INTERNATIONAL HIGHER SCHOOL OF MEDICINE

Fundamental disciplines of department

SYLLABUS
Normal Physiology

2026-2027 academic year for
students of medical faculty
1 course 2 semester, groups 1-6
6 credits (216 h, including auditorial 108 h, independent work – 108 h)

Practical classes:

Kozhomberdieva Dilfuza Kozhomberdievna
0779 45 01 01 phone (Whatsapp)
Email: taste_it @mail.ru

Venue: Educational and Morphological Center
Lev Tolstoy street 114/1
Room № 202.

The Syllabus is considered
at the meeting of Fundamental disciplines department
Protocol № 1 dated 07.09.2026
Head of the department _____ Dzh.N. Abdullaev

Course Objective: Mastering the systematic knowledge about the general physiological laws of the vital activity of a healthy organism in various conditions of its existence with knowledge, the formation and development of analytical physiological thinking, the ability and skills of generalizing data from various medical sciences from general physiological positions, and the ability to comprehend the fundamental and applied tasks of modern medicine.
After study of the discipline the student must demonstrate:

Knowledge:

- The main physiological processes of the human body's vital activity under various conditions, regulation mechanisms, constants and their significance.

Skill:

- analyze the informational value of various homeostatic indicators (constants),
- apply basic experimental and clinical methods of studying various body functions,
- independently work with scientific, educational, reference and teaching literature,
- independently perform laboratory work, protect the protocol of the study,
- solve test tasks and situational tasks, prepare scientific reports, independently work with scientific references.

Attitude:

- skills of experimental work, methods of clinical research, presentation of the results of scientific activity

Pre-requisites. Mastering the discipline "Normal Physiology" requires:

- the cycle of chemical-biological and physical-mathematical disciplines of the school educational program.

Post-requisites:

- Pathologicalphysiology
- Basic and clinical pharmacology
- Medicalgenetics
- Internaldiseases
- Surgicaldiseases
- Pediatrics

THEMATIC PLAN OF LECTURES

№	Theme of lectures	Hours	Date
1	Organization of the endocrine system. Mechanisms of action of hormones. Physiological role of hormones.	2	15.09 – 19.09
2	Pituitary gland. The hypothalamic-pituitary system. Pituitary hormones and their control by the hypothalamus.	2	
3	Thyroid gland. Synthesis and secretion of thyroid hormones. Regulation of thyroid hormone.	2	21.09 – 26.09
4	Parathyroid gland. Parathyroid hormones.	2	
5	Adrenal gland. Adrenocorticotropic hormones. Physiological functions of glucocorticoids and mineralocorticoids regulation of their secretion and action of aldosterone. Catecholamines: regulation of secretion and mechanism of action.	2	28.09 -03.10
6	Pancreas: secretion and mechanism of action of insulin and glucagon.	2	
7	Female reproductive system. Oogenesis. Menstrual cycle.	2	05.10 – 10.10
8	Hormonal regulation of the female reproductive cycle. Pregnancy. placental hormones. Mammary glands and lactation.	2	
9	Male reproductive system.	2	12.10 -17.10
10	Spermatogenesis. Regulation of gonadal hormones in men.	2	
11	Physiology of digestion. Characteristics of the main processes involved in digestion. Generalprinciples of gastrointestinalmotility.	2	19.10 -24.10
12	Digestion in the mouth. Regulation of salivation. The composition of saliva.	2	

13	Digestion in the stomach and small intestine. Composition of gastric juice and secretion of the small intestine. Regulation of the secretory activity of digestive juices.	2	26.10 – 31.10
14	Exocrine activity of the pancreas. Functions of the liver and its role in digestion.	2	
15	Mechanisms of absorption of nutrients in the gastrointestinal tract.	2	02.11 – 07.11
16	Metabolism and energy in the body. Methods for determining energy value. Basal metabolism. Physiology of nutrition.	2	
17	Physiology of excretion. The structure and function of the kidneys. Mechanism of urine formation.	2	09.11 -14.11
18	Mechanisms of regulation of filtration and reabsorption processes in the kidneys. Urination.	2	
19	Internal environment. Principles of maintaining the constants of the internal environment of the body.	2	16.11 – 21.11
20	Regulation of extracellular fluid. Regulation of electrolyte balance and acid-base balance.	2	
21	Renin-angiotensin system. Methods for studying the activity of the kidneys. The value of renal clearance.	2	23.11 – 28.11
22	Clinical assessment of renal function: General urine analysis, measurement of glomerular filtration rate (GFR).	2	
23	Immunity. Development and its regulation. Types of immunity.	2	30.11 – 05.12
24	The mechanism of immune response and the importance role of the lymphatic system in the body.	2	
25	Thermoregulation. Neuronal effector mechanisms of increase and decrease in body temperature. Behavioral mechanisms of body temperature regulation.	2	07.12 – 12.12
26	Regulation of body temperature by forming a balance of heat production and heat transfer. The effect on the body of extremely low temperatures.	2	
27	Comprehensive assessment of the adaptive resource of somatic health of an adult.	2	14.12 – 19.12
28	Pregnancy and lactation. Fetal and neonatal physiology. Growth and functional development of the fetus.	2	
29	Regulation of motor functions (posture, movement, balance and gait). Basic mechanisms of regulation of body functions.	2	21.12 – 26.12
30	The role of sport in physiology	2	
31	Functional organization of the human body and control of the internal environment	2	28.12 - 02.01
32	Nervous and humoral regulation factors and their effectiveness in physiology.	2	
33	Somatic sensations. General organization. Pain. Headache.	2	04.01 – 09.01
34	Physiological variations and high- altitude, age, sex, exercise to the organism.	2	
35	Dietary balance, regulation of feeding, obesity and starvation. Vitamins and minerals.	2	11.01 – 16.01
36	The integrated system for arterial pressure regulation. Biophysics of pressure, flow and resistance.	2	
	Total:	**72**	

