Nutrition:

- Is a science that studies all the interactions that occur between living organisms and food
- Food provides nutrients and energy, which are needed to keep us alive and healthy, to support growth, and to allow reproduction.

4 major groups of nutritious foods:

- Vegetables and fruits
- Grain products
- Milk / alternatives
- Meat / alternatives

> 45 nutrients are deemed essential to human life

- Essential nutrients must be supplied by the diet
- They either cannot be made by the body or cannot be made in sufficient quantities to meet needs (ex: body cannot synthesize vitamin C, but we need it to stay alive)

Fortified foods:

- Foods to which nutrients have been added

Natural health products:

- Consists of food and drugs
- Includes vitamins, minerals, amino acids, and fatty acid supplements + other compounds

Phytochemicals:

- Substances found in plant foods that are not essential nutrients but may have health-promoting properties

Zoochemicals:

- Substances found in animal foods

6 classes of nutrients:

- Carbs
- Lipids
- Proteins
- Water
- Vitamins
- minerals

Energy-yielding nutrients:

- Nutrients that can be metabolized to provide energy in the body.
- Ex: carbs, lipids, and proteins

Macronutrients:

- Nutrients needed by the body in large amounts. These include water and the energy-yielding nutrients
- Measured in kg or g

Micronutrients:

- Nutrients needed by the body in small amounts. These include vitamins and minerals.
- Measured in mg or ug

Organic molecules:

- Those containing carbon bonded to hydrogen.
- Includes carbs, lipids, proteins, and vitamins
- Minerals and water are inorganic molecules (no C-H bond)

Carbohydrates:

- Sugars are simplest form of carbs, starches are more complex carbs (many sugars linked together)

- Most fibre is also carbs, and cannot be digested, therefore providing very little energy (however, it is important for gastrointestinal health)

Fibre:

- Found in vegetables, fruits, legumes, and whole grains

Energy providing by Macronutrient and Alcohol:

- Carbs = 4 kcal/gram > 16.7 kjoules/gram
- Lipid = 9 kcal/gram > 37.7 kjoules/gram
- Protein = 4 kcal/gram > 16.7 kjoules/gram
- Alcohol = 7 kcal/gram > 29.3 kjoules/gram

Proteins:

- Made of amino acids
- Needed for growth and maintenance of body structures and regulation of body processes
- Form ligaments and tendons

Water:

- Is a macronutrient that does not provide energy
- Makes up about 60% of the human body by weight
- Acts as a lubricant, a transport fluid, and a regulator of body temp

Vitamins:

- Organic molecules that don't provide energy
- Needed to regulate body processes
- 13 substances identified as vitamins
- Help the body use the energy from carbs, lipids, proteins + bone growth, vision, blood clotting, oxygen transport, tissue growth, and development

Minerals:

- Inorganic molecules that don't provide energy
- They have regulatory roles such as assisting with bone strength, transport of oxygen, transmission of nerve impulses, etc

- Food processing + prep can also cause vitamin losses because some are destroyed by exposure to light, heat, and oxygen

Composition of the human body:

- 6% Minerals, Carbs, other substances
- 16% Fat
- 16% Protein
- 62% Water

Metabolism:

- The sum of all the chemical reactions that take place in a living organism.

Homeostasis:

- A physiological state in which a stable internal body environment is maintained.

Malnutrition:

- Any condition resulting from an energy or nutrient intake either above or below that which is optimal.

Genes:

- A length of DNA containing the information needed to synthesize RNA or a polypeptide chain; responsible for inherited traits.

Nutritional genomics / Nutrigenomics:

- The study of how diet affects our genes and how individual genetic variation can affect the impact of nutrients or other food components on health.

Adequacy:

- A state in which there is a sufficient amount of a nutrient or nutrients in the diet to maintain health.

Nutrient density:

- An evaluation of the nutrient content of a food in comparison to the kcalories it provides.

Portion distortion:

- The increase in portion sizes for typical restaurant and snack foods, observed over the last 40 years.

Scientific method:

- The general approach of science that is used to explain observations about the world around us.

Hypothesis:

- An educated guess made to explain an observation or to answer a question.

Theory:

- An explanation based on scientific study and reasoning.

