INTERNATIONAL HIGHER SCHOOL OF MEDICINE
Department of Pathology

SYLLABUS
General Pathology

2025-2026 academic year
for students of medical faculty
2 course 3 semester, groups 1-25
10 credits (300 h, including auditorial 180 h, independent work 120 h)

Lecturer: **Indian professor**

Practical classes:

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Venue: Vedanta Pathology Dagestanskaya street 6

The Syllabus is considered
at the meeting of the department of Pathology
Protocol № 2 dated 09.09 2025
Head of the department

Course objective: Study of the basic patterns and mechanisms of disease development and human recovery; preparing students for a deep understanding of the structure, etiology, pathogenesis, clinical manifestations, principles of therapy and prevention of diseases

After study of the discipline the student must:

Knowledge:

• Methods for solving problems in preparation for the subject of general pathology using high-quality information, bibliographic resources, information and communication technologies;
• fundamental professional definitions, categories and signs (symptoms);
• main symptoms and syndromes of pathological damage to organs and systems, mechanisms of their development and methods for their detection;
• the essence of methods for clinical, laboratory and functional examination of the body of an adult and children.

Skill:

• Skills in using high-quality information, bibliographic resources, information and communication technologies when solving problems in mastering the subject of general pathology;
• basic professional skills of interaction with patients based on acquired fundamental knowledge;
• skills in the practical use of methods aimed at identifying the main pathological symptoms and syndromes for the purpose of reliable diagnosis of diseases;
• skills in conducting basic clinical, laboratory and functional examinations of adults and children

Attitude:

• Solve problems related to preparation for the subject of general pathology using high-quality information, bibliographic resources, information and communication technologies;
• use fundamental professional definitions, categories and signs (symptoms) to carry out professional activities;
• analyze and synthesize information about identified pathological symptoms and syndromes of damage to organs and systems and prescribe an adequate examination for the purpose of reliable diagnosis of diseases;
• analyze the results of clinical, laboratory and functional examination of the body of an adult and children, taking into account their specifics in order to diagnose major diseases.

Pre-requisites:

• Macro- and microanatomy
• Normal physiology
• Microbiology, virology and immunology
• Biochemistry
• Medical biology

Post-requisites: All clinical disciplines

THEMATIC PLAN THEMATIC PLAN OF LECTURES

№	Themes of lecture	Hours	Date
1	Introduction to pathology. Methods of study of the pathological anatomy.	2	According to timetable
2	Typical pathological processes, reactions, conditions. General etiology and pathogenesis.	2	According to timetable
3	Death, classification. Types of death.	2	According to timetable
4	Cell injury. Pathophysiology of cellular damage	2	According to timetable
5	Classification of hypoxic conditions. Etiology and pathogenesis of the various forms of hypoxia. Immediate and long-time mechanisms of adaptation to hypoxia	2	According to timetable
6	Mechanisms of apoptosis and necrosis. Necrosis. Apoptosis	2	According to timetable
7	Environmental and nutritional diseases	2	According to timetable
8	Intracellular accumulations	2	According to timetable
9	Extracellular accumulations.	2	According to timetable
10	Pigmentations. Calcification.	2	According to timetable
11	Typical acid-base balance disorders. Types of alkalosis and acidosis.	2	According to timetable
12	Hypo-hyperhydration of the body. Disturbances of water-salt balance. Edema.	2	According to timetable
13	Hemodynamic disorders-I: Hyperemia. Anemia. Edema. Hemorrhage. Ischemia	2	According to timetable
14	Disorder of local circulation. Typical forms of microcirculation, morphological and functional disorders in tissues. Thrombosis and embolism, as main causes of organic and tissue microcirculatory disorder.	2	According to timetable
15	Hemodynamic disorders-II:	2	According to timetable

	Thrombosis. Embolism. Infarction. Shock.		
16	Etiology and pathogenesis of extreme and terminal states (collapse, shock, coma). Pathophysiological characteristic of changes in organs and systems at extreme states.	2	According to timetable
17	Etiology and pathogenesis of DIC	2	According to timetable
18	Pathophysiology of reactivity and resistance. The role of the barrier system in the development of the disease.	2	According to timetable
19	Pathophysiology of the immune response. Classification of allergic reactions	2	According to timetable
20	Etiology and pathogenesis of I-IV types of hypersensitivity.	2	According to timetable
21	Immunodeficiency, primary and secondary (AIDS).	2	According to timetable
22	Immunomorphology	2	According to timetable
23	Immune deficiency, isoimmunity conditions, autoimmune diseases. Etiology, pathogenesis and morphology	2	According to timetable
24	General pathology of the infection process	2	According to timetable
25	Inflammation. Etiology, pathogenesis, stages, signs. Role of mediators during inflammation.	2	According to timetable
26	Mechanisms of exudation, emigration and proliferation during inflammation.	2	According to timetable
27	Acute inflammation. Types. Morphology	2	According to timetable
28	Chronic inflammation. Types. Morphology	2	According to timetable
29	Tissue repair.	2	According to timetable
30	Fever as a typical pathological process. Etiology of Fever, pathogenesis, stages.	2	According to timetable
31	Adaptation	2	According to timetable
32	Neoplasia. General pathology. Carcinogenesis	2	According to timetable
33	Epithelial tumors. Melanocytic tumors.	2	According to timetable
34	Mesenchymal tumors. Tumors of children.	2	According to timetable
35	Typical disorders of protein metabolism. Etiology, pathogenesis, mechanisms of the main manifestations. Starvation.	2	According to timetable
36	Typical disorders of lipid and carbohydrate metabolism. Risk factors for atherosclerosis and obesity. Types of insulin deficiency. Types and pathogenesis of Diabetes Mellitus	2	According to timetable
	TOTAL	**72**	

THEMATIC PLAN OF PRACTICAL CLASSES

Unit	Week	№	Theme of practical class	Hours	Date
1	1	1	Introduction to pathology. Methods of study of the pathological anatomy. Experimental methods in pathological physiology.	2	01.09.25-06.09.25
		2	General nosology, characteristic of disease periods. Term-typical pathological process. Main principles of pathogenesis study.	2	
		3	Death. Classification. Types.	2	
	2	4	Protective, adaptive and pathological reactions of the organism in various forms of hypoxia.	2	08.09.25-13.09.25
		5	Cell injury: general information. Etiology and pathogenesis of typical cell injuries.	2	
		6	Reversible cell injury. Pathogenesis and morphology.	2	
	3	7	Irreversible cell injury. Pathogenesis and morphology of Necrosis. Outcomes.	2	15.09.25-20.09.25
		8	Apoptosis. Pathogenesis and morphology. Difference between necrosis and apoptosis.	2	
		9	UNIT CONTROL-I.	2	
2	4	10	Intracellular accumulations.	2	22.09.25-27.09.25
		11	Extracellular accumulations	2	
		12	Amyloidosis.	2	
	5	13	Pigmentations. Endogenous pigmentations.	2	29.09.25-04.10.25
		14	Pigmentations. Exogenous pigmentations. Pathological calcification.	2	
		15	Homeostasis. Etiology and pathogenesis of acid-base balance disorders.	2	
	6	16	Disorders of water-salt balance. Dehydration. Overhydration.	2	

		17	Edema. Types. Pathogenesis and morphology.	2	06.10.25-11.10.25
		18	UNIT CONTROL-II.	2	
3	7	19	Hemodynamic disorders. Hyperemia, types. Etiopathogenesis and morphology.	2	13.10.25-18.10.25
		20	Hemodynamic disorders. Thrombosis. Etiopathogenesis and morphology.	2	
		21	Hemodynamic disorders. Embolism. Etiopathogenesis and morphology.	2	
	8	22	Hemodynamic disorders. Ischemia and Infarction. Etiopathogenesis and morphology. Mechanism of stasis.	2	20.10.25-25.10.25
		23	Hemodynamic disorders: hemorrhage. Etiopathogenesis and morphology.	2	
		24	Shock. Etiology and classification. Pathogenesis of different types of shock (compensation)	2	
	9	25	Shock. Etiology and classification. Pathogenesis of different types of shock (decompensation). Morphological features.	2	27.10.25-01.11.25
		26	DIC – syndrome. Etiopathogenesis and morphology.	2	
		27	UNIT CONTROL-III.	2	
4	10	28	Pathophysiology of Reactivity. Disorders of local and systemic defenses. Role of General Adaptation Syndrome in pathology.	2	03.11.25-08.11.25
		29	Pathology of phagocytosis and complement system, causes and consequences.	2	
		30	Immune response. Mechanism of immune responses. Pathology of organs and cells of immune system.	2	
	11	31	Experimental anaphylaxis, stages. Types of sensitization and desensitization. Anaphylactic shock.	2	10.11.25-15.11.25
		32	Hypersensitivity I, II, III and IV types. Pathogenesis and morphology.	2	
		33	Autoimmunity. Isoimmunity. Transplant rejection. Graft-versus-host disease (GVHD), Host -versus- graft disease (HVGD). Pathogenesis and morphology.	2	
	12	34	Primary immunodeficiency. Pathogenesis and morphology.	2	17.11.25-22.11.25
		35	Secondary immunodeficiency. AIDS. Pathogenesis and morphology.	2	
		36	UNIT CONTROL-IV.	2	
5	13	37	Inflammation, etiology and pathogenesis. Stages, local and systemic signs of inflammation.	2	24.11.25-29.11.25
		38	Typical microcirculation disorders during inflammation.	2	
		39	Morphology of acute inflammation. Mechanism of exudation, types.	2	
	14	40	Morphology of chronic inflammation. Mechanism of proliferation.	2	01.12.25-06.12.25
		41	Role of pyrogens. Pathogenesis of fever stages.	2	
		42	General pathology of the infection process.	2	
	15	43	Adaptation. Pathogenesis and morphology.	2	08.12.25-13.12.25
		44	Tissue repair. Pathogenesis. Morphology.	2	
		45	UNIT CONTROL-V.	2	
6	16	46	Neoplasia. General pathology.	2	15.12.25-20.12.25
		47	Carcinogenesis. Pathology of tumor growth.	2	
		48	Epithelial tumors.	2	
	17	49	Mesenchymal tumors.	2	22.12.25-27.12.25
		50	Melanocytic tumors. Tumors of children.	2	
		51	Typical disorders of blood plasma proteins. Typical disorders of nitrogen balance.	2	
	18	52	Etiology and pathogenesis of hyperlipidemia, obesity, atherosclerosis.	2	29.12.25-03.01.26
		53	Etiology and pathogenesis of hypo- and hyperglycemic conditions. Types of insulin deficiency.	2	
		54	UNIT CONTROL-VI.	2	
			TOTAL	**108**	

THEMATIC PLAN OF INDEPENDENT WORK OF STUDENTS

№	Unit	Theme of independent work	Hour	Date
1	Introduction to pathology. Cell injury	Albums with micro-macro preparations. Abstracts. Working with literature	20	01.09.2025-20.09.2025
2	Metabolic disease. Accumulation processes.	Presentations, abstracts. Albums with micro-macro preparations Working with literature	20	22.09.2025-11.10.2025
3.	Hemodynamic disorders	Educational films. Presentations, posters. Albums with micro-macro preparations Working with literature	22	13.10.2025-01.11.2025
4.	Immunopathology	Educational films. Albums with micro-macro preparations. Working with literature	18	03.11.2025-22.11.2025
5.	Inflammation. Tissue repair. Adaptation	Educational films. Abstracts, presentations. Albums with micro-macro preparations. Working with literature	20	24.11.2025-13.12.2025
6.	Tumors. Metabolic disorders	Abstracts, presentations, posters. Albums with micro-macro preparations. Working with literature	20	15.12.2025-03.01.2026
	TOTAL		**120**	

