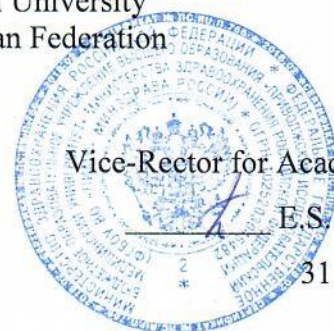


Federal State Budgetary Educational Institution of Higher Education  
"Privolzhsky Research Medical University"  
Ministry of Health of the Russian Federation



APPROVED

Vice-Rector for Academic Affairs

E.S. Bogomolova

31 August 2021

## WORKING PROGRAM

Name of the academic discipline: **FUNDAMENTALS OF SALIVA  
DIAGNOSTICS**

Specialty: **31.05.03 DENTISTRY**

Qualification: **DENTIST**

Department: **BIOCHEMISTRY NAMED AFTER G.YA.GORODISSKAYA**

Mode of study: **FULL-TIME**

Labor intensity of the academic discipline: **72 academic hours**

Nizhny Novgorod  
2021

The working program has been developed in accordance with the Federal State Educational Standard for the specialty 31.05.03 Dentistry approved by Order of the Ministry of Education and Science and Higher Education of the Russian Federation No. 984 dated August 12, 2020.

**Developers of the working program:**

**Zagoskin Pavel Pavlovich, PhD, Associate Professor of the Department of Biochemistry named after G.Ya. Gorodisskaya**

**Barinova Oksana Vladimirovna, PhD, Associate Professor of the Department of Biochemistry named after G.Ya. Gorodisskaya**

**Reviewers:**


**Kochubeynik A.E.- Ph.D, Associate Professor, Head of the Department of the Department of Propaedeutic Dentistry of PRMU**

**Ivashchenko M.N. – Ph.D., Associate Professor, Head of the Department of Physiology and Biochemistry of Animals of Nizhny Novgorod State Agricultural Academy**


The program was reviewed and approved at the department meeting (protocol No.7 on April 15, 2021)

**Head of the Department of Biochemistry named after G.Ya.Gorodisskaya**

**PhD, Professor**

**E.I. Erlykina** \_\_\_\_\_ 

AGREED

Deputy Head of EMA ph.d. of biology \_\_\_\_\_  Lovtsova L.V.

(signature)

April 15, 2021

## **1. The purpose and objectives of mastering the academic discipline " Fundamentals of saliva diagnostics" (hereinafter referred to as the discipline).**

The purpose of mastering the discipline: participation in forming the relevant competencies: professional competencies - PC -1.

Requirements to the deliverables of mastering the discipline.

As a result of completing the discipline, the student should

### **know:**

- the structure and properties of the main classes of biologically important compounds, the main metabolic pathways of their transformation, the role of hereditary factors in the development of diseases,
- the chemical and biological essence of the processes occurring in the human body, including in the oral cavity, at the molecular and cellular levels, their changes under the influence of adverse factors,
- basic principles of biochemical processes of human activity in their integrity and interrelation.

### **Be able to:**

- use the basics of biochemical knowledge about the composition and metabolism of the main components of the oral fluid to analyze their functions at the molecular level and the state of the body as a whole,
- interpret the results of the most common methods of laboratory salivadiagnostics, receive information in global computer networks,
- based on the interpretation of biochemical studies to determine the state of the human body, to identify signs of pathological processes,
- be guided by educational, scientific, norms.

### **Possess:**

- the ability to think abstractly, analyze, synthesize the information received,
- basic information transformation technologies, medical and functional conceptual apparatus,
- methods of forming a healthy lifestyle of a person, using knowledge about the molecular mechanisms underlying the processes of vital activity,
- analytical skills with information obtained from various sources.

## **2. Position of the academic discipline in the structure of the General Educational Program of Higher Education (GEP HE) of the organization.**

2.1. The discipline "FUNDAMENTALS OF SALIVA DIAGNOSTICS" refers to the part of Block 1 of GEP HE (31.05.03 "Dentistry») formed by the participants of educational relations.