THEMATIC PLAN OF SEMINAR AND LABORATORY CLASSES

№	Theme of classes	Hours	Date
1	Hypothalamo-pituitary system: physiological action, hypo- and hypersecretion of the pituitary gland. Thyroid and parathyroid hormones.	2	15.09 – 19.09
2	Adrenal hormones. Glucocorticoid functions. Insulin, glucagon. Blood glucose testing.	2	21.09 – 26.09
3	Assessment of module 7	2	28.09 -03.10
4	The physiology of sex hormones: synthesis, function and regulation. Methods for determining pregnancy.	2	05.10 – 10.10
5	Assessment of module 8	2	12.10 -17.10
6	Features of digestion and absorption of nutrients in the gastrointestinal tract.	2	19.10 -24.10
7	Gastrointestinal function testing: Salivary enzymatic activity testing. Methods for determining energy expenditure.	2	26.10 – 31.10
8	Assessment of module 9	2	02.11 – 07.11
9	Physiology of excretion. Urination reflex. Regulation of acid-base balance with the help of the kidneys.	2	09.11 -14.11
10	Evaluation of kidney function: general urine analysis.	2	16.11 – 21.11
11	Assessment of module 10	2	23.11 -28.11
12	Regulation or body temperature	2	30.11 – 05.12
13	Local skin thermal reflexes; Monitoring body temperature throughout the day.	2	07.12 – 12.12
14	Comprehensive assessment of the functional development of the body: Measurement of anthropometric data. Application of a questionnaire to identify signs of vegetative changes.	2	14.12 – 19.12
15	Assessment of module 11	2	21.12 – 26.12
16	Basic principles of the body's regulatory mechanisms	2	28.12 – 02.01
17	Determination of the functional state of the organism by physiological parameter.	2	04.01 – 09.01
18	Assessment of module 12	2	11.01 -16.01
	Total	**36**	

THEMATIC PLAN OF INDEPENDENT WORK OF STUDENTS

Unit №	Theme of independent work	Hours	Date
7 Physiology of the endocrine system.	Fill up the table: Endocrine glands (location, functions, main hormones and their effect on target organs)	2	During the unit
	Hormones: action and biological role in homeostasis (clinical cases)	2	

	Prepare an essay on the topic: "Neuromuscular transmission and conjugation of excitation and contraction".	2	
	Reference review	6	
8 Physiology of the reproductive system.	Prepare an essay on the topic: “Sexual growth development”.	2	During the unit
	Prepare an essay on the topic: “Female reproductive physiology”.	2	
	Prepare an essay on the topic: “Male reproductive physiology”.	2	
	Prepare an essay on the topic: “Physiology of lactation and contraception”.	2	
	Reference review	12	
9 Physiology of digestion and metabolism.	Compose a general scheme of digestion in the oral cavity, stomach, small and large intestines.	2	During the unit
	Prepare a clinical case: “The action of gastrointestinal enzymes.”	2	
	Practical work: individual calculation of the degree of basal metabolism deviation according to the Rid's formula and the Rid's nomogram	2	
	Practical work: individual calculation of daily energy consumption and calorie content of the diet	2	
	Reference review	4	
10 Physiology of the excretory system.	Abstract message on the topic: “The principle of an artificial kidney”	2	During the unit
	Abstract message on the topic: “Modern methods for the study of urogenital infections”.	2	
	Laboratory work: Determination of the daily amount of urine (Zimnitsky test)	2	
	Reference review	6	
11 Privatephysiology.	Prepare a clinical case: "Assessment of the operability of the body's life-supporting systems at rest and under stress."	2	During the unit
	Reference review	8	
12 Functional diagnostics of the body's condition	To apply a questionnaire to diagnose professional stress and emotional burnout.	2	During the unit
	Practical work: definition of verbal-logical memory and definition of visual short-term memory.	2	
	Abstract message on the topic: “The role of nutrition in a healthy lifestyle”	2	
	Reference review	6	
	Total	**72**	

Recommended reading for the discipline:

Main:

1. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016
2. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020.
3. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019.
4. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019

Additional:

1. Barrett. Ganang's Review of Physiology - Minion Pro by Cenve., Publisher Services., 2010.
2. Jain A.K. Manual of Practical Physiology - Avichal Publishing Company., 2010.
3. Sembulingam K. Essential of Medical Physiology. 9th ed., 2023
4. Jain A.K. Textbook of Physiology. Vol 1.7th ed., 2018

