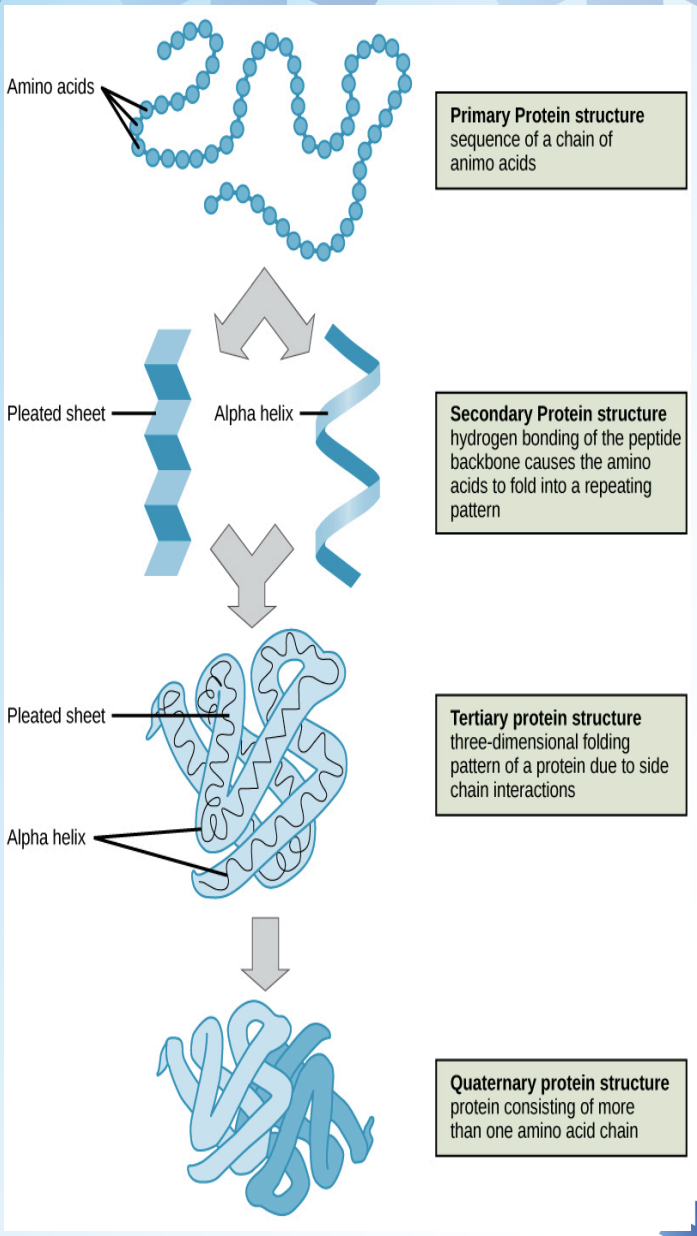
FIRST BIOCHEMISTRY MIDTERM

1. Protein structures
2. Hemoglobin
3. Michaelis Menten
4. Enzyme kinetics

PROTEIN STRUCTURES

Bonds and interactions

1. Primary structure
2. Secondary structure
3. Tertiary structure
4. Quaternary structure



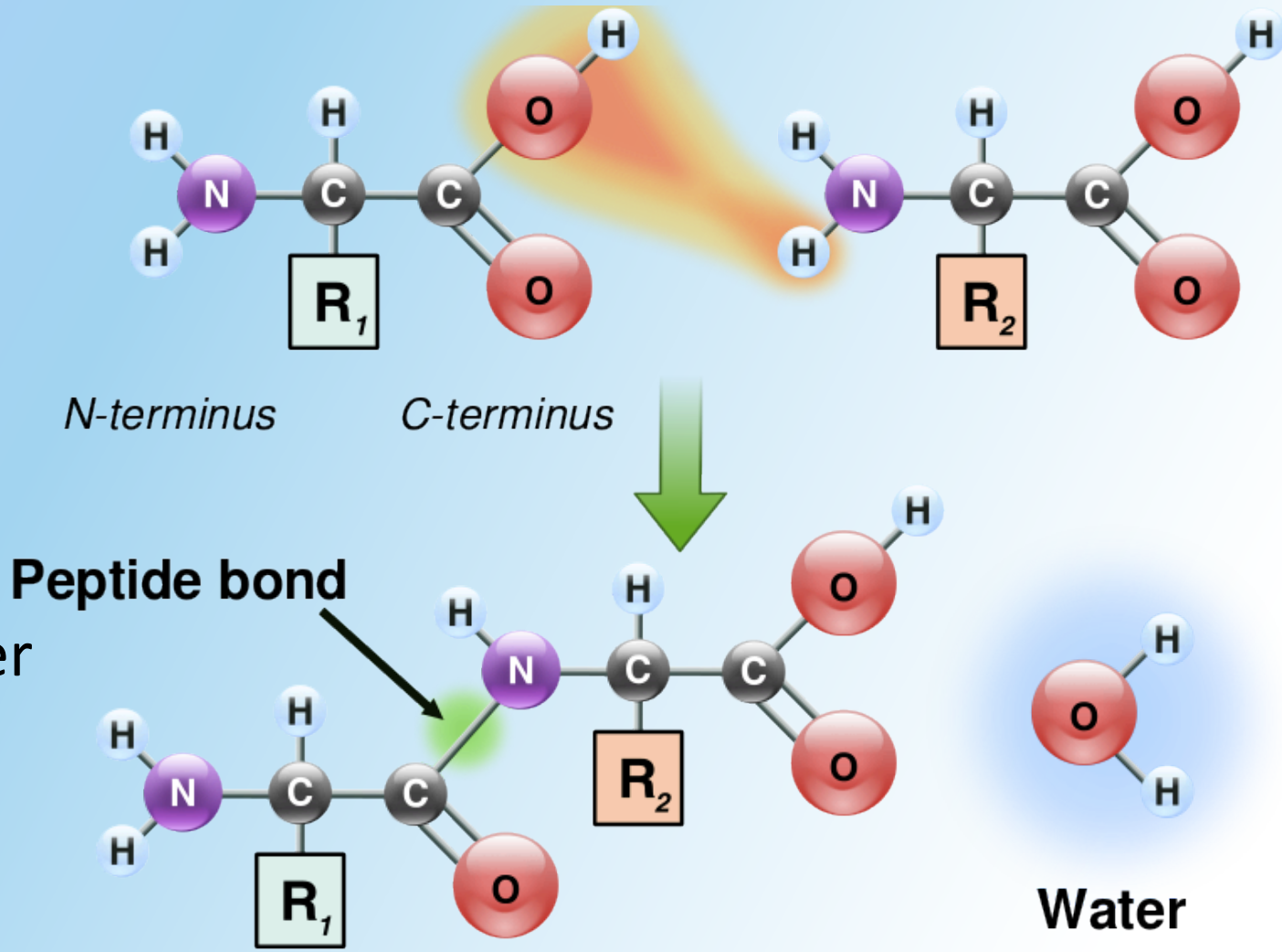
Primary structure

Primary structure

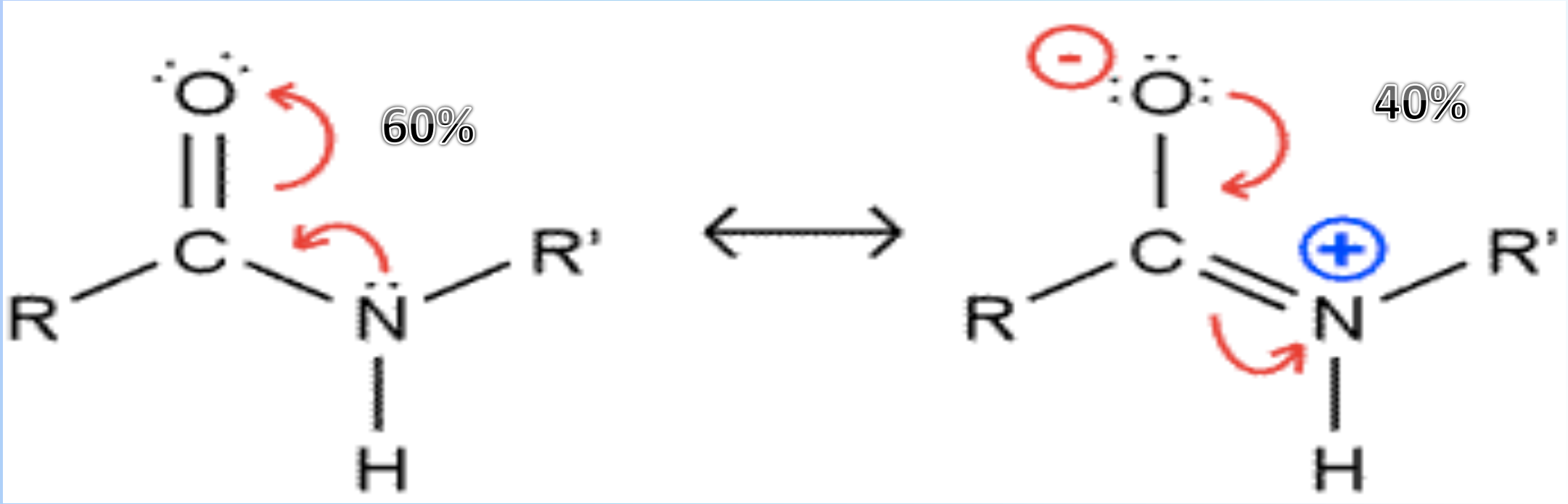
The peptide bond and peptide unit

- O=C–N–H

1. Partial double-bond character
