66018 - Advances in Molecular Pathology

Información del Plan Docente

Academic Year	2017/18
Faculty / School	100 - Facultad de Ciencias
Degree	537 - Master's in Molecular and Cellular Biology
ECTS	6.0
Year	1
Semester	Indeterminate
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The learning process designed for this course is based on the following teaching and learning tasks: Lectures on the latest developments in different research topics related to molecular pathobiology, and seminars presented by the students.

5.2.Learning tasks

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The course includes the following learning tasks:

Lectures and workshops: 45 hours. The work and the latest advances in leading areas of research in molecular pathobiology will be presented to the students, as detailed in the syllabus. Besides, discussion workshops, focusing on hot and controversial topics, will take place. The teacher will do a brief presentation, based on some key articles and then, a discussion in which each student will make 1 or 2 questions related to the topic.
Elaboration and presentation of an assignment. In-class work: 8 hours; autonomous work: 60 hours. In this activity the students collect information on a particular topic, helped by the teacher. The analysis of information should lead to the elaboration of a public presentation of the chosen topic. The teacher will monitor the individual work of students in tutoring sessions. After the presentation, it will be discussed by the student and 2-3 teachers.

5.3.Syllabus

The course will cover the following topics:

1- Course introduction. Dr. Javier Naval.

2- Advances in the mechanisms involved in intestinal absorption of sterols, plasma cholesterol levels and sterol removal: implications for cardiovascular risk and other pathologies. Dr. Miguel Pocoví

3- Obesity: predisposition or incorrect nutrition? Genetic predisposition. Genes and obesity relationships: interplay with food intake and satiety; interplay with inflammatory state. Factors associated to adipose tissue differentiation and metabolic control. Epigenetics. Obesity and the thrifty phenotype. Adipogenesis. Obesity and chronobiology. Dra. Maria Iturralde

4- Gaucher Syndrome: clinical, genetic and epidemiological characteristics. Dra. Pilar Giraldo.

5- 1)Importance of programmed cell death. Apoptosis, Necroptosis, Autophagy. Discovery of apoptosis in the worm *Caenorhabditis elegans* . Apoptosis in *Drosophila melanogaster* .

2)Apoptosis in mammals. Extrinsic pathway. Caspases. Caspase inhibitors. Intrinsic pathway. Inhibitors of apoptosis. Dr. Javier Naval

6- Role of mitochondria in apoptosis. Citochrome c, AIF, Smac/Diablo. Apoptosis regulation by Bcl-2 family proteins. Dra. Isabel Marzo

7- Apoptosis in the Immune System I. Central tolerance. Mechanisms of control of peripheral tolerance. Dr. Alberto Anel

8- Apoptosis in the Immune System II. Cell-mediated cytotoxicity. Natural Killer (NK) cells, cytotoxic T-lymphocytes (CTL) and their weapons of mass destruction. Dr. Julián Pardo

9- Immunological features of a novel tuberculosis vaccine. Dr. Juan Ignacio Aguiló

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10- Workshop on Granzymes Dr. Julián Pardo.

11- Redox activity of Apoptosis-Inducing Factor (AIF): molecular basis and biological function implications. Dr. Patricia Ferreira

12- Unravelling causes of multifactorial diseases: OXPHOS differences among mitochondrial haplogroups. Dr. Eduardo Ruiz Pesini

13- Identification of nuclear factors involved in mitochondrial diseases. Dr. Patricio Fernández

14- 1) Innate immune response: mechanisms of inflammation.

2) Acute-phase proteins. Dr. María Angeles Alava

15- 1) Acute-phase proteins as pathological markers and of animal welfare.

2) Protein glycosylation: principles, study methods and clinical applications. Dr. Fermín Lampreave

16- Introduction to the study of Reactive Oxygen Species (ROS) and Reactive Nitrogen Species (NOS). Antioxidant defences and oxidative stress. Dr. Pedro Iñarrea

17- Final week: Student evaluation seminars: Presentation and discussion of papers related to syllabus topics. Dr. Alberto Anel, Isabel Marzo and Javier Naval

5.4.Course planning and calendar

Further information concerning the timetable, classroom, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the Faculty of Science website, the virtual platform Moodle, and the Department information boards.

Provisional calendar (it may vary depending on the availability of guest lecturers)
session 1
Gaucher Disease. clinical, genetic and epidemiological characteristics
Dr. Pilar Giraldo.
session 2
1) Inborn errors of metabolism of chylomicrons, remnant lipoproteins and high density.
2) regional Hypercholesterolemia dominant.
Dr. Miguel Pocoví.
session 3
1) Importance of programmed cell death or apoptosis. Apoptosis in C. elegans.
2) Apoptosis in Drosophila melanogaster.
Dr. Javier Naval

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session 4
1) Via extrinsic apoptosis. Mortals receivers.
2) Caspases. Caspase inhibitors.
Dr. Javier Naval
session 5
1) Role of mitochondria in apoptosis. Cytochrome c, AIF, Smac / Diablo.
2) Regulation of apoptosis by proteins of Bcl-2 superfamily
Dr. Isabel Marzo

session 6
Apoptosis in the immune system I. Central Tolerance. Maintenance mechanisms of peripheral tolerance.
Dr. Alberto Anel
session 7
Apoptosis in the immune system II. Cell mediated cytotoxicity. Cytotoxic lymphocytes and their deadly weapons
Dr. Julian Pardo
session 8
Lessons from vector-borne infectious disease "Lyme borreliosis"
Novel vaccination strategy outwits pathogens'versatility.
Dr. Markus Simon, Max-Planck Institut
session 9
Workshop on granzymes
Dr. Markus Simon, Max-Planck Institut
session 10
1) Introduction to reactive oxygen species. The chemistry of free radicals.
2) The antioxidant defenses and oxidative stress.
Dr. Pedro Iñarrea
session 11
1) Physiological basis of intake. Orexigens and anorectic neuropeptides and other regulatory molecules. related genetic alterations
2) accumulation of fat in the adipose tissue. Physiological basis and genetic alterations.
Dr. Maria Iturralde

session 12
1) Unraveling the causes of multifactorial diseases: OXPHOS differences between mitochondrial haplogroups.
Dr. Eduardo Ruiz Pesini
session 13
1) Identification of nuclear factors involved in mitochondrial diseases
Dr. Patricio Fernández
session 14
1) innate immune response: mechanisms of inflammation
Dr. Fermin Lampreave
2) Acute Phase Proteins.
Dr. M. Angeles Alava
session 15
1) acute phase proteins as pathological markers and animal welfare.
2) Changes in protein glycosylation: principles, methods of study and possible clinical applications.
Dr. Fermin Lampreave

session 16
Seminars student assessment: presentation and discussion of related agenda items.
Drs. Alberto Anel, Isabel Marzo and Javier Naval

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5.5.Bibliography and recommended resources

The corresponding teachers will indicate the specific bibliography for each topic, updated every year.