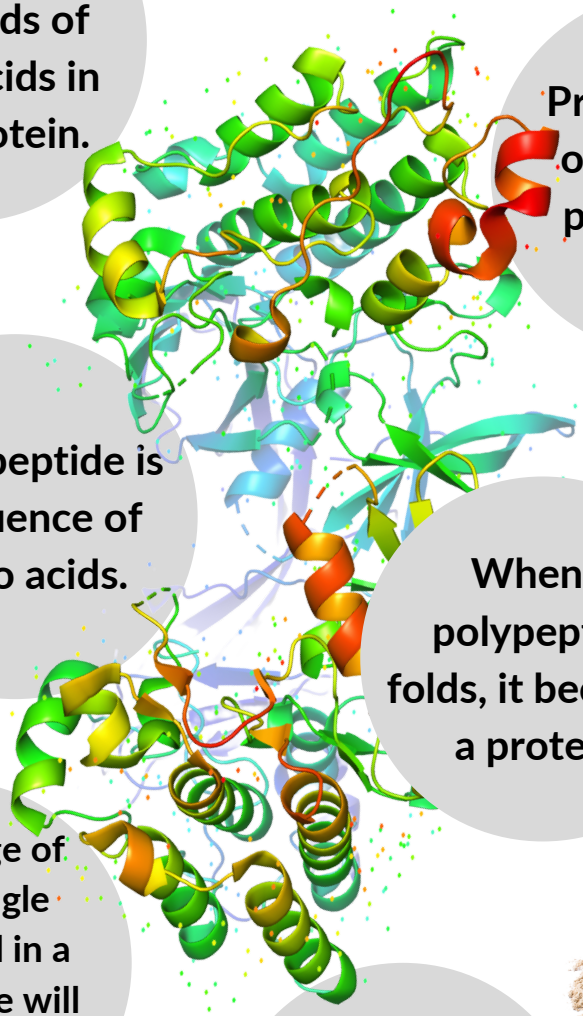
Proteins

There are typically thousands of amino acids in each protein.

Proteins have one or more polypeptide chains.



A polypeptide is a sequence of amino acids.

When a polypeptide folds, it becomes a protein.

The change of only a single amino acid in a polypeptide will change the protein.

Proteins are macromolecules.

Casein proteins found in milk are **hydrophobic**. In the cheesemaking process, they separate from the water and aggregate to form the curd.

Whey proteins found in milk are **hydrophillic**. In the cheesemaking process, they stay in the water. After making cheese, the remaining whey is dehydrated and often used in supplemental protein powders.

Every protein is different according to:

- the order of amino acids in the polypeptide chain,
- the length of the polypeptide chain, and
- how the polypeptide chain is folded.

Denaturation

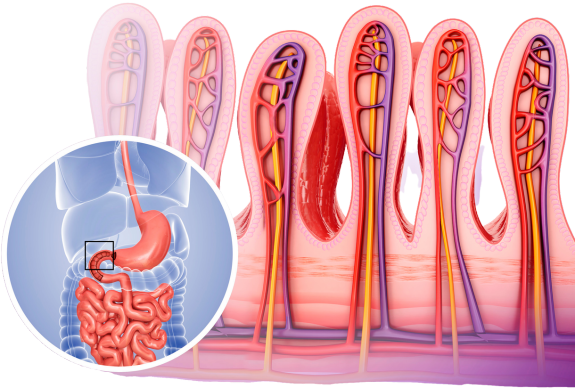
If you heat, cool, or change the acidity of a protein, the folding pattern changes causing the protein to change.

Adding heat to an egg denatures the protein causing the white to change from clear liquid to solid and opaque.

The casein protein is denatured in the process of making cheese by lowering the pH of milk with an acid or bacterial culture.

Denaturation causes the color in red meat to change from red (while raw) to brown when it is cooked.

Hormones, antibodies, and enzymes are made of protein



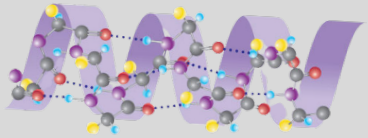
Proteins are too large for our bodies to absorb directly from our food. Enzymes in our digestive system break food down into amino acids that can be absorbed into the bloodstream and then rebuilt.

4 Levels of Protein Structure:

Primary

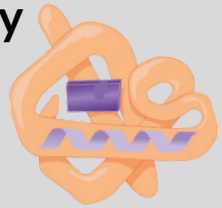
Amino acid sequence

Secondary



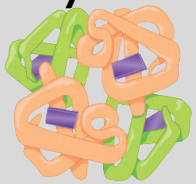
Helix

Tertiary



Folded individual peptide

Quaternary



Aggregation of two or more peptides