

MOLECULAR ONCOLOGY MASTER - EDITION 2021-2022	
SUBJECT	CLASS
MOLECULAR BASIS OF CANCER	Eukaryotic cell
	The carcinogenesis process. Normal cells vs tumor cells
	The human genome: genes and genetic code
	Epigenetics and Cancer
	Regulation of gene expression
	Regulation of gene expression by nuclear receptors
	Metabolism, mitochondria and Cancer
	Stem cells and Cancer stem cells (CSC). Cell reprogramming: iPs
	Genes and Cancer I. Proto-oncogenes and oncogenes: discovering viral and human oncogenes
	Genes and Cancer II. Suppressor genes and genetic predisposition to cancer
	Mutations and DNA repair mechanism
* PROTO ONCOGENES AND ONCOGENES	Main signalling pathways in Molecular Oncology
	Oncogenes that code for growth factors and tyrosine-kinase receptors
	The HER/c-ERBB family. Biology and implication in breast cancer
	Oncogene RAS family, its adaptors and effectors
	Cell Cycle: retinoblastoma, cyclins, CDKs and cancer
	The MYC gene family
	Mitogen signal transduction. RET and the multiple endocrine neoplasia
	Fusion gene BCR-ABL and other fusion oncogenes in myeloide leukemia
	Interpretation of cancer genomes
	Computational analysis of mutations in human tumours. Therapeutic implications.
TUMOR SUPPRESSOR GENES	
	The PI3K-PTEN-AK-mTOR pathway: survival and cell growth
	PI3K and breast cancer
	Genetic basis of hereditary breast and ovarian cancer
	TGF-beta: carcinogenesis effects
	TGF-beta and gliomas
	Hedgehog pathway and cancerogenesis
	Tumor suppressor and senescence
	Gene suppressor APC and the Wnt/beta-catenin pathway
	DNA repair genes. Mutator phenotype and epigenetics
	The gene TP53: structure and biological activity. The TP53-MDM2-1RF pathway
	TP53: mutations and their effects
	Hypoxia and Cancer. Suppressor gene VHL
	The Notch pathway in cancerogenesis
	The Hippo pathway and cancer
CELLULAR PROCESSES INVOLVED IN CARCINOGENESIS	
	Molecular basis of metastasis
	Brain Metastases
	Cell adhesion and cancer: E-cadherina. Epitilium-mesenchyme transition
	Tumor stromma
	Cell migration: Integrins, c-MET
	Microenvironment and metastasis
	Cancer immunology
	How the tumors evade the immune response?
	Inflammation and Cancer
	Apoptosis, necrosis, autophagy and cancer
	Cannabinoids and cancer
	Autofagy and cancer
	Angiogenesis and tumoral lymphangiogenesis
	Mechanism of action of the antiangiogenic agents
	Cancer Stem Cells (CSC) in colorectal cancer. Organoids.
* MOLECULAR PATHOLOGY	
	The future of Molecular Pathology
	Introduction to molecular pathology
	Introduction to special techniques in histopathology
	Introduction to Molecular Pathology 2. Markers for immunotherapy in cancer
	Introduction : Techniques based on DNA analysis

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MOLECULAR PATHOLOGY TECHNIQUES	Introduction to new generation sequencing techniques (NGS)
	Introduction. Techniques based on RNA analysis
	MicroRNAs and ncRNAs: Increasing the possibility for Personalized Medicine in Cancer
	Epigenetics
	Introduction to Proteomics
	Stratified Medicine (Biomarkers) or Personalized Medicine (Model-omics)?
	Biobanks: an old activity and a new discipline
	Discovering genetic biomarkers for personalized cancer therapy
	Evaluation of the prognostic value of a marker. Survival Analysis. Modeling Disease Progression
	Flow Cytometry
MOLECULAR PATHOLOGY IN THE CLINIC OF SOLID TUMOURS	Gynecological tumors
	Molecular stratification of breast cancer
	Molecular Pathology of ovarian cancer
	Molecular Pathology of endometrium cancer
	Molecular pathology of breast cancer
	New molecular targets and new drugs in metastatic breast cancer
	Sarcomas
	Cytogenetic markers in solid tumours
	Sarcoma
	Lung cancer
	Molecular Pathology of Lung Cancer
	Targeting mutant cancers: an urgent medical need
	Melanoma
	Molecular biology of melanoma
	Melanoma, molecular diagnosis
	Advances in the treatment of melanoma
	Animal models and resistance in melanoma
	Colorectal cancer
	Colorectal Cancer: towards a molecular classification
	Bladder cancer
	Bladder cancer: molecular pathology
	Renal cancer
	Relationship between VHL, hypoxia and renal cancer
	Genomics of renal cancer: intratumoral heterogeneity and therapeutic implications
	Central nervous system
	CNS: Glial Tumors
	Pediatric Gliomas: Genetic and Biology of the disease
MOLECULAR PATHOLOGY IN THE CLINIC OF HEMATOLOGICAL TUMORS	Endocrine tumors
	Molecular Pathology of Endocrine Tumors
	Pancreas cancer
	Short update in pancreatic cancer
	Pancreas cancer
	Advanced cancer: therapy selection based on mutations
	Challenges and opportunities in the integration of omics data in epidemiological studies
	Pancreatic ductal adenocarcinoma
	Molecular classification of haematological malignancies
	T-cell lymphomas