2. Cis and trans configurations
3. Where can rotations occur?

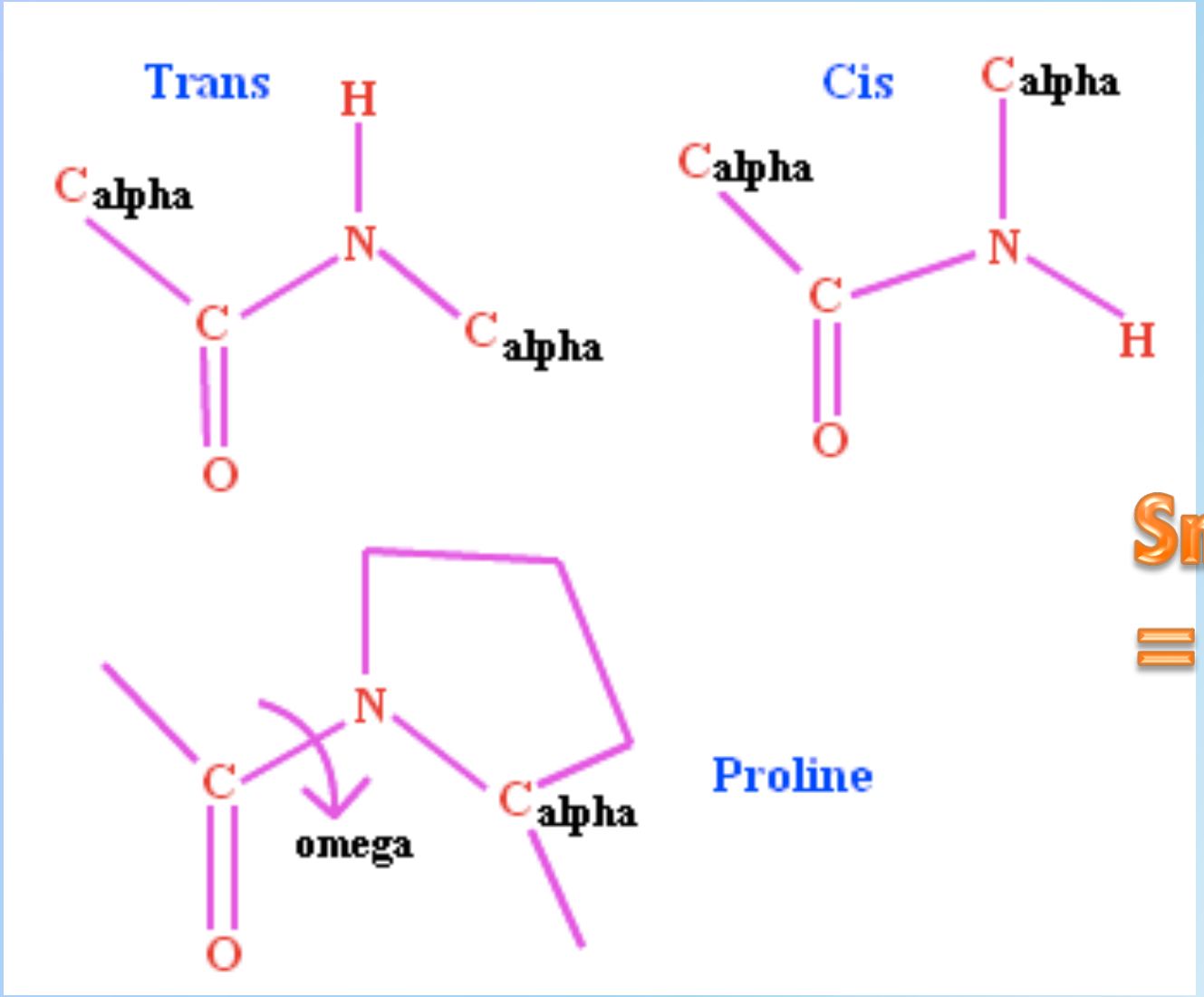


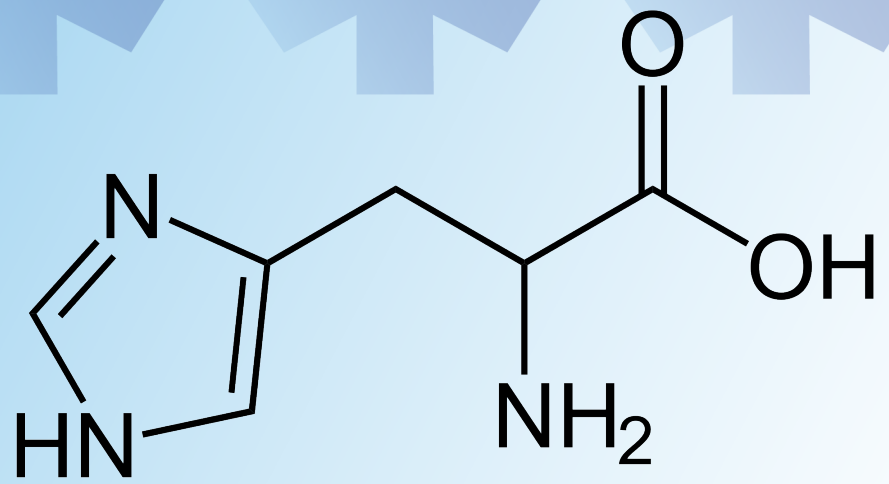
Partial double-bond character

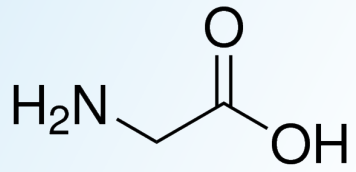


NO FREE ROTATION

