

Cytogenetics

Code: 100761
ECTS Credits: 6

Degree	Type	Year	Semester
2500250 Biology	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 EUCARYOTES

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