



# UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

## IMMUNOLOGY, MEDICAL MICROBIOLOGY AND VIROLOGY

Enrollment year	2019/2020
Academic year	2021/2022
Regulations	DM270
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	BIOTECHNOLOGY
Curriculum	Biomolecolare
Year of study	3°
Period	1st semester (01/10/2021 - 14/01/2022)
ECTS	6
Language	Italian

The activity is split

508357 - IMMUNOLOGY, MEDICAL MICROBIOLOGY AND VIROLOGY - PART 1

508358 - IMMUNOLOGY, MEDICAL MICROBIOLOGY AND VIROLOGY - PART 2



## IMMUNOLOGY, MEDICAL MICROBIOLOGY AND VIROLOGY - PART 1

Enrollment year	2019/2020
Academic year	2021/2022
Regulations	DM270
Academic discipline	MED/04 (GENERAL PATHOLOGY)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	BIOTECHNOLOGY
Curriculum	Biomolecolare
Year of study	3°
Period	(01/10/2021 - 14/01/2022)
ECTS	3
Lesson hours	24 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	SAVIO MONICA (titolare) - 3 ECTS
Prerequisites	Good knowledge of cytology, histology, anatomy, biochemistry and physiology would be necessary for the study of Immunology.
Learning outcomes	Immunology course, address the general biological processes responsible for resistance against disease. These processes operate at the organ, tissue, cellular and molecular levels and the teaching of Immunology aims to provide the student with the basic knowledge of the defense mechanisms. The Immunology course, integrated with Microbiology, will provide the basic knowledge to understand the main pathological mechanisms related to an altered functioning of the immune system.
Course contents	Introduction to the immune system, cells involved in the immune response, the lymphoid system, adaptative and innate immunity. Innate immunity: the inflammation. Acute and chronic inflammation. The

	<p>wound healing. Chemical mediators and cytokines.</p> <p>Immune response: recognition of antigen, antibodies and antigens, the Major Hystocompatibility Complex (MHC). Antigen recognition, cell cooperation in the antibody response. Blood groups and transfusions. Hints of tolerance and autoimmunity, hypersensitivity, immunity against transplants and tumors.</p>
<b>Teaching methods</b>	Lectures and educational seminars
<b>Reccomended or required readings</b>	<p>Abul K. Abbas, Andrew H. Lichtman - Le basi dell'immunologia - Fisiopatologia del sistema immunitario. Elsevier.</p> <p>Elena Quaglino, Federica Cavallo, Guido Forni LE DIFESE IMMUNITARIE, PICCIN</p> <p>Peter Parham - Il sistema immunitario. Edises</p> <p>G.M. Pontieri - Elementi di Patologia generale. Piccin.</p>
<b>Assessment methods</b>	Written exam
<b>Further information</b>	The course will be integrated with educational seminars
<b>Sustainable development goals - Agenda 2030</b>	<a href="#">\$lbl legenda sviluppo sostenibile</a>



## IMMUNOLOGY, MEDICAL MICROBIOLOGY AND VIROLOGY - PART 2

Enrollment year	2019/2020
Academic year	2021/2022
Regulations	DM270
Academic discipline	MED/07 (MICROBIOLOGY AND CLINICAL MICROBIOLOGY)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	BIOTECHNOLOGY
Curriculum	Biomolecolare
Year of study	3°
Period	(01/10/2021 - 14/01/2022)
ECTS	3
Lesson hours	24 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	ZARA FRANCESCA - 3 ECTS
Prerequisites	<p>To study the teaching of Medical Microbiology and Virology, integrated with Immunology, it is recommended to have passed the 2nd year General Microbiology exam.</p> <p>In order to better follow the course, the student should have attended the Cytology, Histology, Human Anatomy, Biochemistry, Genetics and Physiology courses.</p>
Learning outcomes	<p>The course aims to provide students with the knowledge to understand the morphological and structural characteristics of microorganisms and viruses, the host-pathogen interaction, the methodological approach in the diagnostic assessment of infectious diseases and the role of the main infectious agents in human pathology.</p> <p>At the end of the course the student is expected to be able to know and understand the fundamental biological characteristics of bacteria and viruses and to know the main methods of microbiological and virological</p>

analysis (direct and indirect methods).  
The student will also be able to illustrate the main investigation techniques used in traditional and advanced diagnostics in the microbiological and virological field.

