Teaching guide

IDENTIFICATION DETAILS

Degree:	Pharmacy
Scope	Pharmacy
Faculty/School:	Experimental Sciences
Course:	IMMUNOLOGY
Type:	Compulsory
ECTS credits:	6
Year:	3
Code:	2530
Teaching period:	Fifth semester
Subject:	Immunology
Module:	Medicine and Pharmacology
Teaching type:	Classroom-based
Language:	Spanish
Total number of student study hours:	150

SUBJECT DESCRIPTION

Immunology addresses the basic elements of the normal functioning of the immune system, the mechanisms for regulating the immune response and the bases and foundations of immune pathologies of various kinds. In addition, various immunological techniques, diagnostic techniques will be introduced on the state of the immune system and the value of immunoglobulins as diagnostic tools.

It is a science in continuous expansion with countless applications in research, healthcare and industry.

GOAL

That students know the morphology, structure, and function of the Immune System, as well as the mechanisms associated with immune-based pathologies.

PRIOR KNOWLEDGE

In order to cope with the subject, the following knowledge will be required on the part of the students:
Biology: Structure of the eukaryotic and prokaryotic cell; differences between the two. Structure of the DNA molecule.
Macromolecule biosynthesis: DNA replication, RNA transcription, protein translation...
Genomics: chromosomal organization of the human genome, types of sequences, structure of genes, regulation of gene expression...
Instrumental techniques: nucleic acid electrophoresis, capillary electrophoresis, UV-visible absorption spectroscopy, fluorescence emission spectroscopy...

COURSE SYLLABUS

Section I: Basic Concepts of Immunology.
Topic 1. Introduction to Immunology: Basic Concepts. Innate and adaptive immunity. Humoral and cellular response. Primary and secondary response.
Theme 2. Cells involved in innate response and adaptive response.
Theme 3. Primary and secondary lymphoid organs.
Section II: Innate Immunity.
Topic 4. Physical, chemical and biological barriers. Recognition in the innate response. Molecular patterns of pathogens (PAMPs) and their receptors.
Topic 5. Effector mechanisms. Complement System. Opsonization and phagocytosis.
Theme 6. Inflammatory response. Mediators involved: adhesion molecules and chemokines. Lymphocyte circulation. Adhesion molecules.
Section III. Adaptive Immunity.
Topic 7. Immunoglobulins. Structure and function. Immunoglobulin classes and subclasses. Interaction with the antigen. Fc receptors.
Topic 8. Major Histocompatibility Complex. Genomic organization. Class I and Class II molecules: structure and function. Antigenic presentation. The endocytic and cytosolic pathways.
Topic 9. Receptor for B cell antigen or BCR. Ontogeny, activation and maturation of LB.
Topic 10. T-cell receptor (TCR). Structure and function. Activating the LT. Differentiation and functions.
Section IV: The Immune System in Health and Disease.
Topic 11. Hypersensitivity reactions. Antibody-mediated hypersensitivity (Type I, II and III). Allergy: sensitization and effector mechanisms. Cell-mediated hypersensitivity (Type IV).

Topic 12. Congenital and acquired immunodeficiencies. AIDS.
Topic 13. Central and peripheral tolerance. Autoimmune diseases. Causes. Classification. Treatments.
Topic 14. Transplant immunology. Types of rejection, effector mechanisms. Prevention and treatment.
Topic 15. Immune system and cancer. Tumor antigens. Immune response in the tumor process. Immunotherapy.

PRACTICAL CLASSES
1. Western Blot
2. ELISA
3. Flow cytometry
4. Immunofluorescence

EDUCATION ACTIVITIES

AFP1. Theoretical classes. The theoretical contents of the subject will be taught in master classes presented by the teacher or by guest teachers. Student participation in the development of the class will be encouraged by proposing questions to the attendees in order to ensure a greater understanding of the concepts taught. Additionally, self-evaluation, review and reinforcement exercises will be carried out in person both individually and together in the classroom. On the other hand, to strengthen content and promote critical thinking, students will find study material in the Virtual Classroom consisting of presentations (computer support), summaries, articles, links to web pages and additional teaching material.
AFP2. Practical classes. There will be 4 sessions of practical laboratory classes. Attendance at practical classes is strictly mandatory to pass the course.
AFP3. Exercise classes and problems.
AFP4. Seminars and/or exhibition of works.
AFP5. Tutoring. They are voluntary and have no content restrictions. They will take place in existing teaching spaces in the Departments involved in this subject.
AFP6. Conducting exams.
AFNP1. Study of theory, exercises and problems.
AFNP2. Preparation and study of practices.
AFNP3. Preparation of works.
AFNP4. Tutoring preparation.

