Engineering & biological systems

Crédits ECTS
3 crédits

En bref

Langue de cours: Anglais

Présentation

Prérequis

Chemistry Basics (Atoms & Molecules); Biomolecules (Macromolecules of life); Cell Types Prokaryote, Eukaryote & Archea; Molecular Biology Basics (DNA, RNA, and protein synthesis).

Objectifs d'apprentissage

Foundational Knowledge (Remember & Understand)

Biomolecules: Define and describe the structure, composition, and roles of lipids, carbohydrates, nucleic acids, and proteins.

Cell Biology: Defining what's a cell as the fundamental unit of life. Distinguish prokaryotic vs. eukaryotic cells and describe the function of major organelles.

Molecular Mechanisms: Explain the central dogma (DNA # RNA # Protein) and define DNA replication, transcription, and translation, including key molecules involved. Summarize historical discoveries in molecular biology.

Application, Analysis, Synthesis & Evaluation

Apply knowledge of genetic information flow and compare prokaryotic vs. eukaryotic mechanisms. Interpret experimental data (e.g., sequence, molecular weight, PCR, Electrophoresis data). Explain how cells and molecular mechanisms have evolved and identify the evolutionary advantages of cellular structures and processes.

Critical Thinking & Philosophical Questions. Propose hypotheses for biological phenomena and design experiments to test them. Debate the origins of life and reflect on the implications of molecular biology for medicine, biotechnology, and society.

Description du programme

The objective of this course is to provide an overview of some fundamental principles of biochemistry, genetics, molecular biology and cell biology. Throughout this course, we will study the structure and function of key biological molecules such as lipids, carbohydrates, nucleic acids and amino-acids/proteins. Then, we will cover the molecular mechanisms underlying homeostasis in both eucaryotic and prokaryotic cells such as DNA replication, Transcription, Translation, with key examples and historical discoveries. Finaly, this will be complemented with elementary knowledge to answer the following questions: What is a cell? What are the different types of cells? What biological mechanisms take place in living systems and how did they evolve through evolution?

Bibliographie

"State of the Art" Biology TextBook - Harper's Illustrated Biochemistry; Campbell's Biology; Alberts' Molecular Biology of the Cell; Brock Biology of Microorganisms; Life: The Science of Biology

Equipe pédagogique

Pierre SANTUCCI (psantucci@imm.cnrs.fr)

Total des heures		**24h**
CM	Cours Magistral	16h
TD	Travaux Dirigés	8h

Infos pratiques

Nom responsable UE

Responsable pédagogique

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