Recommended reading for students:
Basic literature

№	Authors	Title	The year of publishing
1	Mohan H.	Textbook of Pathology.	2019
2	Mohan H.	Pathology. Practical Book.	2013
3.	J.L. Banasic, L-Ellen C. Copstead	Pathophysiology	2019
4	Kumar V., Abbas A.K., Aster J.A., Deyrup A.T.	Robbins Essential Pathology.	2021
5.	Iliina L.L, Jilkichieva Ch.S. Samaeva E.V.	Typical pathological processes (Part I;II)	2016
6.	Tommie L. Norris,DNS,RN	Ports Pathophysiology	2019 10 Edition

Additional literature

№	Authors	Title	The year of publishing
1	Geraldine O'Dowd, Sarah Bell, Sylvia Wright	Wheater's Pathology. A text, atlas and review of histopathology.	2020
2	Earl J. Brawn	Review 7 PreTest Pathology	2010
3.	Klatt E.C. Robbins and Cotran	Atlas of Pathology.	2014.
4	Buja L.M., Krueger G.R.F.	Netter's Illustrated Human Pathology.	2014
5.	Mills S.E., Greenson J.K., Hornick J.L., Longacre T.A., Reuter V.E.	Sternberg's Diagnostic Surgical Pathology.	2015
6.	Kaplan	USMLE Step 1 Lecture notes	2020
7.	Sue E. Huether Kathrin L. McCance	Understanding Pathophysiology	2016

Grading policy and procedures for all types of work
For the period of studying the discipline, the student gains points for the relevant parameters (per unit):
current score - 40 points
independent work - 20 points
control score (final assessment of knowledge per unit) - 40 points
Maximum score - 100 (40+20+40)

Grading system for student's achievements

Grading criteria per discipline				
Maximum score	Intervals			
	«unsatisfactory»	«satisfactory»	«good»	«excellent»
Current control – 40	0-23	24-30	31-35	36-40
Interval description	Does not know most of the relevant section of the material being studied, presents the material erratically and uncertainly	Presents the material incompletely and allows for inaccuracies in defining concepts	Gives an answer that meets the same requirements as for an "excellent" rating, but makes 2-3 errors	Completely presents the studied material, gives correct definitions of concepts;
Independent work – 20	0-11	12-15	16-17	18-20
Interval description	The topic is not covered, does not correspond to the plan, indicates superficial knowledge	The material is presented quite logically, but there are some irregularities in the sequence of expression of thoughts;	2-3 inaccuracies in the content, minor deviations from the topic are allowed	Excellent knowledge of the topic, targeted analysis of the material, correct conclusions and generalizations;
Control work (module) – 40	0-23	24-30	31-35	36-40
Interval description	Number of correct answers < 60%	Number of correct answers 60-75%	Number of correct answers 76-89%	Number of correct answers 90-100%
TOTAL – 100	0-59	60-75	76-89	90-100

Conduct Policy: (lateness, absence, behavior in the auditorium, late submission of work).
- Punctuality and completion of tasks.
- Mandatory attendance of classes.
- Attending class in a clean medical uniform.
- Eliminating conversations on a cell phone in the classroom.
- Active participation in the learning process.
- Doing homework on time.
- Academic detention at the time specified by the teacher.

For violations of the Conduct Policy, the total points for discipline might be reduced to 1-10 points.

Academic Ethics Policy.
- Be tolerant, respect the opinions of others.
- Formulate objections in the correct form.
- Constructively support feedback in all classes.
- Plagiarism and other forms of dishonest work are unacceptable. Plagiarism includes the following: the absence of references when using printed and electronic materials, quotes, thoughts and works of other authors or students.
- Prompting and cheating during tests, exams, classes is unacceptable as well as passing an exam for another student, unauthorized copying of materials.

For violations of the Academic Ethics Policy, the total points for the discipline may be reduced to 1-10 points.

Guidelines for the practical classes of the discipline
PROGRAM CONTENT OF UNIT № 1
Topic 1. Key questions covered in Lecture №1 "Introduction to pathology. Methods of study of the pathological anatomy."
1. The subject of pathological anatomy.
2. Theoretical foundations of pathological anatomy, and their historical roots.
3. Organophile and nosology. Definition of the nature of disease, the concept of their etiology, pathogenesis and pathomorphism.
4. Death – definition, classification, clinical and biological signs of death.
5. The concept of tanatogenesis and intensive care.

Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 2. Key questions covered in Practical class №1 "Introduction to pathology. Methods of study of the pathological anatomy. Experimental methods in pathological physiology.

1. Methods for the study of pathological anatomy.
2. The autopsy of the dead corpses as a method of studying the nature of disease, clinical and anatomical analysis.
3. Death – definition, classification, clinical and biological signs of death.
4. Biopsy, its importance for in vivo detection and dynamic study of the disease. The types of biopsy.
5. Preparation of microscope to work.
6. Viewing histological preparations under the microscope.
7.Test control of level of knowledge.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №3. Key questions covered in Lecture №2«Typical pathological processes, reactions, conditions. General etiology and pathogenesis. »

1. Basic concepts and terms of pathophysiology
2. General nosology, typical pathological process, pathological reaction, pathological condition.
3. Health, disease, stages of the disease, outcomes of the disease, death and types of death.
4. The concept of etiology and pathogenesis. components of pathogenesis

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill

Topic №4. Key questions covered in Practical class №2 «General nosology, characteristic of disease periods. Term-typical pathological process. Main principles of pathogenesis study. »

1.The definition of " etiology", types of causes of the disease
2. General nosology, typical pathological process, pathological reaction, pathological condition.
3.Health, disease, stages of the disease, outcomes of the disease, death and types of death.
4.The concept of etiology and pathogenesis. components of pathogenesis
5.Laboratory work.

- Action of acceleration on mouse.
- Test with physical load.

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill

Topic №5. Key questions covered in Lecture №3 «Cell injury. »

1. Causes of cell injury: exo- and endogenous; physical; chemical,biological and mechanical.
2. General mechanisms of cell injury. Injury of membranes and enzymes of cell: role of membrane binding phospholipase and hydrolase of lysosomes in cell injury; significance of lipid peroxidation (LPO) in cell injury.
3. Disorder of intracellular mechanisms of cell function regulation. Role of secondary messengers. Disorders of energy supply mechanisms.
4. Mechanisms of hypoxic (ischemic) and reperfusion cell injury. Significance of ionic imbalance of sodium, potassium, calcium, and water in mechanisms of cell injury.
5. Reversible and irreversible, specific and nonspecific manifestations in cell injury. Apoptosis, its significance in norm and pathology.

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016

3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5. 1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6. 2.Mohan H. Textbook of Pathology. 2019.
7. 3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8. 4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №6. Key questions covered in Practical class №3 «Death. Classification. Types. »

1. Definition of death.
2. Classification of death.
3. Determining of signs of clinical and biological death.
4. Signs of biological death.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №7. Key questions covered in Lecture №4 « Necrosis. Apoptosis. »

1. Definition of necrosis
2. Morphogenesis of necrosis.
3. Microscopic morphology of changes in tissues and organs.
4. Gross morphology of changes in tissues and organs.
5. Outcomes of necrosis
6. A practical part. Description of grossly: "Gangrene of foot", "Gray softening of the brain", "The Scar of the myocardium after a heart attack". Diagnosis and drawing of the microscope slide: " Caseous necrosis of the lymph node", "Ischemic infarction of the kidney, “Ischemic acute tubule necrosis".

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №8. Key questions covered in Practical class №4 « Protective, adaptive and pathological reactions of the organism in various forms of hypoxia»

1. The role of hypoxia in the pathogenesis of various diseases and pathological processes. Adaptation of organs and tissues to oxygen deficiency
2. Principles of classification of hypoxic conditions.
3. Types of hypoxia. Etiology and pathogenesis of the main types of hypoxia: exogenous, respiratory, circulatory, hematic, tissue.
4. Short-time and long-time adaptive reaction during hypoxia and their mechanisms. Typical disorders of metabolism. Cell structure, function, physiological systems during acute and chronic hypoxia.
5. Reversibility of hypoxic conditions. Effect of hypo- and hypercapnia for hypoxia. Pathophysiological characteristics of mountain hypoxia, mechanisms of lung and brain edema.

   Laboratory work.

   - Study of RBCs osmotic damage

   O2 content changes in different types of hypoxia (control tests, tasks)

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes. (Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill

Topic №9. Key questions covered in Practical class №5 « Cell injury: general information. Etiology and pathogenesis of typical cell injuries»

1. Causes of cell injury: exo- and endogenous; physical; chemical,biological and mechanical.
2. General mechanisms of cell injury. Injury of membranes and enzymes of cell: role of membrane binding phospholipase and hydrolase of lysosomes in cell injury; significance of lipid peroxidation (LPO) in cell injury.

3. Disorder of intracellular mechanisms of cell function regulation. Role of secondary messengers. Disorders of energy supply mechanisms.
4. Mechanisms of hypoxic (ischemic) and reperfusion cell injury. Significance of ionic imbalance of sodium, potassium, calcium, and water in mechanisms of cell injury.
5. Reversible and irreversible, specific and nonspecific manifestations in cell injury. Apoptosis, its significance in norm and pathology.

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill
5. 1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6. 2.Mohan H. Textbook of Pathology. 2019.
7. 3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8. 4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №9. Key questions covered in Practical class №6 « Reversible cell injury. Pathogenesis and morphology »
Recommended reading for this class:

9. Robbins Basic Pathology (10^{th} edition, 2018)
10. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
11. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
12. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill
13. 1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
14. 2.Mohan H. Textbook of Pathology. 2019.
15. 3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
16. 4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №10. Key questions covered in Practical class №7 « Irreversible cell injury. Pathogenesis and morphology of Necrosis. Outcomes. »

1. Definition of necrosis
2. Morphogenesis of necrosis.
3. Microscopic morphology of changes in tissues and organs.
4. Gross morphology of changes in tissues and organs.
5. Outcomes of necrosis

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №11. Key questions covered in Practical class № 8 « Apoptosis. Pathogenesis and morphology. Difference between necrosis and apoptosis. »

1.Definition of apoptosis
2. Morphology of apoptosis
3. Difference between necrosis and apoptosis

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Key questions covered in Practical class №9 « Control work of the unit»
List of questions for MCQ part of the final unit examination:

1. Subject, methods and questions of terminology in pathophysiology. Significance of experiment in study of pathophysiology.
2. Term «general nosology». Themes, studying in this part. Health as medical category. Definition of "health" (WHO"). Criteria of health.

