**Macromolecules Discussion**

Biomolecules are needed by living things for a variety of biological functions, including energy storage and the control of their metabolic cycles. The four main biomolecules (or macromolecules) that are principally involved in these biological activities are proteins, lipids, carbohydrates, and nucleic acids. The structures of the macromolecules differ and so does their functions. Below is a description of the macromolecules, their structure and how it influences their functions:

Carbohydrates are biomolecules that contain carbonyl compounds and hydroxyl groups. Their atoms are made up of carbon (C), hydrogen (H), and oxygen (O), typically in a 2:1 hydrogen-oxygen ratio. The chemical formula for carbohydrates is Cm(H2O)n. They are classified into monosaccharides, disaccharides and oligosaccharides. Monosaccharides are the simplest form and cannot be further hydrolyzed to smaller carbohydrates. They are what creates the disaccharides and the polysaccharides. They include elements such as glucose, galactose and fructose. Their main function is providing energy to living organisms. Disaccharides on the other hand have two sugar units and when dehydrates release two monosaccharides. They are also a major source of energy and carbohydrate metabolism. Oligosaccharide contain three or more molecules of the same of or different monosaccharides. The chemical formula is Cn(H2O)n-2. It affects their main function which is to attach to proteins in processes such as antigenicity, resistance to protease and solubility.

The protein structure on the other hand is made up of a polypeptide chain. Each protein differs in the sequence of its amino acids and therefore each protein has chemically different side chains. A protein's three-dimensional structure governs how it works. Depending on its shape, a protein's function can alter. When a protein transitions between one state and another, conformational changes take place. Open, closed, partially open, partially closed, etc., are just a few examples of these states. A protein typically performs differently when it switches from one shape to another. Proteins with similar amino acid sequence perform similar functions even in distantly related living organisms.

Fatty acid polymers called lipids have a long, non-polar hydrocarbon chain and a tiny, polar area with oxygen. Lipids are classified into simple lipids complex lipids and precusor and derived lipids. Their functions differ base don type. They for instance store energy for use in the body, help in absorption of minerals and also provide a layer of insulation to the body.

**References**

Jakobek, L. (2015). Interactions of polyphenols with carbohydrates, lipids and proteins. Food chemistry, 175, 556-567.