In the general system of training doctors biochemistry occupies a special position - it is a science that, on the one hand, gives fundamental knowledge about the molecular mechanisms of the functioning of the human body, and on the other hand, is an applied medical discipline, the knowledge of which is necessary for every dentist. Knowledge of the basics of saliva diagnostics is necessary to assess the general condition of the body, as well as the organs of the oral cavity. The discipline is taught in 7 semesters/ fourth year of study.

2.2. The following knowledge, skills and abilities formed by previous academic disciplines are required for mastering the discipline: general and bioorganic chemistry, biology, anatomy, histology, biological chemistry - biochemistry of the oral cavity, physiology, microbiology, propaedeutic and therapeutic dentistry.

2.3. Mastering the discipline is required for forming the following knowledge, skills and abilities for subsequent academic disciplines: therapeutic dentistry, pediatric dentistry, orthopedic and surgical dentistry.

### 3. Deliverables of mastering the academic discipline and metrics of competence acquisition

Mastering the discipline aims at acquiring the following professional (PC) competencies.

№	Competence code	The content of the competence (or its part)	As a result of mastering the discipline, the students should:		
			know	be able to	possess
1	UC-1	Prevention of the occurrence and (or) spread of dental diseases, their early diagnosis, identification of the causes and conditions for the occurrence and development, as well as prevention.	IUC 1.1: Methods of laboratory and instrumental studies for assessing the state of health, medical indications for conducting studies, rules for interpreting their results. The role of oral hygiene, nutrition and the use of fluorides in the prevention of dental and periodontal diseases.	IUC 1.2: Interpret and analyze the results of additional laboratory examinations in children and adults with dental diseases.	IUC 1.3 Has practical experience referral of children and adults with dental diseases to laboratory, additional studies.

#### 4. Sections of the academic discipline and competencies that are formed when mastering them.

№	Competence code	Section name of the discipline	The content of the section in teaching units
1.	PC-1	Biochemistry of the oral fluid.	Mixed saliva, the origin of its mineral organic constituents. Flowing saliva, volume of secretion, regulation of secretory function. Metabolism of acinar cells of the salivary glands. The mineral composition of mixed saliva, the structure of calcium phosphate micelles, changes in their structure when the saliva pH deviates from the optimum. Structure and functions of mixed saliva proteins. Synthesis of mucins, features of their amino acid composition and oligosaccharide chains. The role of mucins in the construction of the pellicle. Polyfunctional proteins of saliva, features of their structure and functioning. Antigen-specific glycoproteins of saliva, their use in forensics. Protective systems of the oral cavity. Proteins and electrolytes of the gingival fluid. Stages and mechanism of activation of proteins of the complement system. The presence of bacterial aggression enzymes in the gingival fluid. Low molecular weight substances and the mechanism of their toxic effect on the cells of the oral mucosa.
2	PC-1	Biochemical aspects of pathological conditions of the oral cavity.	The value of saliva in the diagnosis of pathological conditions. The use of saliva in the diagnosis of pathology of the salivary glands, diseases of the oral cavity, somatic diseases, genetic markers.
3	PC-1	Methods of saliva diagnostics. Practical salivology in assessing the state of health. Saliva screening tests.	Laboratory methods for the study of oral fluid: enzyme diagnostics, determination of individual metabolites, hormones, immunoglobulins, pH measurement. Substances determined in saliva: metabolites of medicinal substances, urea and creatinine, human chorionic gonadotropin, thyroglobulin, cathepsins D and B, indicators of free radical oxidation. crystallography method. Unstimulated sialometry method. Practical salivology in assessing the state of health. Saliva screening tests.

