

Документ подписан простой электронной подписью

Информация о владельце:

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MINISTRY OF SCIENCE AND HIGHER EDUCATION

RUSSIAN FEDERATION

Federal State Autonomous Educational Institution of Higher Education

NORTH-CAUCASUS FEDERAL UNIVERSITY

APPROVED

Assoc. Prof. Kubanov S.I.

PhD in Medical Sciences

Dean

Faculty of Medicine and Biology

ASSESSMENT TOOLS FUND FOR THE DISCIPLINE

General and Medical Enzymology

Name of the discipline (module)

- Specialty: 31.05.01 General Medicine
- Mode of training: Full-time
- Year of commencement of studies: 2026
- Delivered in Semester _4_

Introduction

1. Intended for carrying out current control of academic performance progress and intermediate attestation in the discipline of General and Medical Enzymology for students of the specialty (majoring in) 31.05.01 General Medicine.

2. The ATF is an appendix to the program of the discipline General and Medical Enzymology

Developer(s): Associate Professor of the Department of Physico-Chemical Biology and Immunology
Andrusenko S. F.

3. Expert examination of the ATF has been completed.

Expert group:

Chairperson: Pakhomova T.A., Chairman of the Educational and Methodological Commission of the Faculty of Medicine and Biology

Committee members:

Denisova E.V., Associate Professor of the Department of Physico-Chemical Biology and Immunology

Vlasov A.A., Associate Professor of the Department of Physico-Chemical Biology and Immunology

Employer organization representative: Vilensky I.L., Chief Physician of Independent CDL, LLC

Expert conclusion – the ATF allows evaluating the level of competency levels and is recommended to be employed in the educational process.

4. The validity period for the ATF shall be determined by the period of implementation of the educational program.

1. Description of Evaluation Criteria at Various Stages of Their Formation, Description of Evaluation Scales

Levels of formation of competence(s), indicator(s)	Descriptors			
	Minimum level not achieved (Unsatisfactory) 2 points	Minimum level (Satisfactory) 3 points	Intermediate level (Good) 4 points	High level (Excellent) 5 points
Competency: PC-13 is capable of carrying out laboratory and instrumental research methods to study the properties of substances and processes involving them, process and interpret the results obtained using theoretical knowledge and practical skills in solving scientific problems.				
Learning outcomes for the discipline <i>Indicator:</i> Results of training in the discipline Indicator: systematizes and analyzes the results of chemical, biological, physical, medical experiments, observations, measurements, as well as the results of calculations of the properties of substances and materials ID-1 PC-13	It is difficult to systematize and analyze the results of chemical, biological, physical, medical experiments, observations, measurements, as well as the results of calculations of the properties of substances and materials.	With some errors, he systematizes and analyzes the results of chemical, biological, physical, medical experiments, observations, measurements, as well as the results of calculations of the properties of substances and materials.	It systematizes and analyzes the results of chemical, biological, physical, medical experiments, observations, measurements, as well as the results of calculations of the properties of substances and materials.	Confidently systematizes and analyzes the results of chemical, biological, physical, and medical experiments, observations, measurements, and calculations of the properties of substances and materials.

The evaluation of the competency formation level in the discipline is carried out on the basis of the Regulations on conducting current control of academic progress and intermediate attestation of students in higher education educational programs – Bachelor’s programs, Specialist’s programs, Master’s programs – at the Federal State Autonomous Educational Institution of Higher Education NORTH-CAUCASUS FEDERAL UNIVERSITY in its current edition.

ASSESSMENT TOOLS FOR CHECKING THE LEVEL OF COMPETENCY DEVELOPMENT

Task Number	Correct Answer	Content of the Question	Competency
1	udioxxygenase	Insert the missing word Alkaptonuria is associated with impaired oxidation of homogenizic acid, which is an intermediate product of tyrosine catabolism. For people with this disease, there is a lack of the enzyme *****, as a	PC-13

