

**SIGNALING BY GROWTH FACTOR RECEPTORS IN CANCER**

**1.- Course details**

Code	303027	Plan		ECTS	3
Type	Elective	Year	2021/2022	Timing	2 <sup>nd</sup> Semester
Department	Cancer Research Center				
Virtual Platform	Platform:	CICLOUD			
	Access URL:	<a href="http://cicloud.dep.usal.es/index.php/s/Gp0vghR305Y6glo/authenticate">http://cicloud.dep.usal.es/index.php/s/Gp0vghR305Y6glo/authenticate</a>			

**Teacher details**

Teacher (Coordinator)	Dr. Dionisio Martín Zanca		
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Center	Institute of Functional Biology and Genomics (IBFG). CSIC/USAL		
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Teacher	Dr. Marina Holgado Madruga		
Department	Physiology and Pharmacology		
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Centre	School of Medicine		
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## 2.- Purpose of the course within the study plan

### Teaching module to which the course belongs

Fourth module out of five comprising the academic year. See the academic calendar of activities.

### Role of the course within the teaching module and study plan

To describe, from a historical perspective, the structure and function of growth factor receptors, their importance in the physiological control of cell proliferation, differentiation and survival, and their deregulation in cancer. To present tyrosine kinase receptors as targets for personalised anti-tumour therapies, with their advantages and limitations.

### Professional profile

Translational research.

## 3.- Preliminary recommendations

None

## 4.- Course objectives

- Acquire knowledge of the biology, structure and function of tyrosine kinase (RTK) receptors and their ligands.

- Acquire knowledge about the role of RTK and RTK-derived oncogenes in cancer.
- Acquire knowledge about the importance of RTKs as targets for anti-tumour treatment.

## 5.- Contents

### Course planning

This course will be taught in English

### Theory classes:

- Growth factors.
- Growth factor families.
- Growth factors in cancer.
- Growth factor receptors.
- Structure of tyrosine kinase receptors. Families.
- Functioning of RTKs. Activation by ligand binding. Dimerization.
- Signal transduction from RTKs to the cell nucleus. Docking proteins
- RTKs as nodes in signalling networks. Cross regulation.
- Negative regulation: dephosphorylation, internalisation, ubiquitination, etc...
- RTKs as a target for anti-tumour therapies. Tyrosine kinase activity inhibitors, antibodies that interfere with RTK activation

**Seminars:**

- The students, in groups of two or three, will choose a recent article directly related to the content of the course, critically analyse its results and conclusions in detail and present it to the rest of the class for approximately one and a half hours

**Bibliography**

Students will be provided with up-to-date bibliography at the beginning of the theory classes.

**6.- Competences to be acquired**

**Basic/General**

- Acquiring basic theoretical and practical knowledge.
- Learning how to prepare and present research seminars, answer questions, comments, etc.
- Resolving problems; helping to prepare seminars, etc.
- Learning to search, select and obtain relevant references, and to critically evaluate research results.

**7.- Teaching methods**

- Students must attend the theory sessions of the course (12 hours) having previously read and understood part of the recommended literature; the active participation of the students in the theory classes will be encouraged.
- Students will be organized in work groups of two or three people for the selection and study of an article from the bibliography directly related to the course content.
- These work groups will present a critical review of the article chosen to the teacher and his or her classmates.
- The rest of the students must attend the above-mentioned presentations and actively participate, in a constructive way, with questions and/or comments. This activity will be evaluated.

**8.- Planned teaching method distribution**

		Teacher-led hours		Hours of independent work	TOTAL HOURS
		Face-to-face	Online		
Master Classes		12	20		32
Practical Training	- In the classroom				
	- In the laboratory				
	- In the computer lab				
	- Fieldwork				
	- Observational (Ob)				
Seminars-Scientific talks					
Presentations and debates		12			12
Tutorials		3			3
Online follow-up activities					
Assignment preparation				27	27
Other activities: Scientific talks					
Exams		1			1
TOTAL		28	20	27	75

## 9.- Resources

Students reference books

Other bibliographical, electronic references or any other type of resource

This will be provided at the beginning of the theory classes.

## 10.- Assessment

The assessment tests that are designed must evaluate whether the described competencies have been acquired. Therefore, it is recommended that when describing the tests, the competencies and learning outcomes that are being assessed be indicated.

Criteria

- Final written exam, 70% of the final mark
- Evaluation of participation in the theory classes and seminars: 30% of the final mark