

# Portal:Exam Topics in Pathophysiology (1LF, GM)

## Part I. General Pathophysiology

1. Explain the meaning of the terms: symptom, syndrome, etiology, pathogenesis. Give examples
2. Compensation of a Functional Disturbance. Decompensation. Functional Insufficiency and Failure. Give examples.
3. Significance of Gene Polymorphism. Genetic Predisposition to Diseases.
4. The Instability of the Genome. Mutations.
5. Diseases due to mitochondrial DNA mutations.
6. Autosomal and gonosomal monogenic heredity. Give examples.
7. Polygenic heredity. Give examples.
8. Damage of the Organism Caused by Electric Current.
9. Damage of the Organism Caused by Light, UV and Infrared Radiation.
10. Damage of the Organism Caused by Ionizing Radiation.
11. Damage of the Organism Caused by Heat.
12. Damage to the Organism Caused by Cold. Controlled Hypothermia.
13. Changes Evoked by Immobilization.
14. Intoxication by Chemical Agents: explain the pathogenesis of intoxication by CO, Pb, NO<sub>3</sub><sup>-</sup>, CN<sup>-</sup>, organic phosphates.
15. Chemical Cancerogens. Effects of the Tobacco Smoking.
16. Effects of ethylalcohol on the organism.
17. Toxins of Plants, animals and bacteria. Give examples.
18. Inflammation. Acute Phase Response. Fever.
19. Systemic Inflammatory Response. Septic Shock. Multiple Organ Failure.
20. Stress Reaction. Reaction of the organism to stress.
21. Allergy. Anaphylactic Reaction.
22. Transplantation Immunity. (GvHD, HvGD)
23. Autoimmune Diseases.
24. Inborn and Acquired Immune Deficits.
25. Dehydration of the organism.
26. Hyperhydration of the organism. Oedema, Ascites.
27. Hypoxia of the Organism. Tissue Hypoxia.
28. Hypoxic and reperfusion damage of the tissue. Pathophysiological basis of oxygen therapy. Oxygen toxicity.
29. Acidification of the Internal Environment.
30. Alcalization of the Internal Environment.
31. Acid-Base and Electrolyte Balance
32. Cell Death. Apoptosis.
33. Regeneration and Reparation of Tissues. Wound Healing.
34. Mechanisms of Malignant Cell Transformation. Tumor Growth
35. Interaction of Tumor with the Organism. Paraneoplastic Syndromes. Tumor metastasis and changes in its properties.
36. Consequences of Insufficient Food Intake. Catabolic States.
37. Pathogenesis of Obesity. Complications of the Obesity.
38. Deficits of Water-soluble Vitamins.
39. Deficits of Fat-soluble Vitamins. Hypervitaminosis.
40. Disorders in Lipid Metabolism. Hyperlipoproteinemia.
41. Disturbances in Purine Metabolism. Diseases due to Disorders in Porphyrin Metabolism.
42. Disturbances in the balance and distribution of sodium and chlorides
43. Disturbances in the balance and distribution of potassium
44. Disturbances in the balance and distribution of calcium, magnesium and phosphates.
45. Disturbances in the balance and distribution of iron. Trace Elements and Diseases.
46. Disturbances of Growth and Development.
47. Ageing. Diseases in old age. Death.

## Part II. Pathophysiology of the Organ System Diseases

### Blood

1. States evoked by disturbances of stem cells. Clonal Diseases (myeloproliferative and lymphoproliferative diseases). Pathophysiology of the bone marrow transplantation.
2. The role of erythropoietin and other Growth Factors in the Pathogenesis of Haematological Diseases.
3. Changes in Granulocyte Count. Deranged Function of Granulocytes.
4. Myelodysplastic Syndrome. Acute Myeloblastic Leukaemia.
5. Chronic Myeloid Leukaemia.
6. Classification of anaemias based on pathogenesis. Changes in the shape, size and hemoglobinization of erythrocytes. Functional consequences (anaemic syndrome).
7. Aplastic Anaemias. Anaemia of Chronic Diseases.
8. Anaemias caused by folic acid and vitamin B12 deficiency.

9. Iron Deficiency Anaemia.
10. Intracorpuseular Haemolytic Anaemias.
11. Extracorpuseular Haemolytic Anaemias.
12. Thalassaemias. Haemoglobinopathies.
13. Polycythaemias.
14. Acute lymphoblastic and chronic lymphocytic leukaemia.
15. Lymphomas.
16. Multiple Myeloma (plasmocytoma).
17. Pathophysiology of bone marrow transplantation
18. Complications of blood transfusion.
19. Causes of the haemorrhagic diatheses.
20. Vasculopathies.
21. Changes in platelet counts and disturbances of their function.
22. Coagulopathies.
23. Disseminated Intravascular Coagulation (DIC).
24. Thrombophilia, Thrombosis and Thromboembolism..
25. Hypersplenism. Splenomegaly. Extramedullar Haemopoiesis.