Biomarkers:

- A biological measurement that is an indicator of future disease development.

Cardiovascular disease:

- A disease that results from damage to blood vessels, such as the coronary arteries of the heart, which can cause heart attack, or the blood vessels of the brain, which can result in stroke.

Variables:

- A factor or condition that is changed in an experimental setting.

Epidemiology:

- The study of the interrelationships between health and disease and other factors in the environment or lifestyle of different populations.

Association / correlation:

- Two or more factors occurring together. The correlation can be direct (positive) or inverse (negative). A direct or positive relationship is observed when increased nutrient intake increases disease risk; an inverse or negative relationship is observed when decreased nutrient intake increases disease risk. Correlations do not prove causation.

Causation:

- A relationship between two factors where one factor causes the second factor to occur.

Confounding factors:

- a factor that is related to both the outcome being investigated (e.g., disease) and a factor that might influence outcome (e.g., dietary intake)

Prospective cohort study:

- An observational study in which dietary intake information is collected by researchers and the health of the study participants is observed, usually for several years. At the end of the study, scientists determine whether there are any correlations between dietary intake and the incidence of disease.

Case-control study:

- A type of observational study that compares individuals with a particular condition under study with individuals of the same age, sex, and background who do not have the condition.

Control group:

- A group of participants in an experiment that is identical to the experimental group except that no experimental treatment is used. It is used as a basis of comparison.

Treatment group:

- A group of participants in an experiment who are receiving an experimental treatment. The effects of the treatment are compared to the control group.

Single-blind study:

- An experiment in which either the study participants or the researchers are unaware of which subjects are in the control or experimental group.

Double-blind study:

- An experiment in which neither the study participants nor the researchers know who is in the control or the experimental group.

Depletion-repletion:

- A study that feeds subjects a diet devoid of a nutrient until signs of deficiency appear, and then adds the nutrient back to the diet to a level at which symptoms disappear and health is restored.

Balance study:

- A study that compares the total amount of a nutrient that enters the body with the total amount that leaves the body.

Dietary pattern:

- A description of a way of eating that includes the types and amounts of recommended foods and food groups, rather than individual nutrients.

DRIs:

- A set of reference values for the intake of energy, nutrients, and food components that can be used for planning and assessing the diets of healthy people in the United States and Canada.

Life-stage groups:

- Groupings of individuals based on stages of growth and development, pregnancy, and lactation, that have similar nutrient needs.

Nutrient recommendations:

- Estimated average requirement (EAR)
- Recommended dietary allowance (RDA)
- Adequate intake (AI)
- Tolerable upper intake level (UL)

RDAs:

- Intakes that are sufficient to meet the nutrient needs of almost all healthy people in a specific life-stage and gender group.

AIs:

- Intakes that should be used as a goal when no RDA exists. These values are an approximation of the average nutrient intake that appears to sustain a desired indicator of health.

ULs:

- Maximum daily intakes that are unlikely to pose a risk of adverse health effects to almost all individuals in the specified life-stage and gender group

EAR:

- Intakes that meet the estimated nutrient needs of 50% of individuals in a gender and life-stage group.

Criterion of adequacy:

- A functional indicator, such as the level of a nutrient in the blood, that can be measured to determine the biological effect of a level of nutrient intake.

Requirement distribution:

- A plot of the nutrient requirements for a group of individuals in the same life stage. Typically, the plot has the shape of a bell curve, i.e., a normal or binomial distribution.

EAR cut-point method:

- A method that indicates the proportion of a population that is not meeting its requirements, indicated by the proportion of the population with intakes below the EAR.

Intake distribution:

- A plot of the intakes of a specific nutrient in a population.

Estimated Energy Requirements (EERs):

- Average energy intakes predicted to maintain body weight in healthy individuals.

Acceptable Macronutrient Distribution Ranges (AMDRs):

- Ranges of intake for energy-yielding nutrients, expressed as a percentage of total energy intake, that are associated with reduced risk of chronic disease while providing adequate intakes of essential nutrients.

Atoms:

- The smallest units of an element that still retain the properties of that element.

Elements:

- Substances that cannot be broken down into products with different properties.

Chemical bonds:

- Forces that hold atoms together.