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	The student does not know the basic laws of the functioning of cells, tissues, organs and systems of a healthy body and the mechanisms of its regulation, does not know how to analyze the value of homeostatic	The student knows the basic laws of the functioning of cells, tissues, organs and systems of a healthy body and the mechanisms of its regulation, but does not know	The student knows the basic laws of the functioning of cells, tissues, organs and systems of a healthy body and the mechanisms of its regulation, finds it difficult to analyze the value of homeostatic	The student fully knows the basic laws of the functioning of cells, tissues, organs and systems of a healthy body and the mechanisms of its regulation, is able to analyze the value of homeostatic parameters
	parameters (constants), does not know the methods of studying various body functions.	how to analyze the value of homeostatic parameters (constants), does not fully know and uses research methods for various functions.	indicators (constants), knows the methods of studying various body functions, but makes mistakes when using them.	(constants), knows the methods of studying various body functions.
Independent work - 20	0-11	12-15	16-17	18-20

Interval description	• cannot independently work with scientific, educational, and reference literature, • cannot independently perform laboratory work, protect the protocol of the conducted research, • cannot solve test tasks and situational tasks, • cannot preparescientificreports.	• can independently work with scientific, educational, and reference literature, but cannot identify the main, • can independently perform laboratory work, but makes significant mistakes in the design of the protocol, conducted research, • solves test tasks and situational tasks with errors, • prepares unproductive scientific reports without outlining the basic concept	• can independently work with scientific, educational, and referenceliterature, • can independently perform laboratory work, • can issue a research protocol, • makesmistakes in solving test tasks and situationaltasks, • can prepare scientific reports that need to be finalized	• can independently work with scientific, educational, and reference literature, • can independently perform laboratory work, protect the protocol of the conducted research, • can solve test tasks and situational tasks, • canpreparescientificreports.
Control work (module) - 40	0-23	24-30	31-35	36-40
Interval description	The test results correspond to 059% of the correct answers from the total number of questions.	Testing corresponds to the results of 60-75% of the correct answers from the total number of questions.	Testing corresponds to the results of 7689% of the correct answers from the total number of questions.	Testing corresponds to the results of 90100% of the correct answers from the total number of questions.

Conduct Policy: (lateness, absence, behavior in the auditorium, late submission of work).

- Punctuality and completion of tasks.
- Mandatoryattendance of classes.
- Attending class in a clean medical uniform.
- Eliminating conversations on a cell phone in the classroom.
- Active participation in the learning process.
- Doinghomework 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.

AcademicEthicsPolicy.

- 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 lecture:

Key questions covered in lecture 1: Organization of the endocrine system. Mechanisms of action of hormones. Physiological role of hormones.

1.1 Distinguish the types of intercellular communication, their importance, mechanisms, and effect.
1.2 Identify the major organs and tissues of the endocrine system and their location in the body.
1.3 Identify the organs with a secondary endocrine function, the hormone they produce, and its effects.
1.4 Classification of hormones (functional, chemical).
1.5 **Recommended reading lecture 1:**

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 555
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 561-567
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 915-920
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 391.396

Key questions covered in lecture 2: Pituitary gland. The hypothalamic-pituitary system. Pituitary hormones and their control by the hypothalamus

1.1. Hypothalamic-pituitary system.
1.2. Adenohypophysis. Regulation of anterior pituitary secretion. Hormones secretedbyanteriorpituitary
1.3. Neurohypophysis. Hormones of posteriorpituitary
1.4. Applied physiology – disorders of pituitary gland

Recommended reading lecture2:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 565
2.Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 577-585
3.Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 929-938
4.Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Page 401

Key questions covered in lecture 3: Thyroid gland. Synthesis and secretion of thyroid hormones. Regulation of thyroid hormones.

3.1. Synthesis of thyroid hormones. Stimulation of thyroid cells by TSH.
3.2. Regulation of thyroid hormone secretion
3.3. The parathyroid gland. Calcium and Phosphate metabolism

Recommended reading lecture 3:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 585
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 591
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 941-948
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 415

Key questions covered in lecture 4: Parathyroid gland. Parathyroid hormones.

4.1. Anatomy and Physiology of the Parathyroid Gland
4.2. Physiology of Parathyroid Hormone (PTH)
4.3. BiologicalEffects of Parathyroid Hormone
4.4. Regulation of Calcium and Phosphate Metabolism
4.5. Disorders of the Parathyroid Gland

Recommended reading lecture 4:

5. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 602
6. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 606
7. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 991
8. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 427

Key questions covered in lecture 5: Adrenal gland. Adrenocorticotropic hormones. Physiological functions of glucocorticoids and mineralocorticoids regulation of their secretion and action of aldosterone. Catecholamines: regulation of secretion and mechanism of action.

