UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Proteomics

2526-1-F0803Q056

Aims

The course describes the main goals, experimental strategies and techniques of proteomics.

1.Knowledge and understanding
The students will gain knowledge of the fundamental principles at the basis of the main proteomics techniques, as well as their implementation and application.

2. Applying knowledge and understanding
The students will be able to apply the acquired knowledge to the subsequent courses, laboratory and research activities, as well as to understand and interpret the scientific papers reporting proteomics data.

3. Making judgements
The students will be able to process the acquired knowledge, in order to interpret and critically discuss results from the literature and their own work, obtained by the described methods. These skills will be acquired by guided tutorial activities.

4. Communication skills
The students will be able to use an appropriate scientific language in the description of the acquired methods and in the discussion and interpretation of experimental results.

5. Learning skills
The students will have the skills in reading and understanding to face autonomously the subsequent studies that require knowledge in proteomics and will be able to apply the acquired study method also to other matters.

Contents

1. Introduction to proteomics

2. Microarrays
3. Mass spectrometry
4. Data analysis and bioinformatics
5. Advanced applications
6. Emerging technologies and future directions

Detailed program

1. Introduction to proteomics

- Obiectives and strategies
- Protein separation (SDS PAGE, chromatography)
- Protein depletion, enrichement and fractionation

2. Microarrays

- Introduction
- Antibody microarrays
- Functional microarrays

3. Mass spectrometry

- Technical principles
- Bottom-up proteomics
- Top-down proteomics
- Quantitative proteomics

4. Data analysis and bioinformatics

- Protein identification
- Normalization and statistical analysis
- Functional annotation and pathways analysis

5. Advanced applications

- Post-translational modifications analysis
- Interactomics
- Struttural proteomics
- Clinical proteomics

6. Emerging technologies and future trends

- Single-cell proteomics
- Integrated "omics"
- Future challenges

Prerequisites

Basic protein biochemistry

Teaching form

21 face-to-face lectures composed by:
a section of delivered didactics (around 50%), focused on the presentation-illustration of contents by the lecturer.
a section of interactive teaching (around 50%), including teaching interventions supplementary to delivered didactic activities, short interventions by trainees, demonstrations of practical applications (case study, journal club, etc.).

Teaching language: italian.

Textbook and teaching resource

Learning material (slides and records of the lessons) is available at the e-learning web page of the course.
Scientific papers for each topic will be given. They have to be used for exam preparation.

Semester

First semester

Assessment method

Oral exam (usually three questions, around 30 minutes) to test the knowledge and comprehension of the topics, often interpreting data given by the instructor.

Office hours

Mail to the lecturer

Sustainable Development Goals

QUALITY EDUCATION