#### 5. Volume of the academic discipline and types of academic work.

Type of educational work	volume in academic hours (AH)	Labor intensity (AH) in semesters
		<b>7</b>
Classroom work, including:	<b>44</b>	<b>44</b>
Lectures (L)	4	4
Laboratory practicum (LP)		
Practicals (P)	20	20
Seminars (S)	20	20
Student Independent Work (SIW)	<b>28</b>	<b>28</b>
<b>TOTAL LABOR INTENSITY</b>	<b>72</b>	<b>72</b>

## 6. Content of the academic discipline.

### 6.1. Sections of the discipline and types of academic work\*:

№	semes ter	Name of the section of the academic discipline	L	P	S	SIW	TOTAL
1.	7	Biochemistry of the oral fluid.	2		10	8	20
2.	7	Biochemical aspects of pathological conditions of the oral cavity.	2		10	8	20
3.	7	Methods of saliva diagnostics. Practical salivology in assessing the state of health. Saliva screening tests.		20		12	32

\*- relevant for both full-time and distance learning

### 6.2. Thematic schedule of lectures\*:

№	Name of lectures' topics	Volume in AH
1.	Biochemistry of saliva: chemical composition, properties, role. Regulation of saliva secretion. Micellar structure of saliva. Gingival fluid.	2 AH
2.	Biochemical aspects of pathological conditions of the oral cavity.	2 AH

\*- relevant for both full-time and distance learning

6.3. Thematic plan of laboratory practicum (LP)\* (this type of activity is not provided in the curriculum).

### 6.4. Thematic plan of practicals (P) \*:

№	Name of topics of practicals	Volume in AH
1.	Methods of saliva diagnostics. Unstimulated sialometry method. Determination of organic and inorganic components of saliva.	5 AH
2.	Practical salivology in assessing the state of health. Determination of the content of immunoglobulins sIgA.	5 AH
3.	Saliva crystallography method.	5 AH
4.	Saliva screening tests.	5 AH

\*- relevant for both full-time and distance learning

### 6.5. Thematic plan of seminars \*:

№	Name of topics of seminars	Volume in AH
1.	Biochemistry of the oral fluid. Organic components of saliva.	5 AH
2.	Biochemistry of the oral fluid. Inorganic components of saliva.	5 AH
3.	Biochemical aspects of pathological conditions of the oral cavity.	10 AH

\*- relevant for both full-time and distance learning

### 6.6. Types and topics of student's individual work (SIW)\*:

№	Types and topics of SIW	Volume in AH
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1.	Work with literary sources. Preparation for the current control, work with electronic educational resources. Completion of case tasks. Preparation of abstracts on topics: - Proteins of the oral fluid that perform a protective function. - Enzymes of saliva, their physiological significance.	8
2.	Work with literary sources. Preparation for the current control, work with electronic educational resources. Completion of case tasks. Preparation of abstracts on topics: -Enzymodiagnosics in the practice of a dentist. - The use of molecular diagnostic methods in the diagnosis of diseases of the oral cavity.	8
3.	Work with literary sources. Preparation for the practical session. Preparation for the current control, work with electronic educational resources. Completion of case tasks. Preparation of abstracts on topics: -Modern salivary screening tests. - Diagnostic value of saliva crystallography method.	12

### 7. Types of assessment formats for ongoing monitoring and mid-term assessment

№	Se me - ste r	Types of a control	Name of section of academic discipline	Assessment formats		
				types	number of test questions	number of test task options
1	2	3	4	5	6	7
1	7	Control of the topic assimilation	Biochemistry of the oral fluid.	Test	10	testing (the variant is formed by random sampling)
				Test questions	2	10-15
				Abstract	1	
				Case studies	1	10
2	7	Control of the topic assimilation	Biochemical aspects of pathological conditions of the oral cavity.	Test	10	testing (the variant is formed by random sampling)
				Abstract	1	
				Test questions	2	10-15
				Case studies	1	10
3	7	Control of the topic assimilation	Methods of saliva diagnostics. Practical salivology in assessing the state of health. Saliva screening tests.	Test	10	testing (the variant is formed by random sampling)
				Test questions	2	10-15
				Abstract	1	
				Case studies	1	10

**Examples of evaluation tools. Test examples.**  
**Choose 1 correct answer.**

**1. Specify the type of apatite that accumulates in mineralized tissues in chronic radiation sickness and Kashin-Beck disease:**

- 1) hydroxyapatite
- 2) fluorapatite

- 3) chlorapatite
- 4) strontium apatite.