5. 1. Synthesis and secretion of adrenocortical hormones.
5.2. Glucocorticoids (physiological role, regulation).
5.3. Mineralocorticoids (physiological functions). Aldosterone.
5.4. Endocrine function of the pancreas: insulin and glucagon

Recommended reading lecture 5:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Pages 616-633
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 615-631
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 955-962
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 455-469

Key questions covered in lecture 6: Endocrine functions of the pancreas: secretion and mechanism of action of insulin and glucagon.

6.1. Endocrine function of the pancreas: insulin and glucagon.
6.2. Regulation of pancreas secretion.

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 642
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 637
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Page 973-983
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 443

Key questions covered in lecture 7: Female reproductive system.

7. 1. Physiological anatomy of the female genital organs
7. 2. Ovary. Monthly ovarian cycle. Ovulation
7. 3. Ovarian hormones
7. 4. Menstrual phase. Proliferative or estrogenic phase (preovulatory phase). Ovulatory phase
7. 5. Secretory or progestative phase (luteal phase or postovulatory phase) 7.
6. Hormonal regulation of the female reproductive cycle
7. 7. Fertilization and implantation of the ovum.

Recommended reading lecture 7:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 694
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 663
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 1027-1041
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 506

Key questions covered in lecture 8: Oogenesis. Menstrual cycle. Hormonal regulation of the female reproductive cycle. Pregnancy. placental hormones. Mammaryglands and lactation.

8.1. Fertilization and implantation of the ovum.
8.2. Placenta and placental hormones.
8.3. Maternalchangesduring pregnancy.
8.4. The beginning of childbirth and control over them.
8.5. Structural development of the mammary glands
8.6. Hormonal regulation of mammary gland development
8.7. Regulation of lactation

Recommended reading lecture 8:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 717
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 683-691
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 1027-1056
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Page 506-551

Key questions covered in lecture 9: Male reproductive system. spermatogenesis

4.2. Spermatogenesis
4.3. Seminalfluid (sperm)
4.4. Synthesis of testosterone and estrogen 9.5. Testicular Activity Control 9.6. Application aspects.

Recommended reading lecture 9:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 682
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 651
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 1011
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 487

Key questions covered in lecture 10: Regulation of gonadal hormones in men

10.1. Spermatogenesis
10.2. Seminalfluid (sperm)
10.3. Synthesis of testosterone and estrogen
10.4. Testicular Activity Control

Recommended reading lecture 10:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 682
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 657
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 1011
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 487

Key questions covered lecture 11: Physiology of digestion. Description of the main processes involved in digestion.
General principles of motility of the gastrointestinal tract.

11.1. The process of digestion.
11.2. Types of digestion.
11.3. Functions of the gastrointestinal tract

Recommended reading lecture 11:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 415
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 787
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 225

Key questions covered lecture 12: Digestion in the mouth. Regulation of salivation. The composition of saliva.

12.1. Digestive processes occur in the oral cavity.
12.2. Enzymes present in saliva, and their role in digestion.
12.3. The components of saliva, and the function of each.
12.4. Salivary glands and their secretions saliva.
12.5. Salivation regulated by neural and humoral mechanisms.

Recommended reading lecture 12:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 208
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 421
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 807,809
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 229

Key questions covered lecture 13: Digestion in the stomach and small intestine. Composition of gastric juice and secretion of the small intestine. Regulation of the secretory activity of digestive juices.

13.1. Anatomical and physiological features of the structure of the stomach and the specificity of digestion in the stomach
13.2. Structure and functions of the small intestine.
13.3. The amount and composition of gastric juice.
13.4. Regulation of gastric secretion.
13.5. Motility and evacuation of stomach contents.
13.6. Specifics of digestion in the intestine.

Recommended reading lecture 13:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 213
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 427
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 811-820
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 237,269

Key questions covered lecture 14: Exocrine activity of the pancreas. Functions of the liver and its role in digestion.

14.1. Extra secretory function of the pancreas.
14.2. Regulatory and adaptive function of pancreatic juice.
14.3. Functions of the liver.
14.4. Bile formation and bile secretion. Regulation of bile formation and bile secretion.
14.5. Quantity, composition and functions of bile.

Recommended reading lecture 14:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 229.236
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 435.439
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 814-817
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 248-256

Key questions covered lecture 15: Mechanism of absorption of nutrients in the gastrointestinal tract.

15.1. Mechanisms of absorption in different sections of the GIT.
15.2. The processes in the large intestine.
15.3. Specificity of the Bacterial flora of the large intestine.

Recommended reading lecture 15:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 197.203
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 447-457
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 823-831
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 299-304

Key questions covered lecture 16: Metabolism and energy in the body. Methods for determining energy value. Basal metabolism. Physiology of nutrition.

16.1. Metabolism: catabolism and anabolism
16.2. Basicexchange. Calorierequirement
16.3. Calorie requirements for men and women - weight maintenance, weight loss, weight gain
16.4. Harris-Benedict formula for determining the calorie needs of men and women
16.5. Balanced nutrition and its importance in the normal functioning of the body

Recommended reading lecture 16:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 247
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 447-457
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 853-865
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 299-304

Key questions covered lecture 17: Physiology of excretion. The structure and function of the kidneys. Mechanism of urine formation.

