

UNIT 10 • BIOMOLECULES

# Peptide Bond, Primary & Secondary Structure of Proteins

The molecular architecture of life—from covalent linkages to 3D folding.

# The Blueprint Vocabulary

**Peptide Bond** – The  $\text{-CO-NH-}$  amide linkage joining amino acids.

**Primary Structure** – The exact, unique sequence of amino acids.

**Secondary Structure** – The regular folding of the polypeptide backbone.

**$\alpha$ -Helix /  $\beta$ -Sheet** – The two primary shapes formed by H-bonding.

# Forging the Link: The Peptide Bond

Dehydration Synthesis  
(Loss of Water)



The carboxyl group of one amino acid reacts with the amino group of the next, eliminating a water molecule to forge a robust covalent bond.



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

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

**Practice Now**



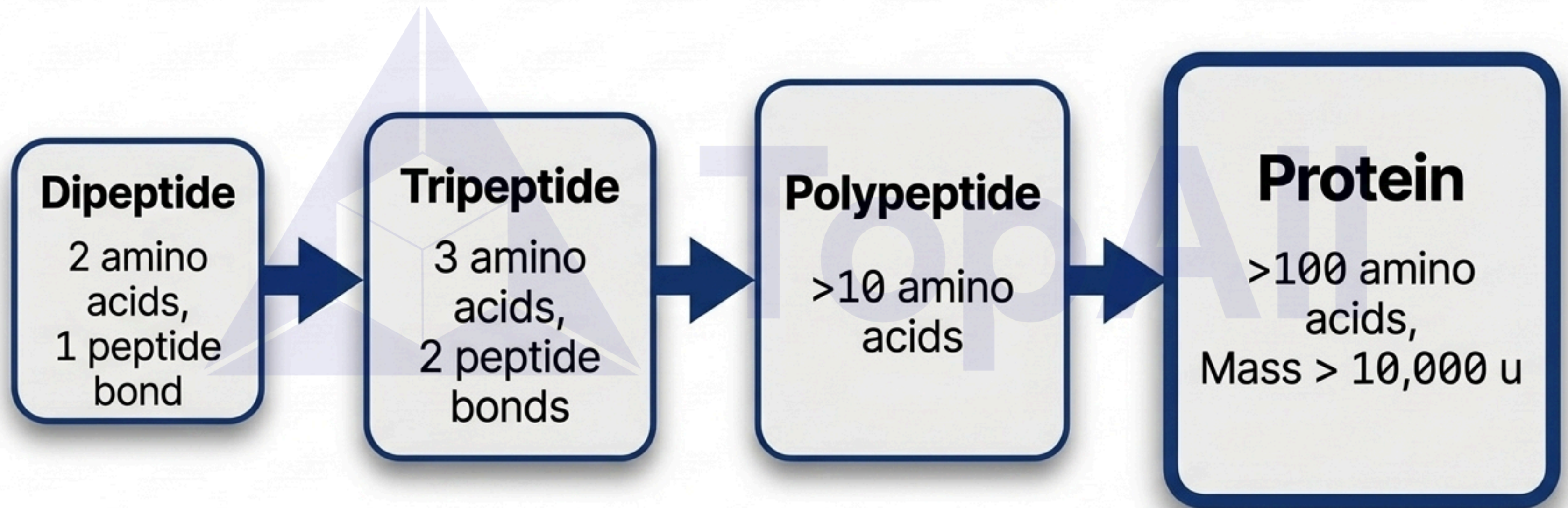
At [prep.topall.app](https://prep.topall.app)