**2. The protein matrix of tooth enamel is represented by:**

- 1) collagens
- 2) keratins
- 3) albumins
- 4) enamelines.

**3. pH of mixed saliva under physiological conditions varies within:**

- 1) 7.5- 8.5
- 2) 5.0-6.0
- 3) 1.5- 2.5
- 4) 6.5- 7.5.

**4. The measure of bacterial contamination of the oral cavity is:**

- 1) amylase
- 2) lipase
- 3) urease
- 4) lysozyme.

**Examples of case studies:**

**Case study 1.** Analysis of the saliva of a patient with periodontitis showed a decrease in catalase activity. What reaction does catalase catalyze? The activity of what other enzymes can change?

**Case study 2.** Why is the drug "Lizobakt", containing the hydrolytic enzyme lysozyme, recommended for the treatment of infectious and inflammatory diseases of the oral mucosa, gums, including gingivitis and stomatitis?

**Case study 3.** Does hypo- and asalivation contribute to the development of multiple caries in patients? Why? Explain the answer.

**8. Educational, methodological and informational support for mastering the academic discipline (printed, electronic publications, the Internet and other network resources)**

8.1. Key literature references

№	Name according to bibliographic requirements	Number of copies	
		at the department	at the library
1	Biochemistry with exercises and tasks: a textbook for universities + 1 electron. disk (CD-Rom) / Severin E.S., A.I. Glukhov, V.A. Golenchenko, O.V. Korlyakova and others; - M. : GEOTAR-Media, 2010. - 384 p. : ill. soft - ISBN 978-5-9704173-6-2.	4	92
2	Glukhov, A. I. Biochemistry of the connective tissue. Biochemistry of mixed saliva practical guide / A. I. Glukhov, E. V. Babchenko ; Glukhov A. I. ; Babchenko E. V. Moscow: GEOTAR-Media, 2021. – 128 c. – ISBN 978-5-9704-6101-3. – Text : electronic.	Electronic resource	Electronic resource



	– URL: <a href="https://www.studentlibrary.ru/book/ISBN9785970461013.html">https://www.studentlibrary.ru/book/ISBN9785970461013.html</a> (date of access: 16.11.2022). – Access mode: by subscription.		
3	Biochemistry of the oral cavity: textbook / P. P. Zagoskin, E. I. Erlykina; Volga Research Medical University. - N. Novgorod: PIMU Publishing House, 2021. - 104 p. : ill. - ISBN 978-5-7032-1425-1.	Electronic resource	Electronic resource
4	Biochemistry of tissues and fluids of the oral cavity: textbook / T.P. Vavilov; Vavilova T.P. - Moscow: GEOTAR-Media, 2019. - 208 p. - ISBN 978-5-9704-5006-2. - Text : electronic. - URL: <a href="https://www.studentlibrary.ru/book/ISBN9785970450062.html">https://www.studentlibrary.ru/book/ISBN9785970450062.html</a> (date of access: 11/14/2021). - Access mode: by subscription.	Electronic resource	Electronic resource

## 8.2. Further reading\*:

№	Name according to bibliographic requirements	Number of copies	
		at the department	at the library
1	Biochemistry for dental students / D. Puri. – Delhi : Elsevier, 2016. – XV, 332 p. – ISBN 978-81-312-4444-9.	Electronic resource	Electronic resource
2	Biochemistry with exercises and tasks : monograph / b. ed, V. V. ; ed. by A. I. Glukhov ; V. V. Garin. – Moscow: GEOTAR-Media , 2022. – 296 p. – ISBN 978-5-9704-7069-5. – Text : electronic. . – URL: <a href="https://www.studentlibrary.ru/book/ISBN9785970470695.html">https://www.studentlibrary.ru/book/ISBN9785970470695.html</a> (date of access: 20.11.2022). – Access mode: by subscription.	Electronic resource	Electronic resource
3	Levine, M. Topics in dental biochemistry / M. Levine ; Levine, Martin. – Berlin : Springer, 2011. – 307 p. : il. – ISBN 9783540881155.	Electronic resource	Electronic resource
4	Essential Biochemistry. P. 1 : study guide for dental students / E. I. Erlykina, L. M. Obukhova. – N. Novgorod: PIMU Publishing House 2021. – Text : electronic.	Electronic resource	Electronic resource