## Heart and Circulation

1. Causes and pathogenesis of the arterial hypertension.
2. Consequences of arterial hypertension.
3. Pulmonary Hypertension. Cor Pulmonale.
4. Arterial Hypotension.
5. Pathophysiological mechanisms of the circulatory shock.
6. Reversible and irreversible stages of the circulatory shock.
7. Haemodynamic consequences of right-to-left and left-to-right cardiac shunts.
8. Stenosis and insufficiency of the mitral valve.
9. Stenosis and insufficiency of the aortic valve.
10. The Valve Diseases of the Right Heart.
11. Cardiomyopathies.
12. Disturbances of the Myocardial Blood Supply. Angina Pectoris
13. Myocardial Infarction.
14. Consequences and complications of myocardial infarction.
15. Constrictive Pericarditis. Low Cardiac Output States.
16. Definitions, classification and causes of heart arrhythmias.
17. Pathogenesis of arrhythmias, local and systemic factors.
18. Disturbances in the Generation of Heart Action Potentials.
19. Disturbances in the Conduction and Spreading of Heart Action Potentials.
20. Sinus and supraventricular arrhythmias.
21. Ventricular arrhythmias.
22. Consequences of arrhythmias in the circulation.
23. Causes and pathophysiological mechanisms of heart failure.
24. Compensatory mechanisms of heart failure and their consequences.
25. Changes in cardiac output and hyper-kinetic circulation
26. Left Heart Failure.
27. Right Heart Failure.
28. Pathogenetic factors leading to atherosclerosis. Endothelial Dysfunction.
29. Manifestations and Consequences of Atherosclerosis.
30. Atherosclerosis, Thrombosis and hypertension related to Endothelial Dysfunction
31. Tissue Ischaemia and redistribution of the blood flow (steal phenomena).
32. Thromboembolic Disease.
33. Insufficiency of the Veins. Disorders of the lymphatic drainage.

## Lung and Respiration

1. Protective Breathing Reflexes. Cough.
2. Alveolar Hypoventilation.
3. Disturbances of the Ventilation to Perfusion Ratio.
4. Disorders of Gas Diffusion Through the Alveolo-capillary Membrane.
5. Type I and type II respiratory insufficiency.
6. Restrictive disorders reducing lung tissue. Lung Fibrosis.
7. Obstructive disorders affecting mechanics of the lung ventilation.
8. Pathophysiology of the chronic obstructive broncho-pulmonary disease (COPD).
9. Pathophysiology of the emphysema.
10. Pathophysiology of the asthma bronchiale.
11. Pulmonary Atelectasis. Lung Oedema. Pneumonia.
12. Pulmonary Fibrosis
13. Acute Lung Failure. ARDS Syndrome.
14. Pneumothorax.
15. Aspiration of objects and fluids into the lungs. Upper Respiratory Tract Obstruction.
16. Pulmonary Embolization.
17. Oxygenotherapy and mechanical support of lung ventilation

## **Kidneys and Urinary Tract**

1. Disturbances of urine production (oliguria, anuria, polyuria, isostenuria).
2. Prerenal, renal and postrenal causes of renal failure.
3. Disturbances of glomerular function. Proteinuria and Nephrotic Syndrome.
4. Acute Tubular Necrosis.
5. Acute Renal Failure.
6. Chronic Renal Failure. Uremia.
7. Glomerular and tubular changes and other consequences of the chronic renal failure
8. Congenital and acquired tubular dysfunctions.
9. Systemic Effects of the Chronic Renal Failure
10. Comparison of the Ion Changes in Acute and Chronic Renal Failure.
11. Disorders Affecting Concentration and Dilution Functions of the Kidneys.
12. Urolithiasis. Disturbances of urinary bladder emptying.

## **Gastrointestinal Tract**

1. Dental Caries. Parodontosis (periodontal diseases). Salivation Disorders
2. Manifestations of Systemic Diseases in Oral Cavity
3. Disorders of the Swallowing and Passage of the Food in the Oesophagus (dysphagia).
4. Gastro-oesophageal Reflux.
5. Disorders of Gastric Motility. Disturbances of gastric secretion.
6. Nausea and Vomiting
7. Postprandial Syndromes. (Acute and chronic dumping syndrome.)
8. Gastric and duodenal ulcer disease.
9. Acute and chronic gastritis.
10. Disorders of the Exocrine Pancreas. Acute and Chronic Pancreatitis.
11. Ileus.
12. Diarrhea.
13. Malabsorption Syndromes.
14. Non-specific Bowel Inflammations (Crohn's disease, ulcerative colitis).
15. Colonic Polyps. Colorectal Carcinoma.
16. Disorders of the large bowel functions. Constipation. Bleeding into the GIT.
17. Disorders of liver excretion and detoxification functions.
18. Liver cirrhosis.
19. Hepatitis. Liver Toxic Damage. Liver Steatosis.
20. Hepatic Failure. Hepatic Encephalopathy.
21. Icterus.
22. Cholestasis.
23. Portal Hypertension. Ascites.
24. Disorders of the gall bladder and tractus choledochus. Cholelithiasis.

