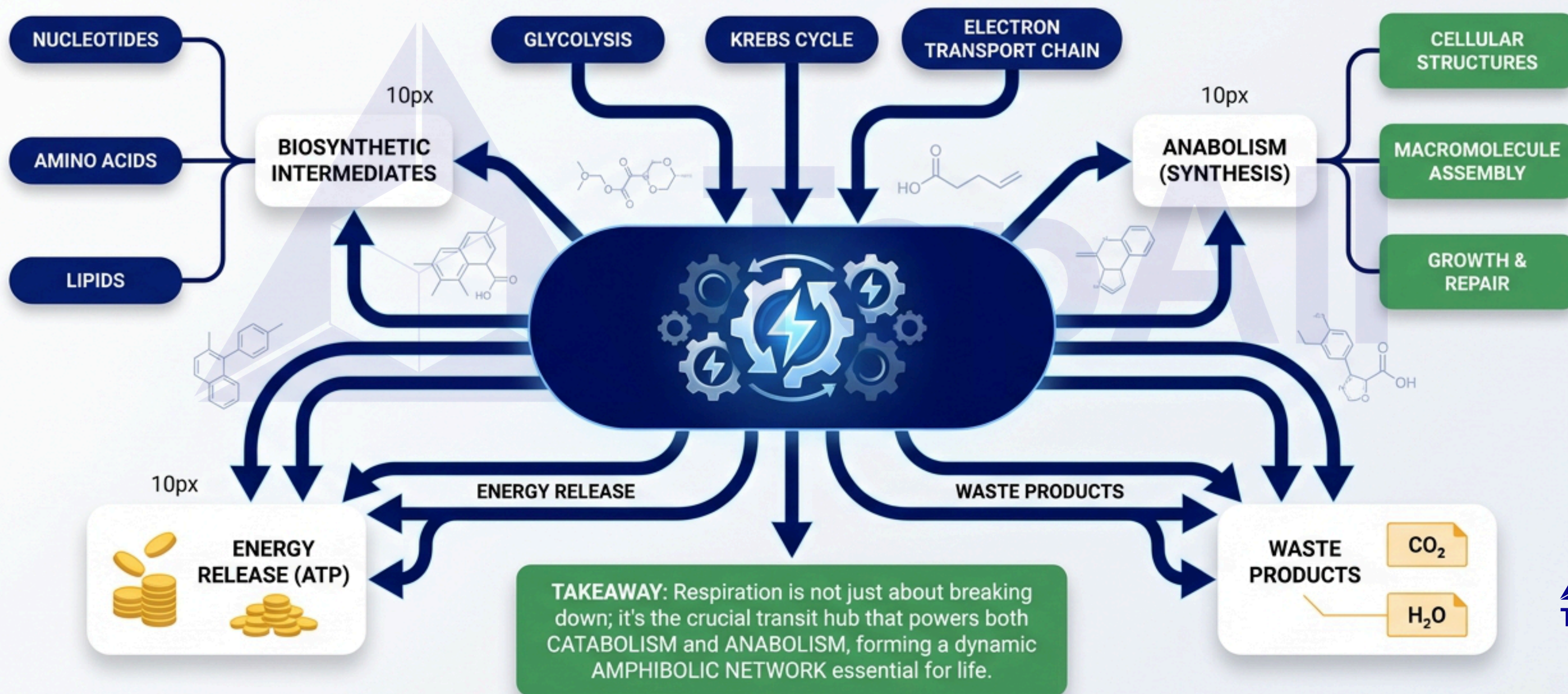


RESPIRATION IS BREAKDOWN AND BUILDING

Rethinking the metabolic pathway: from a simple catabolic furnace to a dynamic, two-way amphibolic network.



The Metabolic Forces: Catabolism vs. Anabolism



Catabolism

- Action:** Breaking down complex substrates into simpler forms.
- Classic Example:** Degrading proteins into individual amino acids.
- Traditional View:** Respiration has historically been considered purely a catabolic process.



Anabolism

- Action:** Synthesizing complex molecules from simpler precursors.
- Classic Example:** Fusing fatty acids and glycerol to build fats.