3. Disease, pathological reaction, pathological process.
4. Typical pathological processes. Problems of ratio of injury and defensive adaptive reactions in development of disease.
5. Terminology "etiology", "cause", "condition". Role of causes and conditions in development of disease.
6. Significance of etiology from position of monocausalism and conditionalism. Definition of polyetiological disease.
7. Concept about pathogenesis. Cause-effect ratio in pathological processes. Leading unit in pathogenesis, positive and negative feedbacks. Vicious cycles.
8. Role of defense-adaptive and compensatory mechanisms in pathogenesis of disease.
9. Principles of disease classification. WHO classification. Stages of disease. Outcome of disease. Recovery complete and incomplete. Remission, recurrence and complications.
10. Causes and mechanisms of cell damage. Signs of reversible and irreversible cell damage.
11. Pathophysiological characteristics of apoptosis and necrosis, and their consequences.
12. Pathophysiological characteristic of cell adaptation to damage. Development of hypo- and hyperplasia, hypo- and hypertrophy.
13. Hypoxia definition. Pathophysiological characteristics of exogenous and endogenous types of hypoxia.
14. Short-time and long-time compensation mechanisms during hypoxia. Pathological changes in organs and tissues in hypoxia.
18. Methods for the study of pathological anatomy.
19. The autopsy of the dead corpses as a method of studying the nature of disease, clinical and anatomical analysis.
20. Death – definition, classification, clinical and biological signs of death.
21. Biopsy, its importance for in vivo detection and dynamic study of the disease. The types of biopsy.
22. Morphogenesis of necrosis.
23. Necrosis morphological changes in tissues and organs.
24. Morphological changes in tissues during apoptosis.
25. Difference between necrosis and apoptosis

PROGRAM CONTENTS UNIT № 2

Topic 1. Key questions covered in Lecture №1 "Typical disorders of protein metabolism. Etiology, pathogenesis, mechanisms of the main manifestations. Starvation. Specifics and consequences of starvation. Protein-energy malnutrition in children"

1. Role of proteins in human body
2. Disorder of protein digestion and absorption
3. Nitrogen balance
4. Disorder of plasma protein composition
5. Azotemia, types
6. Starvation, periods
7. Inborn errors in amino acids metabolism

Recommended reading for this class:

1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
2. Copstead Banasick. Pathophysiology.2013
3. Calor Mattson Porth. Essentials of pathophysiology.2019
4. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
5. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014
6. Mohan H. Textbook of Pathology. 2015
7. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic №2. Key questions covered in Lecture №2 «Intracellular accumulation.»

1. The concept of the human tissue (cellular) metabolism and forms of damage (alteration).
2. The classification of the intracellular accumulations.
3. Hereditary fermentopathy (sickness accumulation) and their significance in pathology of childhood.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №3. Key questions covered in Lecture №3 «Extracellular accumulation. »

1. Classification of extracellular accumulation.
2. Extracellular protein accumulation characteristics.
3. Extracellular fat accumulation characteristics.
4. Extracellular carbohydrate accumulation characteristics.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.

2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №4. Key questions covered in Lecture №4 «Typical disorders of lipid metabolism. Hyperlipidemia, ketonemia. Risk factors for atherosclerosis. Obesity, etiology, pathogenesis, consequences. »
1. Disorder of fats digestion
2. Disorder of intermediate fat metabolism
3. Hyperlipidemia, primary and secondary
4. Obesity, etiology and pathogenesis
5. Types of obesity
6. Clinical manifestations and complications of obesity
Recommended reading for this class:
1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
2. Copstead Banasick. Pathophysiology.2013
3. Calor Mattson Porth. Essentials of pathophysiology.2019
4. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
5. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014
6. Mohan H. Textbook of Pathology. 2015
7. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic №5. Key questions covered in Practical class № 1 «Intracellular accumulation. »
1. The classification of the intracellular accumulations.
2. The classification of the intracellular accumulations depending on the prevalence of violations of either type of exchange (protein, fat, carbohydrate, mineral).
3. The classification of the intracellular accumulations according to the influence of genetic factors (acquired, genetic) and distribution process (general, local).
4. A practical part. Description of grossly: "Fatty liver", "Colloid goiter". Diagnosis and drawing of the microscope slide: "Fatty degeneration of the myocardium", "Fatty liver", the "Hyaline droplet degeneration of the tubular epithelium of the kidney".
Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 6. Key questions covered in Practical class № 2« Extracellular accumulation. »
1. Extracellular protein accumulation: mucoid swelling, fibrinoid swelling, hyalinosis, and amyloidosis. Morphological characteristics, reasons, pathogenesis.
2. Extracellular fat accumulation: total obesity (obesity), emaciation (cachexia). Morphological characteristics, reasons, pathogenesis.
3. Extracellular carbohydrate accumulation. Morphological characteristics, reasons, pathogenesis.
4. A practical part. Description of grossly: "Hyalinosis of the capsule of the spleen", "Amyloidosis of kidney", "Obesity of the heart." Diagnosis and drawing of the microscope slide: "Hyalinosis of the ovary", "Amyloidosis of kidney" and «Obesity of the heart."
Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.
Topic 7. Key questions covered in Practical class №3 « Amyloidosis»
1.Deffinition of amyloidosis
2.Causes and pathogenesis of amyloidosis
3.Classification of amyloidosis
4.Morphology of amyloidosis

Recommended reading for this class:
1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
2. Copstead Banasick. Pathophysiology.2013
3. Calor Mattson Porth. Essentials of pathophysiology.2019
4. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
5. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014

6. Mohan H. Textbook of Pathology. 2015
7. John Wiley. Fundamentals of Applied Pathophysiology 2018
8. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic №8. Key questions covered in Practical class №4 « Pigmentations. Endogenous pigmentations. »
1. Metabolic chromoproteids.
2. Metabolic nucleoproteins.
3. Metabolic of minerals.
4. A practical part. Description of grossly: "Liver with hepatic jaundice", "Erosion of the gastric mucosa", " Metastasis of melanoma". Diagnosis and drawing of the microscope slide: "Gouty bump", " Melanosis of the skin", "Brown atrophy of the myocardium".

Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №9. Key questions covered in Practical class №5 « Pigmentations. Exogenous pigmentations. Pathological calcifications. »
1.Types of exogenous pigments
2.Calcification. Definition. Causes. Pathogenesis
3. Types of calcification

Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 10. Key questions covered in Lecture №5 "Environmental and nutritional diseases."
1.Introduction to environmental pathology. Factors. Classification
2.Air pollution
3.Tobacco smoking
4.Theraupetic (iatrogenic) drug injury
5.Non-theraupetic toxic agents
6.Carbon monoxide poisoning
7.Drug abuse

Recommended reading for this class:
1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
2. Copstead Banasick. Pathophysiology.2013
3. Calor Mattson Porth. Essentials of pathophysiology.2019
4. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
5. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014
6. Mohan H. Textbook of Pathology. 2015
7. John Wiley. Fundamentals of Applied Pathophysiology 2018
8. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic №11. Key questions covered in Lecture №6 « Pigmentations. Calcifications. »
1. Characteristics and classification of pigments.
2. General characteristics of metabolic pigments.
3. General characteristics of metabolic minerals.

Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №12. Key questions covered in Practical class №6 « Homeostasis. Etiology of acid-base balance disorders»
1. Disorders of the acid-base balance (ABB) regulation. Role of chemical (the buffer system) and physiological regulation (kidneys, lungs, and others).
2. Types of ABB disorders, their criteria.
3. Concept of compensated and uncompensated, absolute and relative acidosis and alkalosis.

4. Etiology and pathogenesis of respiratory acidosis and alkalosis.
5. Etiology and pathogenesis of metabolic acidosis and alkalosis renal and nonrenal origin.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №13. Key questions covered in Practical class №7 « Disorders of water-salt balance. Dehydration. Overhydration»

1.Pathology of the water-salt metabolism.
2. Hypo, hyperhydration, definition.
3.Types, etiology, pathogenesis, effects, criteria.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №15. Key questions covered in Practical class №8 « Edema. Types. Pathogenesis and morphology »

1. Edema. Causes, pathogenesis
2. Types, morphology, outcome.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic №16. Key questions covered in Practical class №9 « « Control work of the unit»

List of questions for MCQ part of the final unit examination:

1. Typical disorders of carbohydrate metabolism: the concept of hypoglycemia, hypoglycemic syndrome, hypoglycemic coma; hyperglycemia, types.
2. Disorders of body's tolerance to carbohydrates. Effects of hormone of α- and β-cells of pancreas and other hormones.
3. Insulin deficiency: pancreatic and extrapancreatic, absolute and relative. Role of GLUTs, insulin independent and insulin dependent tissues.
4. The concept of diabetes: primary (IDDM and NIDDM), secondary. The role of viruses and autoimmune processes in pathogenesis of beta – cells destruction in diabetes.
5. The pathogenesis basic biochemical (carbohydrate, protein, lipid, water and electrolyte metabolism, ABB) and clinical manifestations of diabetes mellitus: hyperglycemia, glycosuria, polydipsia, polyuria, etc.
6. Pathogenesis of macro- and microvascular complications in diabetes mellitus.
7. Diabetic ketoacidosis as a basis for the development of diabetic coma. Hypoglycemic coma (insulin shock) and its difference from a diabetic coma.
8. Experimental models of Diabetes mellitus. Role of scientists: Sobolev, Mering and Minkovsky in study of DM. Significance of insulin discovery by Banting and Best.
9. Typical disorders of protein metabolism. The etiology and pathogenesis of disorders of digestion and absorption of food proteins, amino acids and their consequences.
10. Pathology of protein metabolism. Concepts hypoproteinemia, albuminosis, Dysproteinemia, paraproteinemia.
11. Etiology and pathogenesis of hypoproteinemia. Consequences of hypoproteinemia.
12. Disorders of nitrogen balance as an indicator of the state of anabolism and catabolism of proteins.
13. Causes and mechanism of development of a positive and a negative nitrogen balance.
14. Concept of azotemia, types, causes. Disorder of uric acid metabolism.
15. Starvation. Types of Starvation. Exogenous and endogenous causes of Starvation.
16. Periods of Starvation and their pathophysiological characteristics.
17. Typical disorders of lipid metabolism: hyperlipidemia, atherosclerosis, steatorrhea, obesity, ketosis.
18. Modern views on etiopathogenesis of atherosclerosis. Role of lipid metabolism in atherosclerosis.
19. Obesity. Primary and secondary obesity. Etiology, pathogenesis.
20. Metabolism and physiological function in obesity.
21.The classification of the intracellular accumulations.
22. The classification of the intracellular accumulations depending on the prevalence of violations of either type of exchange (protein, fat, carbohydrate, mineral).
23. The classification of the intracellular accumulations according to the influence of genetic factors (acquired, genetic) and distribution process (general, local).

24. Extracellular protein accumulation: mucoid swelling, fibrinoid swelling, hyalinosis, and amyloidosis. Morphological characteristics, reasons, pathogenesis.
25. Extracellular fat accumulation: total obesity (obesity), emaciation (cachexia). Morphological characteristics, reasons, pathogenesis.
26. Extracellular carbohydrate accumulation. Morphological characteristics, reasons, pathogenesis.
27. Metabolic chromoproteids.
28. Metabolic nucleoproteins.
29. Metabolic of minerals
30.Disorders of the acid-base balance (ABB). Etiology, pathogenesis, criteria. The buffer system of the organism, the role of the kidneys, lungs, and others.
31. Concept of compensated and uncompensated, absolute and relative acidosis and alkalosis.
32. Etiology and pathogenesis of respiratory acidosis and alkalosis.Etiology and pathogenesis of metabolic acidosis and alkalosis renal and nonrenal origin.
33. Pathology of the water-salt metabolism. Hypo, hyperhydration, definition. Types, etiology, pathogenesis, effects, criteria.
34.Mechanism of development of various types of edema: hydrodynamic, oncotic, osmotic, and membranogenic and lymphogenic types.

