


UE Molecular Genetics and Epigenetics controls

 ECTS
6 credits

 Component
UFR Chimie-
Biologie

 Semester
Tous les ans

- > **Teaching language(s):** English
- > **Open to exchange students:** No

Presentation

Description

Course outline

This course offers a general view of the new advances related to the control of gene expression, genome structure and organization across the tree of life: bacteria, lower (yeast, protozoans) and higher (plants, mammalian) eukaryotes, and viruses.

It focuses on the analysis and comprehension of the mechanisms underlying gene expression. This includes *in vitro* and *in vivo* approaches as well as the newest developments of gene editing.

A specific emphasis will be given to new aspects of gene regulation at a transcriptional and post-transcriptional level in eukaryotic cells (animals and plants). In particular, the role of the epigenome involving DNA methylation, histones and histone variants, long and short non-coding RNAs will be illustrated.

Through a broad range of model organisms (human, mouse, plants, yeast, bacteria...) the questions that are addressed in the fields of evolution, cell differentiation and development will be presented. The mechanisms used by parasites and viruses to infect host cells will be analyzed as well.

Through these different models, we will see that although specificities exist in the control of gene expression and the way organisms adapt to their environment, common mechanisms and common themes do exist throughout the tree of life.

Key words: Transcriptional and post-transcriptional gene expression regulation, chromosome structure, RNA interference, gene editing, genomes evolution and adaptation, infection, non-coding genomes, Genetics and Epigenetics.

Course parts

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| UE Molecular Genetics and Epigenetics of the Cell - TD | Tutorials (TD) | 13,5h |
| UE Molecular Genetics and Epigenetics of the Cell - CM | Lectures (CM) | 31,5h |
| UE Molecular Genetics and Epigenetics of the Cell - TP | Practical work (TP) | 4h |

Recommended prerequisites

Pre-requisites:

BIO 301/331 (Cell biology L2), BIO 531 (UE Biochimie 3)

Skills

-Targeted skills:

Acquisition of up-to-date fundamental knowledge in the control of gene expression through lectures and discussion sessions.

Analysis of Scientific papers

Introduction to bioinformatic tools with a series of tutorials to analyze genomic databases, with a specific application to the analysis of genome evolution

Useful info

Contacts

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Campus

› Grenoble - Saint-Martin d'Hères