17.1. Excretoryfunction of the kidney
17.2. Urination reflex – nervous regulation of urination.
17.3. Renal blood flow and filtration.
17.4. Regulation of acid-base balance

Recommended reading lecture 17:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 473
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 483-489
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 321-338
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 315-329

Key questions covered lecture 18: Mechanisms of regulation of filtration and reabsorption processes in the kidneys. Urination.

18.1. Renal blood flow and filtration.
18.2. Regulation of acid-base balance.

Recommended reading lecture 18:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 487
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 509

3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 331-360
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 339

Key questions covered lecture 19: Regulation ofpotassium, calcium and phosphate levels by the kidneys. Inclusion ofrenal mechanisms in the system of regulation of the volume of circulating blood and extracellular fluid.

19.1. Physiological parameters are considered constants of the internal environment 19.2.
The internal environment of the human body, and its main components
19.3. Homeostasis, and it essential for survival.

Recommended reading lecture 19:
1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 529
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 517
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 383-400
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019.

Key questions covered lecture 20: Regulation of extracellular fluid. Regulation of electrolyte balance and acid-base balance.

20.1. Regulation of extracellular fluid volume and composition 20.2.
Effective circulatory volume and volume sensors
20.3. Sodium balance.

Recommended reading lecture 20:
1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 534-537
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 531
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 403-416
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 345-352

Key questions covered lecture 21: Renin-angiotensin system. Methods for studying the activity of the kidneys. The value of renal clearance.

21.1. Anatomy of the juxtaglomerularapparatus
21.2. Stimuli for renin secretion
21.3. Role of angiotensinogen, renin, ACE, angiotensin I and II
21.4. Physiological effects of angiotensin II

Recommended reading lecture 21:
1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 529
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 531
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Page 395
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Page 345

Key questions covered lecture 22: Clinical assessment of renal function: General urine analysis, measurement of glomerular filtration rate (GFR).

22.1. Purpose and clinical significance of urinalysis
22.2. Methods of urine collection
22.3. Physicalcharacteristics of urine
22.4. Chemical examination

Recommended reading lecture 22:
1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 540
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 489
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 321
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 339

Key questions covered lecture 23: Immunity. Development and its regulation. Types of immunity.

23.1. Distinguish the types of immunity.
23.2. Identify the major organs and tissues of the immune system.
23.3. Development of immunity. T and B cell in immunity.

Recommended reading lecture 23:
1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page

2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 449
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Page

Key questions covered lecture 24:The mechanism of immune response and the importance role of the lymphatic system in the body.

24.1. Mechanism of regulation of immunity in human organism.
24.2. Allergy and Hypersensitivity

Recommended reading lecture 24:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Page 459
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Page

Key questions covered lecture 25: Thermoregulation. Neuronal effector mechanisms of increase and decrease in body temperature. Behavioral mechanisms of body temperature regulation.

1. Definition and importance of thermoregulation
2. Normal body temperature ranges
3. Sites of temperature measurement
4. Types of thermoregulation

Recommended reading lecture 25:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 1005
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 881
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 901-909
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Key questions covered lecture 26: Regulation of body temperature by forming a balance of heat production and heat transfer. The effect on the body of extremely low temperatures.

1. Definition of thermalbalance
2. Normal body temperature and circadian variations
3. Corevs. surface temperature
4. Thermalneutralzone

Recommended reading lecture 26:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 1005
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 901-909
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Key questions covered lecture 27: Comprehensive assessment of the adaptive resource of somatic health of an adult

1. Definition of somatic health
2. Concept of adaptive resource
3. Importance of assessing adaptive resource in clinical practice

Recommended reading lecture 27:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Key questions covered lecture 28: Pregnancy and lactation. Fetal and neonatal physiology. Growth and functional development of the fetus.

1. Stages of pregnancy
2. Physiological changes in the mother
3. Placentaldevelopment and function
4. Immune adaptation during pregnancy

Recommended reading lecture 28:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 717-728
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 691
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 1043-1061
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 532

Key questions covered lecture 29: Regulation of motor funnctions (posture, movement, balance and gait). Basic mechanisms of regulation of body functions.

1. Homeostasis and feedback mechanisms
2. Levels of regulation
3. Neuralvs. humoral regulation
4. Central and peripheral components of regulation
5. Autonomic nervous system and its role
6. Reflex principle of functional regulation

Recommended reading lecture 29:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 837
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 805
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 685
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Key questions covered lecture 30: The role of sport in physiology

1. Definition and scope of sport (exercise) physiology
2. Acute vs. chronic effects of physical activity on the body
3. Types of physical activity and exercise
4. Health benefits of regular physical activity

Recommended reading lecture 30:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 1015-1037
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 1073
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Key questions covered lecture 31: Functional organization of the human body and control of the internal environment

1. Levels of structural organization
2. Functional systems concept (P.K. Anokhin)
3. Coordination and integration of body functions
4. Autoregulation and self-maintenance

Recommended reading lecture 31:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 3
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Page 3
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Page 3

Key questions covered lecture 32: Nervous and humoral regulation factors and their effectiveness in physiology.