Molecules:

- Units of two or more atoms of the same or different elements bonded together

Cells:

- The basic structural and functional units of plant and animal life.

Organs:

- Discrete structures composed of more than one tissue that perform a specialized function.

Digestion:

- The process of breaking food into components small enough to be absorbed into the body.

Absorption:

- The process of taking substances into the interior of the body.

Gastrointestinal tract:

- A hollow tube consisting of the mouth, pharynx, esophagus, stomach, small intestine, large intestine, and anus, in which digestion and absorption of nutrients occur.

Transit time:

- The time between the ingestion of food and the elimination of the solid waste from that food.

Mucosa:

- The layer of tissue lining the GI tract and other body cavities.

Mucus:

- A viscous fluid secreted by glands in the GI tract and other parts of the body, which acts to lubricate, moisten, and protect cells from harsh environments.

Enzymes:

- Protein molecules that accelerate the rate of specific chemical reactions without being changed themselves.

Barrier function:

- The protective role that gastrointestinal cells have in limiting the absorption of harmful substances and disease-causing organisms.

Antigens:

- A foreign substance (almost always a protein) that, when introduced into the body, stimulates an immune response.

Antibodies:

- Proteins produced by the body's immune system that recognize foreign substances in the body and help destroy them.

Allergen:

- A substance, usually a protein, that stimulates an immune response.

Saliva:

- A watery fluid produced and secreted into the mouth by the salivary glands. It contains lubricants, enzymes, and other substances.

Salivary amylase:

- An enzyme secreted by the salivary glands that breaks down starch.

Lysozyme:

- An enzyme in saliva, tears, and sweat that is capable of destroying certain types of bacteria.

Pharynx:

- A funnel-shaped opening that connects the nasal passages and mouth to the respiratory passages and esophagus. It is a common passageway for food and air and is responsible for swallowing.

Epiglottis:

- A piece of elastic connective tissue at the back of the throat that covers the opening of the passageway to the lungs during swallowing.

Esophagus:

- A portion of the GI tract that extends from the pharynx to the stomach.

Peristalsis:

- Coordinated muscular contractions that move food through the GI tract.

Sphincter:

- A muscular valve that helps control the flow of materials in the GI tract.

Chyme:

- A mixture of partially digested food and stomach secretions.

Parietal cells:

- Large cells in the stomach lining that produce and secrete intrinsic factor and hydrochloric acid.

Pepsinogen:

- An inactive protein-digesting enzyme produced by gastric glands and activated to pepsin by acid in the stomach.

Pepsin:

- A protein-digesting enzyme produced by the gastric glands. It is secreted in the gastric juice in an inactive form and activated by acid in the stomach.

Peptic ulcer:

- An open sore in the lining of the stomach, esophagus, or small intestine.

Gastrin:

- A hormone secreted by the stomach mucosa that stimulates the secretion of gastric juice.

Villi:

- Finger-like protrusions of the lining of the small intestine that participate in the digestion and absorption of nutrients.

Microvilli:

- Minute, brush-like projections on the mucosal cell membrane that increase the absorptive surface area in the small intestine.

Brush border:

- Minute, brush-like projections on the mucosal cell membrane that increase the absorptive surface area in the small intestine.

Lacteal:

- A tubular component of the lymphatic system that carries fluid away from body tissues. Lymph vessels in the intestine are known as lacteals and can transport large particles such as the products of fat digestion.

Segmentation:

- Rhythmic local constrictions of the intestine that mix food with digestive juices and speed absorption by repeatedly moving the food mass over the intestinal wall.

Pancreas:

- An organ that secretes digestive enzymes and bicarbonate ions into the small intestine during digestion.

Gallbladder:

- An organ of the digestive system that stores bile, which is produced by the liver.

Lipases:

- Fat-digesting enzymes.

Bile:

- A substance made in the liver and stored in the gallbladder, which is released into the small intestine to aid in fat digestion and absorption.

Secretin:

- A hormone released by the duodenum that signals the release of pancreatic juice rich in bicarbonate ions and stimulates the liver to secrete bile into the gallbladder.

Cholecystokinin (CCK):

- A hormone released by the duodenum that stimulates the release of pancreatic juice rich in digestive enzymes and causes the gallbladder to contract and release bile into the duodenum.

