

## PATHOPHYSIOLOGY SYNOPSIS FOR MEDICAL STUDENTS

1. Health and disease, contemporary view of disease. Pathologic reactions, processes and conditions. General etiology and pathogenesis.
2. Reactivity and resistance. Factors, influencing reactivity and resistance. Types of reactivity and resistance.
3. Hypersensitivity reactions – types, pathogenesis. Anaphylaxis.
4. Autoimmune diseases and immunodeficient states.
5. Disturbances in peripheral circulation – arterial and venous hyperemia, ischaemia, infarction.
6. Disturbances in peripheral circulation – thrombosis and embolism.
7. Changes in blood glucose levels – hyperglycemic and hypoglycemic states.
8. Diabetes mellitus – etiology, pathogenesis, pathophysiology of major symptoms.
9. Diabetes mellitus – pathobiochemistry – alterations in carbohydrate, protein and lipid metabolism. Mechanisms of development of the acute and chronic complications.
10. Dyslipidemias – types. Atherosclerosis – risk factors, etiology, pathogenesis, consequences and complications.
11. Obesity – definition, types, pathogenesis, complications. Metabolic syndrome.
12. Changes in plasma protein levels. Disturbances in aminoacid metabolism.
13. Disturbances in the end-stage protein metabolism – hyperazotemias. Disturbances in purine metabolism – pathophysiology of gout and its complications.
14. Disturbances in water-electrolyte balance – dehydration and hyperhydration. Types and complications.
15. Edemas – definition, factors for edema formation. Types of edemas.
16. Disturbances in mineral metabolism (Ca, P, Mg). Pathophysiology of osteoporosis and osteomalacia.
17. Disturbances in acid-base balance – general characteristics, regulation, parameters, compensations. Respiratory and metabolic acidosis.
18. Disturbances in acid-base balance – general characteristics, regulation, parameters, compensations. Respiratory and metabolic alkalosis.
19. Hypoxia – definition, parameters. Pathogenetic classification of hypoxias. Characteristics of hypoxic hypoxias.
20. Hypoxia – definition, parameters. Pathogenetic classification of hypoxias. Characteristics of non-hypoxic hypoxias.
21. Adaptations to hypoxia at cellular, tissue and organ level (HIFs). Main principles and mechanisms.
22. Inflammation – definition and biological significance. Classification and outcomes of inflammation. Cardinal signs of inflammation.
23. Inflammation – stages. Mediators. Vascular changes. Cellular response. Alterations in metabolism.
24. Disturbances in body temperature regulation – hypo- and hypertermia.
25. Fever – definition, etiology and pathogenesis. Significance of fever. Stages of fever. Changes in metabolism in fever. Alterations in the function of organs and systems.
26. Neoplasms – general characteristic and etiology. Definition and stages of carcinogenesis.
27. Neoplasms – tumor/organism interactions. Paraneoplastic syndromes.
28. Functional pulmonary diagnostics – spirometry, diffusion capacity, lung volumes, bodyplethysmography, cardio-pulmonary exercise tests.

