Biology Class 01

22nd May, 2023 at 9:00 AM

SCOPE AND SOURCES FOR BIOLOGY (9:01 AM)
FOOD AND NUTRIENTS (9:28 AM)

- ***Nutrients***
- Nutrients are present in our food and are essential to the life and health of a person, providing us with energy and acting as building blocks for repair and growth
- *Macronutrients*
- They are needed by the body in a large amounts and form the greater part of our food
- For example, protein, carbohydrates, and fats
- *Micronutrients*
- They are needed in smaller quantities and form a lesser part of our food
- For example, vitamins and minerals
- *Carbohydrates*
- They are the main macronutrient by which the body gets its energy
- It contains carbon, hydrogen, and oxygen
- Monosaccharides are the simplest form of carbohydrates which contain one single unit, e.g. glucose, galactose, fructose
- Glucose is the main energy source for the body
- Galactose is a component of milk
- Fructose is the fruit sugar
- Oligosaccharides are formed when 2-10 monosaccharide units are joined together by glycosidic bonds, e.g. common table sugar, lactose, maltose, etc.
- Sucrose is made up of glucose and fructose
- Lactose is the milk sugar and is made up of glucose and galactose
- Maltose is present in malt-based syrup, e.g. maple syrup, corn, and barley syrup
- It is made up of two units of glucose
- Polysaccharides are complex carbohydrates that are made up of more than ten units of monosaccharides joined by glycosidic bonds, e.g. glycogen, starch, cellulose, etc.
- Glycogens are found only in animals
- Starch and cellulose are found only in plants
- Starch is the storage product of glucose in plants and glucogens are storage products for animals
- Cellulose makes the cell wall of plants

- *Proteins* **(9:55 AM)**
- They are nitrogenous organic compounds (carbon, hydrogen, nitrogen, and oxygen) that have amino acids joined by peptide bonds
- Fibrous protein: The amino acid chains are arranged in a linear pattern and they act as structural proteins of the body e.g. myosin in muscles, collagen in the skin, alpha keratin in the hair and nails, etc.
- Globular protein: The amino acids are arranged in a spherical manner and they form the functional protein of the body
- For example, insulin, blood plasma proteins, enzymes, etc.
- Enzymes are bio-catalyst that help in different reactions taking place in the body, e.g. lactase enzymes break down lactose into glucose and galactose
- *Fats*
- Fats are organic compounds that are insoluble in water
- Triglycerides are a major form in which fats are stored in the body and are made up of three units of fatty acids and one unit of glycerol joined by an ester bond
- The function of fats:
- They are building material for cell membranes, act as vitamins like A and D, some hormones like sex hormones, and signal molecules for the brain
- Types of fats are based on types of fatty acid
- Saturated fat does not have double bonds between carbon atoms, e.g. ghee, butter, cheeses, cream, coconut oil, etc.
- Unsaturated fats have at least one double bond between carbon atoms
- Unsaturated fats can further be classified into monounsaturated or MUFA (one double bond) and polyunsaturated or PUFA (more than one double bond)
- They are mostly plant-based and liquid at room temperature
- A few examples of MUFA are olive oil, sesame oil, almonds oils, etc.
- A few examples of PUFA are fish oils, walnuts, almonds, etc.
- Transfats are a type of unsaturated fatty acids that are industrially hydrogenated to change to solid form, e.g. vanaspati ghee, fried and processed foods, and certain baker products
- Bad fats are those fats that get deposited in the blood vessels,e.g. transfats, saturated fats, etc.

- *Vitamins* **(10:59 AM)**
- Vitamins are needed in small quantities for the proper functioning of an organism
- Most of these cannot be synthesized in our bodies and have to be taken as a part of our diet
- Water soluble vitamins are the ones that can dissolve in water and fat solubles are the ones that dissolve only in fats
- Vitamins B and C are water-soluble and the rest of Vitamins A, D, E, and K are fat-soluble
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Vitamins	Sources	Disease
Vitamin B1 or thymines	Fruits, sweet potatoes, and peanuts	Beri-Beri, retarded growth
VitaminB2 or riboflavin	Banana, yeast, dates	Cheilosis development or cracks at the corner of the mouth
Vitamin B12 or cyanocobalamin	Meats, eggs, and also made by the bacteria present in the intestine	Pernicious anemia
Vitamin C or ascorbic acid	Citrus fruits like lemon, orange	Scurvy
Vitamin A or retinol	Carrots, green leafy vegetables	Night blindness
Vitamin D or calcipherol	Exposure of the skin to sunlight	Rickets
Vitamin E or tocopherol	Pumpkins, mango	Heart problems, muscle weakness
Vitamin K or phylloquinone	Green leafy vegetables, tomatoes	Increased clotting time

Minerals

- They are inorganic nutrients that play a key role in ensuring the health and well-being of an individual
- Macro-minerals are those minerals that are required in a relatively high amount
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Minerals	Sources	Deficiency
Calcium	Milk and milk products	Brittle bones and bad muscle movements, rickets
Sodium, chlorine	Common table salt	Fluid imbalance and dehydration
Potassium	Most fruits and vegetables	Muscle weakness
Phosphorus	Pulses, milk	Weaker teeth and bones
Magnesium	Nuts and seeds	Poor muscle coordination
Sulfur	Onion, garlic	Protein deficiency

- Micro-nutrients are those minerals which are required in lesser amount
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Minerals	Sources	Deficiency
Iron	Spinach, pumpkins, and meat	Anaemia
Fluorine	Drinking water	Tooth decay
Copper	Pulses, nuts, and seeds	Low white blood cell count
Iodine	Iodized table salt	Goitre
Zinc	Eggs and beans	Diarrhea

- Fortification is the addition of nutrients mainly micronutrients to the foods

The topic for the next class: Cell structure