

3.5 credits

18.5 h + 22.5 h

1q

Teacher(s) :	Chaumont François ; Boutry Marc ; Morsomme Pierre ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	<p>The first part will start with a brief reminder on how the genetic information of an organism, prokaryote or eukaryote, is expressed and regulated at different levels: transcription, translation, post translational modifications. Then molecular biology will be addressed from a more technological angle. We will see how we can take advantage of the genetic engineering tools to isolate and characterize genes, modify and transfer them between species.</p> <p>The second part will expose the principles at the basis of the most classic methods to, on the one hand, purify the biological macromolecules and, on the other hand, determine their identity and their biochemical properties.</p> <p>Practical exercises will be organised to illustrate the most used techniques in genetic engineering, the protein purification and characterisation techniques, as well as the most common identification methods.</p>
Aims :	<p>The first part of this course aims at bringing the student to master the basics of molecular biology useful for the understanding of the major stages of genetic engineering. The second part must enable the student to acquire the principles of the analysis techniques specific to biochemistry and bring him to familiarize himself with the standard techniques of biochemical analysis.</p> <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p>
Content :	<p>Part 1: Genetic engineering (3,5 ECTS) Regulation of transcription and translation, post translational modifications, protein targeting in the sub-cellular compartments. Genetic engineering tools (restriction endonucleases, modification enzymes). Cloning vector: plasmids, phages, artificial chromosomes. Construction of genomic and cDNA libraries. DNA library screen. Gene characterisation : restriction map, nucleotide sequence, expression profile. Cloning techniques derived from PCR (chain amplification reaction). Heterologous expression.</p> <p>Part 2. Biochemical analysis (3,5 ECTS) Centrifugation and fractionation of cells, organelles and molecules. Standard chromatography techniques. Protein electrophoresis (1D and 2D). Microscopic approaches. Protein modifications: mass spectrometry and sequencing. Immunology identification (ELISA, western blot, in situ). DNA sequencing. Identification and genotyping tests based on DNA probes and on PCR: RFLP; RAPD, SNP, microsatellites,</p>
Other infos :	<p>Prerequisite: basic biochemical and genetic courses The two parts can be followed separately. Extra course: The "genetic engineering" part can be increased in the "Genetic engineering (part II)" course (BRMC2101) Course materials: lecture notes</p>
Cycle and year of study :	<p>> Master [120] in Biomedical Engineering > Master [120] in Chemical and Materials Engineering > Master [120] in Biochemistry and Molecular and Cell Biology > Master [60] in Biology > Master [120] in Agricultural Bioengineering</p>
Faculty or entity in charge:	AGRO