

BC351 – Lecture 3 Protein Structure

Terms:

- Peptide bond
- N-terminus and C-terminus
- Peptide Backbone
- Primary Structure
- Ramachandran plot
- Secondary structure
- α -helix
- β -sheet
- Hydrophobic core
- Protein folding
- Tertiary structure
- Quaternary structure
- Denatured state
- Native state
- Conformation
- Amphipathic helix
- Long-range interactions
- Subunit
- Cooperative folding/unfolding

Principles:

1. Form follows function.
 2. Overview of some basic “forms” found in proteins.
 - a. Myoglobin, ribonuclease and hemoglobin as examples.
 3. Protein folding:
 - a. This is a directed process.
 - b. This is a HIGHLY specific process.
 - i. Determined by thermodynamic properties such as enthalpy and entropy.
- I. Introduction **pg. 113**
- a. Function follows form.
 - i. Hand tools
 1. Cutters
 - a. What are things that need to be cut and what “cutter” tool is used to do this?
 - b. Loss of form = loss of function.
 - ii. What functions sustain life?
 1. What molecular “tools” are used for these functions?
- II. Amino Acid polymers- AKA Proteins/peptides **pgs. 82-83; 92-93**
- a. Formation of the Peptide bond

i. Definition of a Peptide bond:

1.

ii. The reaction

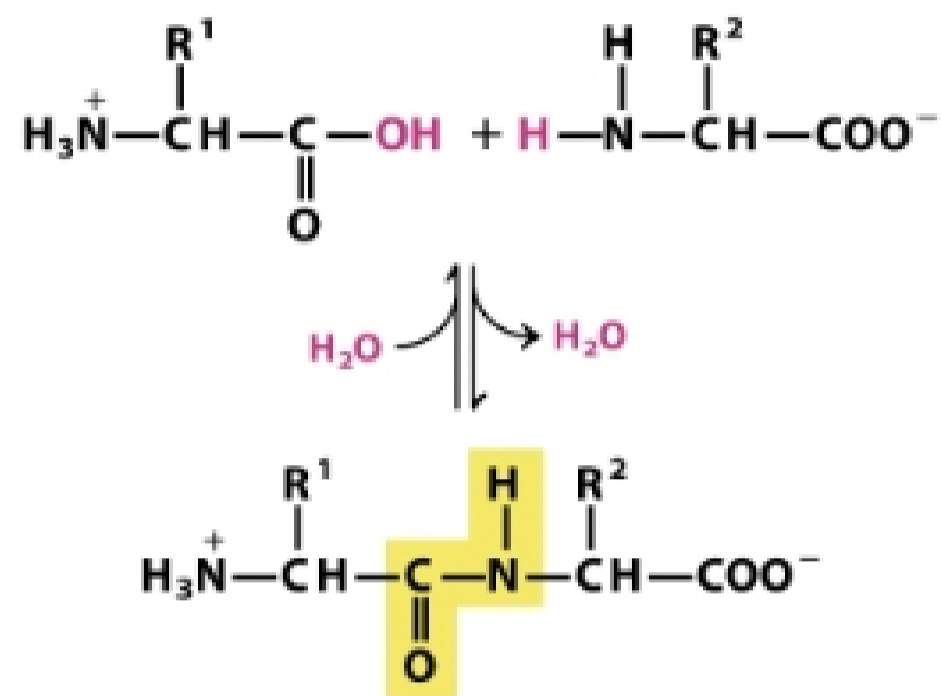


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1. Favors free amino acids at standard conditions.
2. Notice that the carboxyl and the amino can no longer accept or lose protons.

iii. Formation of the N- and C-terminus

1. Definition of N- and C-terminus:

a.

b.