Simple diffusion:

- The movement of substances from an area of higher concentration to an area of lower concentration. No energy is required.

Osmosis:

- The passive movement of water across a semipermeable membrane in a direction that will equalize the concentration of dissolved substances on both sides.

Facilitated diffusion:

- The movement of substances across a cell membrane from an area of higher concentration to an area of lower concentration with the aid of a carrier molecule. No energy is required.

Active transport:

- The transport of substances across a cell membrane with the aid of a carrier molecule and the expenditure of energy. This may occur against a concentration gradient.

Colon:

- The largest portion of the large intestine.

Rectum:

- The portion of the large intestine that connects the colon and anus.

Intestinal:

- Micro-organisms that inhabit the large intestine.

Gastroesophageal reflux disease (GERD):

- A chronic condition in which acidic stomach contents leak back up into the esophagus, causing pain and damaging the esophagus.

Enteral or tube-feeding:

- A method of feeding by providing a liquid diet directly to the stomach or intestine through a tube placed down the throat or through the wall of the GI tract.

Total parenteral nutrition (TPN):

- A technique for nourishing an individual by providing all needed nutrients directly into the circulatory system.

Atrophic gastritis:

- An inflammation of the stomach lining that causes a reduction in stomach acid and allows bacterial overgrowth.

Hepatic portal circulation:

- The system of blood vessels that collects nutrient-laden blood from the digestive organs and delivers it to the liver.

Lymphatic system:

- The system of vessels, organs, and tissues that drains excess fluid from the spaces between cells, transports fat-soluble substances from the digestive tract, and contributes to immune function.

Capillaries:

- Small, thin-walled blood vessels where the exchange of gases and nutrients between blood and cells occurs.

Veins:

- Vessels that carry blood toward the heart.

Arteries:

- Vessels that carry blood away from the heart.

Hepatic portal vein:

- The vein that transports blood from the GI tract to the liver.

Lymphatic system:

- Consists of a network of tubules (lymph vessels), structures, and organs that contain infection-fighting cells. Fluid that has accumulated in tissues drains into the lymphatic system, where it is filtered past a collection of infection-fighting lymphocytes and phagocytes

Cell membrane:

- The membrane that surrounds the cell contents.

Selectively permeable:

- Describes a membrane or barrier that will allow some substances to pass freely but will restrict the passage of others.

Cytosol:

- The liquid found within cells.

Organelles:

- Cellular organs that carry out specific metabolic functions.

Mitochondrion:

- Cellular organelle responsible for providing energy in the form of ATP for cellular activities.

Metabolic pathway:

- A series of chemical reactions inside an organism that results in the transformation of one molecule into another

Coenzymes:

- Small nonprotein organic molecules that act as carriers of electrons or atoms in metabolic reactions and are necessary for the proper functioning of many enzymes.

Catabolic:

- The processes by which substances are broken down into simpler molecules, releasing energy.

ATP:

- The high-energy molecule used by the body to perform energy-requiring activities.

Anabolic:

- Energy-requiring processes in which simpler molecules are combined to form more complex substances.

Cellular respiration:

- The reactions that break down carbohydrates, fats, and proteins in the presence of oxygen to produce carbon dioxide, water, and ATP.

acetyl-CoA:

- A metabolic intermediate formed during the breakdown of glucose, fatty acids, and amino acids. It is a 2-carbon compound attached to a molecule of CoA.

Citric acid cycle:

- Also known as the Krebs cycle or the tricarboxylic acid cycle, this is the stage of cellular respiration in which two carbons from acetyl-CoA are oxidized, producing two molecules of carbon dioxide.

Electrons:

- Negatively charged particles.

ETC:

- The final stage of cellular respiration in which electrons are passed down a chain of molecules to oxygen to form water and produce ATP.

Oxidized:

- Refers to a compound that has lost an electron or undergone a chemical reaction with oxygen.

Reduced:

- Refers to a compound that has gained an electron.

Nephrons:

- The functional unit of the kidney which performs the job of filtering the blood and maintaining fluid balance.

Glomerulus:

- A ball of capillaries in the nephron that filters blood during urine formation.

Refined:

- Refers to foods that have undergone processes that change or remove various components of the original food.

