UCLouvain

lbio1223

2026

Molecular biology

6.00 credits	50.0 h + 20.0 h	Q2

Teacher(s)	Claeys Bouuaert Corentin ;Hallet Bernard ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	To follow this course, it is necessary to master the knowledge and skills developed in the courses LBIO1111 et LCHM1271A
Main themes	After a general introduction replacing molecular genetics in its pluridisciplinary and methodological context, the themes covered in the formation include different levels of genetic information treatment in time and space. - Evolutionary origin of the genome, its current structure and organisation in prokaryotes and eukaryotes. Concepts of chromosomes, chromatin, topology and compaction of DNA. - Replication, maintenance and modification of the genetic material. Assembly and function of the replisome, co-ordination between DNA synthesis and reparation, mechanisms and functions of homologous recombination, transposition and other specialised DNA rearrangements. - From signal to cellular response. This part of the course discusses the different mechanisms and cellular processes linked to the control of genetic expression : transcription regulation in prokaryotes and eukaryotes, remodelling of chromatin, posttranscriptional modifications of RNA, nuclear compartmentalisation, translation, sub-cellular targeting, protein recycling, signal transduction, control of the cell cycle and differentiation.
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 The formation aims to give deepened knowledge in fundamental mechanisms that allow the treatment of genetic information (organisation, replication and expression) in relation to the physiology of the cells and organisms. This knowledge is built by integrating general notions of biochemistry and cellular biology to general concepts like the requirement for "cognitive" interactions between bio-molecules, the co-ordination of complex reactions within molecular machines, the coupling of separate biological processes inside defined cellular entities, etc. These different aspects are covered under the evolutionary angle, comparing strategies developed by prokaryotes and eukaryotes. Specific questions are discussed further, by describing methodological aspects. During tutorials, the student will be asked to personally participate to the formation by practising his/her ability to find, analyse and communicate recent information from the literature.
Evaluation methods	**Theoretical part (V1, 50h**) Oral exam with written preparation. The discussion focuses on 3 types of questions: a synthesis question of the type 'what do you know about?', a question of integration of concepts of the type 'In your opinion,?' and a 'bonus' question on methodological aspects covered by the course. **Practical part (V2 partim, 20h)** Laboratory report.
Teaching methods	**Theoretical part (V1, 50h)** Lectures in auditorium. Reference book 'Molecular Biology - principles and practice' 2nd edition (Ed. Cox et al.) Course slideshows accessible via Moodle **Practical part (V2 partim, 20h)** Practical work in molecular biology laboratory under supervision of teaching assistants. Practical work manual
Content	**Theoretical part (V1, 50h)** The major part of the formation consists in a series of lectures where the teachers develop the different themes of the course based on the refrence text book and original documents from the scientific literature. Students are invited to participate in the course through discussions and by responding to the teacher's questions. **Practical part (V2 partim, 20h)** Practical courses consist in a coherent set of manipulations carried out in the laboratory in order to familiarize students with basic techniques in molecular biology such as DNA amplification by the polymerase chain reaction (PCR), DNA cloning in bacteria, and DNA sequencing. The experiments are carried out in pairs under the guidance of the supervisory staff and the practical work manual.
Other infos	Precursory courses: Basic formation in genetics, cellular biology and biochemistry, (level BIO12) Support • Lectures: -Textbook 'Molecular Biology of the Gene' 6th edition (Ed. Watson et al.) -Powerpoint presentations available on moodle • Tutorials: -Original research papers -Powerpoint files available on moodle
Faculty or entity in charge	BIOL

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Biology	BIOL1BA	6		🔍
Minor in Biology	MINBIOL	5		🔍
Bachelor in Biology, Anthropology and Archaeology	BABA1BA	6		🔍