



## MODULE 5: NEOPLASTIC DISEASES

Code: 43646

Type: Elective

Credits: 6 ECTS

Language: English (75%)/ Spanish (25%)

### Module's Coordinators:

Dr. Josep Roma

✉ [josep.roma@vhir.org](mailto:josep.roma@vhir.org)

**Schedule for mentoring:** Tuesdays, from 4:00-5:00 pm

*Although having this timetable proposal, the **students have to arrange an appointment with the teacher by e-mail.***

## OBJECTIVES

The objectives of this module are:

- to provide the students with sufficient knowledge about the relevant characteristics of the cancer process, including its establishment and progression.
- to distinguish the morphology and patho-physiology, as well as the main molecular alterations of a number of tumor types, all essential elements for the diagnosis and treatment of the disease.

## SKILLS

E01. Identify and use the tools, techniques and methodologies of translational clinical research to solve problems in human health.

E01.18. Learn morphological, imaging, biochemical, genetic, molecular and cellular techniques used in oncology basic research, and their application in clinical pathology.

E01.19. Knowing the state of the art in diagnosis, treatment and outcome of patients with tumors.

E03. Analyze the patho-physiology at the molecular level using the scientific method and identify its relationship with the clinical process of different diseases.

E03.5. Characterize the morphology and patho-physiology of the different types of neoplasia.

E03.6. Identify the most important oncogenic processes to improve the intervention at diagnosis and treatment levels.

## CONTENT

### Lesson 1. Molecular biology of cancer

- 1.1. The Hallmarks of cancer: evading growth suppressors and drivers sustaining proliferative signaling
- 1.2. Cancer cell cycle control, mitotic control and replicative immortality
- 1.3. Invasion and metastasis
- 1.4. Tumor promoted angiogenesis
- 1.5. Autophagy in cancer progression
- 1.6. Cancer cell metabolism (therapeutic opportunities)
- 1.7. Senescence in tumor progression

### Lesson 2. Introduction to neoplastic diseases

- 2.1. Hereditary predisposition to cancer
- 2.2. Pharmacology and antitumor strategies
- 2.3. Clinical diagnosis: Imaging techniques
- 2.4. Diagnosis based on nanotechnology
- 2.5. Alternative therapies: nanotechnology and biological therapy
- 2.6. Alternative therapies: CRISPR and iPSC technology in cancer
- 2.7. Tumor Immunology and immunotherapies
- 2.8. Genome instability, mutations, mechanisms of resistance in chemotherapy, radiotherapy

### Lesson 3. Gastrointestinal tumors

- 3.1. RHO GTPases in gastrointestinal tumorigenesis
- 3.2. Normal stem cells and cancer stem cells
- 3.3. New target-directed therapies for the treatment of colorectal cancer

### Lesson 4. Urologic tumors

- 4.1. Clinical presentation and current diagnostic tools for urologic tumors. Prostate carcinomas: a vision from the clinics in the context of translational research
- 4.2. Prostate cancer: Biomarkers for the early detection and prognosis, strategies for biomarkers search
- 4.3. Advanced metastatic castrated-resistance prostate cancer
- 4.4. Renal cell carcinoma: Guidelines for diagnosis, treatment and monitoring
- 4.5. Renal cell carcinoma: Overview. Clear-cell renal carcinoma (ccRCC): genetic factors, mechanisms of progression and treatments.

### Lesson 5. Gynecologic tumors

- 5.1. Endometrial and ovarian cancer: Update in the classification
- 5.2. Endometrial cancer: From the onset of the tumor to the development of metastasis. Translational research to approach unmet clinical issues.
- 5.3. Breast cancer: Introduction: types, characteristics. Cellular transformation, malignant progression by HER receptors. Mechanisms of resistance to anti-HER therapies.

**Lesson 6. Brain Tumors**

- 6.1. Central Nervous System tumors characteristics.
- 6.2. Treatment of Glioblastomas. Building a clinical research program in GBM

**Lesson 7. Hematologic tumors**

- 7.1. Introduction to hematological malignancies
- 7.2. Progression and pathogenesis of hematological malignancies

**Lesson 8. Childhood cancers**

- 8.1. Introduction to the most common tumours in childhood and adolescence.
- 8.2. Molecular biology of soft tissue sarcomas. The oncogenic role of embryonic signal transduction pathways
- 8.3. Role of microRNAs and epigenetic genes in the behavior of neural tumors
- 8.4. Childhood cancers: Implementation of epigenetic therapies

**METHODOLOGY**

- Theoretical classes
- Making reports/works
- Autonomous study
- Reading articles/reports of scientific interest
- Presentation/ oral defense of works
- Tutorials

**EVALUATION**

Theoretical exam	50%
Oral presentation	40%
Attendance and participation	10%

**Note that:**

- This module does not include a single evaluation system.
- Attending a minimum of 80% of the classes is required for taking the exam and passing the course.

**Second-chance examination:**

- Students who fail the course (grade lower than 5), will be entitled to a second evaluation, provided that they have participated in all the evaluation activities (exam, oral presentation and attendance).
- Second-chance evaluation will consist on a multiple choice exam related to the topics studied during the course.
- Oral presentation and attendance are excluded from second chance examination.

- The maximum grade of the second-chance evaluation will be a pass mark (5).

## TEACHING STAFF

**[Josep Roma Castanyer, PhD – josep.roma@vhir.org](mailto:josep.roma@vhir.org)**

Principal Investigator in Translational Research in Child and Adolescent Cancer Research Group. VHIR.

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Principal Investigator in Translational Research in Child and Adolescent Cancer Research Group. VHIR.

## ACADEMIC SCHEDULE

**Timetable:** Classes will be from November 27<sup>th</sup> to December 17<sup>th</sup> 2024. Exam on January 17<sup>th</sup>, and oral presentations on January 23<sup>rd</sup> and 24<sup>th</sup>.

See complete schedule for exact timetable of classes and exams

[See the Master's Degree Schedule for academic year 2024-2025](#)

**Classroom:**

**Please, check the information board at the Academic Office in order to confirm the classroom before the class starts.**