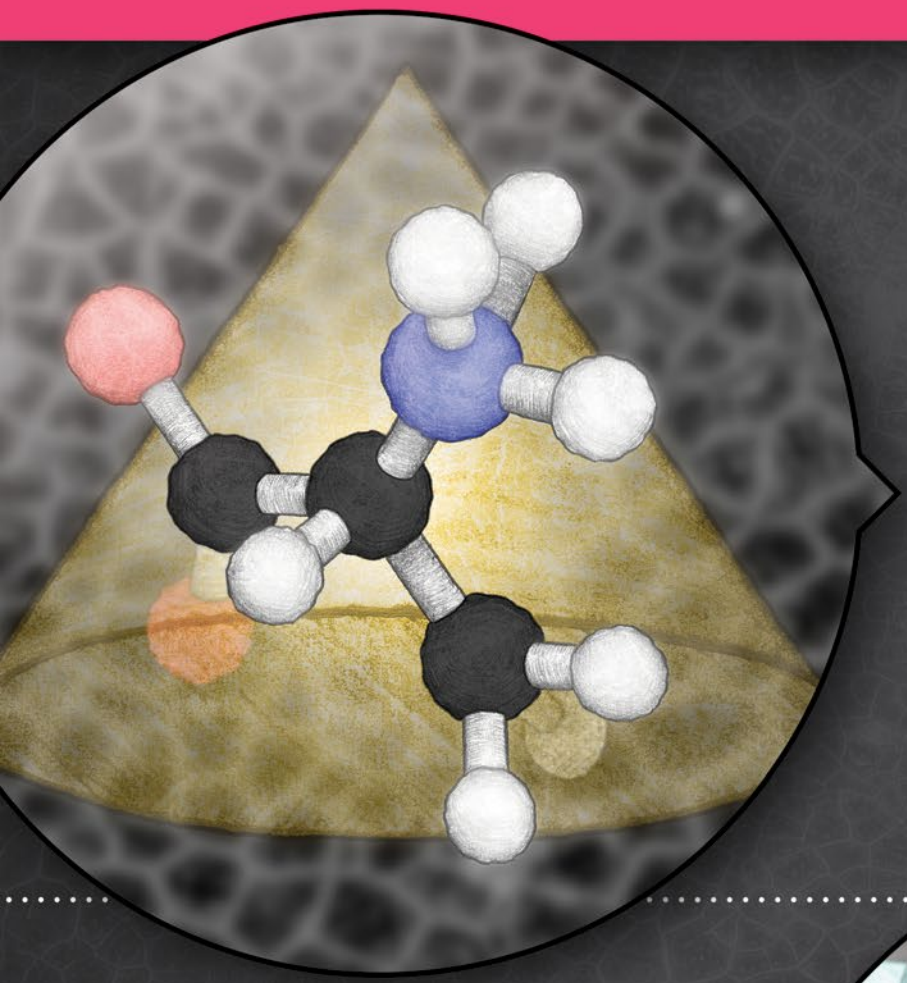
