Academic Year: 2024/25

66158 - Animal models for the study of cancer immunotherapy

Teaching Plan Information

Academic year: 2024/25
Subject: 66158 - Animal models for the study of cancer immunotherapy
Faculty / School: 104 - Facultad de Medicina
Degree: 637 - Masters degree in Tumor Immunology and Cancer Immunotherapy
ECTS: 3.0
Year: 1
Semester: Second semester
Subject type: Optional
Module:

1. General information

This subject provides, together with the other subjects of the term, a global and broad vision of the different animal models in which the effectiveness and safety of immunotherapy treatments can be analysed, including the host factors that modulate their efficacy. It is a generalist and integrated vision of the knowledge that the student must acquire for their future work in the field of cancer immunotherapy.

In this subject the student will learn about the main animal models in cancer immunology and immunotherapy research, how to select the best animal model depending on the immunotherapy treatment to be studied, as well as about current legislation and the necessary procedures to carry out a study in animal models.

Sufficient computer resources with Internet access are required to access the online content.

2. Learning results

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

1. Know the usefulness of animal models in cancer immunology and immunotherapy research.
2. Identify the main milestones in immunotherapy developed thanks to animal models.
3. Know the main types of autologous models of cancer in mice.
4. Know the main transgenic models of cancer in mice.
5. Know the main types of tumour xenotransplantation models in immunosuppressed mice.
6. Understand the main immunological processes affected by species mixing in xenotransplantation models.
7. Know the different types of humanized mice.
8. Know the current legislation and the necessary procedures to conduct a study in animal models.

3. Syllabus

1- The mouse as a model for immunology and tumour immunotherapy. Historical evolution. Main milestones and difficulties.

2- Models of induced carcinogenesis. Chemical carcinogenesis. Virus induced. Cancer types and mechanisms. Immunological characteristics.

3- Autologous tumour cell transplantation models. Orthotopic model. Subcutaneous model. Metastatic models. Immunological characteristics.

4- Transgenic models of inducible and non-inducible tumour mutations. Types of mutations and tumours. Induction by carcinogens. Immunological characteristics.

5- Transgenic models expressing T cell receptors against tumour antigens.

6- Tumour xenotransplantation models in immunosuppressed mice. Immunological interactions between the human and mouse systems at the molecular level. Xenotransplantation of cell lines (CDXs). Xenotransplantation of patient samples (PDXs).

7- Tumour xenotransplantation models in humanized mice. Conditioning. PBMC or bone marrow transfer. Conventional immunosuppressed mice (NOG, NSG, Rag2/Il2rg) Latest generation mice: huNOG-EXL, NSG-SGM3, MISTRG.

8- Limitations of autologous and xenotransplantation models for the study of immunotherapy.

9- Future perspectives on the use of PDXs animal models for the personalized selection of immunotherapy treatments. The mouse in the clinic. 10- Ethical aspects for the use of mouse models in cancer.

4. Academic activities

- **Theoretical classes:** one-hour lectures in which the necessary and general theoretical contents of the subject are presented in order to develop the competencies. It is in the general interest of the faculty to encourage participation.
- **Problem solving and case studies:** problem solving or discussion of practical cases related to the different

approaches of immunotherapy in cancer with permanent attendance and supervision by teachers.

- **Preparation of a REPORT** to be delivered in printed and/or digital format.
- **Seminars**: application of the competences acquired by the student who will present in class the design of an animal model for immunotherapy exposing the most relevant aspects from the point of view of cancer immunotherapy.
- **Visit to the CIBA Animal Facility**
- **Incorporation of materials to the ADD (Anillo Digital Docente)** that are considered elements of consultation for all those involved in the subject.
- **Tutorials:** students may request personal tutorials through the subject´s internal email. For this purpose, a convenient time slot will be agreed upon at the beginning of the term.

5. Assessment system

A. Attendance and participation in the lectures:

Attendance to the master classes is MANDATORY. Minimum attendance shall be 80%.

It will have a weighting of 25% of the total final grade.

B. Problem solving and case studies:

The student will prepare a structured REPORT on the problems and cases developed during the problem and case sessions, which will include the answers to a questionnaire related to the activities carried out in those sessions. The reasoning capacity used to answer the different problems and cases will be assessed.

It will have a weighting of 25% of the total final grade.

C. Seminars:

Students will present in class the design of an animal model to apply immunotherapy against a tumour with defined immunological characteristics, exposing the most relevant aspects from the point of view of cancer immunotherapy.

It will have a weighting of 50% of the total final grade.

6. Sustainable Development Goals

3 - Good Health & Well-Being
4 - Quality Education
8 - Decent Work and Economic Growth