		result, the concentration of homogentisinic acid increases, which in the presence of oxygen turns into a black substance – alkapton.	
2	of glycogen	Insert the missing word People with Hurler's disease have a decrease in blood glucose concentration between meals, which is due to a disruption in the metabolism of ****, resulting from a malfunction of the enzyme glucose-6-phosphatase	PC-13
3	diagnosis of diseases	Insert the phrase In medical practice, the quantitative determination of enzyme activity in tissues and biological fluids of the body is used for ***	PC-13
4	L1- R1 L2- R2 L3- R3 L4- R4 L5- R5	Insert the phrase In medical practice, the quantitative determination of enzyme activity in tissues and biological fluids of the body is used for *** Select the correct pair combinations of keywords or fragments of phrases and semantic final sentences L1 Cyanocobalamin L2 Ubiquinone L3 Phyllochinone L4 Vicasol L5 Pangamic acid R1 contains reduced pyrrole rings, dimethylbenzimidazole, α -D-ribofuranose, and cobalt R2 is a derivative of dimethoxymethylbenzoquinone R3 is an alkylated derivative of naphthoquinone R4 is a water-soluble bisulfite compound of methylnaphthoquinone R5 is dimethylglycyl-6-gluconic acid	PC-13
5	L1- R1 L2- R2 L3- R3 L4- R4	Choose the correct pairings of keywords or phrases and semantic concluding sentences. L1 Nicotinic acid L2 Pyridoxine L3 2-methylnaphthoquinone-1,4 L4 Glucose R1 Antipellagric vitamin R2 The conventional name for vitamin B6, which is represented by pyridoxal, pyridoxal, and pyridoxamine R3 Under the name "meninon," vitamin K3 is used in medicine R4 It serves as the starting material for the synthesis of vitamin C	PC-13
6	a-VI, b -V, c -III, d -I, e -II, f -IV	Correlate the concept and definition: a. Regulatory proteins b. Receptor proteins c. Structural proteins d. Contractile proteins e. Protective proteins f. Transport proteins	PC-13

		I. Proteins that give the cell the ability to contract/ move II. Proteins that recognize and bind foreign molecules, viral particles and bacteria and neutralize them III. Proteins that shape and define tissues mechanical properties of tissue IV. Proteins involved in the transfer of specific ligands from one organ to another V. Proteins interacting with signaling molecules Proteins involved in maintaining homeostasis	
7	a-IV, b-III, c-II, d-V, e-I	Match the concept and definition: a. Enzyme b. Regulatory protein c. Structural protein d. Protective protein e. Contractile protein I. Tubulin II. Elastin III. Calmodulin IV. Trypsin V. Immunoglobulins	PC-13
8	a-II, b-III, c-V, d-IV, e-I	Match the physiological and chemical names of vitamins: a. Thiamine b. Rutin c. Biotin d. Retinol e. Pyridoxine I. Antidermatitis II. Antineuritis III. Capillary-strengthening IV. Antixerophthalmic V. Antiseborrhea	PC-13
9	a-III, b-I, c-II, d-IV, e-I	Match the physiological and chemical names of vitamins: a. Nicotinic acid b. Folic acid c. Ascorbic acid d. Pantothenic acid e. Cyanocobalamin I. Antianemic II. Antiscorbutic III. Antipellargic IV. Antidermatitic factor V. Promoting reproduction	PC-13
10	c, b, d, a	Arrange the vitamin-like substances in order of their discovery: a. Ubiquinone b. Ortoic acid c. Inositol d. Carnitine	PC-13
11	a-I b-III c-II d-V e-IV	Match the names of the groups of monosaccharides and their descriptions: a. Trioses b. Tetroses c. Pentoses d. Hexoses e. Heptooses I. The simplest representatives of monosaccharides with the general formula $C_3H_6O_3$, which may contain an aldehyde or ketone group II. The representatives of this group are	PC-13

		arabinose, xylose, ribose, deoxyribose, and lyxose III. The representative of this group is erythrose. IV. The general formula is $C_7H_{14}O_7$, and the representatives of this group are sedoheptulose and mannoheptulose. V. The representatives are allose, aldose, glucose, mannose, gulose, idose, galactose, and talose.	
12	a-I, IV, V b-II, III, VI	Match the following: a. Acyl lipids b. Isoprenoids I. Waxes II. Phytol III. Sterols IV. Triacylglycerols V. Phospholipids VI. Rosin	PC-13
13	waxes	Insert the missing word Amorphous, plastic, easily softening upon heating, lipids that melt in the temperature range of 40-90°C, and are poorly reactive, is ###	PC-13
14	Creatine phosphate	Insert the missing word Macroerg, which can be obtained by phosphorylating creatine, is ###	PC-13
15	d,a,e,b,c	Arrange the substances in order of increasing hydrolysis energy: a. Acetyl-CoA b. Acetyl phosphate c. Phosphoenolpyruvate d. Creatine phosphate e. Arginine phosphate	PC-13
16	a-I,III,V b-II, IV,VI	Match: a. Nicotin-dependent dehydrogenases b. Flavin enzymes I. Participate in electron transfer in redox reactions II. Complex proteins whose prosthetic group is represented by FMN/FAD III. This includes a large group of PC-13 enzymes that catalyze the reduction of NAD^+ and $NADP^+$ by various substrates IV. They act as a prosthetic group V. They are dinucleotides in which the nucleotides are connected by a pyrophosphate bond. VI. The active part is the conjugated ichoallaxosinic cyclic structure of vitamin B2	PC-13
17	a-II,IV,V b-I,III,VI	Match: a. F_0 component of H^+-ATP synthase b. F_1 component of H^+-ATP synthase I. Soluble component II. Membrane component III. Protein consisting of 5 types of subunits IV. Integral protein V. Protein consisting of 4 types of subunits VI. Component that provides the synthesis of adenosine triphosphate	PC-13