Added sugars:

- Sugars and syrups that have been added to foods during processing or preparation.

Whole grain:

- The entire kernel of grain, including the bran layers, the germ, and the endosperm.

Bran:

- The protective outer layers of whole grains. It is a concentrated source of dietary fibre.

Germ:

- The embryo or sprouting portion of a kernel of grain, which contains vegetable oil, protein, fibre, and vitamins.

Endosperm:

- The largest portion of a kernel of grain, which is primarily starch and serves as a food supply for the sprouting seed.

Fortified or enriched grains:

- Grains to which specific amounts of thiamin, riboflavin, niacin, and iron have been added. Since 1998, folic acid has also been added to enriched grains.

Empty kcalories:

- Refers to foods that contribute energy but few other nutrients.

Simple carbohydrates:

- Carbohydrates known as sugars that include monosaccharides and disaccharides.

Complex carbohydrates:

- Carbohydrates composed of monosaccharide molecules linked together in straight or branching chains. They include glycogen, starches, and fibres.

Monosaccharide:

- A single sugar unit, such as glucose.

Disaccharide:

- A sugar formed by linking two monosaccharides.

Glucose:

- A monosaccharide that is the primary form of carbohydrate used to provide energy in the body. It is the sugar referred to as blood sugar.

Galactose:
- A monosaccharide that combines with glucose to form lactose or milk sugar.

Fructose:
- A monosaccharide that is the primary form of carbohydrate found in fruit.

Sucrose:
- A disaccharide that is formed by linking fructose and glucose. It is commonly known as table sugar or white sugar.

Lactose:
- A disaccharide that is formed by linking galactose and glucose. It is commonly known as milk sugar.

Maltose:
- A disaccharide made up of 2 molecules of glucose. It is formed in the intestines during starch digestion.

Hydrolysis reaction:
- Chemical reaction that breaks large molecules into smaller ones by adding water.

Condensation reaction:
- Chemical reaction that joins 2 molecules together. Hydrogen and oxygen are lost from the 2 molecules to form water.

Oligosaccharides:
- Short-chain carbohydrates containing 3-10 sugar units.

Polysaccharides:
- Carbohydrates containing many monosaccharides units linked together.

Glycogen:
- A carbohydrate made of many glucose molecules linked together in a highly branched structure. It is the storage form of carbohydrate in animals.

Starch:
- A carbohydrate made of many glucose molecules linked in straight or branching chains. The bonds that hold the glucose molecules together can be broken by human digestive enzymes.

Legumes:
- Plants in the pea or bean family, which produce an elongated pod containing large starchy seeds. Examples include green peas, lentils, kidney beans, soybeans, and peanuts.

Dietary fibre:

- A mixture of indigestible carbohydrates and lignin that is found intact in plants.

Functional fibre:

- Isolated indigestible carbohydrates that have been shown to have beneficial physiological effects in humans.

Total fibre:

- The sum of dietary fibre and functional fibre.

Soluble fibres:

- Fibre that dissolves in water or absorbs water to form viscous solutions and can be broken down by the intestinal microflora. It includes pectins, gums, and some hemicelluloses.

Insoluble fibre:

- Fibre that, for the most part, does not dissolve in water and cannot be broken down by bacteria in the large intestine. It includes cellulose, some hemicelluloses, and lignin.

Lactase:

- An enzyme located in the brush border of the small intestine that breaks the disaccharide lactose into glucose and galactose.

Lactose intolerance:

- The inability to digest lactose because of a reduction in the levels of the enzyme lactase. It causes symptoms including intestinal gas and bloating after dairy products are consumed.

Resistant starch:

- Starch that escapes digestion in the small intestine of healthy people.

Glycolysis:

- Metabolic reactions in the cytosol of the cell that split glucose into two, 3-carbon pyruvate molecules, yielding two ATP molecules.

Anaerobic metabolism:

- Metabolism in the absence of oxygen. Each molecule of glucose generates 2 molecules of ATP. Glucose is metabolized in this way when the blood cannot deliver oxygen to the tissues quickly enough to support aerobic metabolism.

Aerobic metabolism:

- Metabolism in the presence of oxygen. In aerobic metabolism, glucose, fatty acids, and amino acids are completely broken down to form carbon dioxide and water and produce ATP.

