

Episode 23 - Protein: Structure & Function

1. What are the two common characteristics of living species as described in the video?
2. What are some of the functions of proteins? Give an example of each.
3. What are the building blocks used to form proteins? How many are found in nature?
4. The video estimates that 100 billion proteins may exist. How can so many proteins form from just a few molecules?
5. What is the name of the bond that results in the formation of proteins?
6. What are the names of two common secondary structures of proteins? Give an example of each.
7. Briefly describe how a “permanent” can change the shape of hair.
8. What name is given to the natural catalysts found in living systems?
9. What is meant by the terms substrate and active site?
10. What is meant by the term tertiary structure?

Extra: Linus Pauling's contribution to protein structure is described in the video. What other contributions has he made to chemistry and what other recognition has he received?

Answer Key

1. What are the two common characteristics of living species as described in the video?

They contain compounds of carbon and contain molecules of protein.

2. What are some of the functions of proteins? Give an example of each.
- Structure - hair, wool, silk
 - Transportation of vital material - hemoglobin
 - Catalysis of reactions - various enzymes
 - Regulation of metabolism - insulin

3. What are the building blocks used to form proteins? How many are found in nature?

amino acids - 20 amino acids are found in most living systems

4. The video estimates that 100 billion proteins may exist. How can so many proteins form from just a few molecules?

When amino acids are joined in different orders, different proteins result.

5. What is the name of the bond that results in the formation of proteins?

Peptide bond

6. What are the names of two common secondary structures of proteins? Give an example of each.

- Helix - may be found in hair and wool*
- Sheet - may be found in silk*

7. Briefly describe how a “permanent” can change the shape of hair.

Permanent wave solution “breaks” old disulfide bonds, roller holds hair in new position, neutralizer solution allow new disulfide bonds to form. Curls!

8. What name is given to the natural catalysts found in living systems?

Enzymes

9. What is meant by the terms substrate and active site?

The substrate is the molecule that the enzyme acts upon. The active site is the position in the enzyme where reaction takes place.

10. What is meant by the term tertiary structure?

The structure that results from the folding of α - helices and β - sheets into a three dimensional globular structure.

Extra: Linus Pauling's contribution to protein structure is described in the video. What other contributions has he made to chemistry and what other recognition has he received?

He did much of the early work on chemical bonding and is the source of the electronegativity tables found in most introductory chemistry books. He was awarded two Nobel Prizes - one for chemistry and one for peace.