Cis and trans configuration





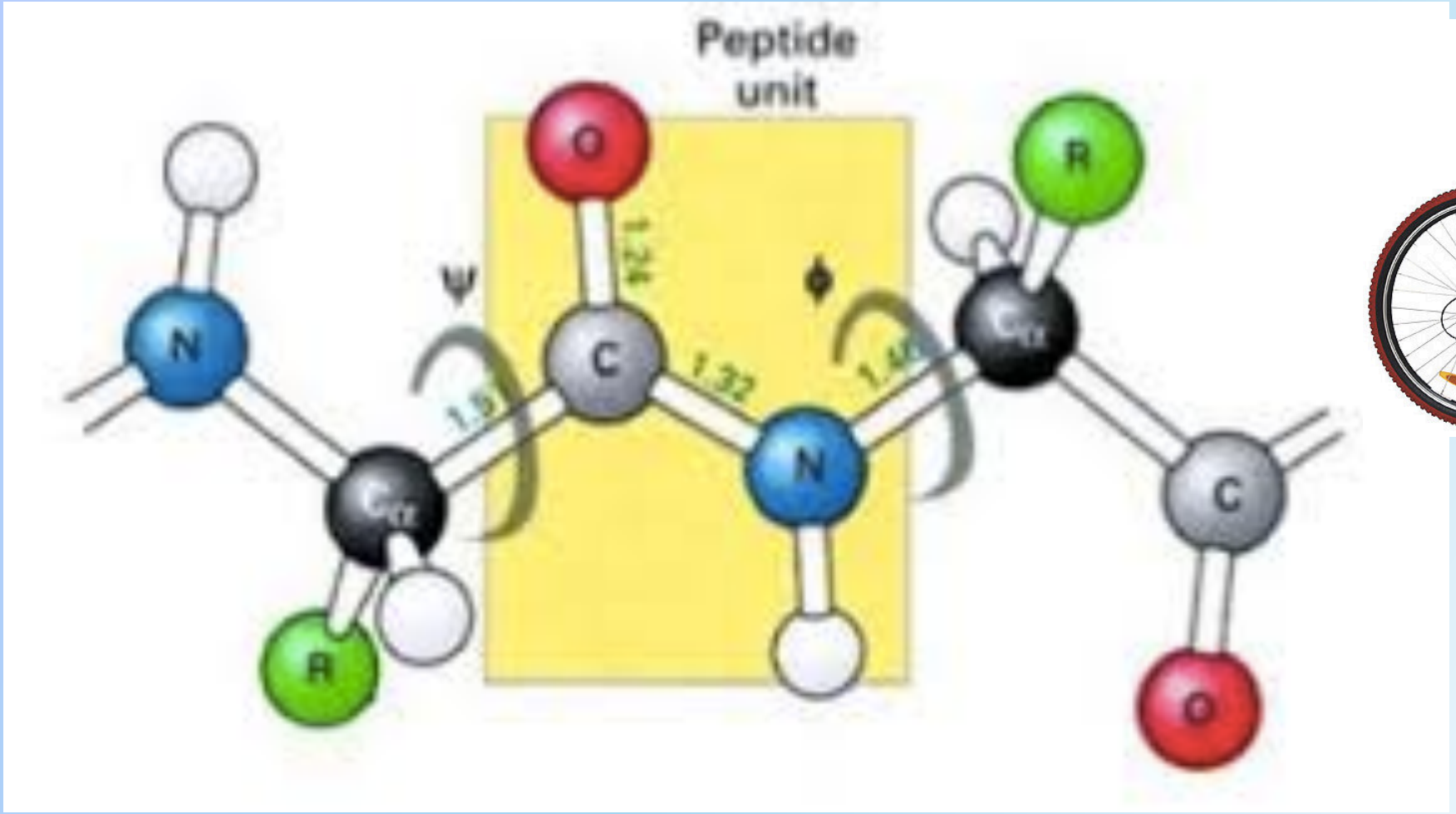


Small STERIC HINDRANCE

= more space

Rotation

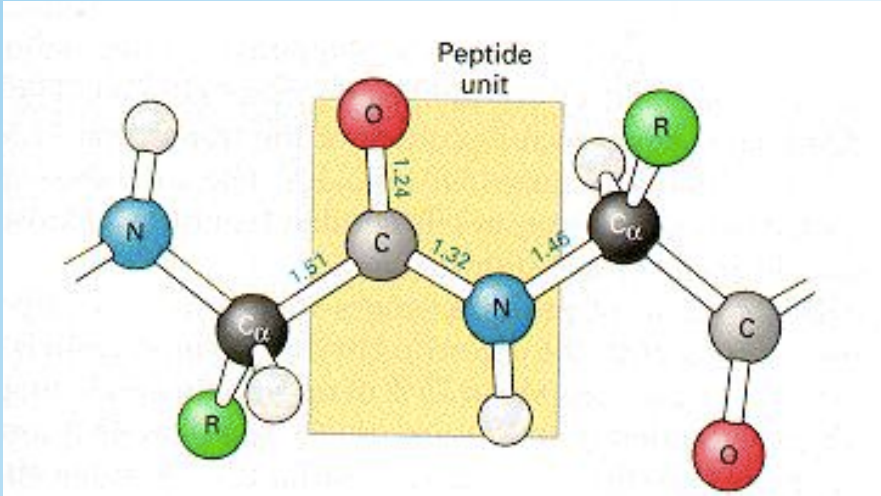
STERIC HINDRANCE



studyaid

Secondary structure

Secondary structures



