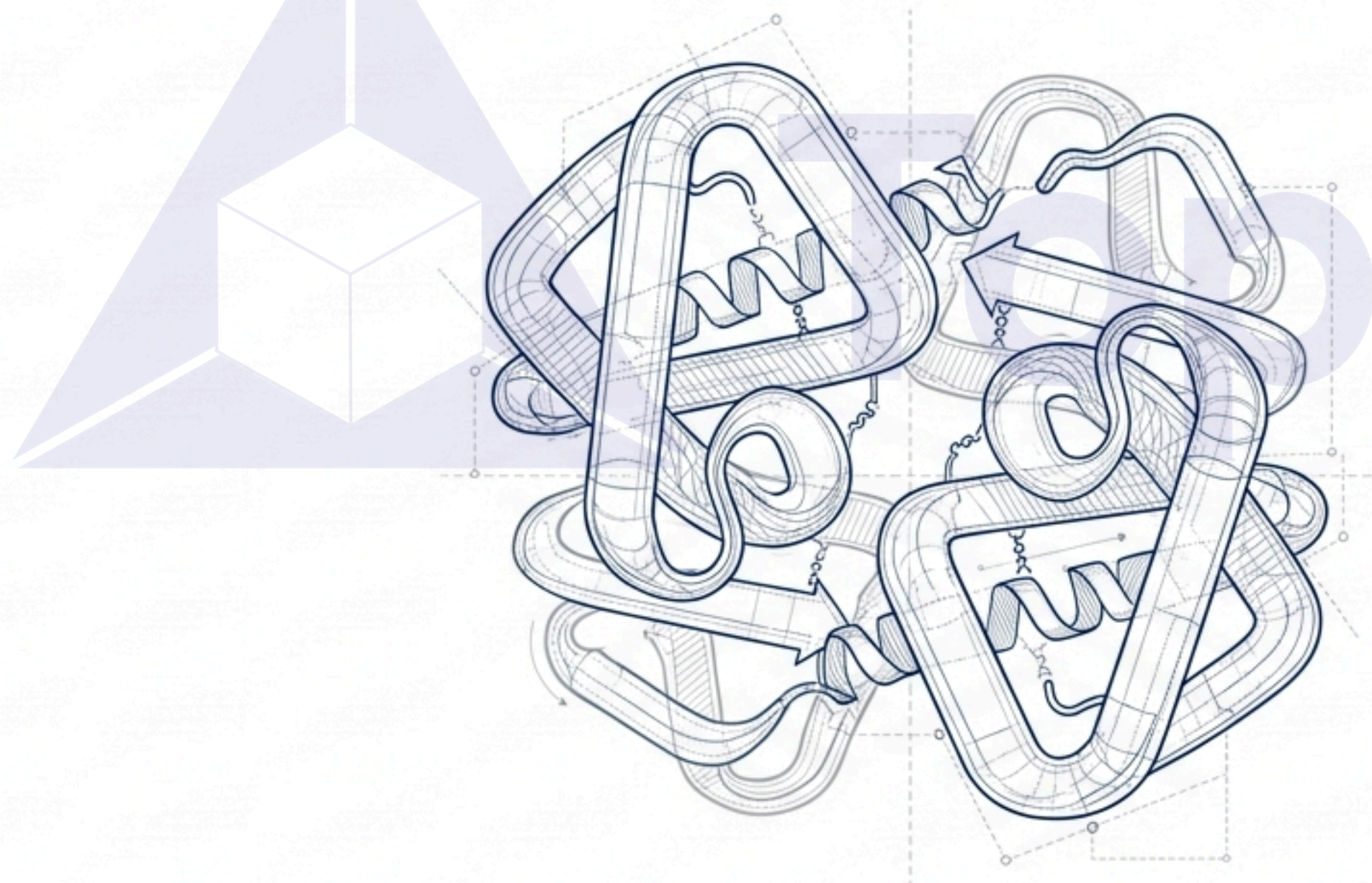


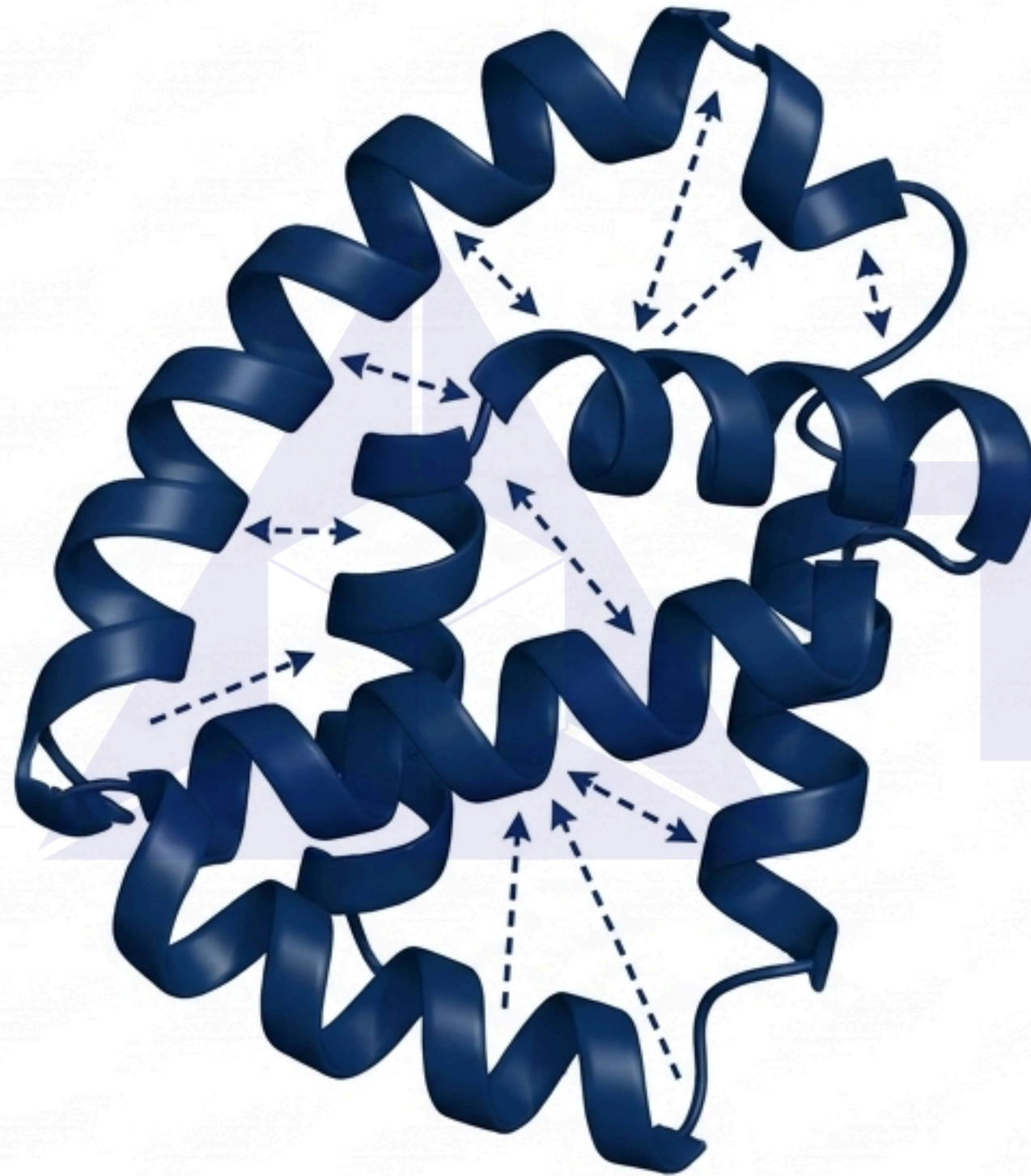
# Tertiary & Quaternary Structure of Proteins



**Tertiary Structure** — The overall 3D folding of a single polypeptide chain.

**Quaternary Structure** — The spatial arrangement of multiple interacting subunits.

**Subunit** — An individual polypeptide chain that forms part of a larger multi-chain protein complex.



## The Full 3D Fold

Represents the overall folding of the polypeptide chains (further folding of the secondary structure).

### Stabilising Forces

H-bonds  
Disulphide linkages  
van der Waals  
Electrostatic forces



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# Fibrous vs. Globular Spotlight



## Structure:

Parallel polypeptide chains held by H-bonds and disulphide bonds.

## Property:

Insoluble in water.

## Examples:

Keratin (hair, wool, silk),  
Myosin (muscles).