1. Definition of regulation in physiology
2. Differences between nervous and humoral regulation
3. Complementary roles of both systems
4. Components of the nervous system involved in regulation
5. Neural pathways and reflex arcs
6. Neurotransmitters and their role
7. Speed and precision of nervous regulation
8. Examples of nervous regulation
9. Neuralplasticity and adaptation

Recommended reading lecture 32:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page

3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 685-693
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Key questions covered lecture 33:Somatic sensations. General organization. Pain. Headache.

1. Definition and types of somatic sensations
2. Receptors involved in somaticsensations
3. Pathways of somaticsensation
4. Neuralprocessing and integration
5. Somatotropic organization (homunculus)
6. Pain: Physiology and Types
7. Definition and significance of pain
8. Types of pain
9. Nociceptors and pain receptors

Recommended reading lecture 33:
1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 613-622
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Page

Key questions covered lecture 34: Physiological variations and high- altitude, age, sex, exercise to the organism.
34.1. Definition and significance of physiological variability
34.2. Factors influencing physiological parameters
34.3. Homeostatic mechanisms adapting to internal and external changes
34.4. Examples of normal physiological variations
34.5. Characteristics of high-altitudeenvironment
34.6. Acute physiological responses to high altitude
34.7. Acclimatization mechanisms

Recommended reading lecture 34:
1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Key questions covered lecture 35: Dietary balance, regulation of feeding, obesity and starvation. Vitamins and minerals.

35.1. DietaryBalance
35.2. Regulation of Feeding
35.3 Causes and symptoms of vitamin deficiencies

Recommended reading lecture 35:
1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Page 877
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Page

Key questions covered lecture 36: The integrated system for arterial pressure regulation. Biophysics of pressure, flow and resistance.

36.1. Integrated System for Arterial Pressure Regulation
36.2. Biophysics of Pressure
36..3. Biophysics of Blood Flow
36.4. Biophysics of Vascular Resistance

Recommended reading lecture 36:
1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Page

Guidelines for the lessons (practical class) of the discipline

Key questions covered in lesson 1: Hypothalamo-pituitary system: physiological action, hypo- and hypersecretion of the pituitary gland. Pancreatic endocrine gland.

1.1. Mechanism and maintainhomeostatic control
1.2. Regulation of Body Functions: (regulation by endocrine system).
1.3. Classification (types) of hormones
1.4. Hypothalamic control. Pituitary gland

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 555,642
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 561,567
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 915-920
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 391,396

Keyquestions covered in lesson 2. Functions of glucocorticoids. Adrenal hormones: Insulin, glucagon. Determination of glucose in blood

2.1. What are the main metabolic functions of glucocorticoids in the human body?
2.2. What are the physiological conditions that stimulate the secretion of insulin and glucagon?
2.3. What is the normal reference range for fasting blood glucose, and how is it used in the diagnosis of diabetes mellitus?

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 616-642
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 577,585
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 929-938
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 401

Keyquestions covered in lesson 3. Assessment of module 7

1. Distinguish the types of intercellular communication, their importance, mechanisms, and effects
2. Identify the major organs and tissues of the endocrine system and their location in the body.
3. Identify the organs with a secondary endocrine function, the hormone they produce, and its effects.
4. Classification of hormones (functional, chemical).
5. Hypothalamic-pituitary system.
6. Adenohypophysis. Regulation of anterior pituitary secretion. Hormones secretedbyanteriorpituitary
7. Neurohypophysis. Hormones of posteriorpituitary
8. Applied physiology – disorders of pituitary gland
9. Synthesis of thyroid hormones. Stimulation of thyroid cells by TSH.
10. Regulation of thyroid hormone secretion
11. The parathyroid gland. Calcium and Phosphate metabolism
12. Synthesis and secretion of adrenocortical hormones.
13. Glucocorticoids (physiological role, regulation).
14. Mineralocorticoids (physiological functions). Aldosterone.

Orally
MCQs
Check laboratory and practical works

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 555-642
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 577,585
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 915-938
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 391- 401

Keyquestions covered in lesson 4. Physiology of sex hormones: synthesis, functions, regulation. Determination of pregnancy.

4.1 Hormonal changes at puberty (hormones affecting puberty)
4.2 Gonadotropins (LH and FSH)

4.3 Sex hormones (testosterone and estrogens)
4.4 Physical changes at puberty

Recommended reading for lecture:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 7625-728
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 651,691
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 1027-1041
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 487- 551

Keyquestions covered in lesson 5. Assessment of module 8

Orallyquestions

1. Fertilization and implantation of the ovum.
2. Placenta and placental hormones.
3. Maternalchangesduring pregnancy.
4. The beginning of childbirth and control over them.
5. Structural development of the mammary glands
6. Hormonal regulation of mammary gland development
7. Regulation of lactation
8. Anatomical and physiological features of the male reproductive system.
9. Spermatogenesis
10. Seminalfluid (sperm)
11. Synthesis of testosterone and estrogen 12.Testicular Activity Control
13. Applicationaspects.

MCQs

Check laboratory and practical works Clinical case

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 7625-728
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 651,691
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 1027-1041
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 487- 551

Keyquestions covered in lesson 6. Features of digestion and absorption of nutrients in the gastrointestinal tract.