Gluconeogenesis:

- The synthesis of glucose from simple, noncarbohydrate molecules. Amino acids from protein are the primary source of carbons for glucose synthesis.

Ketones / ketone bodies:

- Molecules formed in the liver when there is not sufficient carbohydrate to completely metabolize the 2-carbon units produced from fat breakdown.

Diabetes mellitus:

- A disease caused by either insufficient insulin production or decreased sensitivity of cells to insulin. It results in elevated blood-glucose levels.

Hypoglycemia:

- A low blood-glucose level, usually below 2.2 to 2.8 mmol/L of blood plasma.

Plasma:

- The liquid portion of the blood that remains when the blood cells are removed.

Glycemic response:

- The rate, magnitude, and duration of the rise in blood glucose that occurs after a particular food or meal is consumed.

Blood-glucose response curve:

- A curve that illustrates the change in blood glucose that occurs after consuming food.

Glycemic index:

- A ranking of the effect on blood glucose of a food of a certain carbohydrate content relative to an equal amount of carbohydrate from a reference food such as white bread or glucose.

Glycemic load:

- An index of the glycemic response that occurs after eating specific foods. It is calculated by multiplying a food's glycemic index by the amount of available carbohydrate in a serving of the food.

Insulin:

- A hormone made in the pancreas that allows the uptake of glucose by body cells and has other metabolic effects such as stimulating protein and fat synthesis and the synthesis of glycogen in liver and muscle.

Glucagon:

- A hormone made in the pancreas that stimulates the breakdown of liver glycogen and the synthesis of glucose to increase blood sugar.

Type 1 diabetes:

- A form of diabetes that is caused by the autoimmune destruction of insulin-producing cells in the pancreas, usually leading to absolute insulin deficiency; previously known as insulin-dependent diabetes mellitus or juvenile-onset diabetes.

Type 2 diabetes:

- A form of diabetes that is characterized by insulin resistance and relative insulin deficiency; previously known as noninsulin-dependent diabetes mellitus or adult-onset diabetes.

Insulin resistance:

- A situation when tissues become less responsive to insulin and do not take up glucose as readily. As a result glucose levels in the blood rise.

Metabolic syndrome:

- A collection of health risks, including excess fat in the abdominal region, high blood pressure, elevated blood triglycerides, low high-density lipoprotein (HDL) cholesterol, and high blood glucose that increases the chance of developing heart disease, stroke, and diabetes. The condition is also known by other names including Syndrome X, insulin resistance syndrome, and dysmetabolic syndrome.

Pre-diabetes:

- A fasting blood-glucose level above the normal range but not high enough to be classified as diabetes.

Impaired glucose tolerance:

- A fasting blood-glucose level above the normal range but not high enough to be classified as diabetes.

Gestational diabetes:

- A form of diabetes that occurs during pregnancy and resolves after the baby is born.

Dental caries:

- The decay and deterioration of teeth caused by acid produced when bacteria on the teeth metabolize carbohydrate.

Hemorrhoids:

- Swollen veins in the anal or rectal area.

Diverticula:

- Sacs or pouches that protrude from the wall of the large intestine in the disease diverticulosis. When these become inflamed, the condition is called diverticulitis.

Carcinogens:

- A substance that causes cancer.

Mutations:
- Changes in DNA caused by chemical or physical agents.

Malignancy / metastasis:
- A mass of cells showing uncontrolled growth, a tendency to invade and damage surrounding tissues, and an ability to seed daughter growths to sites remote from the original growth.

Sugar alcohols:
- Sweeteners that are structurally related to sugars but provide less energy than monosaccharides and disaccharides because they are not well absorbed.

Lipids:
- A group of organic molecules, most of which do not dissolve in water. They include fatty acids, triglycerides, phospholipids, and sterols.

Triglycerides:
- (Triacylglycerols) The major form of lipid in food and in the body. They consist of three fatty acids attached to a glycerol molecule.

Fatty acids:
- Organic molecules made up of a chain of carbons linked to hydrogen atoms with an acid group at one end.

Phospholipids:
- Types of lipids containing phosphorus. The most common are the phosphoglycerides, which are composed of a glycerol backbone with two fatty acids and a phosphate group attached.