PROGRAM CONTENTS UNIT № 3

Topic 1. Key questions covered in Lecture №1 "Disorders of local circulation. Typical forms of microcirculation, morphological and functional disorders in tissues. Thrombosis and embolism, as main causes of organic and tissue microcirculatory disorder. Etiology and pathogenesis of DIC"

1. Classification of local circulatory disorders
2.Types, causes and mechanisms of development of arterial hyperemia. Characteristic signs and consequences of arterial hyperemia.
3. Types, causes and mechanisms of development of venous hyperemia. Characteristic signs and consequences of venous hyperemia.
4.Types, causes and mechanisms of ischemia development. Characteristic signs and consequences of ischemia.
5. Thrombus and thrombosis concept. embolus and embolism
6. Causes and mechanisms of blood clot formation. Virchow's triad.
7. Types of emboli. The difference between gas embolism and air embolism.
8. Causes and mechanisms of development of DIC.

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill

Topic 2. Key questions covered in Lecture №2. "Etiology and pathogenesis of extreme and terminal states (collapse, shock, coma). Pathophysiological characteristic of changes in organs and systems at extreme states."

1. Concepts of extreme and terminal states: shock, coma, collapse.
2. Common mechanisms the body uses to regulate and maintain blood pressure in norm and pathology.
3. Types of shock according to etiology.
4. Typical pathogenesis of different types of shock.
5. Pathophysiological characteristic of shock stages.

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill

Topic 3. Key questions covered in Lecture №3. "Hemodynamic disorders-I: Hyperemia. Anemia. Edema. Hemorrhage. Ischemia."

1. The concept of common and local disorders of blood circulation, their interconnection, classification, value. Especially in children.
2. Edema. Causes, types, morphology, outcome.
3. Anemia. Causes, types, morphology, outcome.
4. Bleeding. Causes, types, morphology, outcome, significance.

Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 4. Key questions covered in Lecture №4. "Hemodynamic disorders-II: Thrombosis. Embolism. Infarction. Shock. "
1. Thrombosis. Causes, mechanism of clot formation. Local and General factors of thrombosis.
2. Embolism. Reasons, types, morphological characteristics, outcomes, and value of an embolism.
3. Infarct. Reasons, types, morphological characteristics, outcomes, and value of infarct.
4. Shock. Classification, causes, morphological changes, outcomes, and value of shock.
Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 5. Key questions covered in Practical class №1. "Hemodynamic disorders. Hyperemia, types. Etiopathogenesis and morphology"
1. Classification of local circulatory disorders
2. Types, causes and mechanisms of development of arterial hyperemia. Characteristic signs and consequences of arterial hyperemia. Causes, types, morphology.
3. Types, causes and mechanisms of development of venous hyperemia. Characteristic signs and consequences of venous hyperemia. Venous plethora: General and local, acute and chronic.
4. A practical part. Description of grossly: "Nutmeg liver,", "Pericardial tamponade", "Hemorrhages in the brain". Diagnosis and drawing of the microscope slide: "Petechial hemorrhages in the brain", "Brown indurate of lung", "Nutmeg liver".

Recommended reading for this class:
1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 6. Key questions covered in Practical class №2. "Hemodynamic disorders. Thrombosis. Etiopathogenesis and morphology"
1. Thrombus and thrombosis concept.
2. Causes and mechanisms of blood clot formation. Virchow's triad.
3. Thrombosis. Causes, mechanism of clot formation. Local and General factors of thrombosis.
4. The value of thrombosis.
5. Outcomes of thrombosis
6. A practical part. Description of grossly: "Mural thrombus of the left ventricle", "Mural thrombus of the aorta in atherosclerosis", "Melanoma metastases in liver." Diagnosis and drawing of the microscope slide: "Fresh blood clot artery", "Organized thrombus of the pulmonary artery".
Recommended reading for this class:
1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
2. Copstead Banasick. Pathophysiology.2013
3. Calor Mattson Porth. Essentials of pathophysiology.2019
4. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
5. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014
6. Mohan H. Textbook of Pathology. 2015
7. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic 7. Key questions covered in Practical class №3. "Hemodynamic disorders. Embolism. Etiopathogenesis and morphology"

1.Types of emboli. The difference between gas embolism and air embolism.
2. Orthograde, retrograde and paradoxical embolism. Pulmonary embolism.
3.Embolism. Reasons, types, morphological characteristics, outcomes, and value of an embolism.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 8. Practical class №4. "Hemodynamic disorders. Ischemia and infarction. Etiopathogenesis and morphology. Mechanism of stasis"

1. General and local disorders of blood circulation. Classification.
2. Ischemia. Causes, types, morphology, outcomes.
3.Infarction. Causes, types, morphology, outcomes
4. stasis. Causes. Pathogenesis
6. Bleeding external and internal hemorrhage. Causes, types, morphology, outcomes, value.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 9. Key questions covered in Practical class №5 "Hemodynamic disorders. Hemorrhage. Etiopathogenesis and morphology."

1. Hemorrhage. Causes, types, morphology
2. External and internal hemorrhage.
3. Outcomes, value of hemorrhage

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 10. Key questions covered in Practical class №6 "Shock. Etiology and classification. Pathogenesis of different types of shock (compensation)."

1. Concepts of extreme and terminal states: shock, coma, collapse.
2. Pathophysiologic characteristics of different types of shock.
3. Etiology and pathogenesis of hypovolemic shock.
4. Etiology and pathogenesis of distributive shock.
5. Etiology and pathogenesis of cardiogenic shock.
6. Etiology and pathogenesis of obstructive shock.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill

Topic 11. Key questions covered in Practical class №7 "Shock. Etiology and classification. Pathogenesis of different types of shock (decompensation)."
1. Pathophysiological characteristic of septic and toxic shock.
2.Typical disorders of organs and systems in different stages of shock.
3.Morphological changes of internal organs, the value, outcomes.
Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 12. Key questions covered in Practical class №8 "DIC-syndrome. Etiopathogenesis and morphology."
1.Defiition of DIC-syndrome
2. Etiology and pathogenesis of DIC-syndrome
3. Stages and complications of DIC-syndrome
Recommended reading for this class:
1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 13. Key questions covered in Practical class №9 "UNIT CONTROL-3."
List of questions for MCQ part of the final unit examination:
1.Arterial hyperemia, types, causes, mechanisms of development,
2.Signs (macro- and micro-), hemodynamics and lymph production, physiological and pathological significance, consequence of arterial hyperemia.
3.Venous hyperemia. Types, causes, mechanisms of development.
4.Signs (Macro- and micro-), hemodynamics and lymph flow, defense-adaptive and pathological significance, consequence of venous hyperemia.
5.Ischemia. Types, causes, mechanisms of development.
6.Signs (macro- and micro-), hemodynamics and lymph flow in ischemia. Factors, determining consequences of ischemia. Collateral circulation, types of collaterals, mechanisms of their opening.
7.Stasis. Etiology, pathogenesis, types. Significance of blood rheological properties disturbances and "sludge"-phenomenon in development of stasis. Adaptive defensive and pathological significance of stasis.
8.Thrombosis. Definition. Types of thromboses.
9.Causes, conditions and mechanisms of thrombosis. Physiological and pathological significance of thrombosis. Role and place of clotting in system of hemostasis. Fate of thrombus.
10.Consequences of arterial and venous thrombosis.
11.Embolism. Classification of emboli on nature of embolus and direction of its movement. Significance in pathology.
12.Thromboembolism. Peculiarities of etiology and pathogenesis of pulmonary embolism.
13.Etiology, pathogenesis and role of other types of emboli in pathology.
14.Etiology and pathogenesis of air and gas embolism. General and local disorders of blood circulation. Classification.
15.Swelling. Causes, morphological changes in tissues and organs. The value of the outcomes.
16. Hyperemia. Arterial hyperemia. Causes, types, morphology.
17.Venous plethora: General and local, acute and chronic.
18. Anemia. Causes, types, morphology, outcomes.
19. Bleeding external and internal hemorrhage. Causes, types, morphology, outcomes, value.
20. Plasmorrhea. Causes, mechanism of development, morphological characteristics.
21. Thrombosis. Causes, mechanism of clot formation. Local and General factors of thrombosis.

22. Thrombus, disseminated intravascular coagulation. The value of thrombosis.
23. Embolism. Reasons, types, morphological characteristics, outcomes, and value of an embolism.
24. Orthograde, retrograde and paradoxical embolism. Pulmonary embolism.
25. Shock. Types of shock, morphological changes of internal organs, the value, outcomes.
26.Pathophysiological characteristic of septic and toxic shock.
27.Etiology and pathogenesis of extreme and terminal states (collapse, shock, coma).
28.Pathogenetic classification of shock.
29.Etiology and pathogenesis of main types of shock.
30.Typical disorders of organs and systems in different stages of shock. Their pathogenesis

PROGRAM CONTENTS UNIT № 4

Topic 1. Key questions covered in Lecture №1 "Immunomorphology."

1. Morphology of the disorders of immunogenesis.
2. Changes in the thymus, peripheral lymphoid tissue in disorders of immunogenesis. Age and accidental involution (transformation), hypoplasia and hyperplasia of the thymus. Timiko-lymphatic state.
3. Hypersensitivity reactions immediate and delayed type, reactions transplantational immunity. Morphogenesis, morphological characteristics, communications with inflammation. Clinical significance.
4. Autoimmune disease. Etiology, mechanism of development, morphological characteristics. Classification: real autoimmune diseases and diseases with autoimmune disorders.
5. Immunodeficiency syndromes (primary and secondary). Clinical and morphological characteristics.
6. Inflammation on the immune basis of allergic, or immune, inflammation

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 2. Key questions covered in Lecture №2 "Pathophysiology of reactivity and resistance. Role of barrier system in development of disease."

1. Reactivity, definition, types and their characteristics in norm and pathology.
2. Resistance as defenses of human body and role in pathology.
3. Role of skin and mucous linings barriers in pathology.
4. General Adaptation Syndrome of Hans Selye as example of nonspecific reactivity.
5. Characteristics of complement system factors in defenses of human body and role in pathology.
6. Pathophysiology of process of phagocytosis: disorders in phagocytic cells and inability of engulfed agent digestion by phagocytes.

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill

Topic 3. Key questions covered in Lecture №3 "Pathophysiology of immune responce. Classification of allergic reactions. Etiology and pathogenesis of I-IV types of hypersensitivity."

1. Pathophysiology of immune response.
2. Allergy (hypersensitivity) and anaphylaxis. Definition. Common and different features of allergy and immune response.
3. Etiology of allergy. Classification of allergens: extrinsic and intrinsic allergens, their characteristics.
4. Stages of allergic reactions
5. Pathophysiologic characteristics of anaphylaxy stages. Active and passive sensitization.

Pathogenesis of anaphylactic shock. Experimental anaphylaxis in different species of mammals
6. The concept of immediate and delayed hypersensitivity.
7. Etiology and pathogenesis of I type of allergic reactions.
8. Etiology and pathogenesis of II type of allergic reactions (cytotoxic).
9. Etiology and pathogenesis of II type of allergic reactions (cytotoxic).
10. Etiology and pathogenesis of hypersensitivity type III (immunecomplexed). Outcome of immune complexes in norm. Reasons of disorders of immune complexes clearance in pathology.
11. Etiology and pathogenesis of IV type of allergic reactions. Delayed hypersensitivity, T-cell mediated hypersensitivity: tuberculin, contact, granulomatous types

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill

Topic 4. Key questions covered in Lecture №4 "Immune deficiency, isoimmunity conditions, autoimmune diseases. Etiology and pathogenesis."

