

TCE Communication and Expression Techniques

Level: 2nd Year (Licence)

Biological Sciences

Food Sciences

Agricultural Sciences

Ecology and Environmental Sciences

Terminology

Terminology refers to the set of specialized words, expressions, and concepts used within a specific field of study, profession, or scientific discipline. It includes the precise vocabulary that experts use to describe processes, structures, methods, and phenomena in an exact manner.

Importance in science:

- ✓ Provides clarity and precision.
- ✓ Facilitates communication among scientists.
- ✓ Helps in learning, understanding, and organizing knowledge.
- ✓ Enables collaboration and scientific progress.

Main terms commonly used in cell biology, genetics, immunology, and microbiology

- **Cell (Cellule):** The fundamental unit of life, capable of independent existence and performing all essential biological functions. It contains genetic material, cytoplasmic components, and a membrane that maintains internal order.
- **Organelle (Organite):** A distinct cellular substructure with a specialized role, such as energy production, protein synthesis, or molecular transport. For example, mitochondria, endoplasmic reticulum, and Golgi apparatus.
- **Plasma membrane (Membrane plasmique):** A selectively permeable phospholipid bilayer that surrounds the cell and regulates the movement of substances in and out. It also participates in cell signaling, recognition, and communication.
- **Cytoplasm (Cytoplasme):** The semi-fluid, jellylike matrix inside a cell composed of cytosol, organelles, and dissolved nutrients. It is the site of many metabolic reactions.
- **DNA (Deoxyribonucleic Acid):** A double-stranded molecule carrying the hereditary instructions for the development, functioning, and reproduction of organisms. It contains genes encoded with nucleotides (A, T, C, G).
- **mRNA (Messenger RNA):** A single-stranded RNA molecule produced during transcription. It carries the genetic code from DNA in the nucleus to ribosomes in the cytoplasm for protein synthesis.

- **Ribosome (Ribosomes):** A non-membrane-bound organelle composed of rRNA and proteins. It is responsible for translating mRNA into a polypeptide chain (= making proteins).
- **Mitosis (Mitose):** A type of cell division in eukaryotes that produces two genetically identical daughter cells. It is essential for growth, repair, and asexual reproduction.
- **Meiosis (Méiose):** A specialized division that produces haploid gametes (sperm or eggs). It reduces the chromosome number by half and generates genetic diversity through crossing-over and independent assortment.
- **Gene (Gène):** A functional unit of DNA that contains the instructions for producing a specific protein or RNA molecule.
- **Allele (Allèle):** An alternative version of a gene that occupies the same position (locus) on a chromosome. Different alleles can produce variations of a trait.
- **Genotype (Génotype):** The complete set of genetic information carried by an individual, including all alleles (even those not expressed).
- **Phenotype (Phénotype):** The observable or measurable characteristics of an organism, resulting from the interaction between genotype and environment.
- **Mutation (Mutation):** A permanent change in the DNA sequence that can be beneficial, neutral, or harmful. Mutations contribute to genetic diversity and evolution.
- **Crossing-over:** The exchange of homologous chromosome segments during prophase I of meiosis. It increases genetic variation in gametes.
- **Prokaryote (Procaryote):** A unicellular organism (bacteria, archaea) lacking a true nucleus and membrane-bound organelles. DNA is located in the nucleoid region.
- **Eukaryote (Eucaryote):** Organisms whose cells contain a true nucleus and membrane-bound organelles (plants, animals, fungi, protists).
- **Microorganism (Microorganisme):** A microscopic living organism, such as bacteria, fungi, viruses, protozoa, or algae that can only be observed using a microscope.
- **Bacterium (Bactérie):** The bacterium is a ubiquitous, unicellular and nucleusless micro-organism (prokaryote) whose genome consists of DNA. This consists of a single chromosome, and the presence of plasmids may be noted.
- **Virus (Virus):** A non-cellular infectious particle composed of genetic material (DNA or RNA) enclosed in a protein coat. Viruses require a host cell to replicate.
- **Antibiotic (Antibiotique):** A chemical substance that kills or inhibits the growth of bacteria by targeting cell walls, protein synthesis, or metabolism.
- **Pathogen (Pathogène):** Any microorganism (virus, bacteria, fungus, parasite) capable of causing disease in a host organism.
- **Immune System (Système immunitaire):** A complex network of cells, tissues, and organs that protect the body against pathogens and foreign substances.

