UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

CITOGENETICS AND CHROMOSOMIC ENGENEERING

Enrollment year	2020/2021
Academic year	2021/2022
Regulations	DM270
Academic discipline	BIO/18 (GENETICS)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	EXPERIMENTAL AND APPLIED BIOLOGY
Curriculum	Scienze biomediche molecolari
Year of study	2°
Period	1st semester (01/10/2021 - 14/01/2022)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	RAIMONDI ELENA MARIA CLOTILDE (titolare) - 6 ECTS
Prerequisites	Knowledge of the basics of Genetics and Molecular Biology.
Learning outcomes	Knowledge of the structure and organization of the genome of higher eukaryotes. Epigenetic control of gene expression. Concepts and methods for the dissection of the eukaryotic chromosome in its functional elements. Construction of eukaryotic artificial chromosomes and their applications.
Course contents	Supercoiling of the DNA in the eukaryotic chromosome. The functional state of the chromatin: loop structure. Chromosome banding and compositional mapping (isochores). In vitro somatic cell cultures. Point mutations, genomic mutation, chromosome mutations. Main chromosome syndromes. Gene mapping in man: pedigree analysis, somatic cell hybridisation, radiation hybrids, in situ hybridisation (FISH). Multi-colour FISH. Comparative genomic hybridisation (CGH).

	Chromosome isolation and construction of chromosome specific DNA libraries. Epigenetic regulation of gene function. Gene dosage compensation and sex determination. Genomic imprinting. Dynamic mutation and dynamic mutation syndromes. Genome plasticity. DNA sequences mediating genome plasticity. Genomic disorders. Genome plasticity and genome evolution: conserved synteny blocks. Genome instability in cancer. Dissection of the eukaryotic chromosome. Centromere, telomeres and replication origins. Reconstruction of eukaryotic chromosomes. Construction of mammalian artificial chromosomes: bottom-up vs. top-down approach. Model artificial chromosomes. Gene therapy. Cancer gene therapy. Stem cells and cloning of organisms. Nuclear reprogramming: induced pluripotent stem cells (IPS).
Teaching methods	Lectures
Reccomended or required readings	Reference books: Klug W.S. ed altri (2007), Concetti di Genetica, ed. Pearson Prentice Hall Mc Conikey (1997), Genetica Umana (una prospettiva molecolare), ed. Zanichelli Peter Sudbery (2000), Genetica Molecolare Umana, ed. Zanichelli Students also will be delivered scientific reviews on specific topics and all the slides of the course.
Assessment methods	The exam is oral and consists of the discussion of a scientific paper on one of the topics covered during the course, followed by conventional query on the entire program.
Further information	The exam is oral and consists of the discussion of a scientific paper on one of the topics covered during the course, followed by conventional query on the entire program.
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile