UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

LABORATORY METHODS IN MOLECULAR BIOLOGY AND BIOCHEMISTRY

Enrollment year	2019/2020
Academic year	2021/2022
Regulations	DM270
Academic discipline	BIO/13 (APPLIED BIOLOGY)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	BIOLOGICAL SCIENCES
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	2nd semester (01/03/2022 - 14/06/2022)
ECTS	6
Lesson hours	72 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	BINDA CLAUDIA (titolare) - 2 ECTS CANOBBIO ILARIA - 3 ECTS FORNERIS FEDERICO - 1 ECTS
Prerequisites	The course is based on the application of methods described in the courses Biochemistry and Molecular Biology held in the second year. Therefore, to better follow and understand the practicals it is fundamental that the student has already studied the above mentioned courses.
Learning outcomes	The aim of the course is to provide the students with the basic theoretical and practical tools required to work in a laboratory and, in particular, to learn the main biomolecular methods: DNA purification and manipulation; purification, biochemical characterization and crystallization of proteins; analysis and graphical representaion of biomolecules by bioinformatics tools.

Course contents

First part: bacterial genomic DNA extraction; restriction digestion of genomic and plasmid DNA; DNA gel electrophoresis; generation of restriction map; cloning of pyruvate kinase cDNA in an expression vector.
Second part: preparation of buffer solution and pH measurement; usage of chromatographic techniques to purify pyruvate kinase; protein gel electrophoresis; enzymatic assays.
Third part: crystallization experiments of lysozime by different techniques; analysis of the results and phase diagram determination;
Fourth part: computational structural biology: computer practicals using softwares for determination and analysis of three-dimensional structures of pyruvate kinase and other biological macromolecules.

Teaching methods

Short lectures to introduce the topics, followed by practicals.

Reccomended or required readings

The course is aimed at working in the lab: attending the lectures (mandatory for at least 75% of total hours) guarantees the acquisition of knowledge necessary to pass the exam. However, books used for the courses of Biochemistry and Molecular Biology can be used for review and follow-up.

Assessment methods

At the end of the course the students will have to make a test with open questions on the lab activities.

Further information

Students are required to bring a lab coat to wear during the experiments. In the fourth part, students will use their own laptops to run molecular graphics softwares for visualization.

Sustainable development goals - Agenda 2030

As this is a practical course on the basic techniques, no lectures specifically dedicated to Agenda2030 will be included.
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