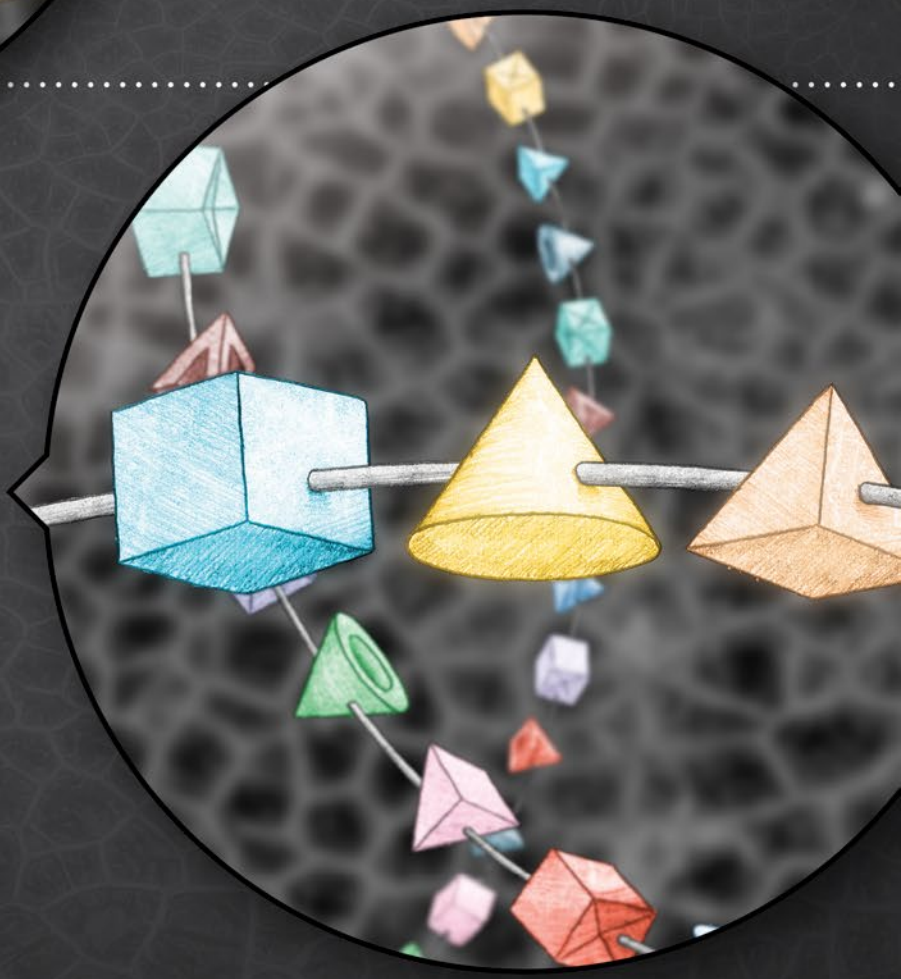
Protein structures uncovered

