

**Cytogenetics**

Code: 101888

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**

Zaida Sarrate Navas

**Prerequisites**

Knowledge required:

1. Understand the basics of the subjects: "Cell Biology and Histology" and "Genetics".
2. Understand specific aspects of these subjects: Mendelian principles, chromosome theory of inheritance, the flow of genetic information, cell cycle principles and mechanisms of cell division.
3. Read correctly in English.
4. Use at the user level, basic computer tools (Internet, PowerPoint and Word Processor)

**Objectives and Contextualisation**

Cytogenetics is a hybrid discipline that draws on concepts of Cell Biology and Genetics. The convergence of issues from these areas has contributed to the development of a modern and dynamic science that has as a main objective the study of the chromosome.

The progress of this discipline has been characterized by the combination of conventional and modern techniques, as well as a continuous exchange between the development of new methods and the formulation of new hypotheses. This has significantly improve the understanding of the chromosome, providing a dynamic conception of this cell structure and developing to the limits the structure-function binomial.

In recent years, the consolidation of Cytogenetics has resulted in an alive discipline, approaching the borders to other disciplines with significant repercussions and applications in human health, agriculture and evolution.

In this context the objectives of the subject are:

1. To offer a comprehensive view into the structure and behavior of chromosomes to guarantee the preservation of genetic information, its transmission from parents to children and gene expression.

2. To study chromosomes variations, from the mechanisms that originate them to the genetic consequences for the offspring.
3. To perform a comprehensive analysis about the cytogenetics applications in human health, agricultural genomics and speciation studies

## **Content**

### **PART I: ORGANIZATION OF HEREDITARY MATERIAL IN HIGHER EUKARYOTES**

Chapter 1. General introduction

Chapter 2. The eukaryotic chromosome

### **PART II: CHROMOSOMES AND CELL DIVISION**

Chapter 3. Mitotic cell division

Chapter 4. Meiotic cell division

### **PART III: SPECIALIZED CHROMOSOMES**

Chapter 5. Adaptational forms of normal chromosomes

Chapter 6. Permanently specialized chromosomes

### **PART IV: TECHNIQUES FOR CHROMOSOME IDENTIFICATION AND ANALYSIS**

Chapter 7. Generalities of the cytogenetic analysis protocols

Chapter 8. Chromosome identification techniques

### **PART V: GENETIC AND EPIGENETIC ANOMALIES**

Chapter 9. Alterations of the karyotype

Chapter 10. Chromosome structural anomalies

Chapter 11. Chromosome numerical anomalies

Chapter 12. Epigenetic anomalies

### **PART VI: CYTOGENETICS APPLICATIONS**

Chapter 13. Applications in speciation studies

Chapter 14. Applications in human health

Chapter 15. Applications in plant breeding