1. Pathophysiology of immunodeficiency. Pathophysiologic characteristics of combined B-cell and T-cell immunodeficiency. X linked and autosomal recessive.
2. Pathophysiologic characteristics of primary B cell-mediated and primary Tcell- mediated immunodeficiencies. Etiology and pathogenesis DiGeorge syndrome, Bruton disease etc.
3. Secondary immunodeficiency. Etiology and pathogenesis of acquired immunodeficiency syndrome - AIDS.Pathophysiologic characteristics of HIV infection.
4. Pathophysiology of isoimmunity. Concept of transplant immunity. Etiology and pathogenesis of HVGD - host-versus-graft and GVHD - graft -versus- host diseases.
5. Pathophysiologic characteristics of autoimmune diseases. Pathological immune tolerance.
6. Possible mechanism of two types of autoimmune disorders development:outside and inside immune system

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill

Topic 5. Key questions covered in Practice class №1 "Pathophysiology of reactivity. Disorders of local and systemic defenses."

1. Reactivity, definition, types and their characteristics in norm and pathology.
2. External and internal factors, which influence to reactivity. Role of reactivity in development diseases.
3. Resistance as defenses of human body and role in pathology.
4. Role of skin and mucous linings barriers in pathology.
5. General Adaptation Syndrome of Hans Selye as example of nonspecific reactivity.
6. Three stages of General Adaptation Syndrome and their characteristics.
7. The influence of conditions of external and internal barrier systems for development of disease.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill

Topic 6. Key questions covered in Practice class №2 "Pathophysiology of phagosytosis and complement system, causes and consequences."

1. Role of reactivity and resistance in occurrence, development and outcome of disease.
2. Types of reactivity and resistance.
3. Significance of exogenous barrier in resistance and its disorders.
4. Stages of phagocytosis and its typical disorders.
5. Disorders in phagocytic system: congenital and acquired, mechanism of development, consequences.
6. Disorder in complement system, causes, mechanism of development, consequences.
7. Significance of Selye adaptation syndrome in pathology.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill

Topic 7. Key questions covered in Practice class №3 "Immune response. Mechanism of immune responses. ."

1.Morphology of the disorders of immunogenesis.
2. Changes in the thymus, peripheral lymphoid tissue in disorders of immunogenesis. Age and accidental involution (transformation), hypoplasia and hyperplasia of the thymus. Timiko-lymphatic state.
3. A practical part. Description of grossly: “Thymomegaly”, «Thyroid gland in Graves disease». Diagnosis and drawing of the microscope slide: "Acute rheumatic myocarditis", “Hashimoto thyroiditis”.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 8. Key questions covered in Practice class №4 “Experimental anaphylaxis, stages. Types of sensitization and desensitization. Types of allergic reactions.”

1. Concepts of immune response disorders.
2. Allergy (hypersensitivity). Definition. Incidence of allergy.
3. Etiology of allergic reactions. Definition of allergens and haptens.
4. Classification of allergens: exogenous and endogenous, its characteristics.
5. Experimental anaphylaxis. Pathophysiological characteristics of anaphylaxis stages.
6. Definition of sensitization. Types of sensitization: active and passive.
7. Definition of hypo-, and desensitization. Types of desensitization: specific, nonspecific.
8. Classification of allergic reactions. Stages of allergy development, their mechanisms and general characteristics. Terms HIT (hypersensitivity of immediate type) and HDT (hypersensitivity of delayed type).

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill

Topic 9. Key questions covered in Practice class №5 “Pathophysiological characteristics I,II,III and IV types of hypersensitivity .”

1.Definition of hypersensitivity I type. Etiology and pathogenesis of atopic and anaphylactic reactions. Role in pathology. Mechanisms of genetic predisposition, peculiarities of allergens and antibodies. Reagins, pathogenic and defensive aspects of IgE action in organism. Role of mast cells in anaphylactic reactions.
2.Definition of hypersensitivity II type. Etiology and pathogenesis of cytotoxic reactions, their role in pathology. Peculiarities of allergens, antibodies and mechanisms of response. Consequences of interaction of cells with cytotoxic autoantibodies. Role of complement system, antibody dependent cellular toxicity, opsonin dependent phagocytosis. Examples of autoimmune and isoimmune destructive cytotoxic reactions in disease.
3. Definition of hypersensitivity III type. Etiology and pathogenesis of immune complex reactions, its role in pathology. Types of immune complex reactions: immune conflict of mother and fetus, its main forms and consequences, serum sickness, Arthus phenomenon and other.
4. Hypersensitivity of delayed type (IV type). Peculiarities of sensitization and response in HDT. Comparative characteristic of its types. Mechanisms of contact dermatitis, tuberculin reactions and granulomatous hypersensitivity.
5. Hypersensitivity reactions immediate and delayed type, reactions transplantational immunity. Morphogenesis,

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 10. Key questions covered in Practice class №6 "Autoimmunity. Isoimmunity. Transplant rejection. Graft-versus-host disease (GHVD), Host-versus-graft (HVGD). Pathogenesis and morphology"

1.Etiology and pathogenesis of autoimmune disease with disorders outside immune system.
2.Etiology and pathogenesis of autoimmune disease with disorders inside immune system.
3.Pathophysiologic characteristics of isoimmunity.
4.Pathophysiology of isoimmunity during pregnancy. Etiology and pathogenesis of hemolytic disease of newborns.
5. Pathophysiology of isoimmunity in tissue and organs transplantation.
6.Etiology and pathogenesis of host versus graft disease (HVGD) and graft versus host disease (GVHD).
7.Autoimmune disease. Etiology, mechanism of development, morphological characteristics. Classification: real autoimmune diseases and diseases with autoimmune disorders.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 11. Key questions covered in Practice class №7 "Primary immunodeficiency. Pathogenesis and morphology"

1. Immune deficiency conditions. Principles of classification. Primary and secondary immune deficiency.
2. Etiology and pathogenesis of combined immune deficiency.
3. Etiology and pathogenesis of congenital immune deficiency in T-lymphocytes and its consequences.
4. Etiology and pathogenesis of congenital immune deficiency in B-lymphocytes and its consequences.
5. .Immunodeficiency syndromes. Clinical and morphological characteristics

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 12. Key questions covered in Practice class №8 "Secondary immunodeficiency. Pathogenesis and morphology"

1. Immunodeficiency syndromes. Clinical and morphological characteristics.
2.Secondary immune deficiency, types, causes and mechanisms of development, examples

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 11. Key questions covered in Practice class №7 "UNIT CONTROL-4."
List of questions for MCQ part of the final unit examination

1. Role of reactivity and resistance in occurrence, development and outcome of disease.
2. Types of reactivity and resistance.
3. Significance of exogenous barrier in resistance and its disorders.
4. Stages of phagocytosis and its typical disorders.
5. Disorders in phagocytic system: congenital and acquired, mechanism of development, consequences.
6. Disorder in complement system, causes, mechanism of development, consequences.
7. Significance of Selye adaptation syndrome in pathology.
8. Concepts of immune response disorders.
9. Allergy (hypersensitivity). Definition. Incidence of allergy.
10. Etiology of allergic reactions. Definition of allergens and haptens.
11. Classification of allergens: exogenous and endogenous, its characteristics.
12. Experimental anaphylaxis. Pathophysiological characteristics of anaphylaxis stages.
13. Definition of sensitization. Types of sensitization: active and passive.
14. Definition of hypo-, and desensitization. Types of desensitization: specific, nonspecific.
15. Classification of allergic reactions. Stages of allergy development, their mechanisms and general characteristics. Terms HIT (hypersensitivity of immediate type) and HDT (hypersensitivity of delayed type).
16. Definition of hypersensitivity I type. Etiology and pathogenesis of atopic and anaphylactic reactions. Role in pathology. Mechanisms of genetic predisposition, peculiarities of allergens and antibodies. Reagins, pathogenic and defensive aspects of IgE action in organism. Role of mast cells in anaphylactic reactions.
17. Definition of hypersensitivity II type. Etiology and pathogenesis of cytotoxic reactions, their role in pathology. Peculiarities of allergens, antibodies and mechanisms of response. Consequences of interaction of cells with cytotoxic autoantibodies. Role of complement system, antibody dependent cellular toxicity, opsonin dependent phagocytosis. Examples of autoimmune and isoimmune destructive cytotoxic reactions in disease.
18. Definition of hypersensitivity III type. Etiology and pathogenesis of immune complex reactions, its role in pathology. Types of immune complex reactions: immune conflict of mother and fetus, its main forms and consequences, serum sickness, Arthus phenomenon and other.
19. Hypersensitivity of delayed type (IV type). Peculiarities of sensitization and response in HDT. Comparative characteristic of its types. Mechanisms of contact dermatitis, tuberculin reactions and granulomatous hypersensitivity.
20. Immune deficiency conditions. Principles of classification. Primary and secondary immune deficiency.
21. Etiology and pathogenesis of combined immune deficiency.
22. Etiology and pathogenesis of congenital immune deficiency in T-lymphocytes and its consequences.
23. Etiology and pathogenesis of congenital immune deficiency in B-lymphocytes and its consequences.
24. Secondary immune deficiency, types, causes and mechanisms of development, examples.
25. Etiology and pathogenesis of autoimmune disease with disorders outside immune system.
26. Etiology and pathogenesis of autoimmune disease with disorders inside immune system.
27. Pathophysiologic characteristics of isoimmunity.
28. Pathophysiology of isoimmunity during pregnancy. Etiology and pathogenesis of hemolytic disease of newborns.
29. Pathophysiology of isoimmunity in tissue and organs transplantation.
30. Etiology and pathogenesis of host versus graft disease (HVGD) and graft versus host disease (GVHD).

PROGRAM CONTENTS UNIT № 5

Topic 1. Key questions covered in Lecture №1 "Inflammation. General pathology. Acute inflammation."

1. Inflammation. Definition. Essence and biological significance of inflammation.
2. Features of inflammation during embryogenesis, fetogenesis, birth.
3. The modern theory of inflammation.
4. Inflammatory mediators: plasma and tissue. Kinetics of the inflammatory response.
5. Classification of inflammation.
6. Acute inflammation.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 2. Key questions covered in Lecture №2 "Chronic inflammation."

1. Chronic inflammation, its types: interstitial (interstitial), granulomatous.
2. Inflammation with formation of polyps and genital warts. Causes, mechanism of development, morphological characteristics, outcomes.
3. The kinetics of granulomatosis. Causes, mechanism of development.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.

3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 3. Key questions covered in Lecture №3 "Inflammation. Etiology, pathogenesis, stages, signs. Role of mediators during inflammation."

1. Definition of Inflammation- the major typical pathological process, etiology and pathogenesis.
2. Pathophysiologic characteristics of Inflammation stages.
3. Role of plasma and cell derived mediators in pathogenesis of alteration in Inflammation.
4. Permeability of the blood vessels changes during inflammation, etiology, pathogenesis, stages.
5. Vascular changes during inflammation. Causes, stages and mechanisms of development. Chonheim's experiment.
6. Pathophysiologic characteristics of local and systemic signs of Inflammation.

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill

Topic 4. Key questions covered in Lecture №4 "Mechanism of exudation, emigration and proliferation during inflammation."

1. Mechanisms of exudation. Role of vascular and tissular factors in pathogenesis of inflammatory edema.
2. Types of exudates, their pathophysiological characteristics.
3. Stages of leukocytes emigration to inflammatory center. Mechanisms of margination and diapedesis of leukocytes.
4. Role of leukocytes and endothelial cells interaction. Adhesion molecules, their functions, role in inflammation.
5. Mechanisms of leukocytes chemotaxis to inflammatory center, their role in phagocytosis.
6. Role of macrophages for development and proliferation of fibroblasts during inflammation.