Lysozyme



Amino acid

Amino acids are molecules and are the building blocks of proteins. Human proteins contain 20 different kinds of amino acids, which are represented below by various geometric shapes and colours.

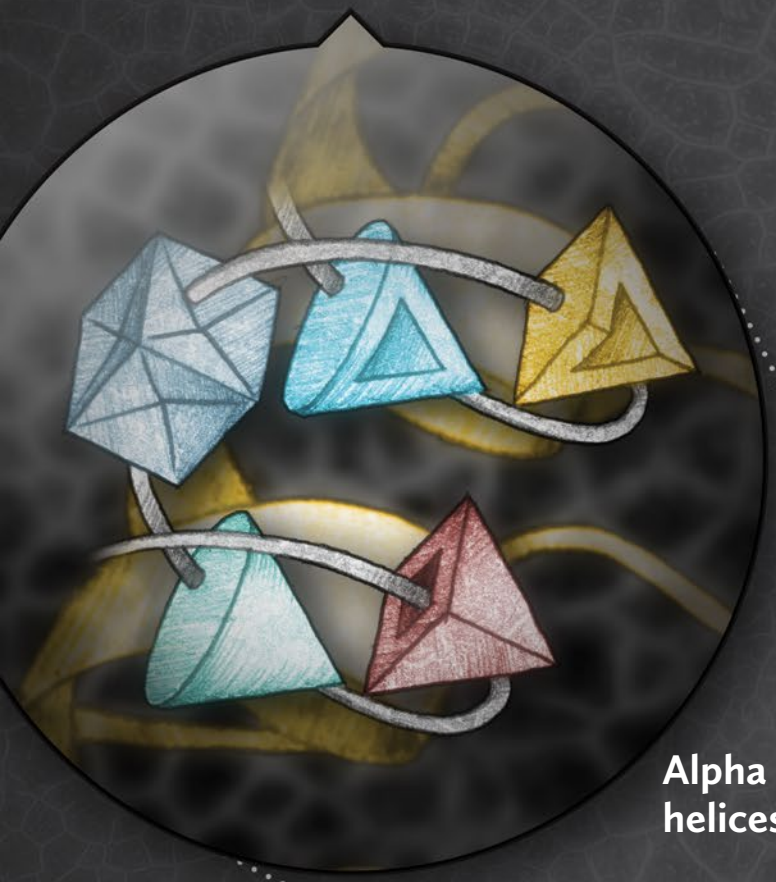


Primary Structure

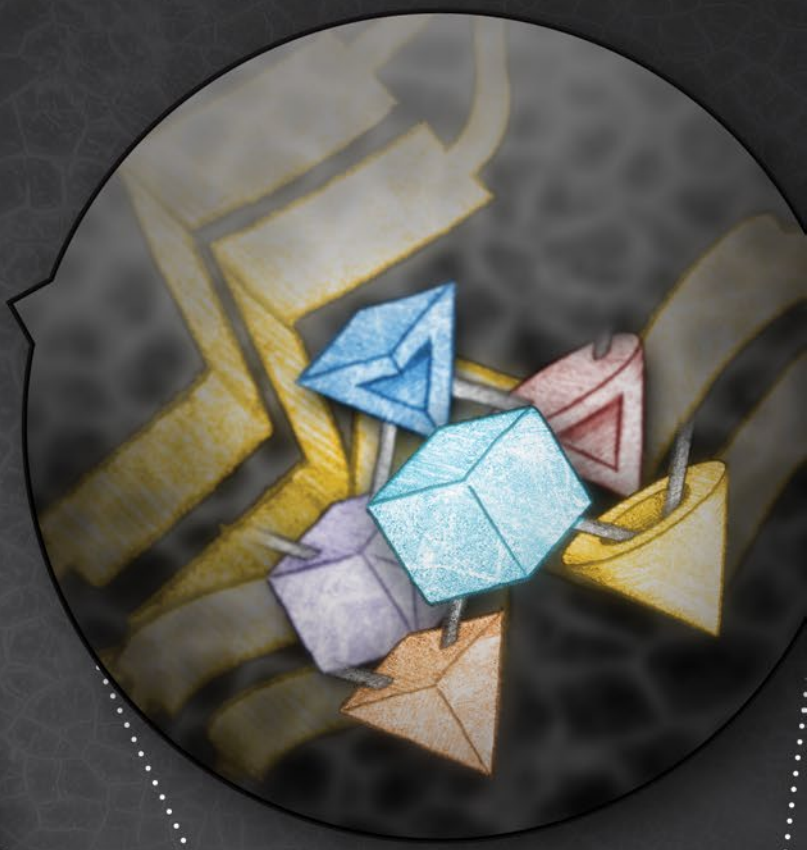
Amino acids link together in a specific sequence to form a chain. This chain is called the **primary structure**. If the protein chain doesn't occur in the correct order, it won't form the secondary and tertiary structure.

Secondary structure

Alpha helices and **beta-pleated sheets** are 'elements' of what is called the **secondary structure** – they are found in many proteins. The primary and secondary structures are folded into complex shapes called the **tertiary structure**. The structure determines the type of protein.