The Paradigm Flaw: Viewing respiration as strictly catabolic ignores how the cell continuously withdraws intermediates to build new structures.

The Main Highway: Carbohydrates



Carbohydrates

Glucose

The universally favoured substrate. All carbohydrates are usually first converted into glucose before entering respiration.

Pyruvic Acid

Acetyl CoA

Krebs Cycle



**You've Learned the Theory.
Let's Test Them Now.**

$$E=mc^2$$



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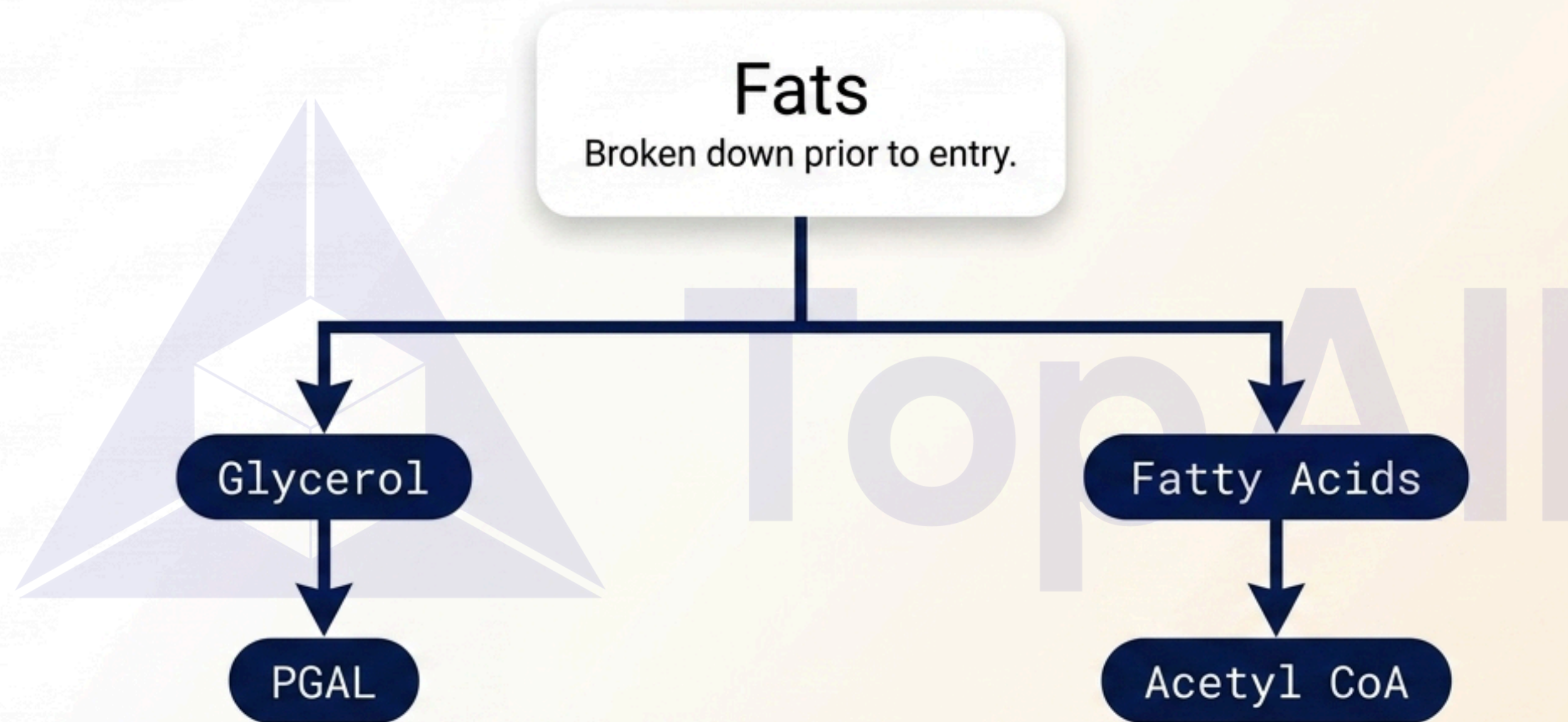
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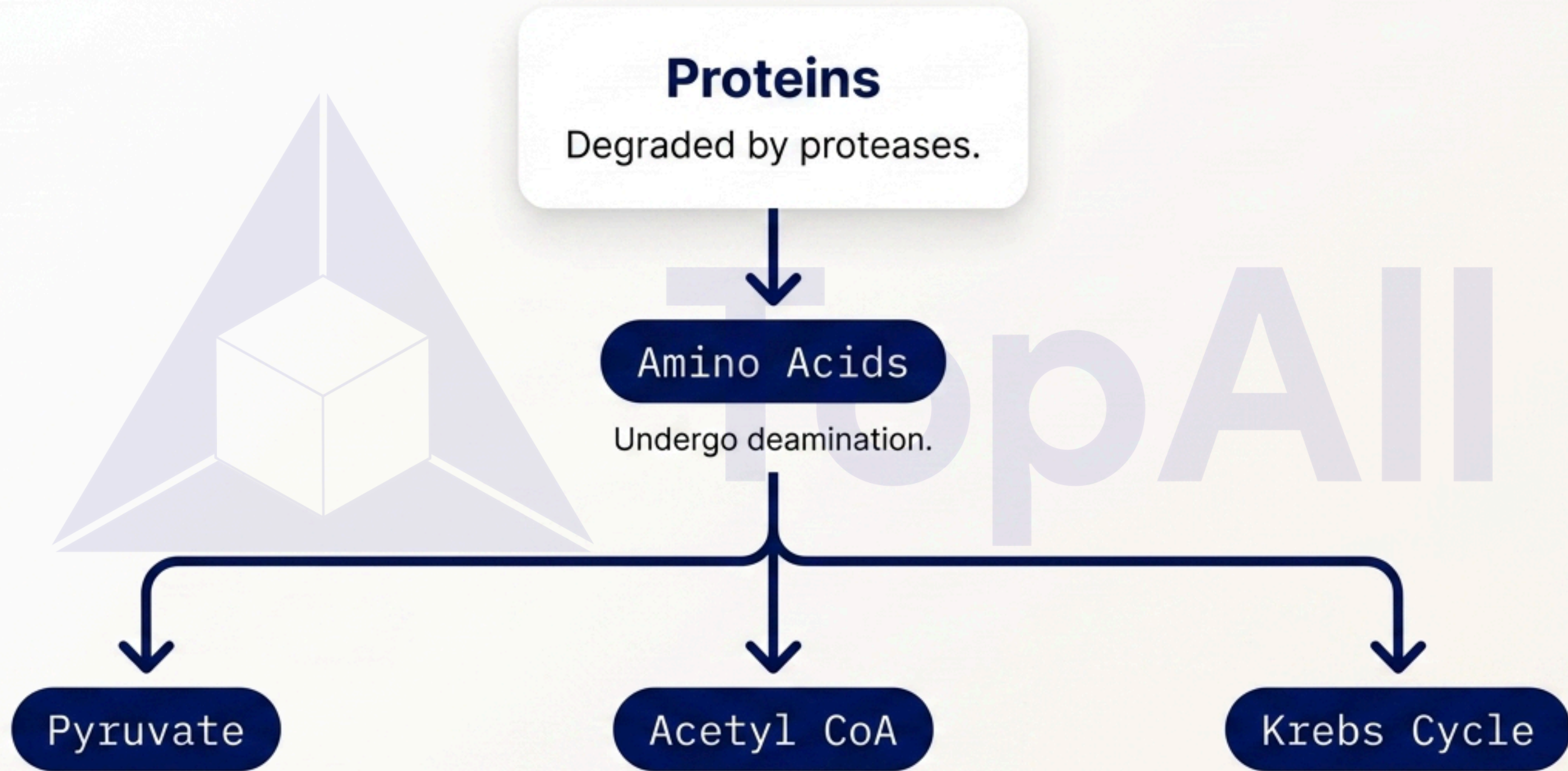


