

# Macromolecule research project overview



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Health: Carbohydrates, Lipids, and Proteins Macromolecules, biological molecules, or organic molecules like carbohydrates, lipids, and proteins are three of the basic molecules that sustain living organisms for its energy and amino acid supplies (Miller & Levine 2003). The commonality among these molecules is in its backbone element which is carbon.

Carbohydrates or sugars are organic molecules made up of carbon, hydrogen, and oxygen atoms with the general formula  $(CH_2O)_n$ , that play a central role in cells by providing energy and support (Miller & Levine 2003).

The different kinds of Carbohydrates are: 1.) Monosaccharide, 2.)

Disaccharides, 3.) Polysaccharides are polymers of monosaccharide of up to 10, 000 glucose molecules per chain, where parallel chains are cross-linked

with H bonds forming bundles of 60-70 molecules. These are: a.) Starch

which are insoluble polymer of glucose, and energy storage molecules

concentrated as granules within plant cells; b.) Glycogen which are water-

soluble, branched polysaccharides storage form in animal liver and muscle

cells; c.) Chitin which are tough molecules of  $\beta$  glucose and the second most

abundant molecule that forms the major component of fungal cell wall and

the exoskeleton of insects and arthropods, recently used as surgical suturing

threads; and d.) Cellulose which are the structural material in plant cell wall

(Campbell & Reece 2002).

Lipids are substances with an oily, greasy or waxy consistency which are relatively insoluble in water and tend to be water-repelling, hydrophobic, i. g.

cuticle on leaf surfaces (Mader 2001). This is also important biological fuels,

hormones and structural components of cell membranes (Mader 2001).

Neutral fats and oils are the most abundant forms found in both plants and

animals. Fats are economical storage for fuel reserves and there is twice

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more energy as the same quantity of carbohydrates it can generate (Mader 2001). Fatty acids which are the main components of neutral fats and phospholipids are of 30 different kinds such as saturated fatty acids which are solid at room temperature, i. g. butter and palmitic acid, and unsaturated fatty acids, oils, which are liquid at room temperature, i. g. linoleic acid.

Important lipids are phospholipids which are the main component of cellular membranes, steroids which are likewise components of membranes and also hormones such as testosterone for sexual growth and development of men and estrogen and progesterone for women sexual growth and development with cholesterol as the main precursor, and carotenoids which are light-absorbing pigments. Important biological functions of lipids are: 1.) concentrated sources of energy providing fuel for aerobic respiration producing water and carbon dioxide; 2.) structural framework of cellular membranes; 3.) insulation to reduce heat loss during cold weather; and 4.) waxes and oils give water-proofing in plants and animals (Mader 2001).

Proteins are basically made up of amino acids which are of 150 plus different kinds and 20 of it are naturally in existence (Mader 2001). Proteins are classified according: 1.) to the level of organization such as primary, secondary, and tertiary; 2.) to structural organization: fibrous proteins; water proteins, tough, and supple; and 3.) to functions: a.) structural role i. g. collagen in connective tissue, cartilages, bones, tendons, and walls of blood vessels; b.) contractile i. g. myosin and actin (Mader 2001). Proteins may also be modified by the addition of carbohydrates forming glycoproteins, and by the addition of fatty acids to form lipoproteins (Mader 2001).

Too little carbohydrates, fats, and protein in a meal which may not be consistent with the body requirement would bring about less supply of

energy for metabolism and building blocks for cells and tissues (Mader 2001). However, excessive intake of these complex compounds would also result to a malnourished condition such as obesity for oversupply.

Starchy and sugary foods like potatoes, pasta, pastries, chocolates, ice cream, nuts, meat, and candies are foods that contain high levels of carbohydrates, fats and protein that encourage its heavy consumption.

Discuss how each of the above diets is related to caloric intake

In a diet of 2, 000 Calories, there should be 300mg (4 Calories/g) carbohydrates, fats should be less than 20 grams (9 Calories/g), and protein should be 5 grams (4 Calories/g). While in a diet of 2, 500 Calories, there should be 375 mg carbohydrates, less than 25 grams fats, and proteins 5 grams (Mader 2001).

Carbohydrates should compose the largest proportion of the diet, which are more preferable over ice creams and chocolates or candies as it contains non-digestible parts which may also have some laxative properties (Mader 2001). Fats should be at the level recommended otherwise excessive intake would result to coronary problems (Mader 2001). Protein on the other hand should be at the level recommended for enough supply of building blocks for cells (Mader 2001).

#### Reference

Mader, S. S. (2001). *Biology*. New York, NY: McGraw-Hill.

Miller, K. & Levine, J. (2003). *Biology*. Upper Saddle New Jersey: Prentice Hall.

Campbell, and Reece. (2002). *Biology*. 6th ed. USA: The Benjamin Cummings

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