Nutrition

11th Grade 2nd Marking Period Biology Notes

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Student's Name

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Institution

Contents

Nutrition

Nutrition is the study of the nutrients in foods and the body's handling of them including ingestion, digestion, absorption, transport, metabolism interaction storage and excretion. Nutrition could also be defined as the study of food. Food is any material containing nutrients taking into the body for the maintenance of life and the growth and repair of tissues. Nutrients are substances obtained from food and used in the body to promote energy and structural materials and to regulate growth, maintenance of life and repair of the body's tissues. The body can make some nutrients for its self. The body cannot make all of the nutrients; it must obtain some nutrients from foods. The nutrients that food must supply are called essential nutrients. Those that the body can make for itself are called non-essential nutrients.

Nutrition is also science that interprets the interaction of nutrients and other substances in foods in relation to maintenance, growth, reproduction, health and disease of an organism. It includes food intake, absorption, assimilation, biosynthesis, catabolism and excretion.

There are six classes of nutrients. These are: carbohydrates, fats, protein, minerals, vitamins, and water. Nutrients that breakdown to yield energy the body can use are called energy yielding nutrients. These are Carbohydrates, fats and proteins. The nutrients in food must be broken down to yield energy. The energy in food is chemical energy. The body can convert this chemical energy to mechanical, electrical or heat energy.

The process by which nutrient are broken down to yield energy is known as metabolism. Metabolism can also be defined as the sum total of all the chemical reactions that go on in living cells. The types of metabolism are: Anabolism, and Catabolism. The reactions in which small molecules are put together to build larger ones is called anabolism. Reactions in which large molecules are broken down to smaller ones is catabolism.

TYPES OF NUTRITION

The types of nutrition are: ***Autotrophic, Heterotrophic, Holozoic, Saprophytic, parasitic, and Mutualistic.*** Plants and some microorganisms take in small inorganic molecules (carbon dixiode, water and minerals), which they build up into complex organic molecules. This is called ***autotrophic nutrition***. Plants and some bacteria convert the radiant energy of sun light into chemical bond energy in a series of chemical reactions called photosynthesis. All autotrophic organisms must obtain chlorophyll. Other bacteria used the chemical bond energy of inorganic molecules to produce their organic nutritional requirements in a process called ***chemosynthesis***. Autotrophic organisms are also called producers.

Animals generally feed on organic matter or food. They use heterotrophic nutrition. Chemical reactions convert their food into the forms they required to maintain their life processes. ***Heterotrophs*** are also known as consumers. Different types of heterotrophs feed different things. Carnivores are animals which kill and eat other animals. Because they have to catch and kill their prey, they are also termed predators. Parasites also feed on other organisms called hosts that must be kept alive. Tape worm and the fungus Tinea leaving on human are

example parasites. *Herbivores* eat plant matters. Example kangaroo, Koala, and honey eaters. Omnivore's diet includes both plants and animals matter. Scavengers eats the remain of dead organisms or their products. *Detritivores* eat the remain of organic matter in soil or water. Examples are: earth worms and pawns. *Decomposers* (fungi and bacteria) feed on dead organisms and their excretory products, breaking them down into simple inorganic molecules. The array of feeding relationship between the producers, consumers, and decomposers with in any group of organisms living in a particular area or community is called a food web. *Holozoic* nutrition is a type of heterotrophic nutrition that is characterized by the internalization or ingestion and internal processing of liquids or solid foods particles. Amoebas, and humans exhibit this type of nutrition. Haplobiontic or saprophytic nutrition is a type of nutrition in which organisms feed of dead and decaying matter. *Parasitic nutrition* is a mode of heterotrophic nutrition where an organism known as a parasite lives on the body or inside the body of another type of organism known a host to obtain a nutrient. *Mutualistic Nutrition* is a form of symbiotic nutrition found among various organisms having a closed association between two organisms to derive nutrients each contributing to and benefiting from the relationship.

FOOD AND NUTRIENTS

Food→ is any substance consumed to provide nutritional support for the body. It is usually of plant or animal origin, and contains essential nutrients, such as carbohydrates, fats, proteins, vitamins, minerals, and water. The substance is

ingested by an organism's cells to provide energy, maintain life, or stimulate growth.

