



UNIVERSITÀ DEGLI STUDI DI PALERMO

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| DEPARTMENT | Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche |
| ACADEMIC YEAR | 2023/2024 |
| MASTER'S DEGREE (MSC) | MOLECULAR AND HEALTH BIOLOGY |
| SUBJECT | MOLECULAR GENETICS |
| TYPE OF EDUCATIONAL ACTIVITY | B |
| AMBIT | 50507-Discipline del settore biomolecolare |
| CODE | 94412 |
| SCIENTIFIC SECTOR(S) | BIO/18 |
| HEAD PROFESSOR(S) | LENTINI LAURA Professore Associato Univ. di PALERMO |
| OTHER PROFESSOR(S) | |
| CREDITS | 6 |
| INDIVIDUAL STUDY (Hrs) | 100 |
| COURSE ACTIVITY (Hrs) | 50 |
| PROPAEDEUTICAL SUBJECTS | |
| MUTUALIZATION | |
| YEAR | 1 |
| TERM (SEMESTER) | 2° semester |
| ATTENDANCE | Mandatory |
| EVALUATION | Out of 30 |
| TEACHER OFFICE HOURS | LENTINI LAURA Thursday 15:00 17:00 Sede del Consorzio Universitario, corso Vittorio Emanuele, 92, 93100 Caltanissetta Friday 11:00 13:00 Studio docente e Aula Microsoft Teams Dip. STEBICEF, viale delle Scienze, Ed.16 , piano -1. |

DOCENTE: Prof.ssa LAURA LENTINI

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| PREREQUISITES | Basic Genetics |
| LEARNING OUTCOMES | <p>Knowledge and understanding: acquisition of terminologies and methodological elements at the base of molecular genetic approaches for the subsequent understanding of cellular pathways under genetic control.</p> <p>Ability to apply knowledge and understanding: to be able to understand the "rationale" of molecular genetics experiments. Ability to collect, interpret and process, scientific data derived from the study of scientific papers that use their own methods of molecular genetics. Problem solving abilities.</p> <p>Making judgments: to be able to integrate knowledge of the experimental data and synthesis presented in scientific papers.</p> <p>Communication skills: to be able to work in a team, ability to present scientific arguments and their conclusion orally and in writing to specialist and nonspecialist audiences.</p> <p>Learning skills: ability to learn autonomously the technical and methodological approach in molecular genetic research by making use of their knowledge or of scientific sources.</p> |
| ASSESSMENT METHODS | <p>The evaluation will be made by a final oral (or written alternatively). The final will be comprehensive and will cover material from the entire course. The assessment will take into account the level of knowledge of the topics treated during the course and skills reasoning demonstrated during the examination.</p> <p>In detail:</p> <p>Insufficient- the student does not possess the basic knowledge of Genetics' topics.</p> <p>18-21- limited knowledge of basic subjects associated with fragmentary and incomplete exposure.</p> <p>22-25- mastery of only basic issues associated with discrete scientific language abilities.</p> <p>26-29- more than good grasp of the topics covered in the course, full of scientific language</p> <p>30-30 cum laude- excellent mastery and ability to present the arguments demonstrating excellent reasoning skills, good mastery of scientific language.</p> |
| EDUCATIONAL OBJECTIVES | <p>The course will focus on recent advances in Genomics and cancer molecular genetics and other pathological conditions (genetic diseases). Specifically, they will be addressed genetic factors with respect to altered genes and cellular pathways that control correct cell proliferation. Reading material is taken from the primary literature.</p> <p>The course includes lab activity focused on molecular genetic techniques.</p> |
| TEACHING METHODS | Frontal lessons and lab activity. |
| SUGGESTED BIBLIOGRAPHY | <p>Tom Strachan & Andrew Read: Genetica umana molecolare. Ed. Zanichelli, 2021 ISBN: 9788808520302.</p> <p>Terry A. Brown Biotecnologie molecolari Ed. Zanichelli ISBN:978990849991-2.</p> <p>Durante il corso vengono forniti agli studenti i necessari strumenti per lo studio della disciplina; in particolare vengono fornite dal docente le presentazioni in Power Point, files multimediali e articoli scientifici pdf.</p> |

SYLLABUS

| Hrs | Frontal teaching |
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| 4 | Analysis of the structure of genes, chromosomes and genomes. Gene function in the postgenomic Era. |
| 8 | Genetics in the post-genomic Era: Structural, comparative and functional genomics (transcriptome and proteome). -Two channels microarray and gene-chips and application in scientific studies. Interpretation of microarray data. CGH array. -Organization of the human genome: gene structure, genomic polymorphisms: SNPs, RFLP, VNTR, STRs. Haplotype. -Pharmacogenomics. |
| 4 | The cell cycle: Cyclins and CDKs, regulation and analysis of the cell cycle checkpoints. Role of pRB and TP53 tumor suppressors in genomic instability. Viral oncoproteins of DNA viruses (E6-E7; E1A-E1B; LargeTag) their cellular targets and checkpoints. |
| 2 | The ATM gene, CHK1 CHK2 effectors and their function in the cell cycle checkpoints |
| 2 | Role of cyclin-dependent kinases inhibitors (CDKIs) p21 and p16. The ARF locus. Relationship between ARF and MDM2. The pathway: E2F1, p14 / 19ARF. |
| 10 | Genetics and genomics of cancer: The origin of cancer: mutations in oncogenes (activation) / tumor suppressor genes. -Carcinogenesis and tumor progression models (retinoblastoma, colorectal, head / neck). Cancer stem cells |
| 6 | Hippo pathway: LATS1 / 2 genes, the role of the Hippo protein pathway in response to antimetabolic drugs (coactivator TAZ) (experiments). |
| 6 | Human genetic diseases models: cystic fibrosis, muscular dystrophy, Huntington's chorea. Gene therapy |

SYLLABUS

| Hrs | Frontal teaching |
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| 2 | Gene Therapy |

| Hrs | Workshops |
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| 6 | Lab activity: Genotyping of wild-type and mutant alleles in CF murine genomic DNA by PCR analysis. Transfection of engineered vectors in human cells. |