- **Antigen (Antigène):** Any foreign molecule (protein, polysaccharide) that can be recognized by the immune system and trigger an immune response.
- **Antibody (Immunoglobulin) (Anticorps):** A Y-shaped protein produced by B cells that specifically binds to an antigen to neutralize or mark it for destruction.
- **Innate Immunity (Immunité innée):** The non-specific first line of defense present from birth. Includes physical barriers, phagocytes, inflammation, and complement proteins.
- **Adaptive Immunity (Immunité adaptative):** A specific, acquired immune response that recognizes particular antigens and creates memory. Includes B cells and T cells.
- **Inflammation (Inflammation):** A protective response characterized by redness, heat, swelling, and pain. It isolates pathogens and promotes healing.
- **Phagocytosis (Phagocytose):** The process by which immune cells engulf, ingest, and destroy foreign particles and microbes.
- **Cytokines (Cytokines):** Small signaling proteins released by immune cells to regulate inflammation, activate defenses, and communicate between cells.

Main terms commonly used in ecology, plant biology, and agricultural sciences

- **Ecosystem (Écosystème):** A functional system formed by the interaction of living organisms (biotic components) and their physical environment (abiotic components) in a given area. It includes energy flow and nutrient cycling.
- **Biotic Factors (Facteurs biotiques):** All living components of an ecosystem, such as plants, animals, fungi, and microorganisms that interact with each other.
- **Abiotic Factors (Facteurs abiotiques):** Non-living environmental factors like temperature, light, water, soil, and minerals that influence organism survival.
- **Food Chain (Chaine alimentaire):** A linear representation of energy flow through organisms: producer → herbivore → carnivore.
- **Crop (Culture):** A cultivated plant grown for food, fiber, or other commercial use.
- **Soil Fertility (Fertilité du sol):** The ability of soil to supply nutrients essential for plant growth, influenced by organic matter, minerals, and pH.
- **Fertilizer (Fertilisant):** A natural or synthetic substance added to soil to improve plant nutrient availability (N, P, K, etc.).
- **Pest (Parasite):** An organism (insect, weed, fungus, rodent) that damages crops or reduces agricultural productivity.
- **Pesticides (Pesticides):** Chemical or biological agents used to kill or control pests (insecticides, herbicides, fungicides).
- **Photosynthesis (Photosynthèse):** A metabolic process by which plants use sunlight, carbon dioxide, and water to produce glucose and oxygen.

- **Xylem (Xylème):** Vascular tissue that transports water and minerals from roots to leaves.
- **Phloem (Phloème):** Vascular tissue that transports sugars and organic nutrients from leaves to other parts of the plant.
- **Chloroplast (Chloroplaste):** A plant cell organelle that contains chlorophyll and carries out photosynthesis.
- **Chlorophyll (Chlorophylle):** The green pigment in chloroplasts that captures light energy.
- **Stomata (Stomates):** Small openings on the leaf surface that allow gas exchange (CO₂ in, O₂ and water vapor out).
- **Seed (Graine):** A structure containing an embryo, stored nutrients, and a protective coat.
- **Roots (Racine):** Plant organs that anchor the plant, absorb water and nutrients, and store food.
- **Stem (Tige):** The main support of the plant, transporting fluids via xylem and phloem.
- **Flower (Fleur):** The reproductive structure of angiosperms, producing pollen and seeds.
- **Fruit (Fruit):** A mature ovary that protects seeds and aids in their dispersal.
- **Transpiration (Transpiration):** The loss of water vapor from leaves through stomata.
- **Germination (Germination):** The process by which a seed begins to grow into a new plant.
- **Pollination (Pollinisation):** The transfer of pollen from the male anther to the female stigma.
- **Fertilization (Fécondation):** The fusion of male (pollen) and female (ovule) gametes to form a seed.

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