



МЕДИЦИНСКИ УНИВЕРСИТЕТ – СОФИЯ
Medical University - Sofia
МЕДИЦИНСКИ ФАКУЛТЕТ
Faculty of Medicine – Dean’s Office

PATHOPHYSIOLOGY CURRICULUM

The curriculum has been adopted at the meeting of the Faculty Council № 41/08.07.2020

Annotation of the academic discipline

Pathophysiology is concerned with disturbances in normal physiological regulatory mechanisms, producing qualitative changes in body functions, as compared with the state of health. Pathophysiology is closely related to fundamental disciplines, such as anatomy, physiology, biochemistry and pathological anatomy. The pathophysiology learning is based also on the basic knowledge and conceptions of other disciplines – genetics, immunology, microbiology etc. The aim of pathophysiology is to introduce students to the formation of functional thinking, the ability of utilization and integration of fundamental and interdisciplinary knowledge, and adequate medical decision making with regard to the diagnosis, treatment and recovery of diseased patients.

Lectures

Health, disease, pathological reaction, pathological process and pathological state. Periods of the disease. Etiology. Pathogenesis, microcirculation disorders

1. Pathophysiology of the cell. Neoplasia.
2. Immunity. Allergy. Autoimmune disorders. Immune deficiency diseases.
3. Metabolic disorders. Disorders in protein, lipid and carbohydrate metabolism.
4. Mineral and water balance disorders.
5. Acid-base balance. Hypoxia.
6. Inflammation. Fever.
7. Pathophysiology of cardiovascular system. Heart failure – definition, etiology and pathogenesis. Rhythm disorders. Ischemic heart disease, myocarditis, pericarditis.
8. Pathophysiology of hypertension and hypotension.
9. Pathophysiology of blood.
10. Pathophysiology of respiratory system.
11. Pathophysiology of digestive system and liver.
12. Pathophysiology of renal-urinary system.
13. Pathophysiology of endocrine system.
14. Pathophysiology of nervous system.

Seminars

1. Peripheral vascular disorders. Regulation of microcirculation. Active (arterial) hyperemia, ischemia, passive congestion (venous hyperemia). Thrombosis. Embolism. Infarction.
2. Pathophysiology of the cell. Neoplasia.
Clinical cases – myocardial infarction, melanoma.
3. Body reactivity and resistance. Immunity, allergy.
Clinical cases – bronchial asthma, serum sickness..
4. Disorders of the lipid, carbohydrate and protein metabolism.
Clinical case – atherosclerosis..

5. Water and electrolyte balance. Sodium and water balance, edema. Potassium balance. Calcium and phosphorus balance.

Clinical case – Dehydration in Diabetes mellitus (DM).

6. Acid-base balance. Acidosis and Alkalosis. Hypoxia. Types and Mechanisms.

Clinical cases – CO poisoning; Acidosis in DM

7. Inflammation – causes, mechanisms and clinical signs. Disorders of thermoregulation. Fever – causes and effects.

8. Cardiac disorders. Compensatory mechanisms. Congestive heart failure, arrhythmias, coronary artery disease, pericardial syndromes.

9. Arterial hypertension and hypotension.

Clinical case - Renal hypertension.

10. Blood. RBC disorders. Anemia – causes and mechanisms. WBC disorders - leucocytosis, leucopenia, leukemia. Coagulation disorders - Etiology and pathogenesis.

Clinical cases - aplastic anemia, polycythemia vera, iron deficiency, vitamin B12 deficiency anemias; acute lymphoblastic leukemia, chronic myelogenous leukemia, idiopathic thrombocytopenic purpura.

11. Respiratory system. Obstructive and restrictive hypoventilation. Diffusion and perfusion alterations. Respiratory insufficiency.

Clinical cases - bronchial asthma, chronic obstructive pulmonary disease, chronic bronchitis; pneumothorax, ARDS

12. Gastrointestinal system. Disorders of secretion, motility, digestion and absorption. Gastric and duodenal ulcer. Causes and mechanisms of liver diseases. Liver dysfunction, jaundice.

Clinical cases – Peptic ulcer; duodenal ulcer, acute pancreatitis, celiac disease; hepatic cirrhosis.

13. Renal disorders. Glomerulonephritis. Nephrotic syndrome. Renal failure. Uremia.

Clinical cases – membranoproliferative glomerulonephritis, nephrotic syndrome, acute tubular necrosis.

14. Endocrine disorders. Alterations of the pituitary, thyroid, parathyroid and adrenal glands, pancreas. Diabetes mellitus.

Clinical cases – hyperthyroidism, Cushing syndrome, diabetes mellitus.

15. Etiology and pathogenesis of the Nervous system – motor, sensor and autonomic disorders.

Clinical cases - myasthenia gravis, Parkinson's disease. Stroke.

Ongoing assessment: oral examinations (during seminars) – 3-4 per semester.

Syllabus for theoretical semester exam

1. Subject and development of pathophysiology. Health, disease, pathologic reaction, pathologic process and pathologic state. Stages of disease.

