

Genomics, Proteomics and Interactomics

Code: 100893
ECTS Credits: 6

Degree	Type	Year	Semester
2500252 Biochemistry	OB	3	2

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

Barbara Negre de Bofarull

Prerequisites

Although no previous formal requirements have been set, basic knowledge is expected on Biochemistry and Molecular biology, Genetics, Microbiology, Cell biology, Methods on recombinant DNA and Statistics.

For certain activities a basic level of understanding for reading english is required.

Objectives and Contextualisation

Genomics is the science dealing with the structure, content and evolution of genomes. Is a relatively novel science (we can say that it was born in 1995 with the sequencing of the first bacterial genomes) that developed explosively in the last years. The development of methods for automatic sequencing of nucleic acids has been a key factor about. In 2001 the first draft of the sequence of the human genome was presented, a historic milestone that opened the doors for the studies on comparative genomics and the evolution of the human species, on the biological clues of the human nature, on the genotype-phenotype association studies to find genes or regions of DNA related with diseases, etc.

After the sequencing of genomes appeared the so called "postgenomic" period. Among its tasks are the analyses of genes and genomes expression in a massive way (Transcriptomics and Functional Genomics), the identification and structural-functional analysis of proteins (Proteomics), and of their interactions (and with the other biomolecules) and formation of complexes (interactomics). Together with the identification and quantitation of all the metabolites present in a sample of an organism (Metabolomics), such knowledge provides the basis to try the integration of the whole conjoint and reach a global description of the biology of the cell (Systems biology).

The main formative goals of the subject are : the understanding of the diversity and complexity of genomes and proteomes; the study of the historic and evolutionary character of the genetic information as well as its nature, the meaning and consequences of the intraspecific and interspecific variability; and finally the potentiality of the applications that come from the genomic, transcriptomic and proteomic information. It is also part of the subject to know the experimental and computational methods that are used in the so-called "omic" sciences.

Content

GENOMICS

- Introduction to genomes
- Genetic and physical maps
- Sequencing, assembly and annotation of genomes
- Transcriptomics
- The human genome
- Comparative genomics
- Nucleotide and structural variation

PROTEOMICS AND INTERACTOMICS

- Proteomics: Basic introduction
- Experimental and bioinformatic methods in proteomics
- Proteomics of identification, functional proteomics and structural proteomics
- Interactomics
- Applications of proteomics and interactomics
- (Metabolomics, Systems biology and other "omics")