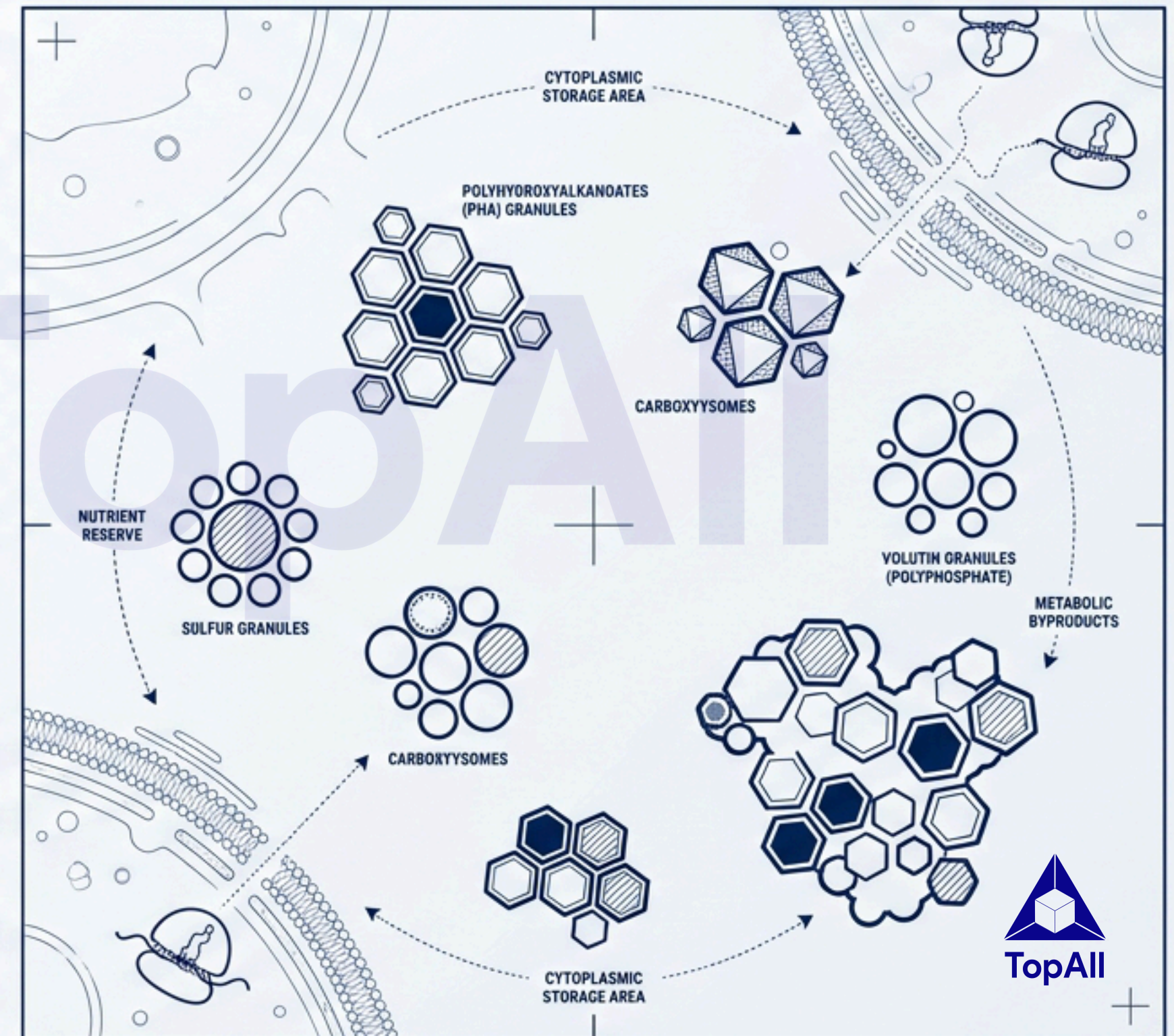