### Key Highlights

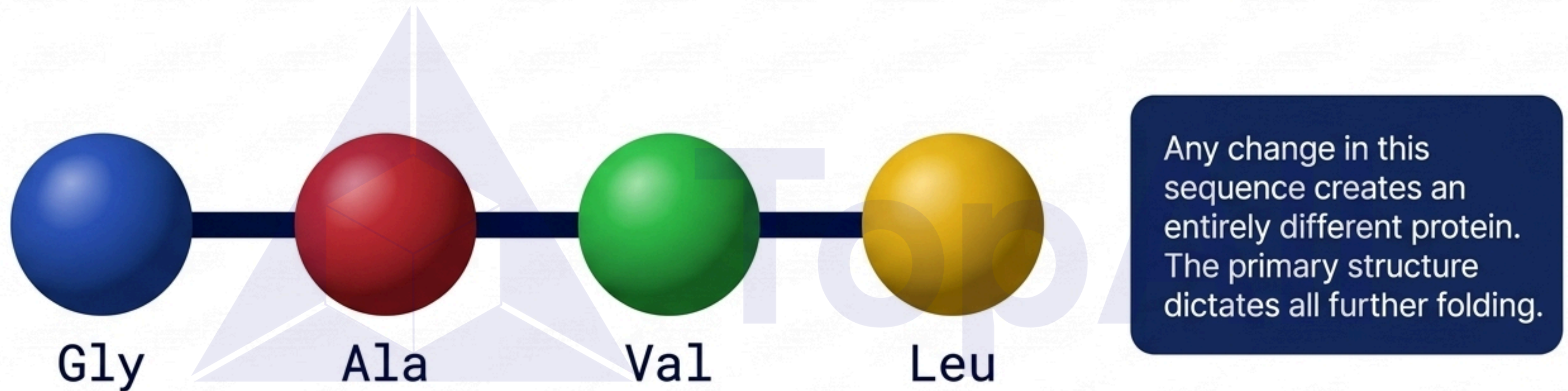
- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



# Sizing the Chain



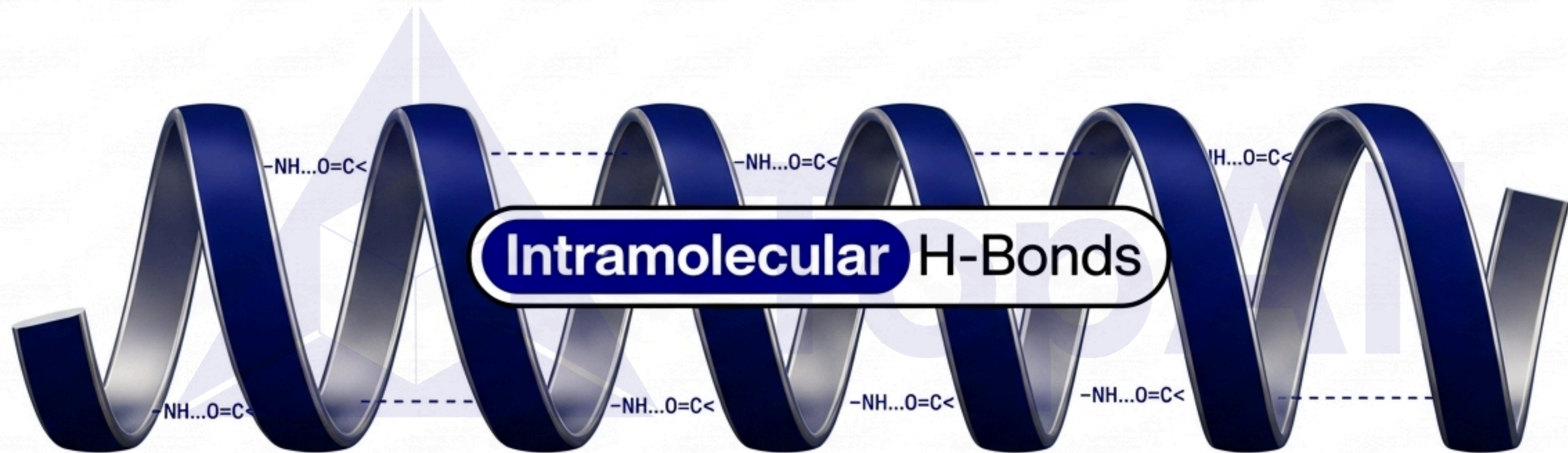
# Primary Structure: The Sequence



Proteins may have one or more polypeptide chains. The specific, linear sequence in which amino acids are linked is the primary structure.