29. Basic mechanisms disturbing lung function – obstruction of the airflow in the airways – types. Main pathogenetic mechanisms, causing obstruction – bronchial inflammation, bronchial hyperresponsiveness, alveolo-capillary and bronchiolar destruction.
30. Obstructive disorders. Pulmonary hyperinflation. Disturbed functional capacity. COPD and bronchial asthma.
31. Basic mechanisms disturbing lung function – types of restrictive ventilatory disorders. Main pathogenetic mechanisms, causing restriction – inflammation, fibrosis, edema, reduction of lung parenchyma, pleural and rib-cage dysfunctionalities.
32. Restrictive disorders. Etiology and pathogenesis of pulmonary edema, pneumothorax, pneumonia and interstitial lung disease.
33. Mechanisms responsible for disturbed gas exchange. Changes in the V/Q ratio, disturbed diffusion of gases through the alveolo-capillary barrier, alveolar hypoventilation syndrome, disturbances in respiratory control.
34. Acute respiratory failure – etiology, pathogenesis, types.
35. Chronic respiratory failure – etiology, pathogenesis, types, adaptations, complications.
36. Coronary artery disease – definition, types, pathogenesis.
37. Arterial hypertension – essential hypertension. Etiology, pathogenesis. Secondary (symptomatic) hypertension.
38. Hypotension, collapse and syncope. Acute insufficiency of hemodynamics – shock – definition, types, etiology, pathogenesis.
39. Heart failure - definition, etiology, pathogenesis and types. Compensatory mechanisms.
40. Functional signs of heart failure.
41. Pathogenesis of some complex symptoms. Dyspnea and fatigue.
42. Anemias – definition and classification. Posthemorrhagic anemias.
43. Anemias due to disturbed hemopoiesis. Anemias due to increased hemolysis.
44. Leukemias – definition, etiology, pathogenesis, types.
45. Disorders of hemostasis (hemorrhagic diatheses).
46. Disorders of hemostasis (thrombotic diatheses). DIC – syndrome.
47. Disorders in the gastrointestinal system. Gastritis – etiology and pathogenesis. Peptic ulcer disease – etiology and pathogenesis.
48. Pancreatitis – types, etiology, pathogenesis, complications. Disorders in the gastrointestinal system: intestinal obstruction (ileus), gastro-intestinal autointoxication. Disorders in the intestinal microbiome.
49. Basic etiology and pathogenesis of liver diseases. Hepatitis.
50. Functional signs of liver damage – jaundice, portal hypertension, ascites, anemia, hepato-renal and hepato-pulmonary syndromes. Disturbances in hemostasis.
51. Pathogenesis of liver cirrhosis. Hepatic encephalopathy.
52. Basic etiology and pathogenesis of renal disorders. Urinary syndrome, alterations in diuresis. Nephritic and nephrotic syndromes.
53. Etiology and pathogenesis of acute renal failure. Complications.
54. Etiology and pathogenesis of chronic renal failure.
55. Functional manifestations of renal disorders – edemas, hypertension, anemia, renal osteodystrophy, hemostatic disturbances, polyserositis, disturbances in acid-base and water-electrolyte balance. Uremia and uremic encephalopathy.
56. Basic etiology and pathogenesis of endocrine disorders.
57. Disturbances in the function of the pituitary gland.
58. Disturbances in the function of the thyroid gland.
59. Disturbances in the function of the suprarenal glands. Disturbances in the functions of the gonads.
60. Basic etiology and pathogenesis of the diseases of the nervous system. – cerebral ischemia,

- cerebral edema, intracranial hypertension, neurodegenerative diseases.
61. Disorders in sleep and wakefulness – insomnia.
  62. Disorders in sleep and wakefulness – central and obstructive sleep apnea.
  63. Pain – definition, types and pathophysiology.

**Recommended literature:**

1. Lecture course in pathophysiology – for the academic years 2022/2023
2. C.M. Porth. Pathophysiology: Concepts of Altered Health States. *Lippincott Williams & Wilkins, 8<sup>th</sup> Ed., 2008. (Later editions are recommended).*
3. S. J. McPhee, V.R. Lingappa, W.F. Ganong. Pathophysiology of Disease: An Introduction to Clinical Medicine. *Appleton & Lange, 5<sup>th</sup> Ed., 2006. (Later editions are recommended).*
4. S. L. Robbins, R.S. Cotran, V. Kumar. Pathologic Basis of Disease. W.B. Saunders Co. 8<sup>th</sup> Ed., 2010. *(Later editions are recommended).*
5. A.S. Fauci et al. Harrison's Principles of Internal Medicine. McGraw-Hill, 19<sup>th</sup> Ed., 2017. *(Later editions are recommended).*