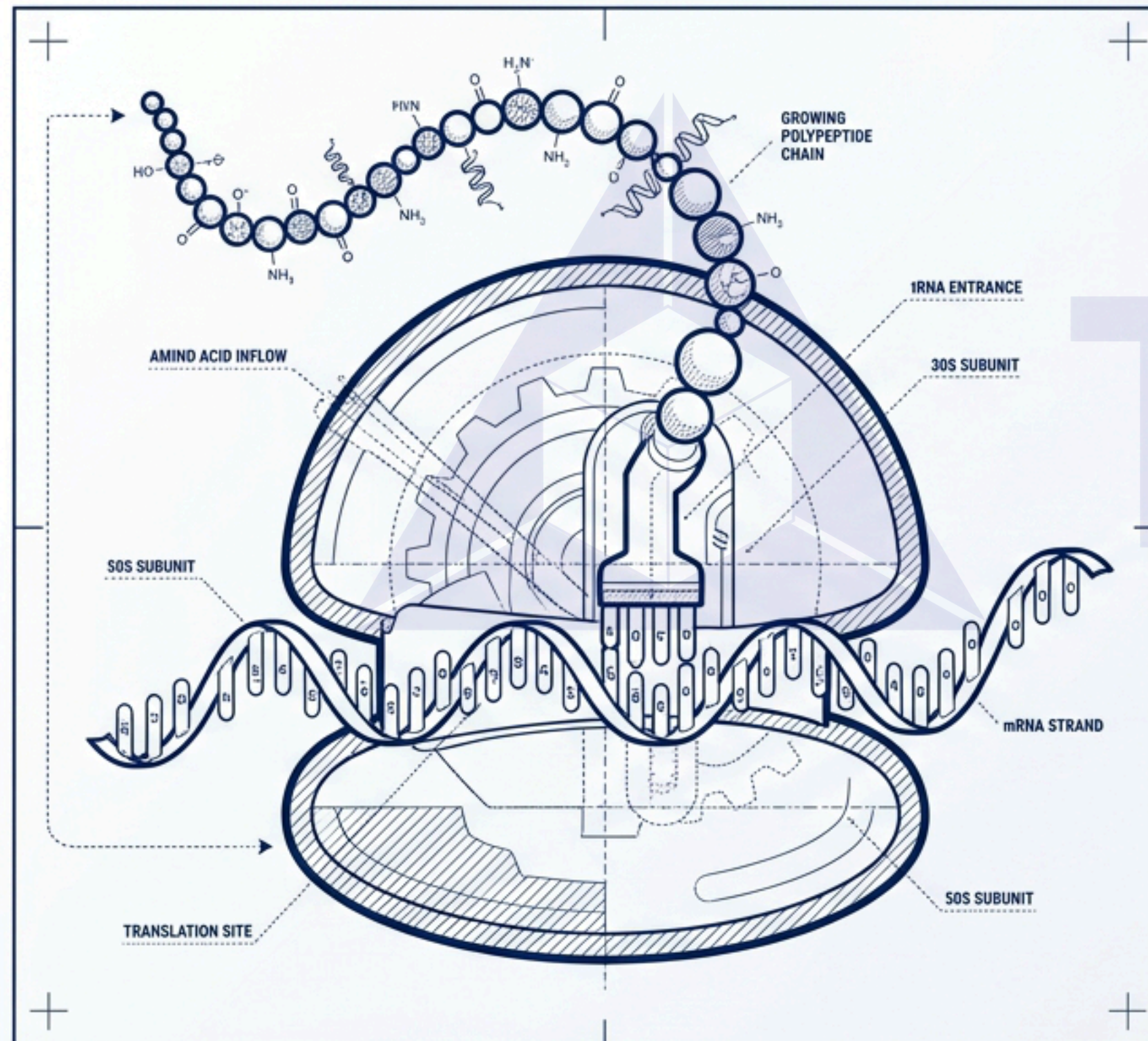