DISTRIBUTION OF WORK TIME

TEACHER-LED TRAINING ACTIVITIES	INDIVIDUAL WORK
69 Horas	81 Horas

Cross Skills

To nurture an attitude of intellectual curiosity and a quest for truth in all areas of life.

To be able to approach a subject by means of rigorous, profound and comprehensive thought.

To be able to assess knowledge acquired.

To be able to apply the theoretical knowledge learnt in the of solving problems and practical cases linked to the various subjects.

LEARNING RESULTS

Acquire the necessary skills to be able to provide therapeutic advice in pharmacotherapy and diet therapy, as well as nutritional and dietary advice to users of the establishments in which they serve.

Know the properties and mechanisms of action of drugs.

Know and understand the structure and function of the human body, as well as the general mechanisms of disease, molecular, structural and functional alterations, syndromic expression and therapeutic tools to restore health.

Know the analytical techniques related to laboratory diagnostics, toxins, food and the environment.

Know and understand the basic fundamentals of clinical analysis and the characteristics and contents of laboratory diagnostic opinions.

Know and understand the techniques used in the design and evaluation of preclinical and clinical trials.

Evaluate the effects of substances with pharmacological activity.

SPECIFIC LEARNING RESULTS

Define the fundamental characteristics of the different components of the Immune System: organs and cells.

Identify the types of immune response and the effector and regulatory mechanisms involved.

Determine the mechanisms involved in the main diseases of the Immune System.

Learn about the main drugs that modulate the immune response, and the role of Immunology in pharmaceutical research and development.

Describe the basic immunological techniques used in research and diagnostic laboratories.

LEARNING APPRAISAL SYSTEM

Ordinary system:
ISE1. Evaluation of the theoretical content of the subject through exams (65%). It will be necessary to get a 5 in this section to average the rest of the grades.
SE2 and SE4. Daily activities and exercises: 10%. Performing and participating in daily activities and exercises. The ability to carry out the presentation of the results of the different exercises or tasks proposed based on the knowledge obtained, as well as their synthesis abilities, will be evaluated through the tasks that can be performed in different formats.
IF 3. Individual and group work: 10%. Evaluation of the realization/exhibition of individual or group/cooperative works on different aspects of the subject and in different formats. The capacity for analytical, reflective and critical thinking will be evaluated.
SE8. Carrying out and evaluating the practical work carried out in the laboratory: 15%. Attendance/completion of the internship is mandatory and essential to be able to pass the subject. They will be evaluated through an exam and the preparation, by the student, of the complementary tasks proposed by the internship teacher (which must be delivered within the stipulated time for this purpose). Tasks delivered after the deadline will not be taken into account and, therefore, will remain unqualified. Likewise, the behavior, skills shown and attitude during the development of the practices (participation, motivation, involvement, group work, punctuality, etc.) will also be taken into account, constituting part of the note of the practical block. It will be necessary to pass the internship obtaining a score of 0.75 (out of 1.5 total) to be able to average with the rest of the grades. In case of duly justified absence, and impossibility of recovering with another group, a specific test will be taken on the day of the examination of the ordinary call. Unjustified non-attendance at any of the practices, manifest disinterest or inappropriate behavior in carrying them out will mean obtaining a final grade of not having passed the internship. This leads to the loss of the right to the evaluation of internships in the ordinary call and, therefore, a suspension in the subject in this call. If this part is approved and others are suspended, the grade will be saved for the extraordinary call for that same academic year.
To pass the subject, it will be necessary to pass both the exam and the practice blocks and the work/exercise blocks independently (that is, you need the one passed in the exam, in the laboratory and in the tasks). The score corresponding to the continuous evaluation will only be counted once the theoretical part has been passed.
Extraordinary evaluation: The exam will consist of a written test with the same characteristics as the ordinary call exam. If you have not passed the subject in the first call, the grades of the approved parts will be saved until the extraordinary call.
If you have suspended the laboratory internship block in the ordinary call, a specific test of the same will be carried out in the extraordinary call. If the blocks of daily activity/work have been suspended in ordinary call, an oral or written assignment will be proposed to the student that allows them to pass the subject in an extraordinary call.
Alternative system: Only in the case of students in the second year and later, and students with academic exemption, they can choose to take advantage of the previously specified Primary System (in which case they must meet all the requirements, including class attendance) or to take advantage of the alternative system in which the following percentages will be applied:
Final theory exam: 75%. It will be necessary to get a 5 in this section to average the rest of the grades.
Laboratory work: 15%. In the case of students in second enrollment or in academic dispensation, the internship note from the previous academic year will be saved if they passed that part, without having to repeat them, but they should contact the teacher for specific evaluation criteria and carry out the proposed tests/tasks. If this is a third enrollment, students will have to do the internship again. If doing the internship again, this block is suspended in the ordinary call, a specific test of the same will be carried out in the extraordinary call.
Delivery of tasks (exercises, case analyses, infographics...): 10%. It is essential to submit the tasks on time and form in order to pass the course.
The student must take one of the two options and request the corresponding authorization within five calendar days from the beginning of the semester. If you do not report, the evaluation will be taken over by the ordinary

