

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits



50.0 h + 20.0 h

Q2

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| Teacher(s) | Hallet Bernard ; |
| Language : | French |
| Place of the course | Louvain-la-Neuve |
| Prerequisites | <i>The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.</i> |
| 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. |
| Aims | <p>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.</p> <p>1</p> <p>-----</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> |
| Evaluation methods | <p>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</p> <p>Lectures part: Oral discussion on two types of questions. A synthetic question in the form of 'tell me about ', and a concepts integration question in the form of 'In your opinion '</p> <p>Tutorials part: A written exercise based on the research papers analysed in class. The student may have access to all information he would need (articles, notes, diaporamas, etc.) to perform the exercise</p> |
| Content | During the lectures part of the formation (35h), the main topics of the course are developed based on the textbook of reference and original documents presented by the teacher. Students are invited to discuss concepts by interacting with the teacher In the tutorial part of the formation (10h), a specific topic is developed based on original research articles going from the initial discovery of a concept to its further developments. The aim is to illustrate how scientific models are built up from the experimental work and how they improve with time. Experimental approaches are analysed in detail with a specific focus on fundamental principles of the scientific reasoning: notions of hypothesis, controls, objectivity in result analysis and interpretation, etc. |
| Other infos | <p>Precursory courses: Basic formation in genetics, cellular biology and biochemistry, (level BIO12)</p> <p>Support</p> <ul style="list-style-type: none"> • 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 |

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| Faculty or entity in charge | BIOL |
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Programmes containing this learning unit (UE)

| Program title | Acronym | Credits | Prerequisite | Aims |
|---------------------|-------------------------|---------|--------------------------|-------------------------------------------------------------------------------------|
| Bachelor in Biology | BIOL1BA | 5 | LBIO1111 |  |
| Minor in Biology | MINBIOL | 5 | |  |