## **Endocrine System**

1. Primary and Secondary Endocrine Disturbances. Give examples of receptor and gland disorders.
2. Disturbances of the Hypothalamus-hypophysis Axis.
3. Hypopituitarism.
4. Gigantism. Acromegaly. Diabetes Insipidus.
5. Hyperthyroidism. Graves's Disease.
6. Hypothyroidism.
7. Inflammations of the thyroid gland. Goiter.
8. Hypoparathyroidism. Hyperparathyroidism.
9. Hyperaldosteronism.
10. Etio-pathogenetic classification of the Cushing's syndrome.
11. Adreno-genital Syndrome.
12. Addison's Disease.
13. Pheochromocytoma.
14. Etio-pathogenetic classification of diabetes mellitus. Type 1. diabetes mellitus.
15. Type 2 diabetes mellitus. Metabolic (Reaven's) syndrome.
16. Hyperglycemia. Hypoglycemia.
17. Acute complications of diabetes mellitus. Diabetic coma.
18. Chronic complications of diabetes mellitus
19. Disturbances of sexual differentiation in development. Hypogonadism.
20. Disorders of the menstrual cycle. The polycystic ovary syndrome.
21. Causes of male and female infertility.

## **Neural System**

1. Disorders of the neuro-muscle junction.
2. Disorders of the peripheral motoneuron. Neuropathies. Damage and Regeneration of Peripheral Nerves.
3. Disorders of the central motoneuron
4. Lesions of the spinal cord.

5. Disorders of the basal ganglia. Parkinson's Disease. Hyperkinetic Disorders.
6. Cerebellar Disorders.
7. Demyelination. Multiple Sclerosis.
8. Disorders of Cognitive Functions. Dementias. Aphasias.
9. Disorders of Consciousness. Consequences of the head injury and the brain damage.
10. Sleep Disorders.
11. Disturbances of the Cerebral Circulation. Cerebral Oedema. Intracranial Hypertension.
12. Disorders of Cerebro-spinal Fluid. Hydrocephalus.
13. Vestibular Disorders.
14. Disorders of Vision
15. Disorders of hearing
16. Pain.
17. Disorders of the autonomic nervous system. Give examples.
18. Seizures and epilepsy.

## **Bone, Connective Tissue, Skeletal Muscles**

1. Osteoporosis.
2. Osteomalacia. Rickets. Renal Osteodystrophy.
3. Bone fractures and their healing.
4. Disturbances of skeletal muscle contraction. Cramps. Tetany. Muscle Atrophy and hypertrophy. Myopathy. Rhabdomyolysis.
5. Vasculitis Caused by Immune Complexes.
6. Systemic Lupus Erythematosus. Rheumatoid Arthritis. Scleroderma

## **Pathophysiological basis of diagnostic procedures (questions related to seminars)**

1. Blood cells examination.
2. Laboratory tests for iron stores and iron availability. Laboratory indicators of hemolysis.
3. Blood tests preceding blood transfusion.
4. Clinical and laboratory tests for bleeding disorders. Laboratory tests for hemocoagulation
5. Clinical and laboratory tests for hyper-coagulation states. Dysproteinaemia, paraproteinaemia.
6. Acute phase proteins.
7. Heart cathetrization.
8. Measurements of the cardiac output. Cardiac index.
9. Blood pressure monitoring.
10. EKG signs of disordered impulse formation or conduction. EKG manifestations of myocardial ischaemia.
11. Ergometry
12. Examination of restrictive and obstructive lung diseases.
13. Lung diffusion capacity, distribution of the lung ventilation and perfusion.
14. Examination of blood gases.
15. Spirometry. Whole body plethysmography.
16. Determination of the glomerular filtration rate and renal blood flow.
17. Tests indicating functioning of the renal tubules.
18. Tests for urine concentration
19. Tests for the acid-base balance.
20. Proteinuria.
21. Haematuria. Hemoglobinuria. Hemosiderionuria
22. Urinary casts.
23. Gastroscopy. Gastric secretion. Pancreatic secretion.
24. Tests for intestinal malabsorption.
25. Tests for cholestasis.
26. Tests for necrotic and inflammatory processes in the liver.
27. Indicators of the liver photosynthesis
28. Clinical tests in endocrinology based on the negative feedback control of hormone secretion.
29. Tests for the secondary arterial hypertension.
30. Tests regarding the adeno- and neurohypophysis.
31. Tests regarding the thyroid gland functioning.
32. Immunological tests regarding the thyroid gland functioning
33. Tests of the parathyroid gland functioning and calcium and phosphates metabolism.
34. Tests regarding the suprarenal cortex and medulla.
35. Tests regarding sex hormones.
36. Tests for muscle hypotension, paralysis or muscle tone disorders.
37. Evaluation of the state of consciousness.
38. Neurological tests regarding the pyramidal system.
39. Neurological tests regarding the extrapyramidal system and cerebellum.
40. Neurological tests regarding functioning of the vestibular system.
41. Examination of hearing disorders. Audiogram.
42. Examination of vision disorders. Perimeter.

