Universidad Zaragoza

Academic Year/course: 2024/25

27148 - Molecular Basis of Cell Communication and Cancer

Syllabus Information

Academic year: 2024/25
Subject: 27148 - Molecular Basis of Cell Communication and Cancer
Faculty / School: 100 - Facultad de Ciencias
Degree: 446 - Degree in Biotechnology
ECTS: 6.0
Year: 4
Semester: Second semester
Subject type: Optional
Module:

1. General information

It is an elective that provides specialized information.

The general objectives pursued are as follows:

- To know the basic molecular mechanisms of cell-cell communication in mammals.

- To understand how alterations in these communication processes are at the molecular basis of tumour cell behaviour

Its approaches and objectives are aligned with the Sustainable Development Goals (Agenda 2030, United Nations) in such a way that the acquisition of the learning results provides training and competency to their achievement.

The subject is part of the elective training block for students of the Biotechnology Degree and will enable students to understand the problem of cancer at the molecular and cellular level and for an eventual specialization in postgraduate studies in molecular oncology.

- It is recommended to have previously taken General Biology, Immunology, Genetics, and Biochemistry.

2. Learning results

Upon completion of the subject, the student will be able to:

- Identify the levels of complexity of cell-to-cell communication, from local to long-distance communication
- To understand the general mechanisms and strategies of cell-to-cell communication in mammals.
- To understand the general molecular principles governing intracellular communication.
- To understand the relationship between altered cellular communication and cancer development.
- To understand the mechanism by which the main oncogenes and tumour suppressor genes act.

In addition, the student will improve their

- Capacity for association and deduction.
- Ability to solve specific problems.
- Ability to critically analyse information.
- Ability to present topics in public.

3. Syllabus

Part I: **Signal Transduction**

1. **Importance of cell communication in multicellular organisms.**
2. **Leitmotifs in signal transduction.**
3. **Main signal transduction pathways.**
4. **Proliferative and survival pathways.**
5. **Cytokines.**
6. **Steroid hormones and nuclear receptors.**
7. **Signals that induce cell death**.

Part II: **Molecular Basis of Cancer**

8. **The nature of cancer.**
9. **Viruses and cancer: discovery of oncogenes.**
10. **Type I and II oncogenes: growth factors, their receptors and cancer.**
11. **Type III and IV oncogenes: alterations of cytoplasmic and nuclear signalling circuits in cancer**.

12. **Tumour suppressor genes.**

4. Academic activities

The following activities will be conducted in the term to help the student achieve the learning objectives

Theoretical classes. (5.5 ECTS)

In them, students will be introduced to and critically discuss the basic theoretical contents of the subject, which will deal with the topics indicated in the syllabus

Performance and presentation of a personal work. (0.5 ECTS)

Towards the end of the term, once the main knowledge has been acquired, students will (individually or in pairs) collect bibliographic information on a particular group of clinically important tumours and, with the help of the teacher, prepare a work to be presented and discussed in class.

5. Assessment system

The subject will be assessed by means of:

- A written test consisting of a series of short questions and/or short essays about the theoretical contents of the subject . It will contribute 90% of the final grade.
- Presentation of a work individually or in pairs.

The work will deal monographically with a type of tumour of clinical importance, which will be specified by the teacher for each group for each group.

The teacher will supervise the student's personal work, guiding them in the search for information and its evaluation. The work will be a PowerPoint presentation and will be presented and discussed in class.

Assessment criteria and levels of demand: The completion of the written work and its presentation to the class will be graded from 0 to 10 and will contribute 10% to the final grade. Assessment criteria are as follows:

- Consistency of information

- Clarity of presentation

- Degree of elaboration of the presentation.

- Degree of internalization of the contents with own suggestions.

In addition to the assessment system indicated in the previous sections, the student will have the possibility of being evaluated by means of a written exam whose syllabus includes the that of the subject + the material contained in the seminars.

6. Sustainable Development Goals

3 - Good Health & Well-Being
4 - Quality Education