

BIOENG-512

Lab methods : bioactive compounds screening

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Cursus	Sem.	Type
Bioingénierie	MA1, MA3	Opt.
Ingénierie des sciences du vivant	MA1, MA3	Opt.
Sciences du vivant	MA1, MA3	Opt.

Language	English
Credits	2
Withdrawal Session	Unauthorized Winter
Semester	Fall
Exam	During the semester
Workload	60h
Weeks	14
Hours	2 weekly
Project	2 weekly
Number of positions	16

Remarque

Présence aux cours obligatoire

Summary

Introduction to the key principles and concepts underlying the screening activity to identify and to characterize bioactive compounds (chemicals, compounds, siRNAs and natural products) acting on a given biological target or a signalling pathway.

Content

- Presentation of the drug discovery principles and processes
- Description of the variety of molecular screening assays, from *in vitro* target-based to cellular phenotypic assays
- Detailed description of the screening activity, high throughput and high content, with special emphasis on the assay development and validation steps
- Generation of experimental results linked to selected assays: *in vitro* enzymatic, cytotoxicity and siRNA cell-transfection assay
- Evaluation and discussion of the generated data in the frame of the screening activity

Keywords

Screening / Drug discovery / Assay development / Assay validation / z' factor / siRNA / Transfection / Cell viability / Enzymatic activity / Inhibitor / Dose response

Learning Prerequisites**Required courses**

Chemical Biology, Biochemistry, Cell Biology

Recommended courses

Bio-494 scientific project design in drug discovery

Important concepts to start the course

Basis of cell biology (cell viability, cytotoxicity, RNA interference, transfection)
Basis of biochemistry (enzymology, inhibition)
Basic knowledge in chemistry (physical, analytical and organic chemistry)
Basic knowledge of statistics applied to biology

Learning Outcomes

By the end of the course, the student must be able to:

- Assess / Evaluate the process of a screening campaign
- Choose a screening strategy for a given biological question
- Develop a screening assay
- Design a screening assay
- Propose an assay improvement
- Analyze results of a screening assay
- Carry out different kind of experiments to develop an assay
- Characterize effect of bioactive compounds
- Detect interferences
- Examine different mode of action
- Manipulate cells, compounds, reagents and fluids in microplate format
- Quantify the effect of compound through pharmacological curves fitting
- Perform cell-based experiments in sterile environment
- Present generated results to others
- Discuss results of experiments, in particular screening assays

Transversal skills

- Set objectives and design an action plan to reach those objectives.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Take feedback (critique) and respond in an appropriate manner.
- Respect the rules of the institution in which you are working.
- Continue to work through difficulties or initial failure to find optimal solutions.
- Demonstrate the capacity for critical thinking
- Write a scientific or technical report.
- Take responsibility for health and safety of self and others in a working context.

Teaching methods

This course will take place from October 22nd to October 26th 2018, full time.

Ex-cathedra courses: Theoretical introduction and case studies presentations

Practical work: Performing experiments including results analyses

Interactive discussion of generated data and biochemical/biological relevance

Training and utilisation of instrumental devices under expert supervision (readers, liquid handlers, automated microscope)

Attend robotic workstations demos during the visit of the screening platform labs.

Expected student activities

Attendance to the whole course

Read and understand experimental protocols

Carry out experiments in the lab (by group of 2)

Analyze daily results (basic statistic with computer), including critical evaluation

Share data and involvement in general discussion
Read some general papers of interest selected and related to the course

Assessment methods

Written examination on November 9th, 2018