

COURSE OF MEDICINE AND SURGERY
Student Handbook a.y. 2014-2015

GENERAL PATHOLOGY AND PHYSIOPATHOLOGY

III Year	Scientific Field	DISCIPLINE	TUTOR
General Pathology and Physiopathology ECM 14 Coordinator Roberto Bei	MED/04	<i>General Pathology and Physiopathology</i>	Roberto Bei
	MED/46	<i>Technical Sciences of Laboratory Medicine</i>	Vittorio Manzari
	MED/04	<i>General Pathology and Physiopathology</i>	Andrea Modesti
	MED/04	<i>General Pathology and Physiopathology</i>	Giulia Donadel
	MED/04	<i>General Pathology and Physiopathology</i>	Camilla Palumbo

Specific aims

This discipline studies the causes and mechanisms of diseases. The course program provides students with opportunities to elucidate the mechanisms and origins of human diseases at fundamental levels emphasizing systemic processes based on molecular and cellular pathologic events.

PROGRAM

General Pathology

Genetic disorders: mutations, mendelian disorders, disorders with multifactorial inheritance, normal karyotype, cytogenetic disorders, single-gene disorders with nonclassic inheritance. Diagnosis of genetic diseases.

Infectious diseases: general principles of microbial pathogenesis. Viral infections. Bacterial infections. Fungal infections. Parasitic infections.

Environmental pathology: recognition of occupational and environmental diseases. Mechanisms of toxicity. Phase I reactions. Common environmental and occupational exposures. Personal exposures: tobacco use, alcohol abuse, therapeutic drugs, outdoor air pollution, industrial exposures, agricultural hazards, natural toxins. Radiation injury: ionizing radiation, ultraviolet radiation. Physical environment: mechanical force, thermal injuries (hyperthermia. Hypothermia). Electrical injuries. Decompression (caisson) disease.

Cellular adaptations, cell injury, and cell death: cellular responses to stress and noxious stimuli. Cellular adaptations of growth and differentiation: hyperplasia, hypertrophy, atrophy, metaplasia. Overview of cell injury and cell death: causes of cell injury. Mechanisms of cell injury. Reversible and irreversible cell injury. Morphology of cell injury and necrosis. Examples of cell injury and necrosis: ischemic and hypoxic injury, ischemia-reperfusion injury, chemical injury. Apoptosis: causes of apoptosis, morphology, biochemical features of apoptosis, mechanisms of apoptosis, examples of apoptosis.

Subcellular responses to injury: lysosomal catabolism (heterophagy, autophagy); hypertrophy of smooth endoplasmic reticulum; mitochondrial alterations; cytoskeletal abnormalities. Intracellular accumulations: lipids, proteins, hyaline change, glycogen, pigments (exogenous pigments, endogenous pigments); pathologic calcification (dystrophic calcification and metastatic calcification). Thesaurismosis.

Cellular aging: structural and biochemical changes with cellular aging, replicative senescence, genes that influence the aging process, accumulation of metabolic and genetic damage.

Amyloidosis

COURSE OF MEDICINE AND SURGERY
Student Handbook a.y. 2014-2015

General features of inflammation:

Acute inflammation: historical highlights, stimuli for acute inflammation; vascular changes (changes in vascular flow and caliber, vascular leakage); cellular events: leukocyte extravasation (leukocyte adhesion and transmigration) and phagocytosis. Adhesion molecules involved in the inflammatory response. Chemotaxis. Defects in leukocyte functions.

Chemical mediators of inflammation: vasoactive amines, plasma proteins, arachidonic acid metabolites: prostaglandins, leukotrienes, and lipoxins, platelet-activating factor (PAF), cytokines and chemokines, nitric oxide (NO), lysosomal constituents of leukocytes, oxygen-derived free radicals, neuropeptides. Disorders of the complement system.

Outcomes of acute inflammation. Morphologic patterns of acute inflammation

Chronic inflammation: causes of chronic inflammation, morphologic features, mononuclear cell infiltration, cells in chronic inflammation. Granulomatous inflammation, lymphatics in inflammation.

Systemic effects of inflammation, consequences of defective or excessive inflammation.

Tissue renewal and repair. Regeneration, healing, and fibrosis: Definitions. Control of normal cell proliferation and tissue growth. Mechanisms of tissue regeneration. Extracellular matrix and cell-matrix interactions. Repair by healing. scar formation and fibrosis. Cutaneous wound healing, fibrosis.

Overview of repair responses after injury and inflammation

Thermoregulation: Neurophysiology of thermoregulation. Body's thermoregulatory set-point. Pirogens. Fever. Types of fevers.

Neoplasia: Definitions. Nomenclature of tumors. Biology of tumor growth: benign and malignant neoplasms. Differentiation and anaplasia, rates of growth, cancer stem cells and cancer cell lineages.

Epidemiology: cancer incidence, geographic and environmental factors, genetic predisposition to cancer, chronic inflammation and cancer, precancerous conditions.

Molecular basis of cancer: essential alterations for malignant transformation, the normal cell cycle, self-sufficiency in growth signals: oncogenes. Insensitivity to growth inhibitory signals: tumor suppressor genes. Retinoblastoma as a paradigm for the two-hit hypothesis of oncogenesis. Selected tumor suppressor genes involved in human neoplasms. p53: guardian of the genome. Evasion of apoptosis. DNA repair defects and genomic instability in cancer cells. Limitless replicative potential: telomerase. Development of sustained angiogenesis. Invasion and metastasis. Stromal microenvironment and carcinogenesis. Dysregulation of cancer-associated genes.

Molecular basis of multistep carcinogenesis gatekeeper and caretaker genes. Tumor progression and heterogeneity.

Carcinogenic agents and their cellular interactions: chemical carcinogenesis, metabolic activation of carcinogens. Molecular targets of chemical carcinogens. Major chemical carcinogens. Radiation carcinogenesis: ultraviolet rays, ionizing radiation.

Microbial carcinogenesis: oncogenic DNA viruses, oncogenic RNA viruses. Host defense against tumors: tumor immunity, tumor antigens, antitumor effector mechanisms. immune surveillance. Effects of tumors on the host local and hormonal effects.

PROGRAM
Physiopathology

Hemodynamic disorders, thromboembolic disease, and shock: Edema. Hyperemia and congestion. Hemorrhage. Hemostasis and Thrombosis. Embolism. Infarction. Shock.

Heart physiopathology: heart failure, cardiac hypertrophy: pathophysiology and progression to failure. Ischemic heart disease. Angina pectoris. Myocardial infarction.

Hypertension. Atherosclerosis: risk factors for atherosclerosis, pathogenesis.

Red blood cell disorders: Anemia, Classification of Anemia, Acute Blood Loss Anemia, Decreased Red Blood Cell Production, Ineffective Red Cell Production, Hemolytic Anemias.

Bleeding Disorders: Hemorrhagic diatheses. Hemostatic Disorders of Blood Vessels, Platelet Disorders
Coagulopathies, Hypercoagulability

COURSE OF MEDICINE AND SURGERY
Student Handbook a.y. 2014-2015

PROGRAM
Technical Sciences of
Laboratory Medicine

Diseases of white blood cells: leukopenia. Neoplastic proliferations of white cells.
Lung physiopathology: Atelectasis. Obstructive pulmonary diseases.
Gastrointestinal tract physiopathology.
Liver physiopathology: general features of hepatic diseases. Patterns of hepatic injury. Hepatic failure. Cirrhosis. Portal hypertension. Bilirubin and bile formation. Causes and classification of jaundice. Hereditary hyperbilirubinemias. Cholestasis. Viral hepatitis. Ascites.
Kidney physiopathology: acute renal failure, chronic renal failure and uremia
Endocrine system physiopathology: pituitary gland, thyroid gland, parathyroid glands, endocrine pancreas (diabetes mellitus and pancreatic endocrine tumors), adrenal glands.
Technical Sciences of Laboratory Medicine
 Diagnostic approach in laboratory. General examples of research techniques applied to diseases diagnosis.

Textbooks

Robbins & Cotran, Pathologic Basis of Disease.
 Rubin's Pathology: Clinicopathologic Foundations of Medicine.

EXAM METHOD

Oral exam.

EXAM COMMISSION

Roberto Bei (President)	
Vittorio Manzari	
Andrea Modesti	
Giulia Donadel	
Camilla Palumbo	



Tutor

Roberto Bei	bei@med.uniroma2.it	06 72596522
Vittorio Manzari	manzari@uniroma2.it	06 72596515
Andrea Modesti	modesti@uniroma2.it	06 72596518
Giulia Donadel	donadel@med.uniroma2.it	06 72596887
Camilla Palumbo	camilla.palumbo@uniroma2.it	06 72596658