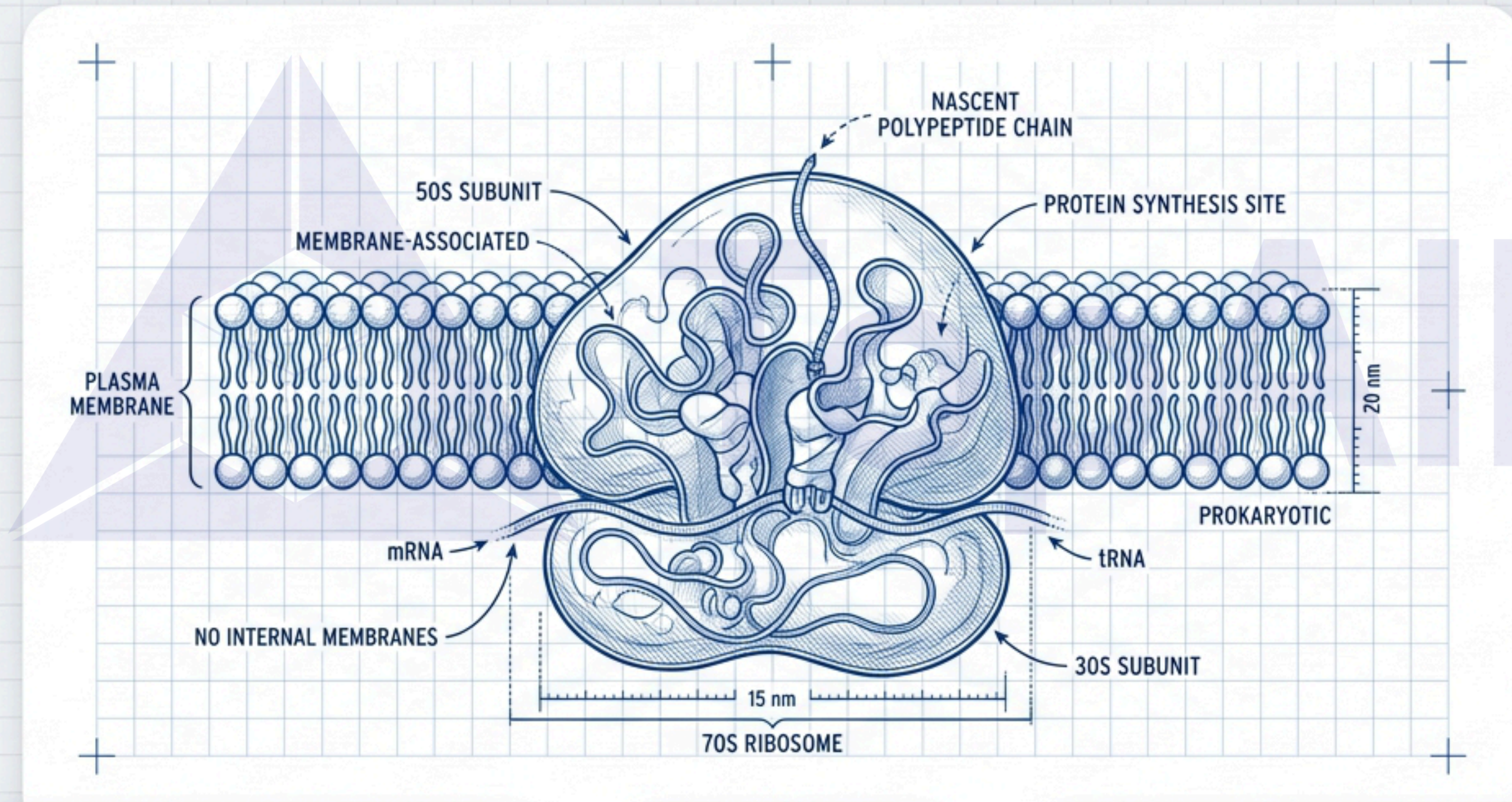
Protein Factories and Storage Granules

Understanding Ribosomes and Inclusion Bodies in Prokaryotic Cells



The 70S Ribosome

In prokaryotes, ribosomes are the dedicated sites of protein synthesis. Unlike eukaryotic ribosomes, which can attach to an endoplasmic reticulum, prokaryotic ribosomes are not bound by typical internal membranes. Instead, they are directly associated with the plasma membrane of the cell.