system.

Plagiarism, as well as the use of illegitimate means in evaluation tests, will be sanctioned in accordance with those established in the Evaluation Regulations and the University's Coexistence Regulations.

ETHICAL AND RESPONSIBLE USE OF ARTIFICIAL INTELLIGENCE

1.- The use of any Artificial Intelligence (AI) system or service shall be determined by the lecturer, and may only be used in the manner and under the conditions indicated by them. In all cases, its use must comply with the following principles:
a) The use of AI systems or services must be accompanied by critical reflection on the part of the student regarding their impact and/or limitations in the development of the assigned task or project.
b) The selection of AI systems or services must be justified, explaining their advantages over other tools or methods of obtaining information. The chosen model and the version of AI used must be described in as much detail as possible.
c) The student must appropriately cite the use of AI systems or services, specifying the parts of the work where they were used and describing the creative process followed. The use of citation formats and usage examples may be consulted on the Library website(https://www.ufv.es/gestion-de-la-informacion_biblioteca/).
d) The results obtained through AI systems or services must always be verified. As the author, the student is responsible for their work and for the legitimacy of the sources used.
2.- In all cases, the use of AI systems or services must always respect the principles of responsible and ethical use upheld by the university, as outlined in the Guide for the Responsible Use of Artificial Intelligence in Studies at UFV. Additionally, the lecturer may request other types of individual commitments from the student when deemed necessary.
3.- Without prejudice to the above, in cases of doubt regarding the ethical and responsible use of any AI system or service, the lecturer may require an oral presentation of any assignment or partial submission. This oral evaluation shall take precedence over any other form of assessment outlined in the Teaching Guide. In this oral defense, the student must demonstrate knowledge of the subject, justify their decisions, and explain the development of their work.

BIBLIOGRAPHY AND OTHER RESOURCES

Basic

Abbas, Abul K. Cellular and Molecular Immunology/9th ed. Philadelphia:Elsevier, 2018.

R.J Regueiro González... [et al.]. Immunology: Biology and Pathology of the Immune System/4th ed., 3rd reimp. Buenos Aires [etc.] :Panamericana, 2016.

Abbas, Abul K. Cellular and Molecular Immunology [Electronic Resource]/9th ed. Madrid:Elsevier, 2018.

Janeway, Charles A. Janeway Immunology/
(Janeway, Charles A. Janeway Immunology/, ||William Rojas M. [and 5 others]. Rojas Immunology/18th edition.)

Jenni Punt... [et al.]. Kuby immunology/8th ed. New York: WH Freeman and Company, 2019.