18	a-II b-V c-III d-I e-IV	Match the relative rate of carbohydrate absorption, assuming that glucose absorption is 100%: a. Fructose b. Galactose c. Mannose d. Xylulose e. Arabinose I. 15% II. 43% III. 19% IV. 9% V. 110%	PC-13
19	a-II,III,V,VIII b-I,IV,VI,VII	Match: a. Phosphorylated glycogen synthase b. Dephosphorylated glycogen synthase I. Active II. Inactive III. Called glycogen synthase I IV. Called glycogen synthase D V. Not capable of allosteric regulation VI. Capable of allosteric regulation VII. Activated by glucose-6-phosphate VIII. Stimulated by glucagon and adrenaline	PC-13
20	a - III, b - V, c - II, d - I, e - IV	Match the enzyme and the reaction it catalyzes: a. Aconitase b. Citrate synthase c. Succinate dehydrogenase d. Isocitrate dehydrogenase I. Hydration of fumaric acid II. Conversion of succinyl-CoA to succinate III. Conversion of citric acid to isocitric acid IV. Oxidative decarboxylation of isocitric acid V. Condensation of acetyl-coenzyme A with oxaloacetic acid	PC-13
21	a)	Cellular enzymes localized in the cytoplasm exhibit maximum activity at a pH close to: a) 7 b) 2 c) 4	PC-13
22	b)	At this temperature, enzymes denature: a) 10 – 20 degrees Celsius b) 80 – 100 degrees Celsius c) 30 – 40 degrees Celsius	PC-13
23	c)	The substrate for salivary amylase is: a) triglycerides b) nucleoproteins c) starch	PC-13
24	c)	Milk intolerance is associated with a deficiency of the following enzyme: a) Amylase b) Aldolase c) Lactase d) Enolase e) Glucokinase	PC-13
25	c)	In pancreatic diseases, there is a deficiency of the following enzymes: a) aldolase b) pepsin c) lipase d) transaminase	PC-13
26	d)	Hyperfermentemia indicates:	PC-13

		a) impaired synthesis of certain enzymes b) appearance of organ-specific enzymes in the blood c) reduced clearance d) necrosis or cell lysis	
27	a)	An increase in the activity of the glutamate dehydrogenase enzyme occurs when the: a) liver is affected b) kidneys are affected c) heart is affected	PC-13
28	b)	The conversion: $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$ is carried out with the help of: a) oxygenase b) catalase c) NAD-dependent dehydrogenase d) oxidase	PC-13
29	c)	Determining the activity of alpha-amylase is important in the diagnosis of the following diseases: a) heart b) lungs c) pancreas	PC-13
30	a)	Enzymopathies are diseases associated with insufficient function of: a) proteins; b) enzyme proteins; c) carbohydrates; d) carbohydrate-protein complexes; e) hormones.	PC-13

2. Description of the Evaluation Scale

Within the framework of the rating system, students' academic progress in each discipline is evaluated during current control and intermediate attestation. The rating system for assessing students' knowledge is based on the use of a combination of control activities to check the covered material (checkpoints), optimally located throughout the entire time interval of studying the discipline. The principles of the rating system for assessing students' knowledge are based on the requirements described in the Regulations on the organization of the educational process based on the rating system for assessing students' knowledge at NCFU.

3. Criteria for Evaluating Competencies

The grade **Excellent** shall be awarded to a student if the theoretical content of the course has been mastered completely, without gaps; the material is presented exhaustively, consistently, clearly, and logically; the student freely copes with tasks, questions, and other types of knowledge application; uses additional material in the answer; all tasks provided for by the program are completed, and the quality of their execution is evaluated by a number of points close to the maximum; analyzes the obtained results; demonstrates independence when performing tasks.

The grade **Good** is to be awarded to a student if the theoretical content of the course is mastered completely, the necessary practical competencies are mainly formed, all educational tasks provided for by the training program are completed, and the quality of their execution is sufficiently high. The student firmly knows the material, presents it competently and strictly on the merits of the matter, without allowing significant inaccuracies in answering the question.

The grade **Satisfactory** is awarded to a student in case the theoretical content of the course has been mastered in part only, but the gaps are not of a significant nature, most of the tasks provided for by the program are completed, but contain errors, the student allows inaccuracies and insufficiently correct wording when answering the question, and violations of logical sequence are observed in the presentation of the program material.

The grade **Unsatisfactory** is awarded to a student if they do not know a significant part of the program material, allow significant errors, perform practical works with great difficulty and

uncertainty, the necessary practical competencies are not formed, most of the educational tasks provided for by the training program are not completed, and the quality of their execution is evaluated by a number of points close to the minimum.