MEDICAL BIOTECHNOLOGY AND NANOBiOTECHNOLOGY (LM49)
(Lecce - Università degli Studi)

Teaching MICROBIAL BIOTECHNOLOGIES

GenCod A004553
Owner professor Pietro ALIFANO

Teaching in italian MICROBIAL BIOTECHNOLOGIES
Teaching MICROBIAL BIOTECHNOLOGIES
SSD code BIO/19
Reference course MEDICAL BIOTECHNOLOGY AND
Course type Laurea Magistrale
Credits 6.0
Teaching hours Ore-Attivita-frontale: 50.0
For enrolled in 2019/2020
Taught in 2019/2020

Course year 1
Language INGLESE
Curriculum PERCORSO GENERICO/COMUNE
Location Lecce
Semester Primo-Semestre
Exam type Orale
Assessment Voto-Finale
Course timetable https://easyroom.unisalento.it/Orario

BRIEF COURSE DESCRIPTION

Lectures
Part 1. Microbial virulence and vaccines
Microbial and viral pathogenesis.
Vaccines.
Part 2. Drugs from microorganisms
Bioactive compounds from microorganisms.
Actinomycetes producing bioactive compounds.

Labs
Large-scale microbial cultivation for industrial purposes.

REQUIREMENTS

No formal prerequisite is required with respect to other courses.
However basic knowledge of general microbiology, basic immunology and microbial genetics is strongly recommended. This knowledge is normally acquired in the bachelor’s degrees that give access to the master’s degree in Medical Biotechnology and Nanobiotechnology.
COURSE AIMS

Course outline and aims
The course aims to provide knowledge and skills to work professionally with roles of responsibility in the areas of medical biotechnology and nanobiotechnology which make use of micro-organisms or viruses (natural or genetically modified, whole or parts thereof) or which develop diagnostic devices and therapeutic to combat infectious and non-infectious diseases.

Learning outcomes
Knowledge to be attained:
- molecular and cellular mechanisms underlying microbial and viral pathogenicity
- methodological foundations for design and development of vaccines
- methodological foundations for discovery and production of bioactive compounds from microorganisms

Abilities to be attained:
- New drug discovery from microorganisms by bioassays and genome mining
- Mutate-and-screen methods for microbial strain improvement
- Cultivation of microorganisms in stirred-tank bioreactors

TEACHING METHODOLOGY
Learning methods consist of formal Lectures and Labs making use of slides and hypertext links to specific Web sites. Outside these activities, the students are expected to read assigned papers from the scientific literature.

ASSESSMENT TYPE
Oral examination. It is aimed at ascertaining, in proportion:
- The level of theoretical knowledge through the presentation of the program topics (50%)
- The level of practical abilities through description of methods and methodologies (25%)
- The ability to apply theoretical knowledge and practical skills to solve simple problems (25%)

Due to COVID-19 emergency, exams will be held temporarily by telematic devices, using the TEAMS platform according to the instructions on the University website (https://drive.google.com/file/d/11SVWGyWOnEoNwoPXwg5gsDmQuhj68gVy/view).
Programs of Lectures and Labs

Lectures

Part 1. Microbial virulence and vaccines


Part 2. Drugs from microorganisms

**Bioactive compounds from microorganisms.** Chemical diversity and structural classes. Biological activity (antibiotic, antifungal, antiprotozoal, immunosuppressive, anticancer, etc.). Biosynthetic pathways: synthesis of precursor substrates, polyketides and polyketide synthase (PKS), oligopeptides and NRPS, PKS_NRPS hybrid systems, oligopeptides of ribosomal origin, oligosaccharides and terpenes, the main decoration reactions; manipulation of biosynthetic pathways.


Labs

**Large-scale microbial cultivation for industrial purposes.** The growth curve. Discontinuous or batch fermentation. Continuous fermentation. Fed-batch fermentation.

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**REFERENCE TEXT BOOKS**