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Instituto Superior de Agronomia
Universidade Técnica de Lisboa

Code: Molecular and Cellular Biology

Degree: Licenciatura in Biology

Curricular Year: 1st **Annual Course** – Compulsory

12 ECTS - 2,5 Theoretical + 2,5 Experimental hours

Estimated Workload: 336 Hours

Coordinator: Wanda Viegas

Lecturer(s): Wanda Viegas; Jorge Pinto de Almeida; Glória Esquível

Objectives: The core material focuses on function at a molecular level: the structure and regulation of genes, and the structure and synthesis of proteins; how these molecules are integrated into cells; and how cells are integrated into multicellular systems and organisms.

Programme:

Molecular Biology
Basic genetic mechanisms – flow of information
Chemical and physical structure of the DNA /chromatin. The cell genome.
Gene expression – transcription and transcriptome; protein synthesis and folding.
Processes of transmission and maintenance of genetic information: DNA replication and genetic mechanisms of DNA repairing.
Mechanisms of genome innovation: origin and types of mutations; molecular mechanism of homologous recombination; transposable elements.
Technology of recombinant DNA
Mechanisms of regulation of gene expression

Cell Biology
Eucaryotic cell organelles and cellular structures: chemical composition and structure of biomembranes; biomembranes trafficking in the endomembraneous system; the spatial organization of the cytoplasm through the cytoskeleton .
Eucaryotic cell compartimentation and protein trafficking. Protein degradation pathways.
Biogenesis, structural and functional organization of mitochondria, plastids and peroxisomes.
Nuclear structure and functions: nuclear compartments; chromatin and chromosomes organization
Comparative genome organization
Fundamental processes in cell biology: Cell signalling and communication; cell division and cell cycle; origin and establishement of germ cells; oncogenesis; cell death and apoptosis;

Bibliography

Main Bibliography
Alberts, B. Bray, D. Lewis, J Raff, M. Roberts, K. Watson, J., 2002. Molecular biology of the cell. Garland Publishing, Inc., New York

Other Bibliography
Selected papers from Current Opinion in Cell Biology

Assessment
Continuous evaluation is compulsory:
Four global examinations in each semester
Direct evaluation each two weeks
Written and oral presentation of scientific papers