UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Laboratory of Biochemistry

2425-3-E1301Q084-E1301Q084M

Aims

This module aims at providing students with skills for the basic biochemical techniques: protein purification, qualitative and quantitative characterization, enzymatic activity assays.

1. Knowledge and understanding.

At the end of the course, the student should be able to apply the knowledge acquired in the field of biochemistry, with particular emphasis on enzyme purification and functional characterization.

2. Applying knowledge and understanding

At the end of the course the student is expected to

correctly interpret the experimental protocols already used, recognize their salient aspects, collect and process experimental data.

3. Making judgment

Students must be able to recognize the opportunity to apply specific experimental methods, to process the data and to present the procedures.

4. Communication skills

At the end of the course the student will be able to express himself appropriately in the description of the topics addressed, and will be able to present the experimental data in the most appropriate way (graphs, tables, numerical indexes, etc.).

5. Learning skills

At the end of the course the student will be able to reproduce the techniques adopted in similar contexts, and will have useful tools to help understanding similar issues (i.e. other courses in the field of Protein science, or the scientific literature in this subject area).

Contents

The laboratory work (5 practical lessons) is aimed at the purification of a recombinant enzyme and its biochemical and kinetics characterization. The experimental data will be analyzed by basic tools, interpreted and discussed.

Detailed program

The biological chemistry module includes the employment of these techniques:

a) protein extraction from bacterial cells;

b) protein purification by affinity chromatography;

c) protein electrophoresis under denaturing conditions (SDS-PAGE) and western blot analysis;

d) measure of protein concentration and enzyme activity;

e) enzyme kinetics. The data will be reported in a “purification table” containing parameters like specific activity, yield and purification fold. The enzyme kinetics will be aimed at determining main parameters, such as Km, Vmax and kcat. Experimental data will be analyzed and interpreted using basic statistics tools, such as average, standard deviation and Pearson correlation coefficient.

Prerequisites

Basic notions of mathematics, chemistry and biochemistry.

Teaching form

Experimental activities performed by groups of 3-4 students in equipped labs. The teaching form will be interactive for 20 h. Each activity is introduced by a theoretical lesson, showing the goals and the experimental design. Slides and experimental protocols will be provided to students at the beginning of the teaching activity, and uploaded on the moodle teaching platform.

Textbook and teaching resource

Slides and experimental protocols will be provided to students at the beginning of the teaching activity, and

uploaded on the moodle teaching platform.

Semester

First semester.

Assessment method

For the Biochemistry module, as for all LIB teaching modules, there is no possibility of taking partial or "module" exams. The method of verifying the entire teaching is a single written test aimed at assessing the skills acquired for each of the 6 modules that make up the course.
The written test lasts 2 hours and takes place in the computer laboratories, using a PC on a dedicated computer platform. The test consists of closed questions (exercises, multiple choice questions) on the subjects contents of all the modules, and a single open question on the disciplinary contents of one module. The closed questions of each module allow to acquire a maximum of 10 points. The overall result on the closed questions of the 6 modules is converted into a maximum score of 29 (automatically assigned by the system at the end of the test); the score of the open question is from 0 to 2 points, awarded following a correction by one of the teachers. The open question will be evaluated only upon reaching a minimum score assigned to the closed questions. The overall score is given in thirtieths and is obtained by adding the two scores (for "closed" answers and for "open" answer). An overall score ?30.5 allows to obtain honor.

Office hours

The teachers will receive by appointment requested by e-mail.

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING