

**DEPARTMENT OF PATOLOGY  
COURSE IN PATHOPHYSIOLOGY  
FOR STUDENTS OF FACULTY OF MEDICINE**

**The name of Unit in which the subject is realized**

Department of Pathology

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<http://www.ams.edu.pl/index.php?cid=134>

[www.sci.pam.szczecin.pl/~zpatog](http://www.sci.pam.szczecin.pl/~zpatog)

**Total hours:**

**90 hours** include:

- 8 h lecture
- 14 h of seminars
- 68 h classes

*ECTS: 10*

**Aims of teaching**

**FORMS OF ACTIVITIES**

Subject of Pathophysiology is carried out in V and VI terms in forms of lectures, classes, seminars, colloquiums, and examination.

1. There are 8 hours of lectures in the V term
2. Seminars are conducted during 14 h in V, VI term on pathophysiology. The seminars are carried out in group of 20-25 students and one tutor. Seminars last 2,15 h
3. Classes with pathophysiology include 68 h in V, VI term. The classes are carried out in 10-12 group of students, per tutor. Classes last 2.15 h.
4. The material of pathophysiology is controlled during four colloquiums: tests with single choice questions. The test has two re-sits.
5. The exam with pathophysiology is carried out as a test single choice questions. The exam has two re-takes. For student wish, the 2-re-sit can be carried out in oral form.

**Purpose of learning**

- The purpose of learning patophysiology is to acknowledge the basic regulating mechanisms of common diseases. Understanding and acknowledging of these mechanisms will allow to find connections between pathogenesis, etiology and symptoms. Patophysiology builds a bridge between basic and clinical medicine. Acknowledging the pathogenesis, etiology and basic symptoms of diseases will prepare the student to understand clinical medicine.

## **PATHOPHYSIOLOGY PROGRAM III YEAR STUDENT DOCTORS.**

### **Pathophysiology of protein metabolism**

- Introduction to metabolism of amino-acids and proteins
- Disorders of digestion and absorption
- Inborn errors of amino-acids metabolism
- Enzymopathies
- Genetically determined defects of biosynthesis of cellular, Secretion and serum proteins.

### **Pathophysiology of carbohydrate metabolism**

- Metabolism of carbohydrates — an introduction
- Disorders of digestion and absorption
- Enzymopathies
- Diabetes mellitus (epidemiology, classification, etiology, molecular basis of pathogenesis, complications, impaired glucose tolerance, glycosylated proteins and their role in diagnosis and disease monitoring, prevention).

### **Pathophysiology of lipid metabolism**

- introduction to lipids metabolism
- Disorders of digestion and absorption
- Dyslipidaemias — classification, etiology, pathogenesis
- Obesity
- Atherosclerosis — etiology, pathogenesis, complications, risk factors, prevention

### **Stem cells (SCs)**

- Definition and features
- Classification of SCs, pluripotent SCs, tissue-committed cells (TCSCs).
- SCs sources: heparinized cadaveric organ donors (HCOD), cord blood, tissue sources of SCs.
- Regulation of SCs migration.
- Pathophysiological mechanisms of endogenous regeneration.
- Clinical application of somatic SCs.

### **Molecular regulation of cell cycle, aging - aselected aspects**

- Mechanisms controlling cell cycle
- Cyclins and cyclin-dependent kinases
- Checkpoint R1 and its molecular regulation
- Aging

### **Inflammation**

- Definition of inflammation

- Inflammation as the universal reaction of the organism to „damage“
- Factors inducing inflammation: infectious, physical and chemical
- Elements participating in inflammation: tissue structures important for inflammation, inflammatory cells, humoral mediators of inflammation
- Induction types of inflammation: role of the mast cells, role of the complement, role of the endothelial cells and platelets
- Typical phases of acute: induction, non-specific reaction, specific reaction, resolution
- Vascular changes enabling inflammatory reaction
- Symptoms according to Celsus and Galen
- Generalized markers of inflammation – acute phase proteins
- Generation and role of exudate in inflammation: decrease of tissues density, intensification of lymph circulation
- Changes in the endothelial cells and leucocytes enabling the migration of inflammatory cells to tissues – adhesion molecules
- Neutrophile as the first blood derived cell in acute inflammation
- Macrophage and its universal role in various stages of inflammation
- Movement of leucocytes in the tissues – advantages and disadvantages, chemokines, proteolytic enzymes – tissue damage
- Specific elements of inflammatory reaction; local and generalized aspects of immune reaction, stages and role of humoral and cellular reactions in inflammation

### **Immunopathology**

- Definition of immunopathology
- Primary immuneodeficiencies – overview
- Secondary immunodeficiencies – pathogenic causes, iatrogenic causes
- Hypersensitivity type I - allergies
- Hypersensitivity type II – organ specific autoimmune diseases
- Hypersensitivity type III – organ non-specific autoimmune diseases
- Hypersensitivity type IV – chronic immunopathies

### **Patophysiology of the respiratory system**

- Localization of the pathologies in the respiratory tract and their influence on its functioning
- Pathogenesis of the obstructive diseases, chronic bronchitis, emphysema, bronchial asthma
- Pathogenesis of the restrictive diseases
- Respiratory insufficiency
- Presentation of inhalers used by patients

### **Acquired Immunodeficiency Syndrome – AIDS**

- Introduction — retroviruses (M- and T-tropic viruses)
- Epidemiology of AIDS, prophylactics
- Molecular mechanisms of cell infection

- Role of chemokines and chemokine receptors in HIV-infection pathogenesis
- Natural history of HIV infection, clinical features
- Estimation of cell culture prepared last week
- Cytometric analysis of peripheral blood leucocytes

### **Apoptosis**

- Basic definition; apoptosis and necrosis — differences, causative factors, morphological, biochemical and pathophysiological characteristics, homeostatic role of apoptosis; ways of apoptosis induction, apoptotic steps on molecular and cellular level; role of apoptosis in selected diseases – examples, molecular techniques of apoptosis estimation.
- Basics of flow cytometry, appliance of flow cytometry in diagnostic and research;
- Analysis of apoptosis by using different cytometric tests.
- Film

### **Pathophysiology of cardiovascular system**

- The structure and function of cardiovascular system
- The disturbances in microcirculation
- Acute circulatory insufficiency
- Chronic circulatory insufficiency
- Morbus coronaries disease

### **Pathophysiology of hypertension**

- Definition and classification of hypertension
- Factors influencing blood pressure
- Patomechanism of hypertension
- Potential causes of primary hypertention
- Complications

### **Pathophysiology of hematopoietic system**

- Anemia: definition, causative factors, characteristics of selected anemias: iron deficiency, megaloblastic, aplastic, hemolytic anemia, anemia of chronic infections
- Hemorrhagic disorders: definition, disorders connected with platelet, clotting factors, vessel abnormalities, causative factors and clinical features
- Disseminated Intravascular Coagulation (DIC)
- Cell sorter
- Preparing of selected blast cell culture; basics of cell culturing; research applications of cell culture

### **Pathophysiology of the gastrointestinal tract**

- Contribution of particular parts of gastrointestinal tract to digestion and absorption of food
- Pathogenesis of peptic ulcer disease
- Pathogenesis of acute and chronic diarrhea

- Pathophysiology of liver and biliary tract diseases (liver failure, cirrhosis, cholelithiasis)
- Acute and chronic pancreatitis

### **Pathophysiology of kidneys and the urinary tract**

- Introduction
- Acute renal failure — etiology, pathogenesis, classification, and clinical features.
- Etiology, pathogenesis, classification, and clinical course chronic renal failure
- Pathogenesis and clinical features of nephrotic syndrome
- Etiology, pathogenesis, and clinical features of pyelonephritis and urinary tract infection
- Polycystic kidney disease

### **Pathophysiology of endocrine system**

- Pathophysiology of endocrine system — introduction
- Hypothalamic — pituitary axis
- Pathophysiology of endocrine system-chosen issues:
  - pituitary gland: prolactinoma, akromegaly, anterior pituitary insufficiency, Cushing's disease
  - adrenal glands: Conn's syndrome, Addison's disease, pheochromocytoma
  - Thyroid glands: nodular and benign goiter, hyperthyroidism hypothyroidism, inflammations, thyrotoxic crisis
- Hyperparathyroidism and hypoparathyroidism