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill

Topic 5. Key questions covered in Lecture №5 "Fever as a typical pathological process. Etiology of fever, pathogenesis, stages."

1. Fever, definition. Fever as a typical pathological process.
2. Etiology of fever. A role of exo-and endogenous pyrogens in development of fever, their characteristics.
3. Significance of the thermoregulation changes in fever development.
4. Mechanism of the body temperature increase in fever.
5. Pathophysiologic characteristics of fever stages.
6. Significance of febrile reactions in the pathology. Mechanism of protection action of Fever.

Recommended reading for this class:

1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill

Topic 6. Key questions covered in Lecture №6 "General pathology of infectious diseases."

1.Introduction. Types of coexistence of microorganism and the human body
2. Clinico-morphological characteristic of infectious diseases
3. Classification of infectious diseases

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 7. Key questions covered in Lecture №7 "Infectious process. Etiology, pathogenesis. Typical mechanism of viral infection."

1. Definition of infectious process (IP) as a typical pathological process.
2. Common etiology of infectious process, pathophysiological characteristics of pathogens.
3. The types of host body and micro-organisms interaction.
4. Common characteristic of predisposing factors to infectious process.
5. Typical pathogenesis of infectious process.
6. Pathophysiological characteristics of the typical manifestations and complications of infectious process.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill

Topic №8. Key questions covered in Lecture №8 « Adaptation. »

1. Adaptation. The definition of the concept. Classification.
2. Hypertrophy – definition, morphology, significance, outcome.
3. Atrophy – definition, morphology, significance, outcome.
4. Hyperplasia – definition, morphology, significance, outcome.
5. Metaplasia – definition, morphology, significance, outcome.
6. Dysplasia – definition, morphology, significance, outcome.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 9. Key questions covered in Lecture №9 "Tissue repair."

1. Regeneration. Definition, essence and biological significance of regeneration.
2. Types of regeneration.
3. Regeneration of certain tissues and organs.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 10. Key questions covered in Practice class №1 "Inflammation, etiology and pathogenesis of inflammation. Stages, local and systemic signs of inflammation."

1. Inflammation, definition, etiology and pathogenesis.
2. Etiology and pathogenesis of primary alteration.
3. Etiology and pathogenesis of secondary alteration. Role of plasma and cell derived mediators in pathogenesis of alteration.
4. Physical and chemical changes in the center of inflammation, as factors of secondary alteration. Positive and negative effects of acidosis, hyperosmosis, hyperoncosis in the center of inflammation.
5. Vascular changes during inflammation. Causes, stages and mechanisms of development. Chonheim's experiment.
6. Local signs of inflammation. Pathogenesis of redness, increasing of local temperature, swelling, pain and disfunction.
7. Common symptoms of inflammation. Acute phase response (pre-immune response). Significance of acute phase proteins during inflammation. Prodromal syndrome.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill

Topic 11. Key questions covered in Practice class №2 . "Typical microcirculation disorders during inflammation."

1.Vascular changes during inflammation. Causes, stages and mechanisms of development. Chonheim's experiment.
2.Mechanisms of exudation. Permeability of the blood vessels during inflammation. Pathogenesis of inflammatory edema.

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 12. Key questions covered in Practice class №3 "Morphology of acute inflammation. Mechanism of exudation, types"

1.The etiology and pathogenesis of inflammation. Humoral and nervous regulation factors, inflammation and immunity.
2. Morphology of inflammation: alteration, exudation and proliferation.
3.Types of exudates, their chemical and morphological composition.
4.Mechanisms of emigration, pavementing and diapedesis of leukocytes to the centre of Inflammmation.
5.Role of leukocytes and endothelial interaction. Adhesion molecules, their functions, role in inflammation.
6.Mechanisms of chemotaxis, role in phagocytosis. Significance of phagocytosis during inflammation. Congenital and acquired disorders of phagocytosis and their consequences.
7.Acute inflammation, its types: serous, fibrinous (croupous, dipteridaceae), purulent (a phlegmon, abscess), putrefactive, hemorrhagic, catarrhal, mixed.
8.A practical part. Description of grossly: "Fibrinous pericarditis", "Phlegmonous appendicitis", "Purulent leptomeningitis". Diagnosis and drawing of the microscope slide: "Fibrinous pericarditis", "Lobar pneumonia", "Embolic pyogenic nephritis".

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 13. Key questions covered in Practice class №4 3 "Morphology of chronic inflammation. Mechanism of proliferation."

1. Chronic inflammation, its types: interstitial (interstitial, granulomatous, inflammation with formation of polyps and genital warts. Causes, mechanism of development, morphological characteristics, outcomes.
2. The kinetics of granulomatosis. Causes, morphogenesis, classification of granulomas.
3. Nosological characteristics of specific granulomas in tuberculosis, syphilis, leprosy, scleroma, Sapa. The morphology of tissue reactions. Characterization of the structure of the granulomas in tuberculosis, syphilis, leprosy, scleroma and Sapa.
4.Role of macrophages for development and proliferation of fibroblasts during inflammation.
5.Regeneration and fibroplasia in the outcome of inflammation.
4. A practical part. Description of grossly: "Echinococcus cyst of the liver", "Miliary tuberculosis of the spleen". Diagnosis and drawing of the microscope slide: "Miliary tuberculosis of lung", "Liver alveococcosis".

Recommended reading for this class:

1. Robbins Basic Pathology (10th edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2nd course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2nd , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.

7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 14. Key questions covered in Practice class №5 "Role of pyrogens. Pathogenesis of fever stages."
1. Fever. Definition.
2. Etiology of Fever. The role of exogenous and endogenous pyrogens.
3. Pathogenesis of increase of body temperature during Fever.
4. Stages of Fever. Meaning of thermoregulation changes in each stage of Fever.
5. Fever Classification according to etiology, level of temperature and types of temperature curves.
6. Differences between Fever and Overheating.
7.Significance of febrile reactions in the pathology. Mechanism of protection action of Fever.

Recommended reading for this class:
1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill

Topic 15. Key questions covered in Practice class №6 "General pathology of the infectious diseases."
1.Introduction. Types of coexistence of microorganism and the human body
2. Clinico-morphological characteristic of infectious diseases
3. Classification of infectious diseases
4.The concept of an infectious process (IP): types, transmission, routes, portal of entry etc.
5.Etiology and pathogenesis of IP.
6.Pathophysiological characteristics of typical macro- and micro-organism relationships.
7.Stages of pathogenesis of IP and their characteristics: approximation (distribution), adhesion, colonization, penetration.
8.Pathophysiologic characteristics of virulent factors: toxins, adhesive, invasive, evasive factors, their role in IP.
9.Pathophysiologic characteristics of host barrier system in development of IP.
10. Etiology and pathogenesis of viral infection.

Recommended reading for this class:
1. Robbins Basic Pathology (10^{th} edition, 2018)
2. General Nosology. Typical pathological processes.(Part II). Methodical recommendation for foreign students of 2^{nd} course.-2016
3. Essentials of pathophysiology. By Carol Mattson Porth.- Publisher: Lippincott Williams & Wilkins; 2 edition (February 1, 2006)
4. Pathophysiology: PreTest Self-Assessment and Review (2^{nd} , 2002).-McGraw Hill
5.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
6.Mohan H. Textbook of Pathology. 2019.
7.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
8.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 16. Key questions covered in Practice class №7 "Adaptation."
1. Adaptation. The definition of the concept. Classification.
2. Hypertrophy – definition, morphology, significance, outcome.
3. Atrophy – definition, morphology, significance, outcome.
4. Hyperplasia – definition, morphology, significance, outcome.
5. Metaplasia – definition, morphology, significance, outcome.
6. Dysplasia – definition, morphology, significance, outcome.

Recommended reading for this class:
1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 17. Key questions covered in Practice class №8 "Tissue repair."
1. Regeneration. Morphogenesis of the regenerative differentiation.
2. Types of regeneration: physiological, reparative, pathological.
3. Healing – definition, concept, types, morphology, significance.
4. The healing and regeneration of certain tissues and organs – connective, bone, nervous, muscle tissues, mucous membranes, and parenchymatous organs.

5. A practical part. Description of grossly: “Postinfarction myocardial scar”. Diagnosis and drawing of the microscope slide: "Granulation tissue", “Postinfarction myocardial scar”.

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015.

Topic 17. Key questions covered in Practice class №9 “UNIT CONTROL-5.”

List of questions for MCQ part of the final unit examination:

1. Inflammation, definition, etiology and pathogenesis.
2. Etiology and pathogenesis of primary alteration.
3. Etiology and pathogenesis of secondary alteration. Role of plasma and cell derived mediators in pathogenesis of alteration.
4. Physical and chemical changes in the center of inflammation, as factors of secondary alteration. Positive and negative effects of acidosis, hyperosmosis, hyperoncosis in the center of inflammation.
5. Vascular changes during inflammation. Causes, stages and mechanisms of development. Chonheim’s experiment.
6. Local signs of inflammation. Pathogenesis of redness, increasing of local temperature, swelling, pain and disfunction.
7. Common symptoms of inflammation. Acute phase response (pre-immune response). Significance of acute phase proteins during inflammation. Prodromal syndrome.
8. Mechanisms of exudation. Permeability of the blood vessels during inflammation. Pathogenesis of inflammatory edema.
9. Types of exudates, their chemical and morphological composition.
10. Pathophysiological characteristics of purulent inflammation.
11. Mechanisms of emigration, margination and diapedesis of leukocytes to inflammatory center.
12. Role of leukocytes and endothelial interaction. Adhesion molecules, their functions, role in inflammation.
13. Mechanisms of leukocytes chemotaxis, role in phagocytosis. Significance of phagocytosis during inflammation. Congenital and acquired disorders of phagocytosis and their consequences.
14. Role of macrophages for development and proliferation of fibroblasts during inflammation.
15. Regeneration and fibroplasia in the outcome of inflammation.
16. Fever. Definition.
17. Etiology of Fever. The role of exogenous and endogenous pyrogens.
18. Pathogenesis of increase of body temperature during Fever.
19. Stages of Fever. Meaning of thermoregulation changes in each stage of Fever.
20. Fever Classification according to etiology, level of temperature and types of temperature curves.
21. Differences between Fever and Overheating.
22. Significance of febrile reactions in the pathology. Mechanism of protection action of Fever.
23. The concept of an infectious process (IP), types, etiology and pathogenesis.
24. Types relationship macro- and micro-organisms.
25. Stages of pathogenesis of IP and their characteristics: approximation (distribution), adhesion, colonization, penetration.
26. Pathophysiological characteristic of viral infection.
27. The etiology and pathogenesis of inflammation. Humoral and nervous regulation factors, inflammation and immunity.
28. Morphology of inflammation: alteration, exudation and proliferation.
29. Acute inflammation, its types: serous, fibrinous (croupous, dipteridaceae), purulent (a phlegmon, abscess), putrefactive, hemorrhagic, catarrhal, mixed.
30. Chronic inflammation, its types: interstitial (interstitial, granulomatous, inflammation with formation of polyps and genital warts. Causes, mechanism of development, morphological characteristics, outcomes.
31. The kinetics of granulomatosis. Causes, morphogenesis, classification of granulomas.
32. Nosological characteristics of specific granulomas in tuberculosis, syphilis, leprosy, scleroma, Sapa. The morphology of tissue reactions. Characterization of the structure of the granulomas in tuberculosis, syphilis, leprosy, scleroma and Sapa.
33. Regeneration. Morphogenesis of the regenerative differentiation.
34. Types of regeneration: physiological, reparative, pathological.
35. Healing – definition, concept, types, morphology, significance.
36. The healing and regeneration of certain tissues and organs – connective, bone, nervous, muscle tissues, mucous membranes, and parenchymatous organs.
37. Adaptation. The definition of the concept. Classification.
38. Hypertrophy – definition, morphology, significance, outcome.