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METHODOLOGY IN CLINICAL RESEARCH IN ONCOLOGY	Epidemiological method
	Scientific information and documentation
	Measures of disease frequency
	Biostatistics applied to clinical trial design
	Principles and foundations for research ethics
	Informed consent
	Methodology and application in clinical research
	Clinical Trials in Oncology - Case Studies
	Use of biological material in clinical protocols. Creation of diagnostic kits
	Histopathology and pharmacodynamics in treatment with molecular design agents
	Antibody engineering for therapeutic use
	The contribution of molecular biology to clinical decision-making
RISK FACTORS IN NEOPLASIAS	Carcinogenic risk factors. Diet and Tobacco.
	Alcohol and carcinogenesis. Molecular Mechanisms
	Ionizing Radiation. Effect of Low Doses. Modifying factors.
	Virus and other infectious agents, and Cancer
	Human exposition to endocrine disruptors and cancer
	Mechanism of estrogen action
	Carcinogens: disruption of DNA tuning
	Introduction to familial cancer. Entities with demonstrated mendelian inheritance
	Molecular Diagnosis. Diagnostic strategies.
	Genetic counseling in familial cancer. Diagnostic problems
	Occupational factors and cancer
	Practical management of family cancer in an oncology practice
	Obesity and cancer. Current epidemiological data.
	Cancer prevention
	Microbiota and cancer
PHARMACOLOGY AND ANTI-TUMOUR AGENTS	Introduction to drug discovery and development
	Current state of lung cancer treatment: Conventional chemotheapies vs new targeted therapies
	Treatment with immunostimulatory antibodies
	Genetic Therapy: antitumoral virotherapy in the clinic
	New concepts for the design of antitumoral inhibitors of the Ras-ERK pathway
	Approach to tumours of the endocrine system from molecular alterations to treatment selection
	Potential of the cell cycle regulators in the design of therapeutic drugs
	Molecular evolution and clinical implications of prostate cancer
	Role of the antiangiogenic therapy in tumoral progression and metastasis
	TP73 as a therapeutic target
	Anti-tumor strategies based on the redirection of immune system effector cells
	Stromal fibroblasts as a possible anti-tumour target
	Lipid metabolism as a therapeutic target in cancer. Role of therapeutic nutritional supplements as metabolic modulators.
NEW MOLECULAR THERAPIES	Keynote Session: From molecular oncology to personalized therapies: Changes in the clinical practice
	Vitamin D and Cancer: Mechanism and Possibility of clinical use
	Selective metastatic CXCR4+ stem cell removal for the prevention of metastasis in human colorectal cancer
	Embryonic reprogramming and Cancer
	Molecular biology behind the modulation of cellular radiosensitivity
	Drugs blocking oncogenic stimulation
	Apoptosis regulation in chronic lymphatic leukemia. New therapeutic targets.
	Extracellular matrix, tumoral stroma and chaperones as drug targets
	New molecular therapies in pancreatic cancer
	Discover, validate and transfer to the clinic therapeutic targets in sarcomas
	Energy protein metabolism: Rising targets in antitumoral therapy
	Anti-tumor treatment with transgenic CRT
	Analysis of the extracellular genetic material circulating in the blood
	CART immunotherapy in solid tumours
	Biomarkers in immunotherapy. Immunomonitoring.

Note: The academic content is preliminary and can be subject to changes