

BIOENG-514

Lab methods : flow cytometry

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Cursus	Sem.	Type
Bioengineering	MA1, MA3	Opt.
Sciences du vivant	MA1, MA3	Opt.

Language of teaching	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	12

It is not allowed to withdraw from this subject after the registration deadline.

Remark

Inscriptions sur dossier auprès du responsable du cours; présence aux cours obligatoire

Summary

This module cover the fundamentals of Flow Cytometry from theory to practical applications, including practice of acquisition and cell sorting experiments. Students work in small groups for hands-on time, putting theory into practice in the laboratory.

Content

This module will cover a wide range of topics on Flow Cytometry and Cell Sorting. These lectures will start from the basics and move right through to the complicated aspects of flow cytometry for analysis and cell sorting. This module will be separated into three theoretical lectures, one demonstration, a "practical part" and articles discussion. The followings topics will be introduced :

First principles of flow cytometry

- Principle of fluorescence
- Cytometer subsystems (optics, fluidics, electronics)
- Principle of compensation
- Digital world

Principles of Multicolour flow cytometry

- Why Multicolour ?
- Fluorescence and Fluorochromes
- How to choose the Fluorochromes
- Stain Index
- Visual Paradox
- Controls

Principles on cell sorting

- Why and How ?

- Technological principle
- Basic parts of a cell sorter
- Limit from the technique
- Optimization

Keywords

Flow Cytometry, fluorescence, multicolour, panel design, compensation, cell sorting

Learning Prerequisites

Required courses

First year of master in Life Sciences & Technology or Bioengineering program.

Learning Outcomes

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

- Integrate the basic theoretical and technical concepts of Flow Cytometry
- Apply these concepts to the analysis of biological samples and to the Flow Cytometry field
- Design a multicolor panel of different fluorescences with a minimum of compensations impact
- Analyze and interpret data coming from Flow Cytometry or sorting experiments
- Perform sample preparation for Flow Cytometry and/or sorting experiments
- Describe and explain the different methods and tools presented during the module
- Select appropriately method for sample preparation adapted to the nature of the sample sorted
- Synthesize useful information from a paper and summarize its content

Transversal skills

- Collect data.
- Summarize an article or a technical report.

Teaching methods

Ex-cathedra lectures to introduce the theory followed by demonstration and "hands-on" on practical sessions in the Laboratory including sample acquisition, analysis and data interpretation. Discussion on selected papers representative of the technique used in Flow Cytometry.

Registration forms must be sent together with a cover letter clearly stating your interest in this technique. Enrolment will be validated by the teacher on a motivational basis.

This course will take place from October 24th to October 28th, 2016.

Assessment methods

Written exam (2 hours)

Supervision

Office hours	Yes
Assistants	Yes
Forum	No
Others	Office Hours : 9:00 - 17:00 Assistants : Loïc Tauzin

Resources

Websites

- <http://fccf.epfl.ch/>

Moodle Link

- <http://moodle.epfl.ch/enrol/index.php?id=13371>