39. Atrophy – definition, morphology, significance, outcome.
40. Hyperplasia – definition, morphology, significance, outcome.
41. Metaplasia – definition, morphology, significance, outcome.
42. Dysplasia – definition, morphology, significance, outcome

PROGRAM CONTENTS UNIT № 6

Topic 1. Key questions covered in Lecture №1 "Neoplasia. General pathology."

1. Tumor. Definition.
2. The morphogenesis and histogenesis of tumors. Types of growth and structure of tumors.
3. The modern theory of tumor growth.
4. Modern classification of tumors

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015

Topic 2. Key questions covered in Lecture №2 "Epithelial tumors. Melanocytic tumors."

1. Epithelial tumors (organo nonspecific) – definition, types, importance.
2. Benign epithelial (organo nonspecific) tumors – definition, types, morphology.
3. Cancer – definition, types, morphology.
4. Melanocytic tumors (benign and malignant) - definition, classification, morphology

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015

Topic 3. Key questions covered in Lecture №3 "Mesenchymal tumors. Tumors in children."

1. Mesenchymal tumors (benign and malignant) – definition, classification, morphology
2. Tumor in children. Classification, morphology

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015

Topic 4. Key questions covered in Lecture №4 "Pathophysiology of tissue growth. Benign and malignant tumors. Etiology, pathogenesis, stages"

1. Neoplasia definition, classification
2. Etiology of tumor
3. Pathogenesis of tumor
4. Clinical manifestations of tumor
5. Complications

Recommended reading for this class:

1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
1. Copstead Banasick. Pathophysiology.2013
2. Calor Mattson Porth. Essentials of pathophysiology.2019
3. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
4. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014
5. Mohan H. Textbook of Pathology. 2015
6. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic 5. Key questions covered in Practice class №1 "Neoplasia. General pathology."

1. Tumor. The definition of the concept. The etiology of tumors. The modern theory of tumor growth.
2. Morphogenesis and histogenesis of tumors.
3. The structure of the tumor and the properties of tumor cells. Morphological manifestations of the tumor.
4. Benign or malignant tumor. Criteria of malignancy.
5. Metastasis, types, patterns. The concept of relapse. Secondary changes in tumors.
6. Modern classification of tumors. The principles of its construction.

7. A practical part. Description of grossly: "Leiomyoma of uterus", "Carcinoma of the lung", "Metastases of the gastric carcinoma in the liver.". Diagnosis and drawing of the microscope slide: "Squamous papilloma of skin", "Metastases of the gastric carcinoma the liver».

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015

Topic 6. Key questions covered in Practice class №2 "Carcinogenesis. Pathophysiology of tumor growth."

1.The definition of "neoplasia". Specifics of tumor growth (malignant proliferation, clonal nature of metaplasia, invasiveness).
2. Differences between benign and malignant tumors.
3.Etiology of tumor growth. Theory of carcinogenesis: oncogenic viruses, chemical carcinogenic factors, radiation. Role of endogenous factors: chromosomal abnormalities, immune suppression, and others.
4.Pathogenesis of cancer (carcinogenesis). Stage: Initiation, Promotion, progression.
5.Mutations in genes-regulators of cell division: activator genes (proto-oncogenes), suppressor genes (anti-oncogene), DNA repair genes, apoptotic genes.
6.Pathogenic effects of tumor onto the body. Types and mechanisms of metastasis. Outcomes of metastases.
7.Pathogenesis of cancer cachexia

Recommended reading for this class:

1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
7. Copstead Banasick. Pathophysiology.2013
8. Calor Mattson Porth. Essentials of pathophysiology.2019
9. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
10. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014
11. Mohan H. Textbook of Pathology. 2015
12. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic №7. Key questions covered in Practice class №3 "Epithelial tumors."

1.Epithelial tumors without specific localization (organo nonspecific) benign and malignant – definition, types, morphology, significance, outcomes.
2. Cancer, its types, morphology, significance, outcomes.
3. A practical part. Description of grossly: "Adenomatous polyps of the colon ", "Ulcerative gastric carcinoma", "Carcinoma of the body of uterus". Diagnosis and drawing of the microscope slide: "Adenocarcinoma of the stomach", "Squamous cell carcinoma of the skin", "Basal cell carcinoma of the skin".

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015

Topic №8. Key questions covered in Practice class №4 "Mesenchymal tumors."

1. Mesenchymal tumors benign and malignant. Sarcoma, its types. Special types of mesenchymal tumors.
4. A practical part. Description of grossly: "Lipoma", "Nephroblastoma", "Ovarian teratoma", "Melanoma metastatic to the liver". Diagnosis and drawing of the microscope slide: "Cavernous hemangioma of the liver", "Undifferentiated sarcoma", "Leiomyoma of uterus".

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.
3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015

Topic №9. Key questions covered in Practice class №5 "Melanocytic tumors. Tumors in children."

1.Melanocytic tumors is benign or malignant. Nevus, melanoma.
2. Tumor in children. Classification, morphology
3.Tumors in children – classification, morphology,
4.Tumors in children - characteristics, differences in structure, flow, value, outcomes
5. A practical part. Description of grossly:

Recommended reading for this class:

1.Kumar V., Abbas A.K., Aster J.A. Robbins Basic Pathology. 2018.
2.Mohan H. Textbook of Pathology. 2019.

3.Wheater's Pathology. A text, atlas and review of histopathology. 2020.
4.Klatt E.C. Robbins and Cotran Atlas of Pathology. 2015

Topic №10. Key questions covered in Practical class №6 «Typical disorders of blood plasma proteins. Typical disorders of nitrogen balance »

1. Typical disorders of protein metabolism. The etiology and pathogenesis of disorders of digestion and absorption of food proteins, amino acids and their consequences.
2. Pathology of protein metabolism. Concepts hypoproteinemia, albuminosis, Dysproteinemia, paraproteinemia.
3. Etiology and pathogenesis of hypoproteinemia. Consequences of hypoproteinemia.
4. Disorders of nitrogen balance as an indicator of the state of anabolism and catabolism of proteins.
5. Causes and mechanism of development of a positive and a negative nitrogen balance.
6. Concept of azotemia, types, causes. Disorder of uric acid metabolism.
7. Starvation. Types of Starvation. Exogenous and endogenous causes of Starvation.
8. Periods of Starvation and their pathophysiological characteristics.
9. MCQ testing.
10. Laboratory work.

● The quantitative determination of blood total protein in various pathological conditions

Recommended reading for this class:

1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
2. Copstead Banasick. Pathophysiology.2013
3. Calor Mattson Porth. Essentials of pathophysiology.2019
4. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
5. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014
6. Mohan H. Textbook of Pathology. 2015
7. John Wiley. Fundamentals of Applied Pathophysiology 2018
8. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic 11. Key questions covered in Practical class №7 "**Etiology and pathogenesis of hyperlipidemia, obesity, atherosclerosis."**

1.Typical disorders of lipid metabolism: hyperlipidemia, atherosclerosis, steatorrhea, obesity, ketosis.
2.Typical disorders of lipid digestion and absorption. Etiology, pathogenesis, consequences.
3.Typical disorders of plasma lipoproteins composition.
4.Role of damage lipid exo- and endogenous pathway in hypercholesterolemia.
5.Etiology and pathogenesis of atherosclerosis. Role of lipid metabolism disorders in development of atherosclerosis.
6.Obesity. Primary and secondary obesity. Etiology, pathogenesis.
7.Metabolism and physiological function in obesity.
8.MCQ testing.
9.Laboratory work.

- ● Atherosclerosis pathogenesis. Role of LDL and HDL(ed.film)
- Detection of body mass index

Recommended reading for this class:

1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
2. Copstead Banasick. Pathophysiology.2013
3. Calor Mattson Porth. Essentials of pathophysiology.2019
4. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
5. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014
6. Mohan H. Textbook of Pathology. 2015
7. John Wiley. Fundamentals of Applied Pathophysiology 2018
8. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic 12. Key questions covered in Practical class №8 "**Etiology and pathogenesis of hypo- and hyperglycemic conditions. Types of insulin deficiency.**"

1.Typical disorders of carbohydrate metabolism: the concept of hypoglycemia, hypoglycemic syndrome, hypoglycemic coma; hyperglycemia, types.
2.Disorders of body's tolerance to carbohydrates. Effects of hormone of α- and β-cells of pancreas and other hormones.
3.Insulin deficiency: pancreatic and extrapancreatic, absolute and relative. Role of GLUTs, insulin independent and insulin dependent tissues.
4.The concept of diabetes: primary (IDDM and NIDDM), secondary. The role of viruses and autoimmune processes in pathogenesis of beta – cells destruction in diabetes.
5.The pathogenesis basic biochemical (carbohydrate, protein, lipid, water and electrolyte metabolism, ABB) and clinical manifestations of diabetes mellitus: hyperglycemia, glycosuria, polydipsia, polyuria, etc.
6.Pathogenesis of macro- and microvascular complications in diabetes mellitus.

7.Diabetic ketoacidosis as a basis for the development of diabetic coma. Hypoglycemic coma (insulin shock), and its difference from a diabetic coma.
8.Experimental models of Diabetes mellitus. Role of scientists: Sobolev, Mering and Minkovsky in study of DM. Significance of insulin discovery by Banting and Best.
9. MCQ testing.
13. Laboratory work
● Glucose tolerance test. Drawing of sugar curves.
- Differences I type and II type 2 diabetes (educational tasks)

Recommended reading for this class:

1. Kumar V., Abbas A.K., Aster J.A. Robbins and Cotran Pathologic Basis of Disease. 2015.
2. Copstead Banasick. Pathophysiology.2013
3. Calor Mattson Porth. Essentials of pathophysiology.2019
4. Pathophysiology. Ivan Damjanov. - Philadelphia,2009.
5. Gary D. Hammer, Stephen J. McPhee. Pathophysiology of disease. 2014
6. Mohan H. Textbook of Pathology. 2015
7. John Wiley. Fundamentals of Applied Pathophysiology 2018
8. John Wiley. Fundamentals of Applied Pathophysiology 2018

Topic 10. Key questions covered in Practice class №6 "UNIT CONTROL-6."
List of questions for MCQ part of the final unit examination

1.The definition of "neoplasia". Specifics of tumor growth (malignant proliferation, clonal nature of metaplasia, invasiveness).
2.Differences between benign and malignant tumors.
3. Etiology of tumor growth. Theory of carcinogenesis: oncogenic viruses, chemical carcinogenic factors, radiation. Role of endogenous factors: chromosomal abnormalities, immune suppression, and others.
4 Pathogenesis of cancer (carcinogenesis). Stage: Initiation, Promotion, progression. Mutations in genes-regulators of cell division: activator genes (proto-oncogenes), suppressor genes (anti-oncogene), DNA repair genes, apoptotic genes.
5. Pathogenic effects of tumor onto the body. Types and mechanisms of metastasis. Outcomes of metastases. Pathogenesis of cancer cachexia
6.Tumor. The definition of the concept. The etiology of tumors. The modern theory of tumor growth.
7.Morphogenesis and histogenesis of tumors.
8. The structure of the tumor and the properties of tumor cells. Morphological manifestations of the tumor.
9. Benign or malignant tumor. Criteria of malignancy.
10. Metastasis, types, patterns. The concept of relapse. Secondary changes in tumors.
11. Modern classification of tumors. The principles of its construction.
12. Epithelial tumors without specific localization (organo nonspecific) benign and malignant – definition, types, morphology, significance, outcomes.
13. Cancer, its types, morphology, significance, outcomes.
14. Mesenchymal tumors benign and malignant. Sarcoma, its types. Special types of mesenchymal tumors.
15. Melanocytic tumors is benign or malignant. Nevus, melanoma.
16. Tumor in children. Classification, morphology
17.Typical disorders of protein metabolism. The etiology and pathogenesis of disorders of digestion and absorption of food proteins, amino acids and their consequences.
15. Pathology of protein metabolism. Concepts hypoproteinemia, albuminosis, Dysproteinemia, paraproteinemia.
16. Etiology and pathogenesis of hypoproteinemia. Consequences of hypoproteinemia.
17. Disorders of nitrogen balance as an indicator of the state of anabolism and catabolism of proteins.
18. Causes and mechanism of development of a positive and a negative nitrogen balance.
19. Concept of azotemia, types, causes. Disorder of uric acid metabolism.
20. Starvation. Types of Starvation. Exogenous and endogenous causes of Starvation.
21. Periods of Starvation and their pathophysiological characteristics.
22. Typical disorders of lipid metabolism: hyperlipidemia, atherosclerosis, steatorrhea, obesity, ketosis.
23. Typical disorders of lipid digestion and absorption. Etiology, pathogenesis, consequences.
24. Typical disorders of plasma lipoproteins composition.
25. Role of damage lipid exo- and endogenous pathway in hypercholesterolemia.
26. Etiology and pathogenesis of atherosclerosis. Role of lipid metabolism disorders in development of atherosclerosis.
27. Obesity. Primary and secondary obesity. Etiology, pathogenesis.
28. Metabolism and physiological function in obesity.
29. Typical disorders of carbohydrate metabolism: the concept of hypoglycemia, hypoglycemic syndrome, hypoglycemic coma; hyperglycemia, types.
30. Disorders of body's tolerance to carbohydrates. Effects of hormone of α- and β-cells of pancreas and other hormones.

31. Insulin deficiency: pancreatic and extrapancreatic, absolute and relative. Role of GLUTs, insulin independent and insulin dependent tissues.
32. The concept of diabetes: primary (IDDM and NIDDM), secondary. The role of viruses and autoimmune processes in pathogenesis of beta – cells destruction in diabetes.
33. The pathogenesis basic biochemical (carbohydrate, protein, lipid, water and electrolyte metabolism, ABB) and clinical manifestations of diabetes mellitus: hyperglycemia, glycosuria, polydipsia, polyuria, etc.
34. Pathogenesis of macro- and microvascular complications in diabetes mellitus.
35. Diabetic ketoacidosis as a basis for the development of diabetic coma. Hypoglycemic coma (insulin shock), and its difference from a diabetic coma.
36. Experimental models of Diabetes mellitus. Role of scientists: Sobolev, Mering and Minkovsky in study of DM. Significance of insulin discovery by Banting and Best.

Methodological instructions for the implementation of independent work on the discipline

The student should prepare presentstion in POWER POINT 10-12 pages.

Topics for independent work for 1 unit:

I.History of the development of pathology as a science.

1. history of pathology
2. Origins of pathology
3. Origins of microscopic pathology
4. Modern experimental pathology

II. Normal and abnormal cytology

1. What are the two types of cytology?
2. What are the different types of cells in the cervical cytology?
3. What causes abnormal cells?
4. What is the most common type of abnormal Pap smear?

III. Pathogenesis of direct and indirect effect of ionizing radiation on the body. The concept of radiosensitivity of tissues. Principles of radioprotection.

1. Peroxide substances.
2. Radiosensitivity.
3. Radioprotection
4. The damaging effect of radiation on organic molecules.
5. Pathogenesis of direct and indirect effects of ionizing radiation.

IV. Mechanisms of hypoxic cellular injury.

1. Development and manifestations of energy deficiency in the cell.
2. Metabolic disorders.
3. Immediate and long-term mechanisms of coping and adaptation to hypoxia
4. Long-term compensatory and adaptive responses.
5. Mechanisms of free-radical damage to the cell.

Topics for independent work for 2 unit:

1.Intracellular accumulations of carbohydrates.

1. Gierke's disease. Etiology of Gierke's disease. Pathogenesis of Gierke's disease. Macro- and microscopic morphology. Clinical manifestation. Complications.
2. Pompe disease. Etiology and pathogenesis. Macro- and microscopic morphology. Clinical manifestation. Complications.
3. McArdle disease. Etiology and pathogenesis. Macro- and microscopic morphology. Clinical manifestation. Complications.
4. Forbes-Cori disease. Etiology and pathogenesis. Macro- and microscopic morphology. Clinical manifestation. Complications.

2. Lipomatoses

1. Gaucher disease - cerebroside lipidosis or glucoside ceramide lipidosis. Etiology of Gaucher disease. Pathogenesis of Gaucher disease. Localization of lipid accumulations. Macro- and microscopic morphology. Clinical manifestation. Complications.
2. Niemann-Pick disease sphingomyelin lipidosis. Etiology and pathogenesis. Localization of lipid accumulations. Macro- and microscopic morphology. Clinical manifestation. Complications.
3. Tay-Sachs disease ganglioside lipidosis, amaurotic idiocy. Etiology and pathogenesis. Localization of lipid accumulations. Macro- and microscopic morphology. Clinical manifestation. Complications.
4. Norman-Landing disease generalized gangliosidosis. Etiology and pathogenesis. Localization of lipid accumulations. Macro- and microscopic morphology. Clinical manifestation. Complications.

3. Cachexia

1. Definition.
2. Etiological factors of cachexia.
3. Classification of cachexia.

4. Macro- and microscopic morphology of cachexia.
5. Clinical manifestation.
6. Consequences

4. Formation of stones.

1. Formation of kidney stones. Etiology and pathogenesis. Macro- and microscopic morphology. Clinical manifestation. Complications.
2. Formation of stones in the salivary ducts. Etiology and pathogenesis. Macro- and microscopic morphology. Clinical manifestation. Complications.
3. Formation of gallstones. Etiology and pathogenesis. Macro- and microscopic morphology. Clinical manifestation. Complications.

5. Calcification

1. Definition.
2. Etiology and Pathogenesis.
3. Classification of calcification.
4. Dystrophic calcification . Etiopathogenesis.
    A. Calcification in dead tissue.
    B. Calcification in degenerated tissues.
5. Metastatic calcification.
    A. Excessive mobilization of calcium from bone.
    B. Excessive absorbtion of calcium from gut.
    C. Sites of metastatic calcification.
    D. Pathogenesis of metastatic calcification.

Topics for independent work for 3 unit:

I.Edema

1. Causes and mechanism of edema.
2. Pathogenesis of edema
3. Classification of edema
4. Renal edema. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
5. Cardiac edema. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
6. Pulmonary edema. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
7. Cerebral edema. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences

II. Dehydration. Overhydration

1. Causes of dehydration, overhydration and pathogenesis
2. Classification by mechanism
3. Clinical manifestation, consequences

III.Infarction

1. Defination.
2. Causes of infarction. Causes in arteries, veins, microcirculation.
3. Factors determining severity of ischemic injury
4. Pathogenesis
5. Morphologic features of infarcts in different organs
6. Infarction of the lungs. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
7. Infarction of the kidney. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
8. Infarction of the spleen. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
9. Infarction of the liver. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences

IV.Plasmorrhagia

1. Causes of plasmorrhagia
2. Pathogenesis
3. Microscopic morphology
4. Outcomes
5. Significance

V.Shock

1. Definition of the shock
2. Etiology and classification of shock

3. Pathogenesis
4. Pathophysiology of shock (stages)
5. Hypovolemic shock. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
6. Cardiogenic shock. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequence.
7. Septic shock. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
8. Traumatic shock. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
9. Neurogenic shock. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
10. Morphological features. Hypoxic encephalopathy. Heart in shock. Shock in lung. Shock in kidney. Adrenals in shock. Hemorrhagic gastroenteropathy. Liver in shock. Other organs. They macro and microscopic morphology.
11. Clinical features and complications

Topics for independent work for 4 unit:

I. Inflammation

1. Causes of inflammation.
2. Terminology of inflammation
3. Exception
4. Local signs of inflammation
5. This process has two main components
6. Pathogenesis of inflammation (phases of inflammation

II. Acute inflammation

1. Morphology: type of Inflammation.
2. Serous inflammation. Etiology, Localization. Causes. Morphology. Outcomes.
3. Fibrinous inflammation. Localization. Causes. Morphology. Outcomes.
4. Purulent inflammation. Etiology, Localization. Causes. Morphology. Outcomes and complications. Patterns.
5. Hemorrhagic inflammation. Etiology, Localization. Causes. Morphology. Outcomes.
6. Catarrhal inflammation. Localization. Causes. Morphology. Outcomes.
7. Outcomes of acute inflammation: -resolution, scarring (fibrosis), ulceration, progression to chronic inflammation may follow acute inflammation.

III. Chronic inflammation

1. Causes of chronic inflammation.
2. Chronic inflammatory cells.
3. Functions of macrophages.
4. Types of chronic inflammation. Causes. Localization. Outcome
5. Granulomatous inflammation. Types of granulomas. Morphogenesis of granuloma. Patterns of granulomas. Outcomes of granulomatous inflammation.
6. Inflammation with formation of polyps and condylomas. Localization. Polyp. Condyloma. Histologically condyloma. Recurrent acute inflammation.

IV. Regeneration

1. Groups based on their regenerative capacity. Labile or continuously dividing cells. Stable or quiescent cell. Permanent or nondividing cells.
2. Growth factors.
3. Functions of growth factors.
4. Repair by connective tissue (organization, fibrosis).
5. Wound Healing. Mechanisms. Types of wound healing. Differences between primary and secondary union. Factors that adversely affect wound healing. Aberration of growth.

Topics for independent work for 5 unit:

I.Allergic reaction

1. Definition
2. Role of allergens in allergic reaction.
3. Types of allergens
4. Classification of allergic reactions

II.Pathology of reactivity

1. Definition
2. Systems determining reactivity
3. Resistance. Definition. Classification.

4. Barrier system
5. Clinical classification of reactivity

III.Immunodeficiency syndromes

1. Definition. Etiology
2. Pathogenesis
3. Classification. Primary and Secondary immunodeficiency syndromes

IV.Autoimmune diseases

1. Systemic lupus erythematosus. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
2. Rheumatoid arthritis. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
3. Hashimoto's thyroiditis. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
4. Multiple sclerosis. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences

Topics for independent work for 6 unit:

I.Etiology, morphogenesis of tumors. Carcinogenesis

1. Causes and mechanism of neoplasia.
2. Characteristics of Dysplastic Cells.
3. Malignant tumors
4. Characteristics of Anaplastic Cells
5. Degenerative changes

II. Epithelial tumors

1. Squamous cell papilloma and transitional cell papilloma
2. Adenoma. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
3. Polyp Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
4. Carcinoma Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences

III. Melanocytic tumors

1. Nevocellular nevi. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
2. Superficial spreading melanoma. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
3. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
4. Nodular melanoma Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences

IV. Mesenchymal tumors.

1. Fibrous tissue tumors. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
2. Muscle tumors. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences
3. Cartilage tumors. Etiology, pathogenesis, macro and microscopic morphology, clinical manifestation, consequences