

GENERAL SCIENCE

BIOLOGY

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1. VARIOUS BRANCHES OF BIOLOGY

- **Morphology.** Study of form and external structure. It is also called external morphology. Study of internal structure through anatomy and histology is then called internal morphology.
- **Cytology.** Study of cell structure is called cytology.
- **Cell Biology.** It is the branch of biology that studies different aspects of cells and their components like structure, organisation, chemistry, functions, genetics and development.
- **Histology.** It is the study of tissues with the help of microscope. For histological studies, the tissues are embedded in chemicals called fixatives. Fixatives kill the tissues. They also maintain the tissue and cellular architecture by stabilisation of proteins.
- **Anatomy.** Study of internal structures after dissection as visible to naked eye. It is important in knowing homology or phylogenetic similarity and analogy or phylogenetic dissimilarity. The term micro-anatomy is sometimes used for detailed study of tissues (histology) and cells (cytology).
- **Ecology.** It is the study of inter-relationships between living organisms and their environment. Based on habitat, ecology is of several types, e.g., marine ecology, fresh water ecology, desert ecology, grassland ecology, etc.
- **Taxonomy.** It is the study of classification, nomenclature and identification of organisms.
- **Embryology.** It is the study of fertilisation and development of a zygote into an embryo, larva, metamorphosis and a miniature adult.
- **Developmental Biology.** It is the study of processes by which an organism undergoes progressive and orderly changes in structure as well as physiology during entire life cycle.
- **Palaeontology.** It is the study of fossils (remains, tracks or impressions of ancient forms) and their distribution in rocks of various ages. Palaeontology or palaeobiology' has two branches : (i) Palaeozoology (study of animal fossils) and (ii) Palaeobotany (study of plant fossils).
- **Exobiology.** Study of possibility of life in the outer space.
- **Physiology.** It is the study of various body functions of organisms. Depending upon the specialised field of biological science, physiology has several aspects- plant physiology, animal physiology, cell physiology, physiology of respiration, physiology of muscle contraction, physiology of excretion, digestion, secretion, etc. Stress physiology is the study of changes in functions of organisms that help them to adapt and acclimitise to unfavourable environmental conditions.
- **Genetics.** Study of variations and transmission of characters from parents to young ones. Characters and their variations are controlled by genes. Therefore, genetics is actually the study of transmission and expression of genes.
- **Microbiology.** It is the study of structure, life cycle and activities of micro-organisms (viruses, bacteria, algae, fungi and protozoa) invisible to naked eye with a size of less than 0.1 mm.
- **Pathology.** Study of diseases, effects, causal agents, transmission and other activities of pathogens is called pathology.
- **Molecular Biology.** Study of nature, organisation, synthesis, working and interaction of biomolecules or molecules that constitute the body of living organisms.
- **Eugenics.** It is science that deals with factors influencing hereditary qualities of a race and ways of improving the same by modifying fertility of different categories of individuals. Eugenics is of two types, negative and positive. Negative eugenics is improvement of a race through preventing reproduction by

individuals having inferior or undesirable traits. Positive eugenics is improvement of a race through promoting optimum reproduction of individuals possessing desirable superior traits.

- **Euphenics.** Treatment of defective heredity through genetic engineering.
- **Euthenics.** Study of environmental conditions that contribute to the improvement of intellect and other traits of human beings.
- **Genetic Engineering.** Manipulation of genes in order to improve or create organisms with newer combination of gene:.
- **Cryobiology.** It is the study of effects of low temperature on organisms including their preservation.
- **Biogeography.** Distribution of different organisms in various parts of the world. It is of two types(i) Zoogeography. Distribution of animals on earth. (ii) Phytogeography. Distribution of plants on earth.

