

Документ подписан простой электронной подписью  
Информация о владельце:  
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**Federal State Autonomous Educational Institution  
of Higher Education "Peoples' Friendship University of Russia"**

**Medical Institute**

(name of Educational Division developing the postgraduate program)

**Department of Biochemistry named after academician T.T. Berezov**

(name of the Educational Department developing the postgraduate program)

**SCIENTIFIC ACTIVITY PLAN**

**Scientific specialty:**

1.5.4. Biochemistry

(code and name of the scientific specialty)

**Practical training of students is carried out within the framework of the  
postgraduate education program:**

Biochemistry Molecular mechanisms of cancer

(name of the postgraduate program)

2023 г.

## 1. THE PURPOSE OF SCIENTIFIC RESEARCH

The purpose of carrying out scientific research (carrying out scientific (research) activities) is to prepare a dissertation for the degree of Candidate (Philosophy Doctor) of Biological Sciences (herein and after - the dissertation) for defense.

Tasks of scientific research (implementation of scientific (research) activities):  
ensuring the formation of professional research thinking of graduate students, the formation of their clear understanding of the main professional tasks, ways to solve them;

- formation of skills to develop work plans and research programs;
- preparation of data for the compilation of reviews, reports, scientific reports and publications;
- formation of skills and abilities to conduct scientific discussion, to present research results in various forms (presentation, abstract, essay, analytical review, critical review, report, message, speech, scientific article of a review, research and analytical nature, etc.);
- acquisition of experience in independent organization of research activities.

## 2. PLANNED RESULTS OF SCIENTIFIC RESEARCH

The solution of a scientific problem that is important for the development of biochemistry.

Preparation of a dissertation for defense includes the implementation of an individual plan of scientific activity, writing, registration and presentation of a dissertation for final certification.

As a result of the training, the graduate student must:

*Know:*

- methodology of scientific research;
  - modern technologies of information search and processing;
- requirements for the quality, completeness and reliability of sources of scientific information used in scientific research;

- requirements for registration of scientific research results;

*Be able to:*

- organize independent research work;
- to identify, formulate current problems in the field under study, set goals, determine the subject and objectives of the study;

- to collect, systematize and study scientific literature in the field of the topic under study;
- conduct biochemical studies;
- analyze, adapt, optimize existing and develop new methods necessary for conducting research;
- to argue the results of their own scientific research and draw reasonable conclusions;

to present the results of scientific research in the form of completed research papers: reports, abstracts, reports, theses, scientific articles;

*Own:*

- skills of independent research work;
- methods of research and experimental work and rules for the use of research tools;
- methods of analysis and processing of experimental and empirical data, means and methods of data processing;

- skills in using modern software for statistical data processing;
- scientific and theoretical approaches of domestic and foreign scientists on the problem under study, methods of analyzing data accumulated in the scientific industry on the subject of research;
- methods of organizing, planning, and implementing scientific works, knowledge on the design of the results of research work.;
- public speaking skills;
- skills in preparing presentations and scientific reports, design of scientific articles and scientific work.

*The plan of scientific activity of a particular student is approved in the individual plan of scientific activity of a graduate student, the requirements for which are established by the relevant local regulatory act of the RUDN.*

### 3. SCOPE OF SCIENTIFIC RESEARCH

The total workload of scientific research is 210 credits (7560 ac.h.).

### 4. STAGES OF SCIENTIFIC RESEARCH\*

*Table 5.1. Stages of scientific research*

Stage name	Content of the stage (topics, activities)	Workload, ac.h
<b>1st course</b>		
Section 1. Scientific activity of a postgraduate student aimed at preparing a dissertation for defense	Study of methodological recommendations for the organization and passage of research work. Getting individual tasks. Individual consultations with the supervisor.	1548 (433E)
	Formulation of the purpose, objectives, and prospects of the study. Determination of the relevance and scientific novelty of the work. Formulation of the topic and structure of scientific work (together with the supervisor).	
	Familiarization with scientific methods, technology of their application, methods of processing the obtained empirical data and their interpretation.	
	Writing the first chapter of the dissertation "Literature Review" on the research topic.	
Section 2. Preparation of publications in which the main scientific results of the dissertation are presented	Подготовка и публикация научных статей в журналах перечня ВАК, РИНЦ, SCOPUS, Wos.	216 (6 3E)
Midterm attestation		72 (2 3E)
<b>TOTAL:</b>		<b>1836</b>
<b>2 course</b>		
Section 1. Scientific activity of a postgraduate student aimed at preparing a dissertation for defense	Conducting scientific research on the topic of research work.	1332 (37 3E)
	Collection and generalization of the material.	
	Statistical processing and analysis of the received data.	