Sterols:
- Types of lipids with a structure composed of multiple chemical rings.

Saturated fatty acid:
- A fatty acid in which the carbon atoms are bound to as many hydrogens as possible and which, therefore, contains no carbon-carbon double bonds.

Tropical oils:
- A term used in the popular press to refer to the saturated oils—coconut, palm, and palm kernel oil—that are derived from plants grown in tropical regions.

Monounsaturated fatty acid:
- A fatty acid that contains 1 carbon-carbon double bond.

Polyunsaturated fatty acid:
- A fatty acid that contains 2 or more carbon-carbon double bonds.

Omega 3 fatty acid:

- A fatty acid containing a carbon-carbon double bond between the third and fourth carbons from the omega end.

Omega 6 fatty acid:

- A fatty acid containing a carbon-carbon double bond between the sixth and seventh carbons from the omega end.

Trans fatty acid:

- An unsaturated fatty acid in which the hydrogen atoms are on opposite sides of the double bond.

Hydrogenation:

- The process whereby hydrogen atoms are added to the carbon-carbon double bonds of unsaturated fatty acids, making them more saturated.

Phosphoglycerides:

- A class of phospholipid consisting of a glycerol molecule, 2 fatty acids, and a phosphate group.

Emulsifiers:

- Substances that allow water and fat to mix by breaking large fat globules into smaller ones.

Lipid bilayer:

- Two layers of phosphoglyceride molecules oriented so that the fat-soluble fatty acid tails are sandwiched between the water-soluble phosphate-containing heads.

Lecithin:

- A phosphoglyceride composed of a glycerol backbone, two fatty acids, a phosphate group, and a molecule of choline.

Cholesterol:

- A lipid that consists of multiple chemical rings and is made only by animal cells.

Micelles:

- Particles formed in the small intestine when the products of fat digestion are surrounded by bile acids. They facilitate the absorption of fat.

Lipoproteins:

- Particles containing a core of triglycerides and cholesterol surrounded by a shell of protein, phospholipids, and cholesterol that transport lipids in blood and lymph.

Post-prandial:

- The time following a meal when nutrients from the meal are being absorbed.

Chylomicrons:

- Lipoproteins that transport lipids from the mucosal cells of the small intestine and deliver triglycerides to other body cells.

Lipoprotein lipase:

- An enzyme that breaks down triglycerides into fatty acids and glycerol; attached to the cell membranes of cells that line the blood vessels.

VLDLs:

- Lipoproteins assembled by the liver that carry lipids from the liver and deliver triglycerides to body cells.

LDLs:

- Lipoproteins that transport cholesterol to cells. Elevated LDL cholesterol increases the risk of cardiovascular disease.

LDL receptor:

- A protein on the surface of cells that binds to LDL particles and allows their contents to be taken up for use by the cell.

HDLs:

- Lipoproteins that pick up cholesterol from cells and transport it to the liver so that it can be eliminated from the body. A high level of HDL decreases the risk of cardiovascular disease.

Adipose tissue:

- Tissue found under the skin and around body organs that is composed of fat-storing cells.

Essential fatty acids:

- Fatty acids that must be consumed in the diet because they cannot be made by the body or cannot be made in sufficient quantities to meet needs.

Eicosanoids:

- Regulatory molecules, including prostaglandins and related compounds, that can be synthesized from omega-3 and omega-6 fatty acids.

Beta-oxidation (using triglycerides to provide energy):

- The first step in the production of ATP from fatty acids. This pathway breaks the carbon chain of fatty acids into 2-carbon units that form acetyl-CoA and releases high-energy electrons that are passed to the electron transport chain.

Hormone-sensitive lipase:

- An enzyme present in adipose cells that responds to chemical signals by breaking down triglycerides into free fatty acids and glycerol for release into the bloodstream.

Glucose / fatty acid cycle:

- The relationship between blood glucose and free fatty acids. When blood glucose levels are high, as in the post-prandial state, free-fatty-acid levels are low. In the fasting state, when blood glucose levels decline, free-fatty-acid levels increase.

Essential fatty acid deficiency:

- A condition characterized by dry, scaly skin and poor growth that results when the diet does not supply sufficient amounts of the essential fatty acids.