9.1 Mechanisms of absorption in different sections of the GIT.
9.2 The processes in the large intestine.
9.3 Specificity of the Bacterial flora of the large intestine.

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 205
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 415
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 787
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 225

Keyquestions covered in lesson 7. Laboratory work. Study of gastrointestinal functions: Study of enzymatic activity of saliva. Methods for determining energy expenditure.

7.1 What are the main physiological functions of the gastrointestinal (GI) tract in digestion and absorption?7.2 Which digestive enzymes are present in saliva, and what are their specific roles in the initial stage of digestion?
7.3 How can the enzymatic activity of salivary amylase be studied experimentally in the laboratory?
7.4 What factors can influence the enzymatic activity of saliva in the human body?

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 208
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 421
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 807,809
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 229

Keyquestions covered in lesson 8. Assessment of module 9

1. The process of digestion.
2. Types of digestion.
3. Functions of the gastrointestinaltract

4. Digestive processes occur in the oral cavity.
5. Enzymes present in saliva, and their role in digestion.
6. The components of saliva, and the function of each.
7. Salivary glands and their secretions saliva.
8. Salivation regulated by neural and humoral mechanisms.
9. Anatomical and physiological features of the structure of the stomach and the specificity of digestion in the stomach
10. Structure and functions of the small intestine.
11. The amount and composition of gastric juice.
12. Regulation of gastric secretion.
13. Motility and evacuation of stomach contents.
14. Specifics of digestion in the intestine.

MCQs

Check laboratory and practical works Clinical case

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 205,208
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 415,427
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 787-831
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 225- 256

Keyquestions covered in lesson 9. Physiology of excretion. Urination reflex. Regulation of acid-base balance with the help of the kidneys.

9.1Excretory function of the kidneys

9.2 Urination reflex – nervous regulation of urination.

9.3. Renal blood flow and filtration.

9.4 Regulation of acid-base balance

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 473
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 483-489
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 321-338
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 315- 329

Keyquestions covered in lesson 10. Assessment or kidney function: Clinical and biochemical analysis or urine.

1. Assessment of kidney function -clinical and biochemical analysis of urine
2. Assessment GFR

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 487
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 509
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 331-360
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 339

Keyquestions covered in lesson 11. Assessment of module 10

1.Physiology of excretion. The structure and function of the kidneys. Mechanism of urine formation.
2.Excretoryfunction of the kidney
3. Urination reflex – nervous regulation of urination.
4. Renal blood flow and filtration.
5. Regulation of acid-basebalance
6. Mechanisms of regulation of filtration and reabsorption processes in the kidneys. Urination.
7. Renal blood flow and filtration.
8. Regulation of acid-base balance.
9. Internal environment. Principles of maintaining the constants of the internal environment of the body.
10. Physiological parameters are considered constants of the internal environment
11. The internal environment of the human body, and its main components
12. Homeostasis, and it essential for survival.
13. Regulation of extracellular fluid. Regulation of electrolyte balance and acid-base balance.
14. Regulation of extracellular fluid volume and composition

15.Effective circulatory volume and volume sensors
16. Sodium balance.
17. Renin-angiotensin system. Methods for studying the activity of the kidneys. The value of renal clearance.
18. Anatomy of the juxtaglomerularapparatus
19. Stimuli for renin secretion
20. Role of angiotensinogen, renin, ACE, angiotensin I and II
21. Physiological effects of angiotensin II
22. Clinical assessment of renal function: General urine analysis, measurement of glomerular filtration rate (GFR).
23. Purpose and clinical significance of urinalysis
24. Methods of urine collection
25. Physicalcharacteristics of urine
26. Chemicalexaminatio

MCQs

Clinical case

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 473-540
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 483-531
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 321-395
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 315- 400

Keyquestions covered in lesson 12. Regulation of body temperature

12.1. Definition of thermalbalance
12.2. Normal body temperature and circadian variations
12.3. Corevs. surface temperature
12.4. Thermalneutralzone

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 1005
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 881
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 901-909
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Key questions covered in lesson 13. Local skin thermal reflexes; Monitoring body temperature throughout the day.

1. Regulation of body temperature by forming a balance of heat production and heat transfer. The effect on the body of extremely low temperatures.
2. Regulation of motor functions (posture, movement, balance and gait). The main mechanisms of regulation of body functions.

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 1005
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 881
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 901-909
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Key questions covered in lesson 14. Comprehensive assessment of the functional development of the body: Measurement of anthropometric data. Application of a questionnaire to identify signs of vegetative changes

14.1. Physiology of infancy.
14.2. Growth map.
14.3. Growth map interpretation.
14.4. Anthropometric assessment of infants.

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Keyquestions covered in lesson 15. Assessment of module 11.