- Alpha helix
- Beta sheet

HYDROGEN BONDS

H ---- O

H ---- N

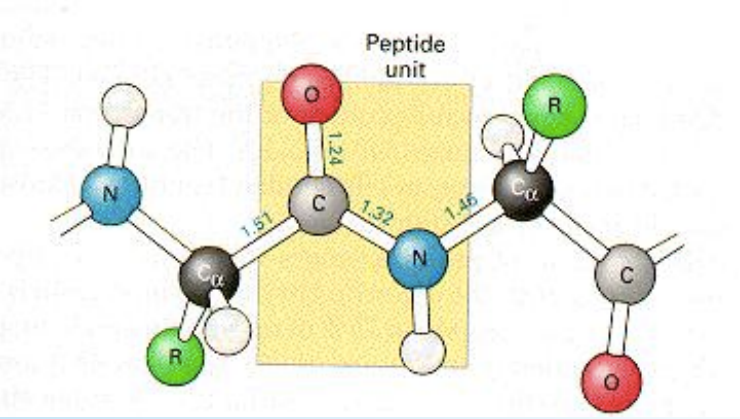
H ---- F

Common in secondary structures

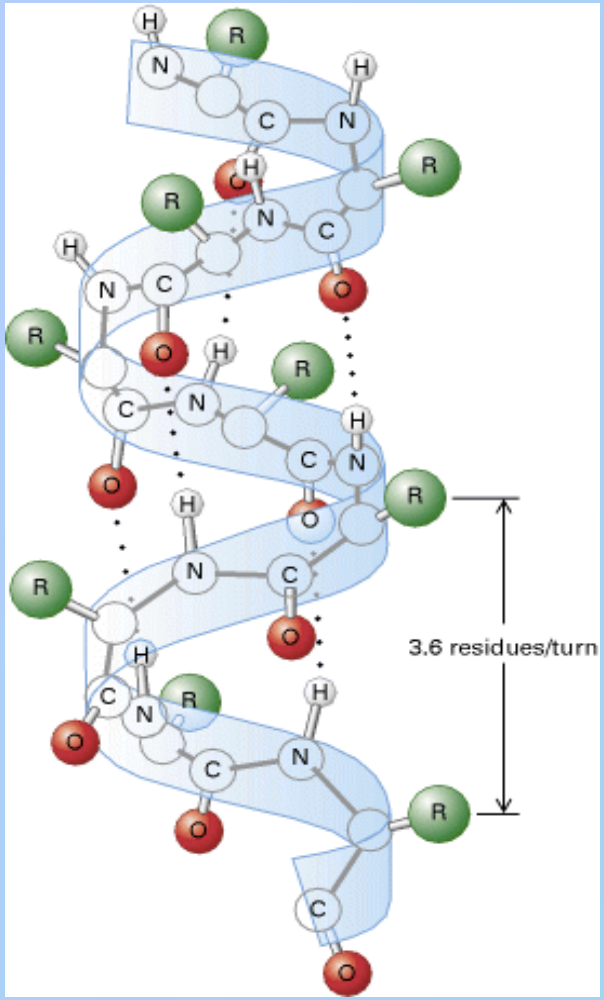
N-H ---- O-C

(recall peptide bond: O=**C**–**N**–H)