## 8.3. List of guidelines for independent work of students:

№	Name according to bibliographic requirements	Number of copies	
		at the department	at the library
1	Training material in biochemistry : Training material / E. Erlykina, A. A. Anashkina, O. V. Barinova [et al.] ; – N. Novgorod : Publishing House of Privolzhskiy Research Medical University, 2019.	Electronic resource	Electronic resource
2	Hormones. Textbook / ed. prof. E.I. Yerlykina. - N. Novgorod: 2018. - 39 p.	Electronic resource	Electronic resource
3	Biochemical aspects of matrix syntheses. Textbook / ed. prof. E.I. Yerlykina. - N. Novgorod: 2019	Electronic resource	Electronic resource

#### **8.4. Electronic educational resources for teaching academic subjects.**

##### **8.4.1. Internal Electronic Library System of the University (IELSU)\***

<i>Name of the electronic resource</i>	<i>Brief description (content)</i>	<i>Access conditions</i>	<i>Number of users</i>
Internal electronic library system (IELS)	Proceedings of the teaching staff of the Academy: textbooks and teaching aids, monographs, collections of scientific papers, scientific articles, dissertations, abstracts of dissertations, patents.	From any computer on the Internet, using an individual login and password [Electronic resource] - Access mode: <a href="http://95.79.46.206/login.php">http://95.79.46.206/login.php</a>	unlimited

##### **8.4.2. Electronic educational resources acquired by the University**

<i>Name of the electronic resource</i>	<i>Brief description (content)</i>	<i>Access conditions</i>	<i>Number of users</i>
Electronic database "Student Advisor"	Educational literature + additional materials (audio, video, interactive materials, test tasks) for higher medical and pharmaceutical education. Editions are structured by specialties and disciplines in accordance with the current Federal State Educational Standards of Higher Professional Education.	From any computer on the Internet, using an individual login and password [Electronic resource] - Access mode: <a href="http://www.studmedlib.ru/">http://www.studmedlib.ru/</a>	General subscription of PIMU
Electronic library system "Bukap"	Educational and scientific medical literature of Russian publishing houses	From any computer located on the Internet by login and password, from the computers of the university.	General subscription of PIMU
"Bibliopisk"	Integrated search service "single window" for electronic catalogs, ELS and full-text databases.	For PIMU, access to the demo version of the	General subscription of PIMU

	The results of a single search in the demo version include documents from domestic and foreign electronic libraries and databases available to the university as part of a subscription, as well as from open access databases.	Bibliopoisk search engine is open: <a href="http://bibliosearch.ru/pimu">http://bibliosearch.ru/pimu</a> .	
Russian electronic periodicals	Periodicals on medical topics and higher education	From the computers of the university on the platform of the electronic library eLIBRARY.RU -magazines publishing house "Mediasphere" - from the computers of the library or provided library at the request of the user [Electronic resource] - Access mode: <a href="https://elibrary.ru/">https://elibrary.ru/</a>	
International scientometric database "Web of Science Core Collection"	Web of Science covers materials on natural, technical, social, humanities; takes into account the mutual citation of publications developed and provided by Thomson Reuters; has built-in search, analysis and management of bibliographic information.	Free access from PIMU computers [Electronic resource] - Access to the resource at: <a href="http://apps.webofknowledge.com">http://apps.webofknowledge.com</a>	Free access from PIMU computers

#### 8.4.3 Open access resources

<i>Name of the electronic resource</i>	<i>Brief description (content)</i>	<i>Access conditions</i>
Federal Electronic Medical Library (FEML)	Includes electronic analogues of printed publications and original electronic publications that have no analogues recorded on other media (dissertations, abstracts, books, magazines, etc.). [Electronic resource] - Access mode: <a href="http://neb.rf/">http://neb.rf/</a>	from any computer on the Internet
Scientific electronic library eLIBRARY.RU	The largest Russian information portal in the field of science, technology, medicine and education, containing abstracts and full texts of scientific articles and publications. [Electronic resource] -	from any computer on the Internet