1. Measurement Technique: Weigh, length

2. Regulation of Feeding
3. Obesity: Causes, Consequences, and Management
4. Starvation: Physiology and Adaptations
5. Vitamins and MineralsAssessment unit 11

MCQs

Clinical case

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page 1005
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 881
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 901-909
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Keyquestions covered in lesson 16. Basic principles of the body's regulatory mechanisms

16.1.Functional organization of the human body and management of the internal environment

16.2. Nervous and humoral regulatory factors and their effectiveness in physiology.

16.3. Physiological changes and the effect of height, age, gender, and physical activity on the body.

16.4. Somatic sensations. General organization. Pain. Headache.

16.5. Dietary balance, nutrition regulation, obesity and starvation. Vitamins and minerals.

16.6. Integrated blood pressure regulation system. Biophysics of pressure, flow and resistance.

Recommended reading:

17 Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019. Page

18 Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016 Page 805

19 Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020. Pages 685

20 Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Keyquestions covered in lesson 17. Determination of the functional state of the organism by physiological parameter.

17.1. Physiology of infancy

17.2. Growthmap

17.3. Growthmapinterpretation.

17.4. Anthropometricassessment of infants

17.5. Measurement Technique: Weigh,length

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019.
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020.
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages 391- 401

Keyquestions covered in lesson 18. Assessment in module 12.

Measurement Technique: Weigh,length

1. Mineral substances of the human body, their content, role
2. Phosphate-calcium metabolism, the role of hormones and vitamins in its regulation. Mineral and organicphosphates. Phosphates of urine.
3. The role of hormones and vitamins in the regulation of mineral metabolism.
4. Pathological conditions associated with metabolic disorders of mineral substances.
5. Quantitative determination of calcium and inorganic phosphorus in blood serum
6. Acute renal failure
7. Types of acute renal failure.
8. Symptoms of acute renal failure
9. Chronic renal failure
10. Types of chronic renal failure
11. Nephroticsyndrome
12. Mechanisms of appetite regulation.
13. Epidemiology of obesity
14. Appetite and energyhomoeostasis
15. Treatments for obesity

16. Physiological reserve as the "potential capacity of a cell, tissue, or organ system to function beyond its basal level in response to alterations in.
17. Functional reserve in functionally independent elderly persons; functional reserve is defined as the difference between the maximum physical or mental capacity of a construct and the minimum necessary to perform daily functioning.
18. Functional residual capacity (FRC) is the volume of air left in your lungs after a normal, passive exhalation.
19. Identifyfour groups of persons

MCQs

Clinical case

Recommended reading:

1. Textbook of Physiology. 8th ed Volume 1,2 // Jain. //2019.
2. Textbook of Medical Physiology. Guyton A.C.,1-part. 10th. ed. ElsevierInc., 2016
3. Textbook of Medical Physiology. Guyton A.C.,2-part. 10th. ed. ElsevierInc., 2020.
4. Essentials of Medical Physiology. 8th edition/ K. Sambulingam and Prema Sambulingam// - Jaypee Brothers Medical Publishers (P) Ltd, 2019. Pages

Methodological instructions for the implementation of independent work on the discipline.

Registration of the practical work protocol

In the notebook for practical work, it is necessary to write down the protocol of the laboratory work performed, indicating the purpose, objectives, equipment and reagents, the course of the experiment, results, conclusions.

Preparation of an abstract report or presentation

At each lesson, students can prepare an abstract report or a presentation on their chosen topics. The volume of the abstract report is 5-15 pages, the number of slides in the presentation is 10-20. The duration of the report is 10 minutes. The report is presented orally, reading out the text is unacceptable. Presentation It should be designed using diagrams, illustrations, and the test should be brief and contain only the most important information.

Unit 7 Physiology of the endocrine and reproductive system.

1. Fill in the table: Endocrine glands (location, functions, main hormones and their effect on target organs).
2. Hormones: action and biological role in homeostasis (solving situational problems).
3. Prepare an essay on the topic: "Endocrine functions of the hypothalamus and pituitary gland".

Unit 8 Physiology of Physiology of the reproductive system.

1. Prepare an essay on the topic: "Development of sexual growth".
2. Prepare an abstract on the topic: "Female reproductive physiology" and "Male reproductive physiology".
3. Prepare an essay on the topic: "Physiology of lactation and contraception."

Unit 9. Physiology of the digestive system. Metabolism.

1. Draw up a general scheme of digestion in the oral cavity, stomach, small and large intestines.
2. Prepare a clinical case: "The action of enzymes of the gastrointestinal tract."
3. Practical work: individual calculation of the degree of deviation of basal metabolic rate using Reed's formula and Reed's nomogram.
4. Practical work: individual calculation of daily energy consumption and caloric intake.

Unit 10 Physiology of excretion

1.Prepare an essay on the topic: "The principle of operation of an artificial kidney."

2.Prepare an essay on the topic: "Modern methods of urogenital infections research".

3.Practical work: determination of the daily amount of urine (Zimnitsky's test).

Unit 11 Private physiology.

1.Prepare a clinical case: "Assessment of the operability of the body's life-supporting systems at rest and under stress."

Unit 12 Functional diagnostics of the body's condition

1. Apply a questionnaire to diagnose occupational stress and emotional burnout.
2. Practical work: definition of verbal-logical memory and definition of visual short-term memory.
3. Prepare an essay on the topic: "The role of nutrition in a healthy lifestyle."