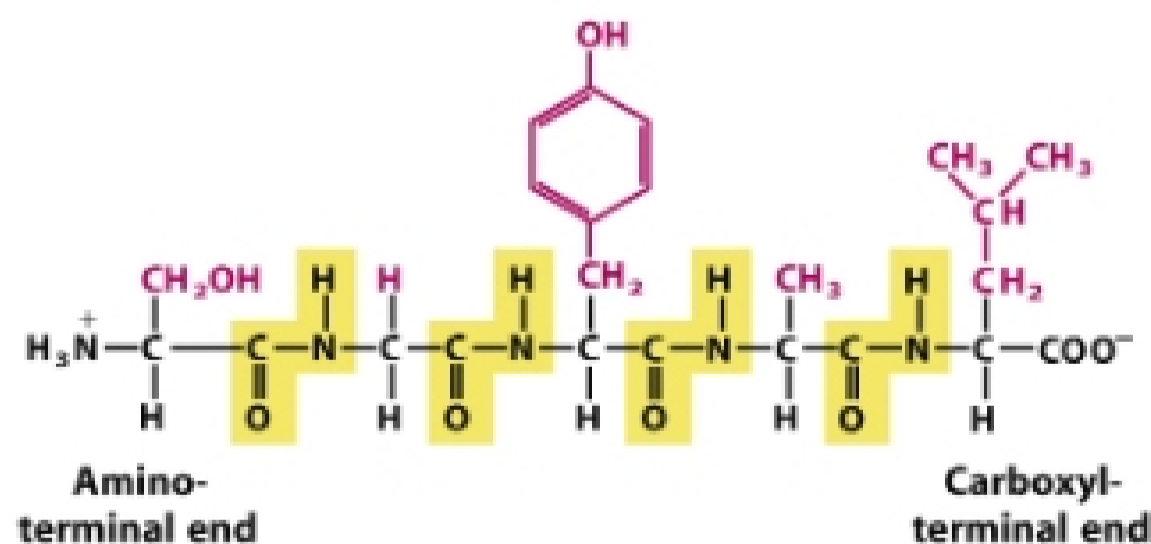


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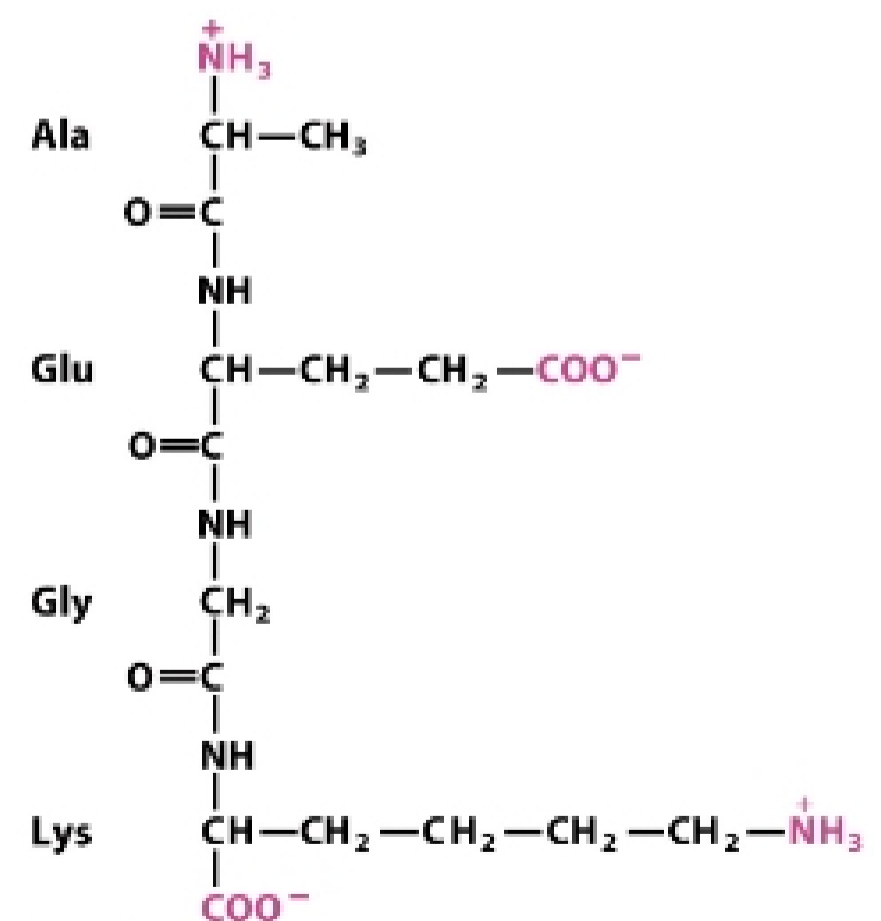


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c. Implications:

- i. There are only 2 amino acids in the protein that could have as many as 2 ionizable groups:
 1. N and C terminus.
 2. Only if they are Asp, Glu, Lys, His, Arg, Tyr and Cys.
- ii. All other amino acids in a protein have at the most 1 ionizable group.
 1. Only if they are Asp, Glu, Lys, His, Arg, Tyr and Cys.

2. Definition of the Peptide Backbone:

a.

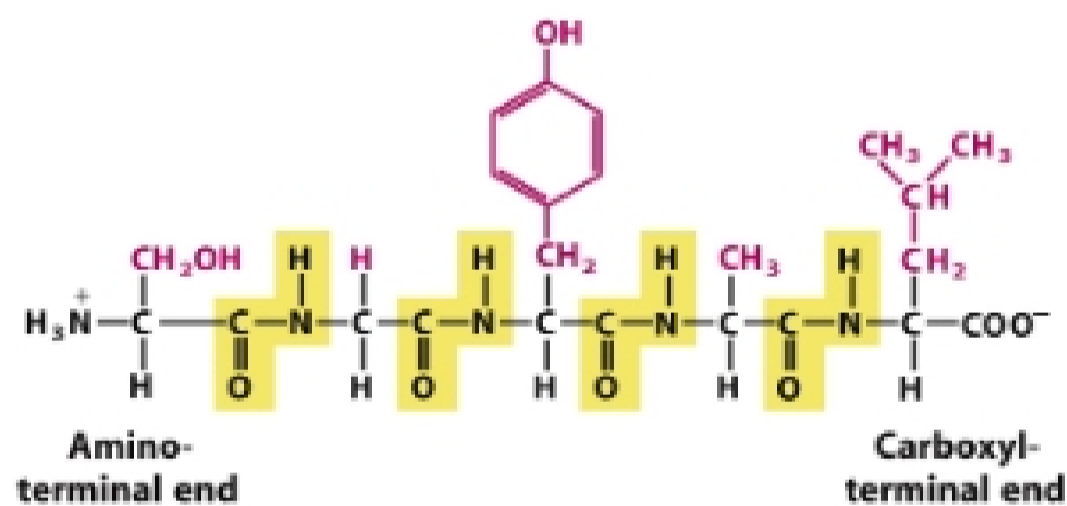


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