Alternate Routes: Fats

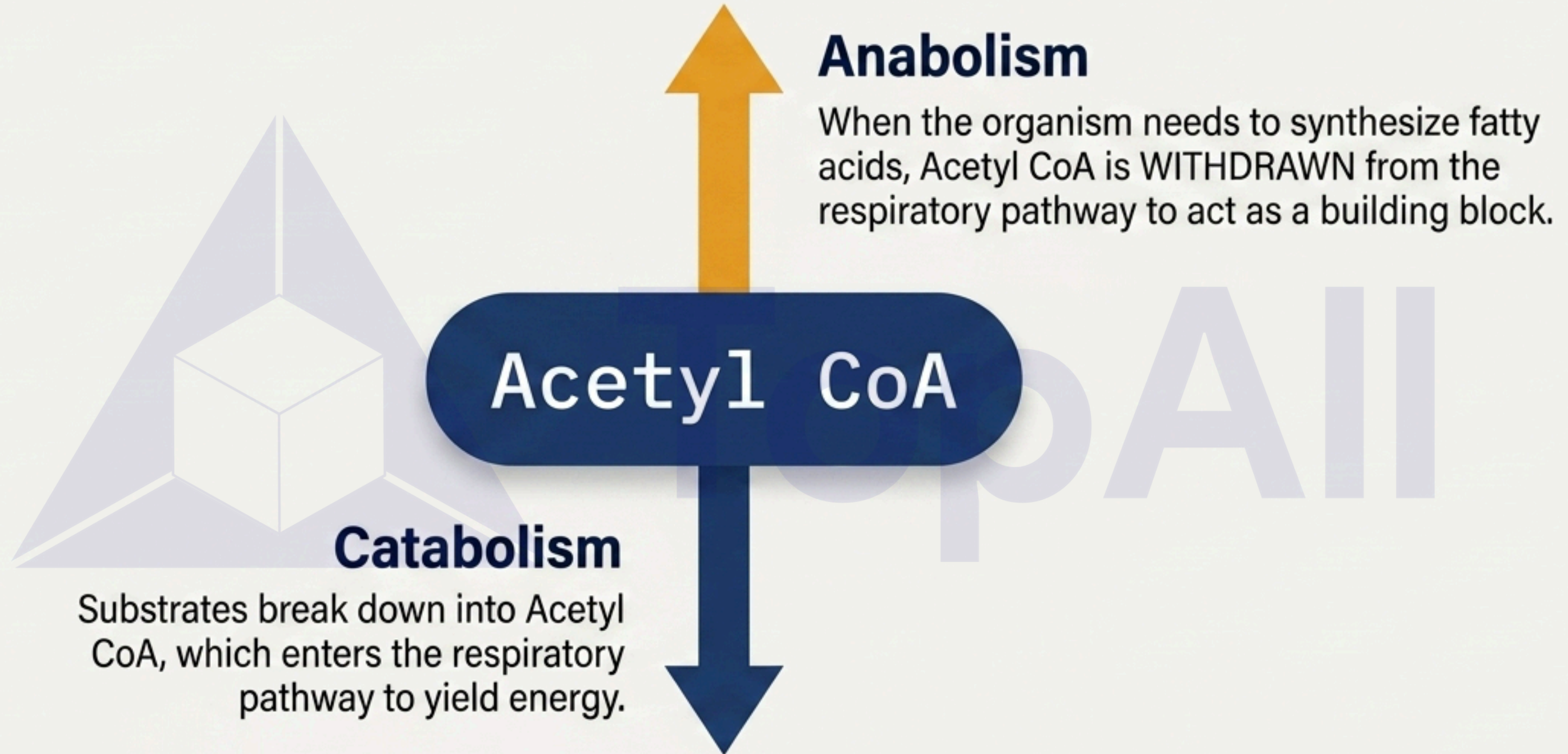


Notice that fats do not enter at the very first step. They require initial degradation before slipping into the established respiratory stream.