Particular Branches

- **Acarology.** Study of ticks and mites.
- **Aerobiology.** Study of air borne organisms as well as structures (e.g., spores) and their distribution.
- **Agriology.** Comparative study of primitive tribal customs.
- **Agroforestry.** A type of land use in which besides crops, grasses and multipurpose shrubs and trees are grown to stabilise soil and obtain useful articles like fodder, fruit, fuel, timber, etc.
- **Agronomy.** Science of soil management and production of crops.
- **Agrostology.** Study of grasses.
- **Algalogy (Phycology).** Study of algae.
- **Anaesthesiology.** Branch dealing with practice of anesthesia (induction of inability to feel pain).
- **Anatomy.** Study of internal structure.
- **Andrology.** Study of male reproductive organs.
- **Angiology.** Study of blood vascular system including arteries and veins.
- **Anthology.** Study of flowers and flowering plants.
- **Anthropology.** Study related to origin, development and culture of present and past races of humans.
- **Apiculture.** Rearing of bees.
- **Aquaculture.** Rearing and management of aquatic animals.
- **Arthrology.** Study of joints.
- **Autecology (Species Ecology).** Reciprocal effect of environment on various stages of development of individuals of a population or species.
- **Bacteriology.** Study of bacteria.
- **Biochemistry.** Science connected with chemistry (composition, chemical nature, mode of formation, functioning) of living matter.
- **Bioenergetics.** Flow of energy and energy transformations.
- **Biogeny.** Science of evolution of organisms comprising ontogeny and phylogeny.
- **Biomedical Engineering (Bio-engineering).** Designing and production of equipment (e.g. artificial limbs, iron lungs, artificial kidneys, pace maker) for overcoming various defects.
- **Biometrics (Biometry = Biostatistics).** Statistical study of biological problems.
- **Biopoiesis.** Origin of living organisms from non-living objects/matters.
- **Bryology.** Study of bryophytes.
- **Carcinology.** (i) Study of Crustacea. (ii) Study of cancers or tumours (Carcinomatology)

- **Chirolgy (Cheirolgy).** Communication system for deaf and mute by sign language.
- **Chromatology.** Science of colours.
- **Cosmogeny.** Origin and evolution of universe.
- **Cosmogony.** Branch of science dealing with origin of universe.
- **Cosmology.** Science of structure and evolution of universe.
- **Cryobiology.** Biology of organisms, tissues, embryos, etc. at very low temperature (-150°C).
- **Cryogenics.** Branch of technology and physics that deals with production of very low temperature and their effects.
- **Cryosurgery and Cryotherapy.** Use of intense cold in severing of unwanted tissues and treatment of diseases.
- **Cybernetics.** Science of communications and control as by brain, nervous system (neurobiology) and endocrine system (endocrinology).
- **Dendrology.** Study of trees and shrubs.
- **Dermatology.** Study of skin and other body coverings.
- **Developmental Biology.** Study of changes in structure and physiology during various stages of life.
- **Dietetics.** Nutritional planning.
- **Ecobiology.** (i) Study of adaptations in relation to habitat. (ii) Study of problems connected with existence of life in space and other planets.
- **Entomology.** Study of insects.
- **Floriculture.** Cultivation of plants for their flowers.
- **Forensic Science.** Application of science for identification of various facts (blood groups, hair, poisons, narcotics, finger prints, injury, weapon, DNA matching) for civilian and criminal laws. DNA matching is also called DNA finger-printing or genetic finger-printing.
- **Genecology.** Study of genetic composition of populations in relation to habitat or environment.
- **Geneology.** Study of development of individual/race/pedigree.
- **Gene Therapy.** Removal and replacement of defective genes with genes of desirable traits.
- **Haematology.** Study of blood.
- **Hepatology.** Study of liver.
- **Herpetology.** Study of reptiles and amphibians/creeping animals.
- **Histochemistry.** Chemistry of living tissues.
- **Histology.** Study of tissues
- **Horticulture.** Development and management of orchards and gardens.
- **Hydroponics.** Soil-less culture of plants.
- **Hypnology.** Science dealing with sleep including the one from hypnosis.
- **Obstetrics.** Midwifery or science connected with care of pregnant woman before, during and after childbirth. Caesarean is operative procedure for child birth named after emperor Caesar who is believed to be first child born through operation.
- **Occupational Therapy.** Treating mental and physical defects with occupation.