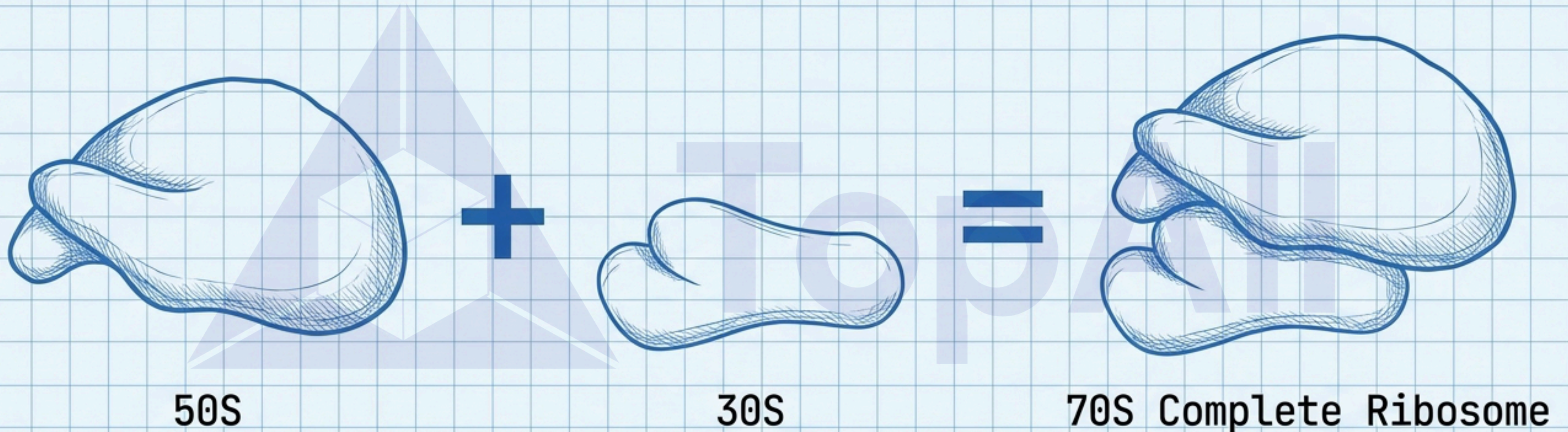
SIZE: 15 nm x 20 nm

TYPE: 70S

MEMBRANE: None

Structural Subunits

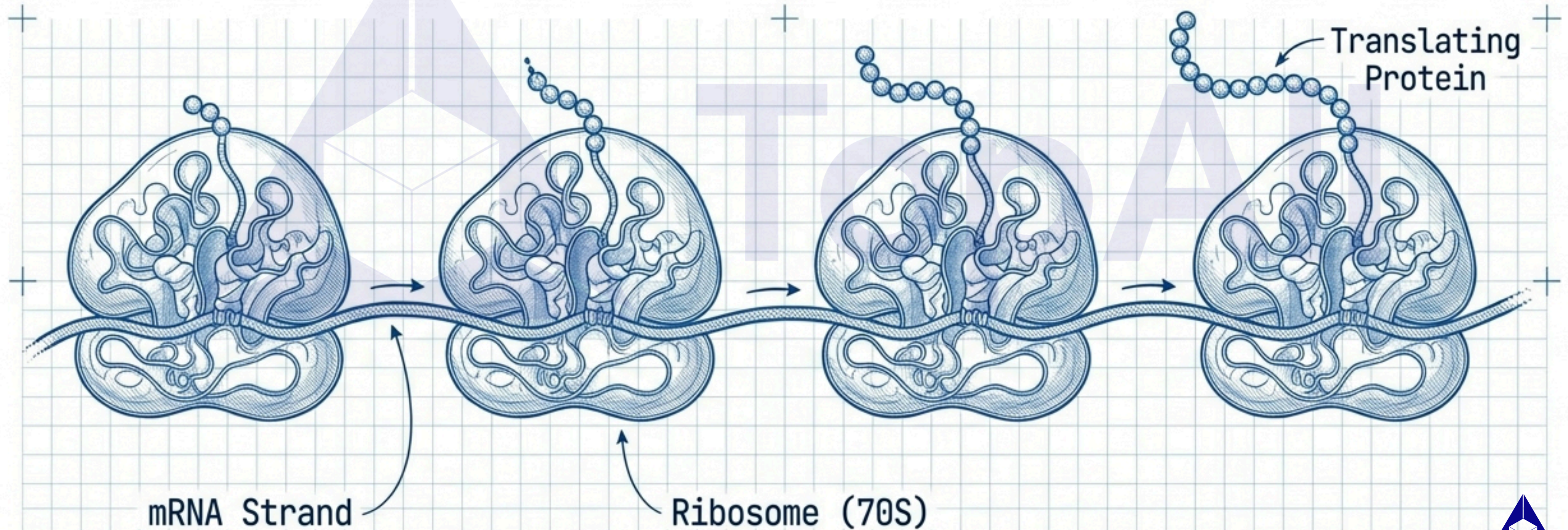
Every prokaryotic 70S ribosome is constructed from two distinct ribonucleoprotein subunits that lock together to synthesize proteins.