Variable Entry: Proteins

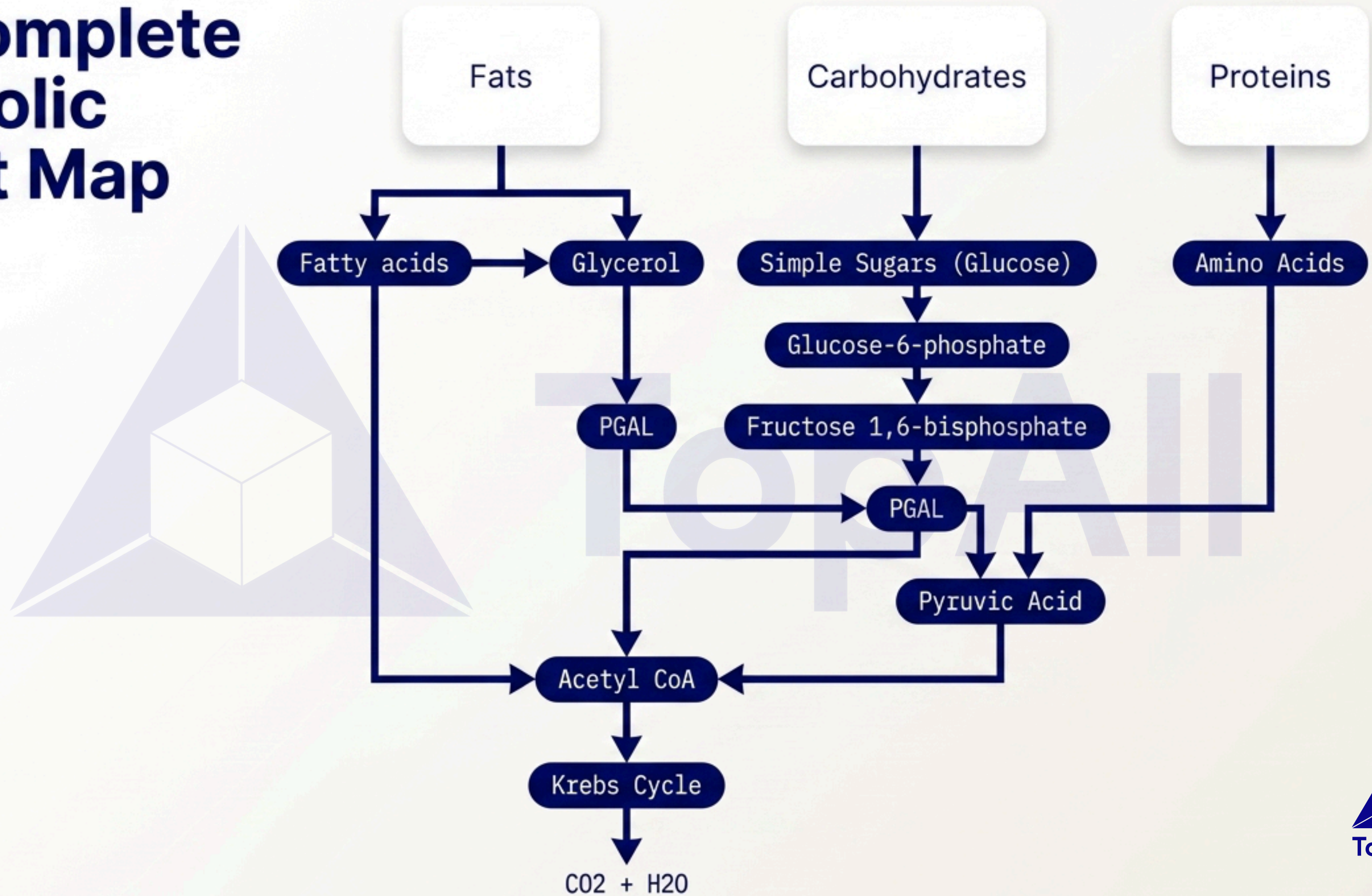


The Intersectional Hub: Acetyl CoA



Respiration is not a one-way street. Its intermediates act as a shared pool for both breaking down and building up.

The Complete Metabolic Transit Map



The Paradigm Shift

Because the respiratory pathway is fundamentally involved in both the catabolism (breakdown) of substrates for energy and the anabolism (synthesis) of new cellular materials through shared intermediates...

It is more accurate to define respiration as an Amphibolic Pathway.

This dual nature reveals the true efficiency and elegance of cellular metabolism.



You've Learned the Theory.

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