Nutrients → is a compound in food that an organism uses to survive and grow. Macronutrients provide the bulk energy an organism metabolism system needs to function while Micronutrients are cofactors.

Classes of nutrients

I. *Carbohydrates*: Sugars and polysaccharides

The term carbohydrate originates from the way that most member of this chemical class resembles combinations of carbon and water. Carbohydrates can be represented by the formulae ($CH_2O)_n$, in which n indicates the number of units. In molecular configuration, the carbon form chain or rings with two or more hydroxyl groups and is either an aldehyde or ketone group.

Carbohydrate exists variety of configurations. The common term sugar (saccharide) refers to a simple carbohydrate such as monosaccharide or disaccharide that has a sweet taste. A monosaccharide is a simple polyhydroxy. Aldehyde or ketone molecule containing from three to seven carbons. A disaccharide is combination of two monosaccharide, and a polysaccharide is a polymer of five or more monosaccharide bound in a linear or branched chain patterns. Monosaccharides and disaccharides are specified by combining a prefix that describes some characteristics of the sugar with the suffix –ose. For example, hexose are composed of 6-carbons, and pentoses contain 5-carbons. Glucose is the most important hexose. Fritose is name for fruit. Disaccharides are named similarly: lactose is an important component of

milk, maltose, means malt sugars, and sucrose is common table sugar or cane sugar.

The simple carbohydrates.

a. Monosaccharides: the three monosaccharides are glucose, fructose, and galactose.
b. Disaccharides: the three disaccharides are
   Sucrose (glucose + fructose)
   Lactose (glucose + galactose)
   Maltose (glucose + glucose)

Complex carbohydrates

The simple carbohydrates contain glucose fructose, and galactose in single and pairs. Complex carbohydrates contain mostly glucose units together as polysaccharides. Three complex carbohydrates are important in nutrition. These are: glycogen, starch and fibers.

Lipids: (fats, phospholipids and waxes)

The term lipids derived from the Greek word "lipose", meaning fat, is a substance that is not soluble in solvent such as water. This property occurs because the substances called lipids contain long or complex C-H (hydrocarbon) chains that are non-polar and hydrophobic. Important storage lipids are triglycerides, a category that includes fats and lipids. Triglycerides are composing of a single molecule of glycerol bound to three fatty acids. Glycerol is a 3-carbon alcohol with three OH-groups that serves as binding sites, and fatty acid are long-chain hydrocarbon molecules with a carboxyl group (COOH) at one end that is freed to bind to the glycerol. The bond that forms between the –OH group and the

–COOH is defined as an ester bond. The hydrocarbon portion of a fatty acid can vary in length from 4 to 24 carbons and it may be saturated or saturated. If all the carbons in the chain are single bounded to two other carbons and two hydrogens, the fat is saturated. If there is at least one C=C double bond in the chain, it is unsaturated. The structure of fatty acid is what give fats and oils their greasy, insoluble nature.

Picture of fatty acid

Membrane lipids

A class of lipids that serve as a major structural component of cell membrane is the phospholipids. Phospholipids contain only two fatty acid attached to the glycerol. Lipids have a hydrophilic region from the charge on the phosphoric acid-alcohol head of the molecule and a hydrophobic region that corresponds to the uncharged tail. This property causes lipids to naturally assume single and double layers, which contribute to their biological significance in membranes. This structure of lipid bilayers confers characteristics on membranes such as selectively permeability and fluid nature.

Miscellaneous lipids

Steroids, a complex ringed compound found in cell membranes and animal hormones. The best known of these is sterol called cholesterol that reinforces the structure of the cell membrane in animal cell and bacteria cells. Wax is an ester alcohol and is saturated fatty acid. Among living things, fur, feathers, fruits leaves, human skins, and insects' exoskeletons are water proofed with wax. Bacteria that cause tuberculosis and leprosy produce wax that contributes to their pathogenicity.

