Comparisons between the structure and function of collagen and Insulin

Insulin is a very important hormone and is also it is a fibrous protein, this means its properties are that it is extensible, strong and insoluble it is also a secondary structure which is made up of α helices and β sheets, where as collagen is a important structural protein found in animals which is a globular protein (a secondary structure bent and folded into spherical shapes) which is soluble which consists of a hydrophobic core which is surrounded by a hydrophilic external surface. An insulin molecule consists of 51 amino acids and three disulphide cross links which is made up of two separate polypeptide chains know as chain A and chain B. Polypeptide chain A contains 21 amino acids and polypeptide chain B contains 30 amino acids, they are joined tighter by three disulphide bridges two inter-chain disulphide bridges and one intra-chain disulphide bridges. The structure of insulin is a compact cylinder with the carboxyl of polypeptide chain B longer then the rest of the protein. Insulin contains many hydrophobic residues which together form a hydrophobic core where as a collagen molecule is a much larger structure, it consists of three polypeptide chains which each contain around 1000 amino acids which are coiled together to form a triple helix.

The collagen polypeptide contains nearly one-third glycine, every third amino acid is glycine, and all the other amino acids are mostly either proline or hydroxyproline. Some the amino acids form a ring to force to become a triple helix and stop it from forming a secondary structure where as insulin is a chain and does not need to do this, the structure of collagen can be changed in diseases like scurvy, which is a lack of ascorbic acid, a cofactor in the hydroxylation of proline, an amino acid present in collagen.

As collagen is a very strong structural protein the function for this molecule is to give strength to cartilage, teeth, cornea, bones, tendon and the fibrous matrices of skin and blood vessels where as the function of insulin is that mainly increases the rate of synthesis of fatty acids, protein and glycogen, and also inhibits the breakdown of protein and glycogen. A very important part of the process is to stimulate cells such as liver, muscle and fat to remove glucose which causes an overall reduction of blood glucose levels, some other sugars and amino acids are also removed from the blood, which are either used or stored as fat or glycogen. In insulin in your body is not functioning or you are not sensitive it you will form diabetes where as if collagen is not functioning then you may form brittle bone disease.