

into a dimer of two identical subunits that are joined by sulphide bridges. Dimers are then arranged in a way to form a protofilament, these protofilaments then dimerize to form protofibrils. The protofibrils then form tetramers called microfibrils. This huge quaternary structure then goes through one last stage in that the microfibrils then associate to form macrofibrils.

Collagen is a fibrous protein that is the main constituent of connective tissues such as tendons, cartilage and bone. This makes it one of the most abundant protein in most vertebrates. The primary structure of collagen is an unbranched polypeptide chain that is rich in the amino acids glycine and proline. Collagen has a left-handed, alpha helical secondary structure. This makes collagen very stable and narrow which makes it suited to its function of being a support fibre in tendons and cartilage. The alpha-helix is cross linked by hydrogen bonds in order to hold the shape of the protein in place. This tertiary structure gives collagen its long fibrous molecular shape.

The quaternary structure of collagen is very complex and this gives collagen extreme strength. Collagen has three polypeptide chains that are tightly wound around one another, and each chain is a coil itself, making it a compact molecule. These three polypeptides wrap around one another to form a right-handed triple helix that is formed by the regular assurance of glycine in the primary structure of the protein.

Fibroin is an major component of silk and spider webs and is insoluble. The primary structure of fibroin contains mostly glycine and alanine; due to the presence of glycine, it allows for the tight packing of the molecule.

The secondary structure of fibroin is that the polypeptide chains form a beta pleated sheet of chains. These sheets are further cross linked in parallel by hydrogen bonds to create the tertiary structure of the protein. The beta pleating allows for little stretch and therefore is a major property of silk due to the limited elasticity of the material.

The quaternary structure of fibroin is the stacking of the beta pleated sheets to create a functional structure.