Proteins (shapes of life)

The predominant organic molecule in cells is protein, a term adopted from the Greek word "Proteois", meaning first or prime. The structure, behavior, and unique qualities of each living thing are a consequence of the proteins they contain. The building blocks of protein are amino acids, which exist in 20 different forms. Amino acid acids have a basic skeleton consisting of a carbon linked to an amino group (NH_2), a carboxyl groups (COOH), a hydrogen atom (H) and variable (R) group. The variations among the amino acid occur at the R group. A covalent bond called peptide bond forms between the amino group on one amino acid and the carboxyl group on another amino acid. Peptide usually refers to a molecule composed of short chains of amino acids, such as dipepitide, tripeptide, tetrapeptide. A polypeptide contains an unspecified number of amino acids, usually more than 20 and is a smaller sub unit of protein. Protein is the longest and contains a minimum of fifty amino acid. The reason that proteins are so varied and specific is that they do not function in the form of a simple straight chain of amino acids called primary structure. A protein has the tendency to assume more complex levels of organization, called the secondary, tertiary, and quaternary structures.

Vitamins

Vitamins are organic substances that act as coenzymes, they assist enzymes during chemical reactions. Vitamins are necessary for normal growth and body activity. Vitamins are classified as either fat-soluble or water – soluble. Fat – soluble or vitamins A, D, E, and K are stored in the body's fatty tissue.

Water –Soluable vitamins – all the B vitimins and vitiman C – can be dissolved in water but cannot be stored in the body. They must be obtained from food.

Minersl minersl

Are inorganic substances that form an important part of living tissue. Like vitamins, minerals do not supply energy but help regulate body functions. Teeth and bone require calcium and phosphorus. Iron is the central atom in the oxygen carrying molecules of the blood. Magnesium, calcium, and zinc help regulate never and muscle function. Some deficiencies of vitamins and mineral are: night blindness, beriberi, dim vision, premature aging, pellagra, anemia, scurvy, rickets, goiter, dehydration, kwashiorkor etcetera.

Water

About two third of the body's weight is water, most of it in the cytoplasm of cells. Bold plasma, tissue fluids, and body cavities contain the remainder. Water is required for many body functions. Most of the chemical reactions in the body take place only in a water solution. Water carries nutrients to the blood plasma and into the body cells. Water also forms the major part of urine and sweat, which help rid the body of waters.

DENTAL FORMULA

A dental formula expresses the number and kind of teeth possessed by an animal. A dental formula is usually written in the form of four fractions, one for each type of tooth, with the upper and lower lines describing the upper and lower jaws

respectively. The formula I:C:P:M or 2:1:2:3 for upper teeth indicates two incisor, one canine, two premolars and three molars.

Dental care

Basic dental care involves brushing and flossing your teeth regularly, seeing your dentist or dental hygienist for regular checkups and cleanings, and eating a mouth-healthy diet, which means foods high in whole grains, vegetables and fruits, and dairy products.

Malnutrition

Malnutrition or malnourishment is a condition that results from eating a diet in which nutrients are either not enough or are too much such that the diet causes health problems. It may involves calories, proteins, carbohydrates, vitamins, or minerals. Not enough nutrient is called undernutrition or under nourishment, while too much is called overnutrition. Example of undernourishment is known starvation. There are two main types of undernutrition: Protein-energy malnutrition and dietary deficiencies. Protein-energy malnutrition has two severe forms: Marasmus (lack of protein and calories) and Kwashiorkor (lack of just protein). Overnutrition is a form of obesity.

Assignment

1. The main kinds of carbohydrates are _____ and _____
2. animals store extra carbohydrates in the liver as _____

3. Fats and oil provide energy for life activities True/False
4. Proteins provide the organic compounds needed to build and repair body tissues True/False.
5. Vitamins are found in small quantities in food. True/False
6. Thiamine is another name for _____
7. Not enough thiamine results in a disease called _____
8. A deviancy of vitamin B2 results in _____
9. A lack of vitamin B6 causes _____
10. What blood condition is callused by a lack of vitamin B12? _____
11. The deficiency disease caused by a lack of niacin is _____
12. Scurvy is caused by _____
13. List some foods that have a large amount of vitamin _____
14. Vitamin D is sometimes called _____
15. Vitamin K. helps _____
16. _____ dissolves and transport materials.
17. The indigestible part of food is called _____
18. What is meant by the term calorie? _____ _____
19. Name two eating disorders _____ and _____
20. What is a dietitian? _____ _____