Oxidized LDL cholesterol:

- A substance formed when the cholesterol in LDL particles is oxidized by reactive oxygen molecules. It is key in the development of atherosclerosis because it contributes to the inflammatory process.

Scavenger receptors:

- Proteins on the surface of macrophages that bind to oxidized LDL cholesterol and allow it to be taken up by the cell.

Amino acids:

- The building blocks of proteins. Each contains a central carbon atom bound to a hydrogen atom, an amino group, an acid group, and a side chain.

Indispensable amino acids:

- Amino acids that cannot be synthesized by the human body in sufficient amounts to meet needs and therefore must be included in the diet.

Nonessential:

- Amino acids that can be synthesized by the human body in sufficient amounts to meet needs.

Dispensable amino acids:

- Amino acids that can be synthesized by the human body in sufficient amounts to meet needs.

Transamination:

- The process by which an amino group from one amino acid is transferred to a carbon compound to form a new amino acid.

Dipeptide:

- Two amino acids linked by a peptide bond.

Tripeptide:

- A tripeptide is 3 amino acids linked by peptide bonds.

Polypeptide:

- is a chain of 3 or more amino acids linked by peptide bonds.

Denaturation:

- The alteration of a protein's three-dimensional structure.

Anaphylaxis:

- An immediate and severe allergic reaction to a substance (e.g., food or drugs). Symptoms include breathing difficulty, loss of consciousness, and a drop in blood pressure and can be fatal.

Amino acid pool:

- All of the amino acids in body tissues and fluids that are available for use by the body.

Protein turnover:

- The continuous synthesis and breakdown of body proteins.

Transcription:

- The process of copying the information in DNA to a molecule of mRNA.

Translation:

- The process of translating the mRNA code into the amino acid sequence of a polypeptide chain.

Limiting amino acid:

- The essential amino acid that is available in the lowest concentration in relation to the body's needs.

Gene expression:

- The events of protein synthesis in which the information coded in a gene is used to synthesize a product, either a protein or a molecule of RNA.

Neurotransmitters:

- Molecules that function to transfer signals between the cells of the nervous system and can stimulate or inhibit a signal.

Deamination:

- The removal of the amino group from an amino acid.

Urea:

- A nitrogen-containing waste product formed from the breakdown of amino acids that is excreted in the urine.

Antibodies:

- Proteins produced by the body's immune system that recognize foreign substances in the body and help destroy them.

Protein - energy malnutrition (PEM):

- A condition characterized by wasting and an increased susceptibility to infection that results from the long-term consumption of insufficient amounts of energy and protein to meet needs.

Kwashiorkor:

- A form of protein-energy malnutrition in which only protein is deficient.

Marasmus:

- A form of protein-energy malnutrition in which a deficiency of energy in the diet causes severe body wasting.

Phenylketonuria:

- An inherited disease in which the body cannot metabolize the amino acid phenylalanine. If the disease is untreated, toxic by-products called phenyl ketones accumulate in the blood and interfere with brain development.

Nitrogen balance:

- The amount of nitrogen consumed in the diet compared with the amount excreted by the body over a given period.

Protein quality:

- A measure of how efficiently a protein in the diet can be used to make body proteins.

Complete dietary protein:

- Protein that provides essential amino acids in the proportions needed to support protein synthesis.

Incomplete dietary protein:

- Protein that is deficient in one or more essential amino acids relative to body needs.

Digestible indispensable amino acid score:

- A measure of the quality of a food protein; it is the lowest DIAA reference ratio of a food protein × 100.

Protein efficiency ratio:

- A measure of protein quality determined by comparing the weight gain of a laboratory animal fed a test protein with the weight gain of an animal fed a reference protein.

Net protein utilization:

- A measure of protein quality determined by comparing the amount of nitrogen retained in the body with the amount eaten in the diet.

Biological value:

- A measure of protein quality determined by comparing the amount of nitrogen retained in the body with the amount absorbed from the diet.

Protein complementation:

- The process of combining proteins from different sources so that they collectively provide the proportions of amino acids required to meet needs.

Vegetarianism:

- A pattern of food intake that eliminates some or all animal products.

Vegans:

- A pattern of food intake that eliminates all animal products.