

Genomics, Proteomics and Interactomics

Code: 100792
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: No
Some groups entirely in Spanish: No

Teachers

Víctor Gámez Visairas
Alicia Roque Cordova

Prerequisites

Although there are no official requirements students are assumed knowledge of Biochemistry and Molecular Biology, Genetics, Microbiology, Cellular Biology, Methods of recombinant DNA and Statistics.

For some activities a basic level of English is necessary.

Objectives and Contextualisation

Genomics is the science that studies the structure, content and evolution of genomes. It is a relatively new science (born in 1995 with the sequencing of the first bacterial genomes) and has developed explosively during recent years. The development of automatic methods for genome sequencing has been key. In 2001 the first draft of the Human genome was presented, it represented a historic landmark which opened the doors to studies in comparative genomics and evolution of humans, the biological components of human kind, genotype-phenotype association studies for the discovery of gens or genetic regions related with illnesses, etc.

After the sequencing of whole genomes appears the "postgenomic" era. The aim is to conduct a massive analysis of the expression of genes and genomes (Transcriptomics and Functional Genomics), the identification and structural and functional analysis of proteins (Proteomics) and their interactions (and with other biomolecules) and the formation of complexes (Interactomics). In conjunction and with the identification and quantification of all the metabolites present in a sample of the organism (Metabolomics) this knowledge give rise to the bases to integrate all the data and reach a global description of the biology of the cell (Systems Biology).

The main objectives of this course are: the understanding of the diversity and complexity of genomes and proteomes; the study of the historic and evolutive characteristics of genetic information and the nature, meaning and consequences of intraspecific and interspecific variability; and finally the potential applications of genomics, transcriptomics and proteomics data. It is also an objective learn the experimental and computational methods used in the so-called "omic" sciences.

Content

Aims of Genomics. Introduction to genomes. Recombination and linkage maps. Physical and sequencing maps. Sequencing technologies. The human genome. Functional genomics /Transcriptomics. Comparative genomics. Nucleotidic and structural variability. Transposable Elements. Proteomics. Diversity and location of proteins. Experimental and bioinformatics methods in Proteomics. Functional and structural proteomics. Interactomics. Strategies for the visualization of proteins and their ligands in vivo.