Why doesn't $50 + 30 = 80$? The 'S' stands for Svedberg's Unit, which measures sedimentation coefficient (density and size) during centrifugation, rather than additive mass.

Polysomes: The Assembly Line

Prokaryotes maximize their protein production by attaching several ribosomes to a single strand of mRNA simultaneously. This highly efficient translation chain is called a polyribosome, or polysome.





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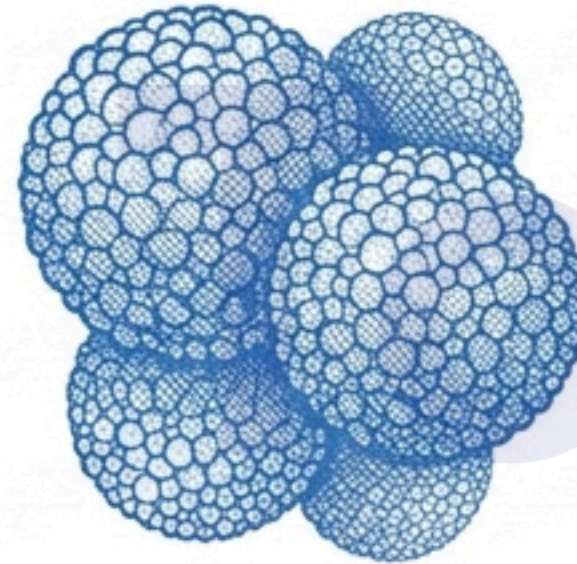
Inclusion Bodies: Cytoplasmic Storage

Because prokaryotes lack an endomembrane system or membrane-bound organelles, reserve materials must be stored directly in the cytoplasm. These reserves group into inclusion bodies, lying completely free in the intracellular fluid.



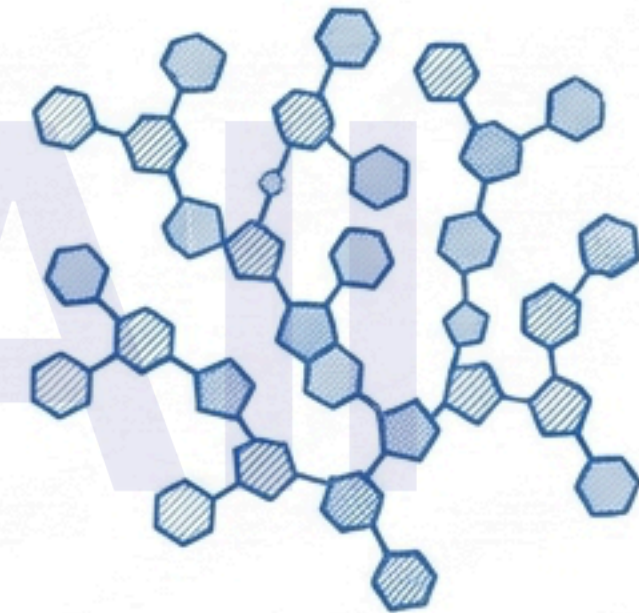
Phosphate Granules

Reserve of inorganic phosphate for cellular processes.



Cyanophycean Granules

Nitrogen and protein storage, typically found in cyanobacteria.



Glycogen Granules

Essential carbohydrate storage acting as an energy reserve.