#### Course contents

Epidemiological aspects of infectious diseases. Microorganisms and viruses of bio-health interest. Prions. Routes of transmission of infectious agents (horizontal and vertical transmission). Zoonoses. Bacteria: size, shape, grouping. Review of the structure of the Gram-positive and Gram-negative bacterial cell. Accessory components of prokaryotic cells. Bacterial biofilms. Host-pathogen interaction, pathogenic and opportunistic microorganisms, iceberg concept, pathogenic action of bacteria (structural and secretory elements). Microbiota of the human body. Method of collecting, from various anatomical sites, clinical samples for microbiological analysis and their proper storage. Appropriateness of the microbiological sample. Diagnosis of infectious diseases. Direct diagnostic approach: microscopic examination and staining methods, culture examination and cultivation methods of bacteria (solid and liquid media; enriched, differential and selective media), diagnostics with manual / automated systems, detection of microbial macromolecules, identification of bacteria, methods evaluation of in vitro antimicrobial activity to antibacterial drugs (antibiogram, MIC, MBC). Indirect or serological diagnostic approach. Antibiotic resistance. General characteristics of the main bacteria of medical interest. Viruses of bio-health interest. Structure and composition of animal viruses. Classification (ICTV and Baltimore) and replication of animal viruses. Pathogenesis of viral infections (virus transmission routes, interferon system, virus-cell interaction, localized and disseminated infections). Viral infection diagnostics: direct (virological investigations) and indirect (serological investigations) diagnosis. Viral isolation and identification techniques. Antiviral drugs. Herpesviruses, Viruses responsible for hepatitis, Retroviruses, Orthomyxovirus. Fungi: definition, structure of the fungal cell.

#### Teaching methods

The course includes lectures.  
The teacher is available for clarifications about the topics covered in class, by appointment to be booked (via email).

#### Recommended or required readings

Microbiologia Clinica-Cevenini-Piccinin  
Microbiologia Medica-Janetz-Melnick-Adelberg's-Ed.Piccin  
Microbiologia Medica-P.R.Murray-K.S.Rosenthal-M.A.Pfaller-Ed.Elsevier  
Microbiologia Medica-Sherris-Ed. EMSI  
The didactic material presented in class will be provided.

#### Assessment methods

The exam consists of a written test structured in two questions with

	written answers and five questions (definitions to be written or multiple choice questions).
<b>Further information</b>	Examination Commission of the integrated course: Prof.ssa Monica Savio Prof.ssa Francesca Zara Prof. Elisabetta Nucleo
<b>Sustainable development goals - Agenda 2030</b>	<p>Goal 1: No poverty</p> <p>Goal 2: Zero hunger</p> <p>Goal 3: Good health and well-being</p> <p>Goal 4: Quality education</p> <p>Goal 5: Gender equality</p> <p>Goal 6: Clean water and sanitation</p> <p>Goal 7: Affordable and clean energy</p> <p>Goal 8: Decent work and economic growth</p> <p>Goal 9: Industry, innovation and infrastructure</p> <p>Goal 10: Reduced inequalities</p> <p>Goal 11: Sustainable cities and communities</p> <p>Goal 12: Responsible consumption and production</p> <p>Goal 13: Climate action</p> <p>Goal 14: Life below water</p> <p>Goal 15: Life on Land</p> <p>Goal 16: Peace, justice and strong institutions</p> <p>Goal 17: Partnerships for the goals</p> <p><a href="#"><u>\$ibl legenda sviluppo sostenibile</u></a></p>