2. Etiology – subject and concepts, modern viewpoints. Pathogenesis. Reflex, humoral, hormonal, and cellular mechanisms.

3. Cellular injury – etiology and pathogenesis.

4. Reversible and irreversible cellular injury.

5. Reactivity and defense of the body. Types of reactivity and defense.

6. Allergy. Definition and classification. Antibody mediated hypersensitivity reactions.

7. Cell-mediated hypersensitivity reactions.

8. Autoimmune disorders – nature and mechanisms.

9. Immunodeficiency diseases.

10. Peripheral vascular disorders. Active (arterial) hyperemia. Passive congestion (venous hyperemia). Stasis.

11. Peripheral vascular disorders. Ischemia. Infarction.

12. Thrombosis. Embolism.

13. Disorders of lipid metabolism. Atherosclerosis, obesity, metabolic syndrome.

14. Disorders of digestion, absorption and transport of carbohydrates. Hyper and hypoglycemia.

15. Disorders of digestion, absorption, intermediate and end products of protein metabolism. Gout.

16. Disorders of fluid and electrolyte balance. Fluid excess and fluid deficit. Edema.
17. Disorders of calcium, phosphate and potassium balance.
18. Disorders of acid base balance. Acidosis. Alkalosis. Types. Compensatory mechanisms.
19. Hypoxia – definition, classification and compensations. Hypoxic hypoxia.
20. Hypoxia due to reduced O₂ uptake capacity of the blood. Circulatory hypoxia. Tissue hypoxia. Metabolic changes in hypoxia.
21. Inflammation – etiology, pathogenesis, phases and main clinical signs. Classification.
22. Acute inflammation. Alteration. Vascular changes and mediators of inflammation.
23. Cellular response in inflammation.
24. Chronic inflammation. Systemic effects, biological significance and outcome of inflammation.
25. Fever – etiology and pathogenesis.
26. Stages of fever. Fever patterns. Metabolic and functional changes. Biological role of fever.
27. Hyperthermia, heat stroke, malignant hyperthermia.
28. Concepts of tissue growth and differentiation.
29. Neoplasms – types, characteristics and etiology.
30. Pathogenesis of neoplasms – stages of oncogenesis, invasion and metastasis. Clinical manifestations, principles of treatment.
31. Disorders of respiratory control. Pathological patterns of breathing. Cough.
32. Disorders of ventilation, diffusion and perfusion and of ventilation/perfusion ratio.
33. Restrictive and obstructive respiratory disorders.
34. Respiratory failure – definition, classification etiology and pathogenesis. Arterial hypoxemia. Hypercapnia.
35. Chronic bronchitis, COPD, emphysema, bronchial asthma.
36. Pulmonary edema, respiratory distress syndrome.
37. Cardiac arrhythmias – definition, classification, basic electrophysiological mechanisms. Conduction disorders – types, hemodynamic changes. Disorders of action potential formation.
38. Congestive heart failure – definition, compensatory mechanisms. Types of heart failure. Etiology and pathogenesis. Left ventricular and right ventricular failure.
39. Ischemic heart disease – definition, clinical forms, etiology and pathogenesis.
40. Diseases of the endocardium, myocardium and pericardium.
41. Primary (essential) hypertension – etiology and pathogenesis.
42. Secondary (symptomatic) hypertension.
43. Acute circulatory failure. Syncope. Shock. Chronic hypotension.
44. Anemias – etiology, pathogenesis and classification. Blood loss anemia.
45. Impaired red cell production - iron deficiency, megaloblastic, aplastic anemias.
46. Hemolytic anemias.
47. Leucocytosis and leucopenia. Leukemias – acute and chronic.
48. Disorders of platelet function.
49. Disorders of gastrointestinal function. Gastrointestinal autointoxication. Diarrhea and constipation.
50. Disorders of digestion in the mouth and stomach.
51. Gastritis. Gastric and duodenal ulcer.
52. Disorders of the small intestines – secretion, absorption, motility and excretion.
53. Acute and chronic pancreatitis.
54. Etiology and pathogenesis of liver diseases. Types of liver dysfunction.
55. Hepatitis. Liver Cirrhosis. Portal hypertension. Ascites. Hepatic encephalopathy. Jaundice.
56. Functional syndromes in renal diseases.
57. Etiology and pathogenesis of glomerular abnormalities and tubulo-interstitial disorders.
58. Acute renal failure – etiology and pathogenesis. Chronic renal failure.
59. Disorders of the hypothalamus and the pituitary.
60. Hypofunction and hyperfunction of the adrenals.
61. Hypothyroidism. Hyperthyroidism.
62. Disorders of the parathyroid glands.
63. Disorders of the gonadal function.

64. Diabetes mellitus. Types, metabolic disorders, clinical manifestation, complications.
65. Etiology and pathogenesis of the nervous system diseases.
66. Disorders of the somatosensory system. Pain.
67. Disorders of the motor function of the nervous system.
68. Disorders of the autonomic nervous system. Stress and distress.
69. Disorders of cognitive functions.

Academic literature:

1. Porth, C. M. Essentials of Pathophysiology. Wolter Kluvers Health/Lippincott, Williams & Wilkins, 4th edition 2014, ISBN-10: 1451190808; ISBN-13: 978-1451190809.