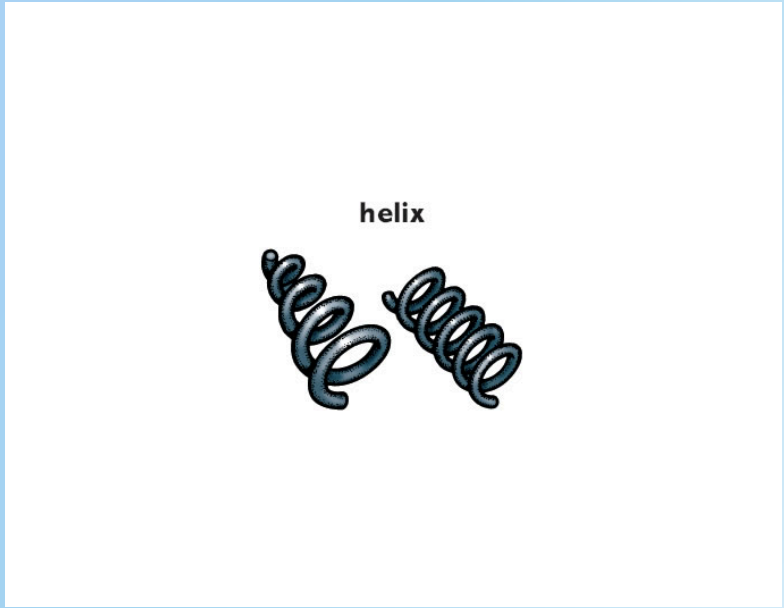
Aplha helix



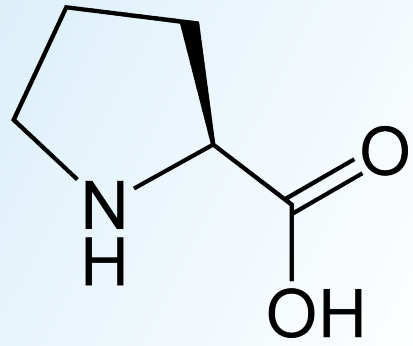
HYDROGEN BONDS:



Hydrogen bonds between C=O and H–N **4 residues along the chain**

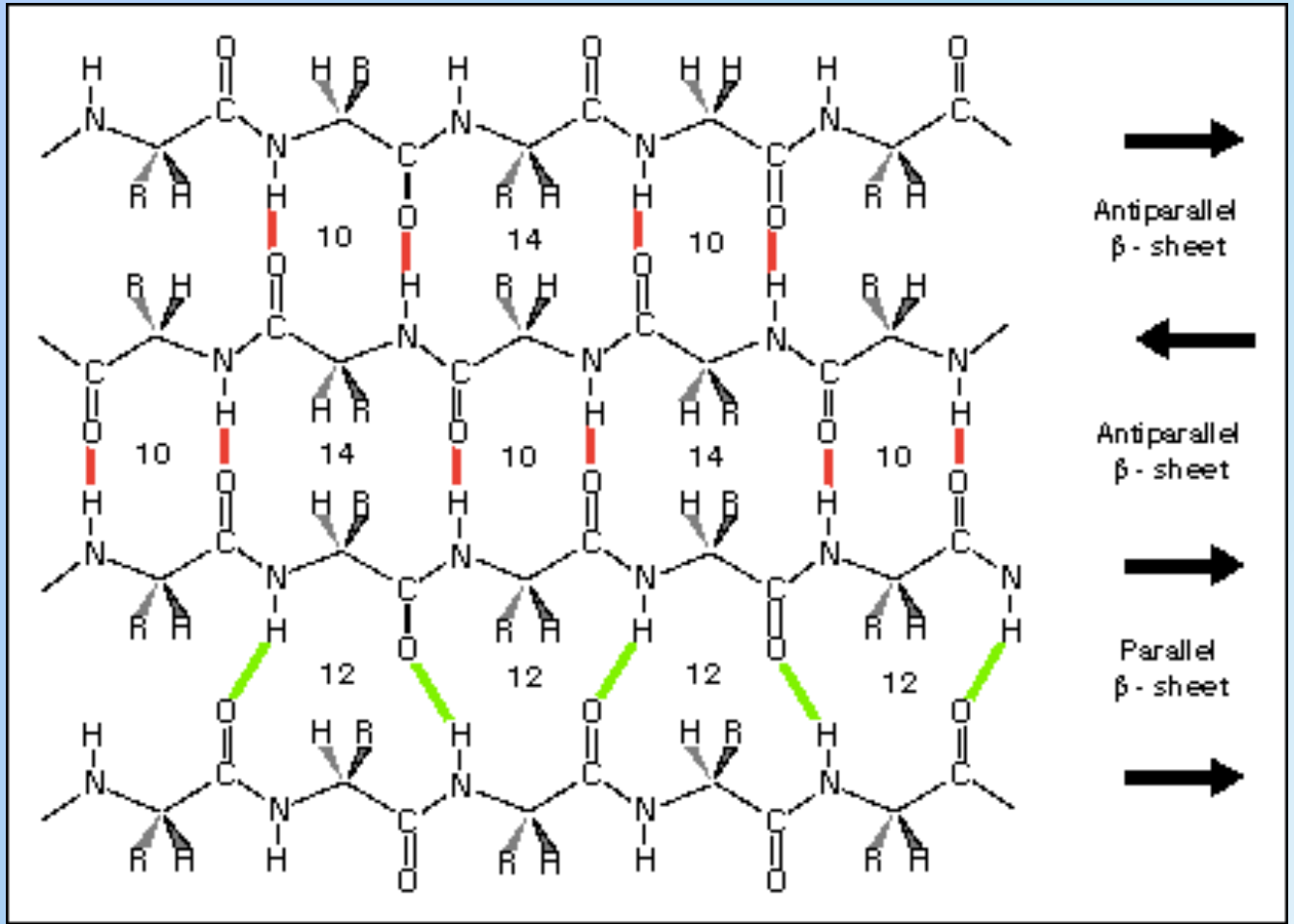


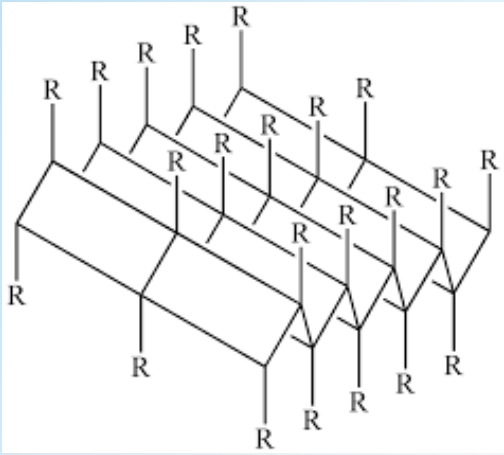
Proline



Beta sheet and beta turns

HYDROGEN BONDS:

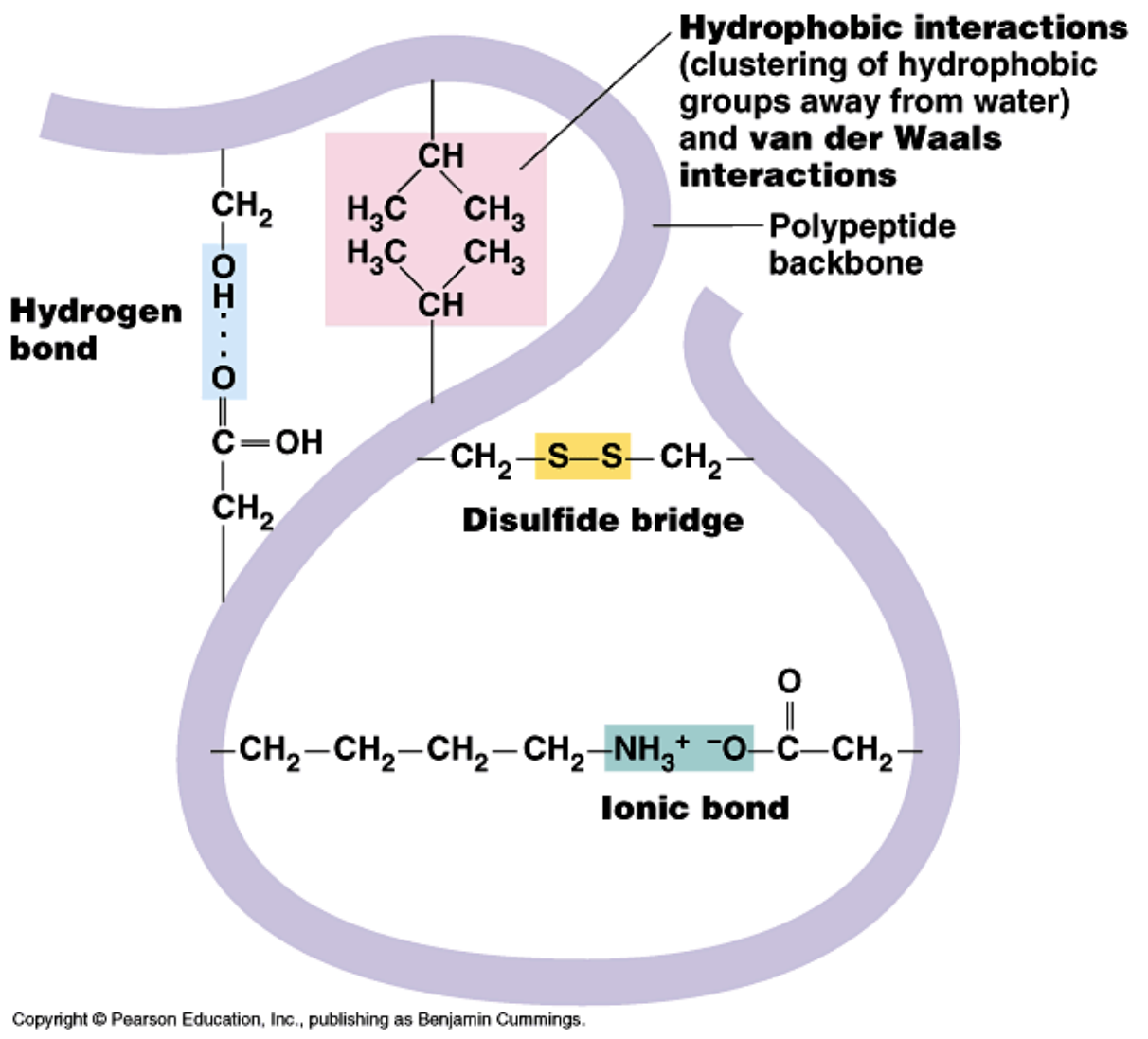




Proline and Glycine

Tertiary structure

Tertiary structure



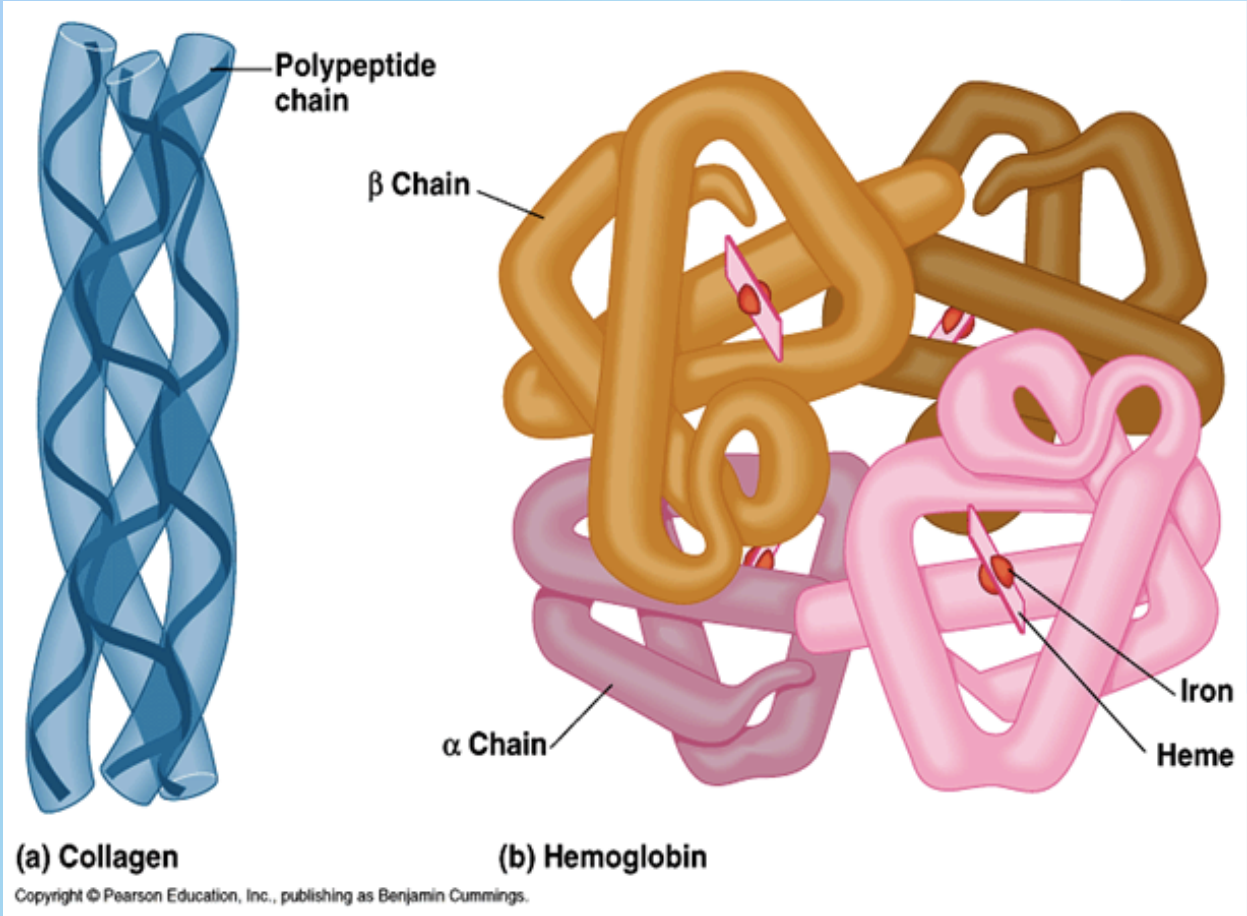
Types of bonds in tertiary structures

1. **H**ydrogen bonds
2. **H**ydrophobic interactions
3. **V**an der Waals interactions
4. **I**onic bonds
5. **D**isulfid bridges

Quaternary structure

Quaternary structure

NON-COVALENT BONDS



Summary: bonds and interactions

	Primary structure	Secondary structure	Tertiary structure	Quaternary structure
Bonds and interactions	Peptide bonds	Hydrogen bonds	1. Hydrogen bonds 2. Hydrophobic interactions 3. Van der Walls interactions 4. Ionic bonds 5. Disulfide bridges	Non-covalent interactions