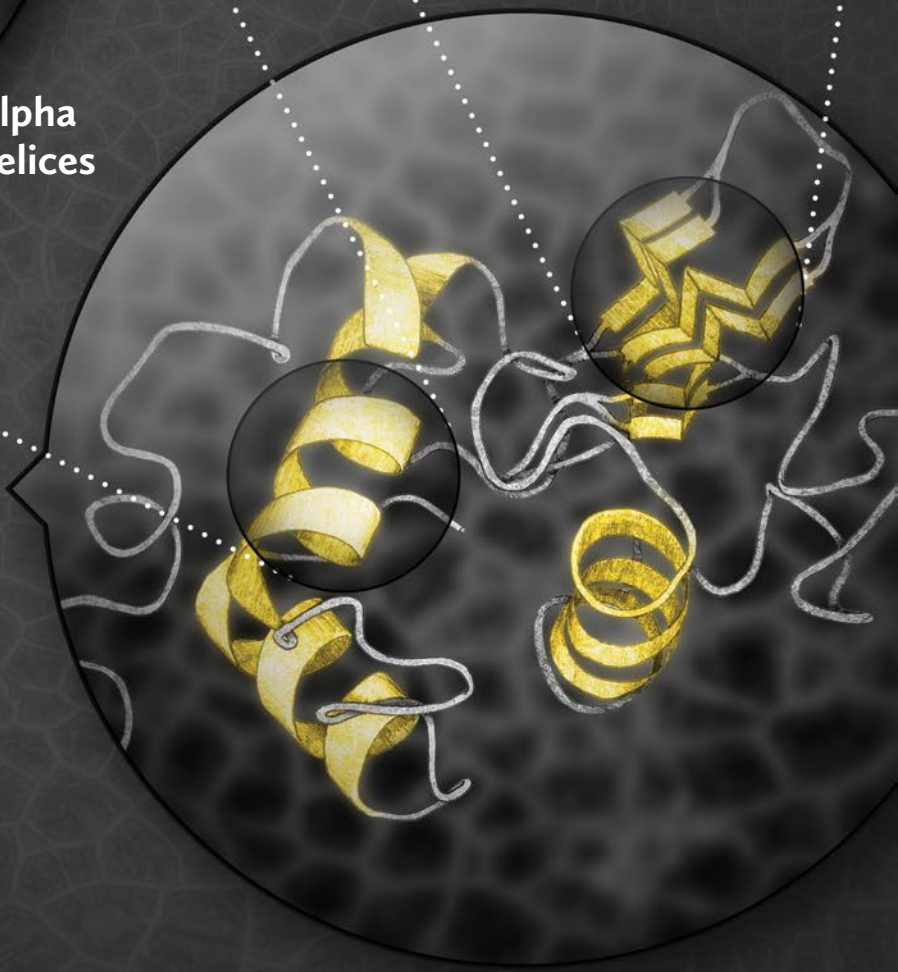
Alpha helices

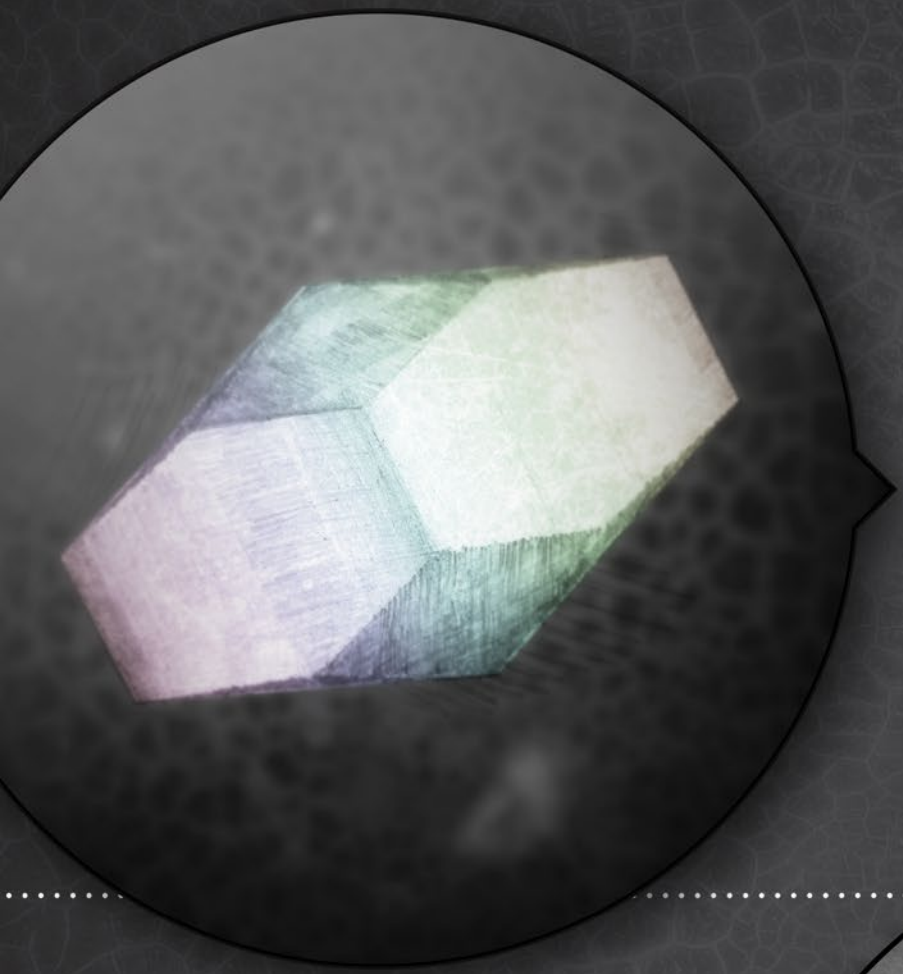


beta-pleated sheets

Tertiary structure

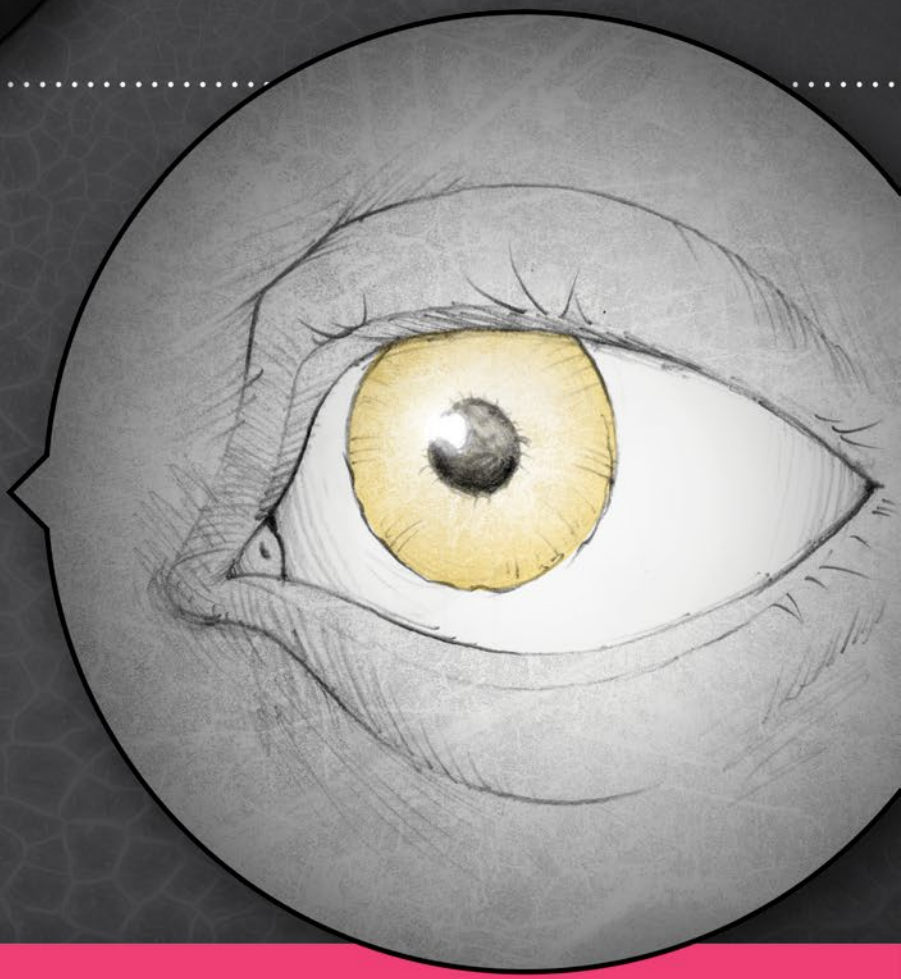
The molecular structure of **lysozyme**, like the structure of many proteins, seems highly irregular. Its polypeptide chain is folded into a unique conformation, which includes alpha helices and beta-pleated sheets. The precise way in which these are arranged together is called the tertiary structure.





Crystal structure

Like many proteins, pure lysozyme can be made to form regular crystals. By measuring how these crystals scatter a fine beam of X-rays in many different directions, we can work out the molecular structure of the protein within. This technique is called **X-ray crystallography**.



Lysozyme

When dissolved in body fluids, lysozyme acts as an **enzyme** that can destroy bacteria by breaking down their cell walls. It is found in many body secretions (including tears, where it protects the eye from bacterial infections).

Discover more about proteins at **wellcome.ac.uk/bigpicture/proteins**

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