	Access mode: <a href="https://elibrary.ru/">https://elibrary.ru/</a>	
Scientific electronic library of open access CyberLeninka	Full texts of scientific articles with annotations published in scientific journals in Russia and neighboring countries. [Electronic resource] - Access mode: <a href="https://cyberleninka.ru/">https://cyberleninka.ru/</a>	from any computer on the Internet
Russian State Library (RSL)	Abstracts for which there are copyright agreements with permission for their open publication [Electronic resource] - Access mode: <a href="http://www.rsl.ru/">http://www.rsl.ru/</a>	from any computer on the Internet
Reference and legal system "Consultant Plus"	Federal and regional legislation, judicial practice, financial advice, legislative comments, etc. [Electronic resource] - Access mode: <a href="http://www.consultant.ru/">http://www.consultant.ru/</a>	from any computer on the Internet
Official website of the Ministry of Health of the Russian Federation	National Clinical Guidelines [Electronic resource] - Access mode: <a href="http://cr.rosminzdrav.ru">cr.rosminzdrav.ru</a> - Clinical recommendations	from any computer on the Internet

## 9. Material and technical support for mastering an academic discipline

### 9.1. List of premises for classroom activities for the discipline

1. 7 specially equipped classrooms equipped with laboratory tables for seminars, practical lessons in the study of the subject
2. 2 specially equipped scientific laboratories for the implementation of research work of students

### 9.2. List of equipment for classroom activities for the discipline

water baths, photoelectrocolorimeters, laboratory centrifuges, thermostats, spectrophotometers, ionometers, urine analyzers, laboratory glassware, tripods, sets of appropriate reagents, tweezers, Petri dishes, flasks, test tubes, pipettes, reagent bottles; filter paper; multimedia systems for lecturing (laptop, projector, screen), TVs, laptop with multimedia attachment, computers, printers, scanners, whiteboards.

### 9.3. A set of licensed and freely distributed software, including domestic production

Item no.	Software	number of licenses	Type of software	Manufacturer	Number in the unified register of Russian software	Contract No. and date
1	Wtware	100	Thin Client Operating System	Kovalev Andrey Alexandrovich	1960	2471/05-18 from 28.05.2018
2	MyOffice is Standard. A corporate user	220	Office Application	LLC "NEW CLOUD TECHNOL	283	without limitation, with the right

	license for educational organizations, with no expiration date, with the right to receive updates for 1 year.			OGIES"		to receive updates for 1 year.
3	LibreOffice		Office Application	The Document Foundation	Freely distributed software	
4	Windows 10 Education	700	Operating systems	Microsoft	Azure Dev Tools for Teaching Subscription	
5	Yandex. Browser		Browser	«Yandex»	3722	
6	Subscription to MS Office Pro for 170 PCs for FGBOU VO "PIMU" of the Ministry of Health of Russia	170	Office Application	Microsoft		23618/HN10030 LLC "Softline Trade" from 04.12.2020

### 10. List of changes to the working program (to be filled out by the template)

№	Date of change	Protocol number of the Department meeting	Content of change	Signature
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Department of  
*Name of the department*

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**CHANGE REGISTRATION SHEET**

working program for the academic discipline  
***NAME OF THE ACADEMIC DISCIPLINE***

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Field of study / specialty / scientific specialty: \_\_\_\_\_  
(code, name)

Training profile: \_\_\_\_\_  
(name) - for master's degree programs

Mode of study: \_\_\_\_\_  
full-time/mixed attendance mode/extramural

Position	Number and name of the program section	Contents of the changes made	Effective date of the changes	Contributor's signature
1				

Approved at the department meeting  
Protocol No. \_\_\_\_\_ of \_\_\_\_\_ 20\_\_

Head of the Department

\_\_\_\_\_  
department name, academic title

\_\_\_\_\_  
signature

/ \_\_\_\_\_  
print name