# Secondary Structure: The $\alpha$ -Helix

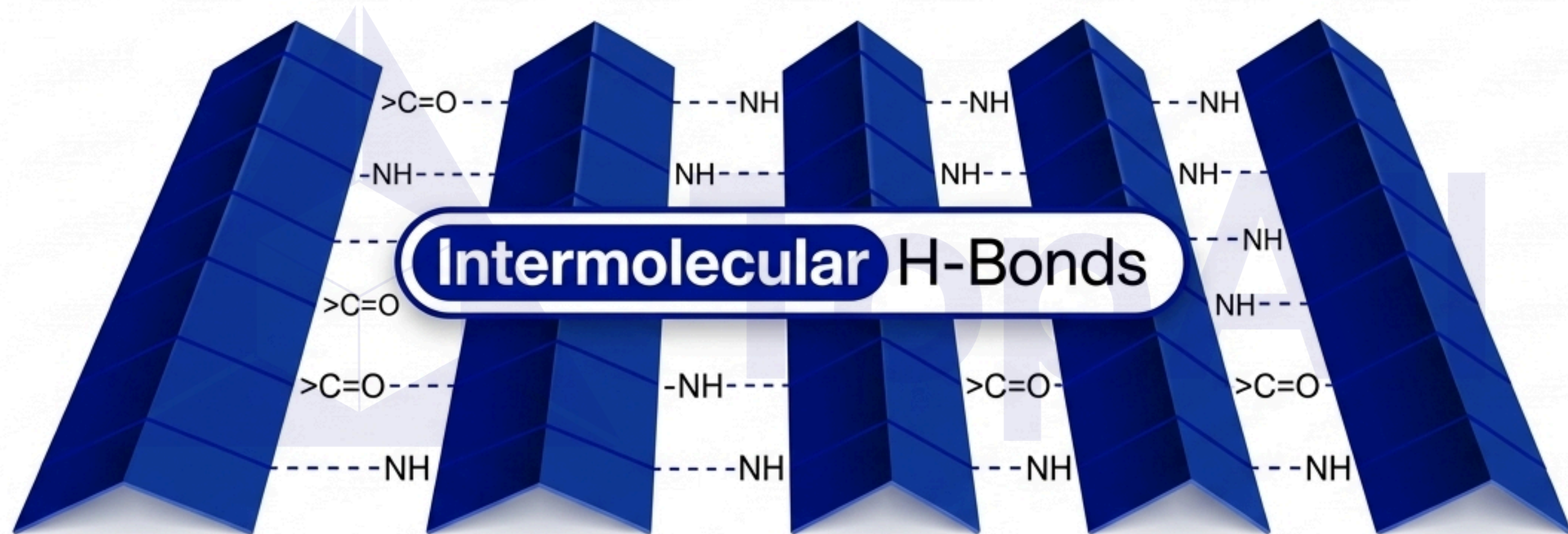
Twisting into a right-handed screw.



The polypeptide chain forms all possible hydrogen bonds by twisting. Hydrogen bonds occur within the same continuous chain.

# Secondary Structure: The $\beta$ -Pleated Sheet

Maximum extension, laid side-by-side.



Chains are stretched out to near maximum extension and laid side-by-side. Hydrogen bonds occur between neighboring peptide chains.

# Final Review

## JEE Trap Alert

Watch for this...

Examiners frequently swap the bonding types in MCQs.

Remember:  $\alpha$ -helix = **INTRAmolecular** H-bonds (within the same coil).

$\beta$ -pleated sheet = **INTERmolecular** H-bonds (between neighboring sheets).

## Key Takeaways

- **Primary structure** is the covalent sequence of amino acids linked by peptide bonds ( $-\text{CO}-\text{NH}-$ ).
- **Secondary structure** arises from regular folding of the backbone, driven entirely by Hydrogen bonding between  $>\text{C}=\text{O}$  and  $-\text{NH}$  groups.



# You've Learned the Theory.

## Now Let's Test It.

Reading notes gets you knowledge.

**Practicing MCQs gets you marks.**

**That's exactly what TopAll Pro is built for.**

**Try TopAll Pro Now**

### What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**  
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**  
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**  
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**  
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**  
AI Recommendation Analysis your Tests and tell you where you need to improve.



**Practice the moment you finish studying**  
Jump in while the concept is still fresh in your head

**4.5L+**  
MCQs

**1.5L+**  
Students

**AI Powered**  
In-Depth Analysis