

Main course information	
Academic subject	Immunogenetics
Degree course	Cellular and Molecular Biology
Classe di laurea	LM/6
ECTS credits (CFU)	3
Compulsory attendance	yes
Teaching language	Italian
Accademic Year	2019/2020

Docente responsabile	
Name & SURNAME	Rachele Antonacci
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Tutorial time/day	Thursday: 10.00-12.00

Course details	Pass-fail exam/Exam with mark out of 30	SSD code	Type of class
	Exam with mark out of 30	BIO/18	Lecture/workshop

Teaching schedule	Year	Semester
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Modalità erogazione	CFU/ECTS	Lessons (hours)	CFU/ECTS lab	Lab hours	CFU/ECTS tutorial/workshop	Tutorial/workshop hours	CFU/ECTS field trip	Field trip Hours
		3	24	0	0	0	0	0

Time management	Total hours	Teaching hours	Self-study hours
	75	24	51

Academic Calendar	First lesson	Final lesson
	October	January

Syllabus	
Course entry requirements	Basics of genetics, molecular biology and immunology
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	
<i>Knowledge and understanding</i>	To gain advanced knowledge of genetics by studying the structure and the function of genes involved in the immune response, and to use that knowledge to understand the molecular mechanisms underlying the characteristics of the acquired immune response of Vertebrates, including humans.
<i>Applying knowledge and understanding</i>	To be able to use broad-spectrum methodologies for genetics research.
<i>Making informed judgements and choices</i>	To be able to independently evaluate and interpret experimental data.
<i>Communicating knowledge and understanding</i>	To acquire skills and to use appropriate communication tools through discipline specific lexicon and bibliographical insights.
<i>Capacities to continue learning</i>	To acquire skills that allow the insightfulness and constant updating of immunogenetics, by consultation of bibliographic material and databases.

Syllabus	
Course content	- Overview of the Immune System The immune response is composed of two interconnected arms: innate immunity and

	<p>adaptive immunity. Characteristics of the adaptive immune response. Cells, organs and microenvironment of the immune system.</p> <p>-Antigens</p> <p>Imunogenicity versus antigenicity. Epitopes.</p> <p>- Antibodies: structure and function</p> <p>Basic structure of antibodies. There are two major types of antibody light chains and five major classes of antibody heavy chains. Antigenic determinants on immunoglobulins. Antibody-mediated effector functions. Antibody classes and biological activities.</p> <p>-Organisation and expression of immunoglobulin genes.</p> <p>The immunoglobulin superfamily. Genetic model compatible with Ig structure. Multigene organization of Ig genes. Mechanism of V(D)J recombination. Generation of antibody diversity. Somatic hypermutation in the variable region. Class switching among constant region genes. Regulation of Ig-gene transcription. Allelic exclusion. B-cell receptor expression.</p> <p>-Monoclonal antibodies and their applications in the laboratory or clinic.</p> <p>-T cell receptor</p> <p>Early studies of the T cell receptor. $\alpha\beta$ and $\gamma\delta$ T cell receptors: structure and roles. Organization and rearrangement of TCR genes. Genomic organization of the TR loci in human and in other mammalian species. Regulation of the TCR expression. Allelic exclusion. the somatic hypermutation in the $\gamma\delta$ T cell receptors.</p> <p>-Major Histocompatibility Complex.</p> <p>The structure and function of MHC molecules. Exon-intron organization of the MHC genes. Antigen processing and presentation. The role of the MHC molecules in the T cell development. General organization and inheritance of the MHC.</p>
Course books/Bibliography	<p>- R. A. Goldsby, T. J. Kindt, B. A. Osborne: Kuby - Immunologia, Ed. UTET</p> <p>- Book of Genetics</p>
Notes	<p>Some topics not present in the textbooks are to be eventually integrated with scientific articles.</p> <p>Lectures Power Points (no lecture notes) are available as support to the study.</p>
Teaching methods	<p>Frontal lessons with the use of PowerPoint presentations and workshops at the whiteboard.</p>
Assessment methods (indicate at least the type written, oral, other)	<p>Oral exam</p>
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are)	<p>All students must be capable of elaborate and accurate discussions on the scientific processes taught during the course and therefore able to develop hypotheses and experimental questions and, ultimately, to create new knowledge.</p>
Further information	