## Structure:

Polypeptide chains coil around to give a spherical shape.

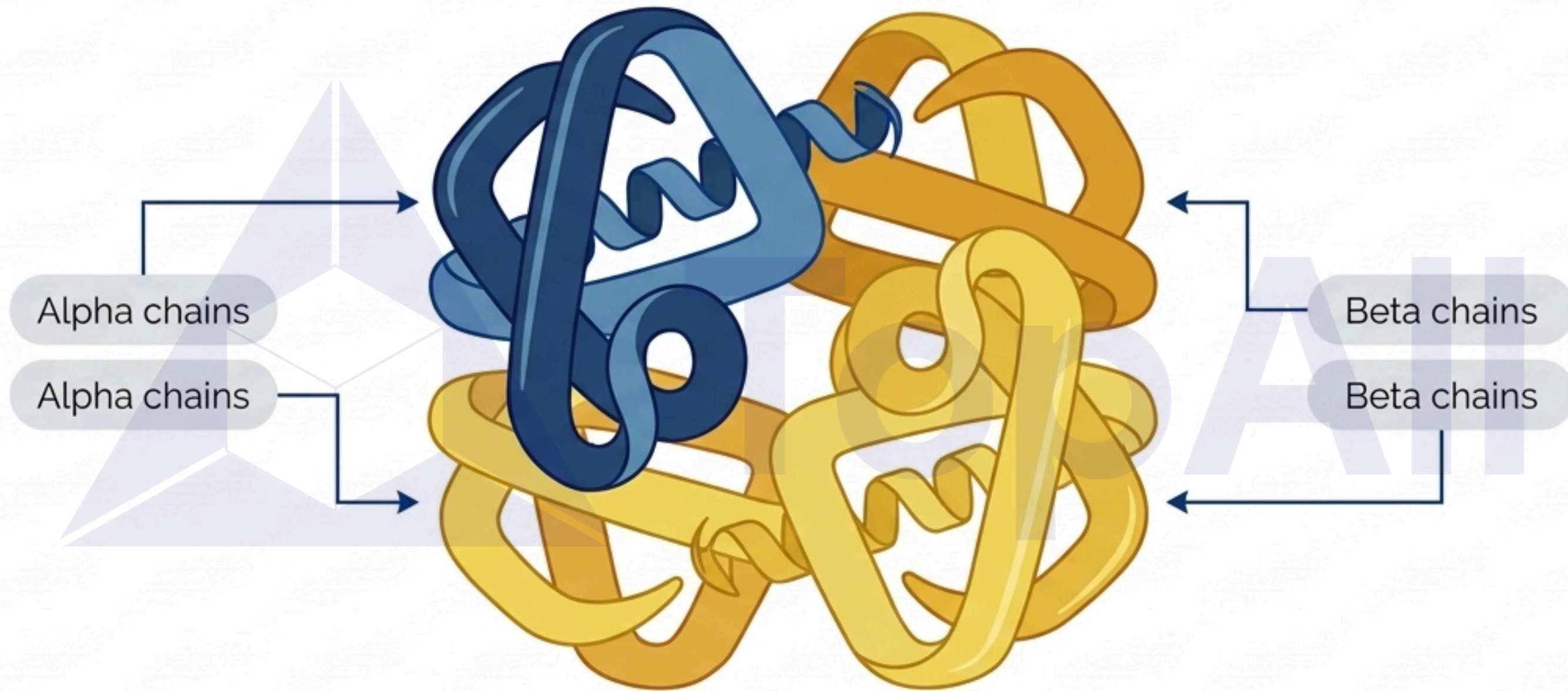
## Property:

Soluble in water.

## Examples:

Insulin, Albumins.

# Haemoglobin: The Quaternary Masterpiece



Quaternary structure is the precise spatial arrangement of two or more independent polypeptide subunits interacting to form a single functional complex.

# Watch for this

Single-chain proteins stop at the tertiary level. Quaternary structure only exists for proteins composed of **two or more polypeptide chains (multi-subunit)**.



Single-chain



Multi-subunit

# Key Takeaways

- Tertiary structure represents the final 3D shape (fibrous or globular) stabilized by H-bonds, disulphide, van der Waals, and electrostatic forces.
- Quaternary structure refers exclusively to the spatial arrangement of two or more interacting polypeptide subunits (e.g., Haemoglobin).



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