

Degree	Type	Year
Cytogenetics and Reproductive Biology	OT	0

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## Teaching groups languages

You can view this information at the [end](#) of this document.

## Prerequisites

There are not

## Objectives and Contextualisation

- To recognize cytogenomic alterations related to specific cancer types and to understand their importance for diagnosis and prognostics.
- To explain the molecular bases of breast cancer, including genetic, epigenetic, and hormonal changes, as well as the influence of environmental factors.
- To know the biological effects of ionizing radiation interaction with DNA.

## Competences

- Apply the basic tools of statistical analysis in cytogenetics and reproductive biology.
- Apply the scientific method and critical reasoning to problem solving.
- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Continue the learning process, to a large extent autonomously.
- Design experiments, analyse data and interpret findings.
- Identify and take into account the genetic, epigenetic and hormonal changes involved in the development of cancer in pursuit of a correct diagnosis and prognosis (Specialisation in Cytogenetics).
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Interpret, resolve and report on clinical cases or scientific findings in the area of the master's degree.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Use and manage bibliography or ICT resources in the master's programme, in one's first language and in English.
- Use creative, organisational and analytic skills when taking decisions.

## Learning Outcomes

1. Apply the scientific method and critical reasoning to problem solving.
2. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
3. Continue the learning process, to a large extent autonomously.
4. Describe the importance of chromosomal and molecule alterations in the diagnosis of certain cancers and their prognosis factor.
5. Design experiments, analyse data and interpret findings.
6. Explain the biological effects of the interaction of ionising radiations with DNA.
7. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
8. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
9. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
10. Use and manage bibliography or ICT resources in the master's programme, in one's first language and in English.
11. Use creative, organisational and analytic skills when taking decisions.
12. Use statistical methods to estimate, through biological methods, the dose of exposure to ionising radiation.
13. Write articles or report scientific findings in the area of cancer or radiobiology.

## Content

### Part 1: Cancer Genetics: Solid Tumors

The unstable genome of the tumor cell. Cancer genomics. Patterns of intratumoral heterogeneity. Cancer treatment in the era of personalized medicine. Detection of changes in the genome of tumour cells and identification of the genetic cause in families with hereditary cancer syndromes. Noninvasive genetic diagnosis of solid tumors.

### Part 2: Cancer Genetics: Hematologic Neoplasms

Genetics and cytogenetics of haematological neoplasms: acute leukaemias, chronic leukaemias and lymphomas. Detection of genetic and cytogenetic changes in hematological malignancies.

### Part 3: Molecular Mechanisms of Cancer: The Breast Cancer Model

Cancer and the molecular mechanisms involved: breast cancer. Embryology, morphology and physiology of the normal breast and changes in breast cancer. Genetic and epigenetic factors. Endocrine factors and mechanisms of hormonal action. Environmental factors and lifestyle. Clinical bases of breast pathology, metastasis. Biological prognostic factors. Hereditary breast cancer and prevention.

### Part 4: Radiobiology

Biological dosimetry (chromosomal alterations and analysis techniques, dosimetric curves, partial irradiation). Radiation-induced genetic instability. Modulating factors of radiosensitivity. Aging and radiosensitivity.

## Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Master classes	40	1.6	1, 4, 6, 8, 7, 9, 10
Type: Supervised			
Homework presentation and scientific articles discussion	17	0.68	1, 5, 11, 13, 2, 7, 3, 10, 12
Type: Autonomous			
Scientific papers reading and study	82	3.28	7, 3, 10

The teaching methodology will consist of:

- 1.- Theoretical lessons.
- 2.- Classroom practices
- 3.- Discussion of scientific papers. Students must have read the papers beforehand to discuss them in class.
- 4.- Presentation of assignments

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

## Assessment

### Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Attendance and active participation	10%	3	0.12	1, 4, 5, 6, 11, 13, 8, 2, 7, 3, 9, 10, 12
Examination	27%	4	0.16	4, 6, 8, 2, 9, 10
Homework presentation	63%	4	0.16	1, 4, 5, 6, 11, 13, 8, 2, 7, 3, 9, 10, 12

To pass the subject, a minimum mark of 5 out of 10 is required. The final grade will be obtained by taking the weighted average of the different tests according to the weight of the teaching in each lesson. This weight will be maintained for the establishment of the final score, considering that attendance and active participation represents 10% of the final grade of each subject. The evaluation will consist of different types of tests: exams, preparation, and presentation of assignments and/or the resolution of problems and questions.

The students that did not pass, have the opportunity of a retake that will consist of a written exam, where the three topics will be weighted in a balanced way. To participate in the retake, the students must have been previously evaluated in a set of activities whose weight equals a minimum of two-thirds of the total grade of the subject or module. Therefore, students will obtain the "No Evaluable" qualification when the assessment activities carried out have a weight less than 67% in the final mark.

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## Software

Web-based CNAApp and MUSICA tools

## Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAULm) Classroom practices (master)	1	Catalan	first semester	morning-mixed
(PLABm) Practical laboratories (master)	1	Catalan	first semester	morning-mixed
(TEm) Theory (master)	1	Catalan	first semester	morning-mixed