Gas Vacuoles: Engineered for Buoyancy

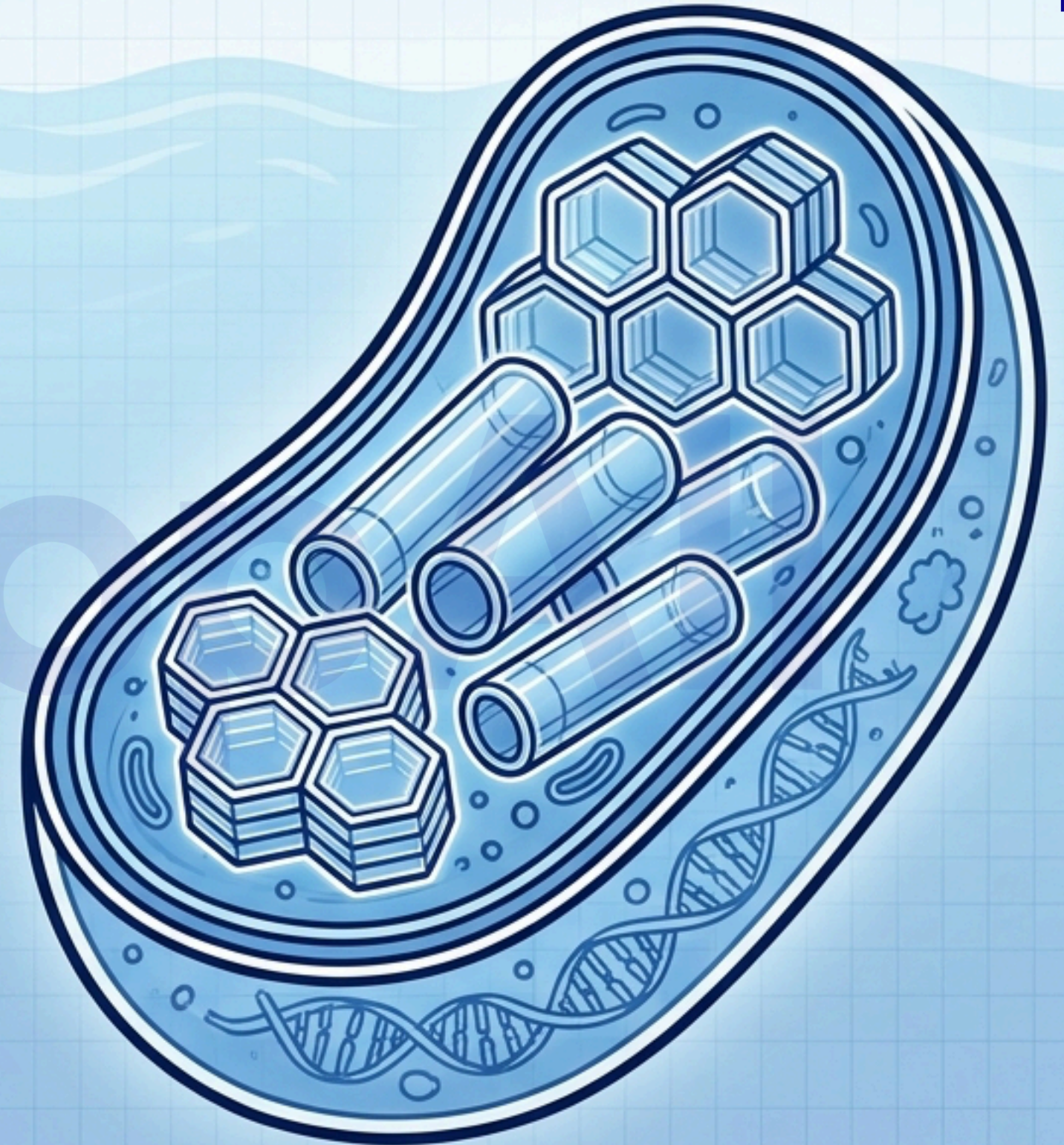
A highly specialized form of inclusion body, gas vacuoles provide crucial cellular buoyancy. This evolutionary adaptation allows certain aquatic bacteria to float and position themselves at optimal depths for sunlight and nutrient absorption.

FOUND IN:

Blue-Green Bacteria

Purple Photosynthetic Bacteria

Green Photosynthetic Bacteria



Key Takeaway

Prokaryotic efficiency relies on elegant simplicity. Without a complex endomembrane system, these cells utilize 70S ribosomes and polysome chains for rapid, decentralized protein synthesis, while simultaneously relying on free-floating inclusion bodies to manage essential reserve storage and aquatic buoyancy.



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