

## NEW TREATMENTS IN HEMOPATHIES: FROM THE LABORATORY TO THE CLINIC

1.- General information					
Code	303020	Plan		ECTS	3
Type	Elective	Course	2026/2027	Periodicity	2 <sup>st</sup> Semester
Language		Spanish			
Department	<a href="#">Cancer Research Center</a>				
Virtual Platform	<a href="https://moodle2.usal.es/">https://moodle2.usal.es/</a>				

1.1.- Faculty			
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<b>Research area</b>	Oncohematology		
<b>Center</b>	<a href="#">Cancer Research Center</a> University Hospital of Salamanca		
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<b>Tutorials</b>	10.00-12.00 from Wednesday and Thursday		
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**BIOLOGY AND CLINICAL CÁNCER MÁSTER DEGREE**

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**2.- Previous recommendations**

No prior requirements

**3.- Aims of the subject**

To acquire an overview of which are the main lines of current research in the treatment and monitoring of the response in haematological malignancies.

This general objective is divided into several sub objectives that are shown below:

To understand the different pathways and molecular processes involved in the development of tumours and to analyse which of these mechanisms can be used as antitumor targets. In this respect, it will be insisted on drugs, molecules or antibodies used for this purpose.

To know the different steps to be followed in the development of a new antitumor drug. The student must acquire/ gain knowledge of: the first steps of preclinical research; studies in experimentation animals; and the planning and conduct of clinical trials that will lead to the approval of the above mentioned treatment for its use in the Clinic.

To deepen the new clinical procedures that, nowadays, are improving the applicability of these new drugs to the daily Clinic. In this sense, it is intended to explain the new techniques for monitoring the response to these above-mentioned drugs (flow cytometry, molecular analysis, etc.). At the same time, the markers that will allow to know the potential resistance or sensitivity of a patient to a specific treatment will be analysed (clinical, genetic, molecular and phenotypic markers, etc.) and

the variables within these techniques will be defined with prognostic value for patients.

To know the characteristics and different modalities of Hematopoietic stem cell transplantation (HSCT).

To deepen the biology and possibilities of therapeutic action in graft versus host disease and the possibilities of modulating and enhancing the graft effect against tumour / leukaemia

To know the necessary laboratory techniques for the preclinical study of the efficacy and toxicity of a new antitumor drug. To do this, the student should familiarize with the techniques of cell line and cell culture obtained from patients.

Likewise, the student should have some knowledge of how the efficacy studies and mechanism of action are carried out: MTT studies; annexin V and cell cycle analysis by flow cytometry; expression microarrays to know induced changes in the gene expression profile; Western blot to study protein changes

To know how “in vivo” studies are performed in animal models with different haematological malignancies.

<b>4.- Skills to be acquired / Learning outcomes</b>
<b>Skills</b>
<p><b>4.1: Basic skills:</b></p> <ul style="list-style-type: none"> <li>- To know the basis of the new techniques for monitoring these diseases in the context of the new targeted drugs. The student must become familiar with immunophenotype techniques by flow cytometry, basic cytogenetic techniques (FISH, NGS ....) and molecular biology analysis such as quantitative PCR Specific.</li> </ul>
<p><b>4.2: Specific skills:</b></p> <ul style="list-style-type: none"> <li>- To know the necessary laboratory techniques for the preclinical study of the efficacy and toxicity of a new antitumor drug.</li> <li>-To know how a clinical trial is planned: susceptible population, inclusion and exclusion criteria, evaluation methods of efficacy and toxicity.</li> </ul>
<p><b>4.3: Transferable skills:</b></p>

<b>5.- Contents (Syllabus)</b>
<p><b>Theoretical lessons:</b></p> <ol style="list-style-type: none"> <li>1. Introduction to hematological malignancies. Types of hematological malignancies: myeloid and lymphoid; acute and chronic (Class 1). Dr. Marcos González</li> <li>2. Introduction to hematological malignancies. Types of hematologic malignancies: myeloid and lymphoid; acute and chronic (Class 2). Dr. Marcos González</li> <li>3. Technical foundations of multiparameter flow cytometry and its application to the study of hematological diseases. Dr. Belén Vidriales.</li> <li>4. Applications of Molecular Biology in Malignant Hemopathies. "From the laboratory to the Clinic". Dr. Ramón García Sanz</li> <li>5. Genomic techniques in haematology. Dr. Norma Gutierrez</li> <li>6. Preclinical investigation of new antitumor drugs. “In vitro” studies, ex vivo and in vivo. Dr. Mercedes Garayoa</li> <li>7. Clinical research of new antitumor drugs. Clinical trials: Phases of the trials. Monitoring efficacy</li> </ol>

and toxicity. Dr. M<sup>a</sup> Victoria Mateos

8. New drugs based on Biology in Lymphoproliferative Syndromes. Dr. Alejandro Martín

9. New Drugs in Myelodysplastic Syndromes. Dr. M<sup>a</sup> Díez Campelo

10. Bases for the healing of Multiple Myeloma. Dr. M<sup>a</sup> Victoria Mateos.

11. Immunotherapy in Multiple Myeloma. Dr. Teresa Paino

12. Role of the microenvironment in tumour pathogenesis: Multiple Myeloma. Dr. Mercedes Garayoa

13. Bone lesion associated with multiple myeloma. Drugs that act on bone metabolism. Dr. Mercedes Garayoa.

14. Transplantation of hematopoietic progenitors in malignant hemopathies. Different strategies and indications. Dr. M<sup>a</sup> Dolores Caballero

15. Transplantation of hematopoietic progenitors in malignant hemopathies. New strategies to modulate the graft effect against host / tumour. Dr. Lucia Lopez.

**Training:**

1. The immunophenotype in monitoring the response in hematologic malignancies. Dra. Noemi Puig.
2. Evaluation “in vivo” of new antitumor drugs. Visit to the animal house
3. Molecular techniques in monitoring the response in hematologic malignancies. Dra Verónica González
4. Cytogenetic and genomic techniques in monitoring the response in hematologic malignancies.
5. Cell cultures. Cell lines and primary cells of patients.

<b>6.- Teaching methodology</b>
The student must attend 15 hours of theoretical lessons having previously read and understood the recommended bibliography as well as the presentations that will be explained in these theoretical lessons. The presentations and recommended bibliography are shown on the studium platform.

<b>6.1.- Estimated learning time</b>				
	Hours tutored by the teacher		Individual work (hours)	TOTAL HOURS
	Attendance required (hours)	Distance learning (hours)		
<b>Lectures</b>	15			15
<b>Practices</b>	- In classroom			
	- In laboratory	10		10
	- In computer classroom			
	- Countryside			
	- Others (specify)			
<b>Seminars</b>				
<b>Work presentations and debates</b>				
<b>Tutorials</b>	7			7
<b>Online activities</b>	12			12
<b>Work preparation</b>				
<b>Other activities</b>				
<b>Exams - evaluation</b>	1		30	31
<b>TOTAL</b>	<b>45</b>		<b>30</b>	<b>75</b>

**7.- Materials, other bibliographical, electronic references or any other type of resource**

Reference books for the student: Presentations and pdfs of recommended readings are uploaded to the Studium Platform.

**8.- Assessment**

**8.1: Assessment Criteria:**

**8.2: Assessment Systems:**

The students' participation in theoretical and practical sessions (20% of the final mark) will be evaluated.

Evaluation in writing (80% of the final mark).

**8.3: General Considerations and Recommendations for Assessment and Resit:**

**9.- Weekly Teaching Schedule**