

**Genetics of Cancer and Oncology**

Code: 101882  
ECTS Credits: 6

Degree	Type	Year	Semester
2501230 Biomedical Sciences	OT	4	0

**Contact**

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**Use of languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

**Teachers**

Rosa Caballín Fernández  
Rosa Miró Ametller  
Jordi Surrallés Calonge  
Alba Hernández Bonilla

**Prerequisites**

To have basic knowledge on Human Genetics.

In order to be able to attend the laboratory classes, it is necessary that the student shows that he/she has passed the biosafety tests that can be found in Campus Virtual. He/she must know and accept laboratory standards of practice from Faculty of Biosciences.

**Objectives and Contextualisation**

The objectives of the course are to show how the acquisition of somatic mutations contribute to tumor growth and how genetic variations contribute to inherited susceptibility to cancer. Some issues such as genomic instability and the types of functional changes that result in tumor growth are addressed. We also discuss the genetic and epigenetic changes in cancer, from the chromosomal scale up to small mutations, with examples of the most common cancers

**Content**

1. What is cancer? Types of tumors. Benign and malignant tumors. Incidence and survival.
2. Characteristics of tumor cells. Cell signalling. Cell cycle control. Angiogenesis. Inactivation of senescence. Apoptosis.
3. Genes and cancer. Oncogenes and tumor suppressor genes. Type and function. Activation / inactivation. Modulators.

4. Epigenetics and cancer. Methylation. Modification of histones. miRNAs. Potential clinical use.
5. Sequencing the cancer genome. Driver and passenger mutations. Number of mutations required. Circo Plots. |
6. Genetic alterations in leukemia and lymphoma.
7. Genetic alterations in common carcinomas.
8. New genetic strategies applied to diagnosis and treatment of cancer.
9. Stability of the genome. DNA repair genes. Chromosomal instability. Telomeres and cancer. Hereditary cancer
10. Repair mechanisms and telomere maintenance as a therapeutic target for cancer.
11. Microsatellite instability, hereditary non polyposis colorectal cancer.
12. Individual genetic susceptibility and cancer. SNPs. Genome-wide association studies.
13. Carcinogenesis. Embryonic stem cells (SCs) and cancer stem cells (CSCs). The cancer stem cell hypothesis
14. Environmental carcinogenesis. Molecular mechanisms of environmental carcinogenesis. Human carcinogens. Transplacental carcinogens.