Stage name	Content of the stage (topics, activities)	Workload, ac.h
	Presentation at scientific conferences, congresses, seminars with mandatory publication of abstracts	
Section 2. Preparation of publications in which the main scientific results of the dissertation are presented	Preparation and publication of scientific articles in the journals of the list of HAC, RSCI, SCOPUS, Wos.	216 (6 3E)
Midterm attestation		72 (2 3E)
	<b>TOTAL:</b>	<b>1620 (45 3E)</b>
<b>3 course</b>		
Section 1. Scientific activity of a postgraduate student aimed at preparing a dissertation for defense	Conducting scientific research on the topic of research work.	1872 (52 3E)
	Collection and generalization of the material.	
	Statistical processing and analysis of the received data.	
	Presentation at scientific conferences, congresses, seminars with mandatory publication of abstracts	
Section 2. Preparation of publications in which the main scientific results of the dissertation are presented	Preparation and publication of scientific articles in the journals of the list of HAC, RSCI, SCOPUS, Wos.	216 (6 3E)
Midterm attestation		72 (2 3E)
	<b>TOTAL:</b>	<b>2160 (60 3E)</b>
<b>4 course</b>		
Section 1. Scientific activity of a postgraduate student aimed at preparing a dissertation for defense	Interpretation of the results obtained, formulation of conclusions, conclusions, practical recommendations based on the results of research work.	1656 (46 3E)
	Completion of writing a dissertation.	
	Approbation of the obtained results of research work. Preparation of a scientific report and presentation on the results of the study.	
	Discussion of the results of the study at the meeting of the department.	
	Writing the abstract of the dissertation. Recommendation of the dissertation for official defense.	
Section 2. Preparation of publications in which the main scientific results of the dissertation are presented	Preparation and publication of scientific articles in the journals of the list of HAC, RSCI, SCOPUS, Wos.	216 (6 3E)
Midterm attestation		72 (2 3E)
	<b>TOTAL:</b>	<b>1944 (54 3E)</b>
	<b>TOTAL:</b>	<b>7560 (210 3E)</b>

## 6. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE

Table 6.1. Material and technical support of the discipline

Auditorium type	Equipment the audience	Specialized educational/laboratory equipment, software and materials for the development of the discipline (if necessary)
Lecture hall	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a board (screen) and technical means of multimedia presentations. Hall No. 1 for 300 seats, Hall No. 2 for 300 seats, Hall No. 3 for 50 seats, RUDN Medical Institute, 117198, Moscow, Miklukho-Maklaya str., 8	A set of specialized furniture; technical means: a multimedia projector, a computer, a white magnetic board, a set of markers for the board, a set of educational presentations, educational posters and tables. Software: Microsoft products (OS, office application package, including MS Office/Office 365, Teams, Skype.
Specialized audience	An auditorium for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment. Auditoriums 329, 334, 336, RUDN Medical Institute, 117198, Moscow, Miklukho-Maklaya str., 8.	Multimedia projectors and motorized screens NEC V 260X Projector, Motorized Screen for Master Control Projector 203X203. laboratory equipment: Exhaust hood, CENTRIFUGE OPN-8, KFK-3-01 photoelectrocolorimeter, Electric drying cabinet SNOL 67/350, Thermoblock PE-4030 36 gn. d-23*45mm, Spectrophotometer Specord M -40, Computer HP 280 G2 MT V7 Q81E Intel Pentium Dual-Core G4400
Educational and Scientific Laboratory	Laboratory of Molecular Biological and Biochemical Research Methods. Audiences 201, 316, 318, 319, 339, RUDN Medical Institute, 117198, Moscow, Miklukho-Maklaya str., 8	Pestle microbiological homogenizer Vilitek DY89-II, pestles and containers to it for 3, 5, 10, 20 and 50 ml. NANODROP 2000C Thermo Fisher Microspectrophotometer Camera for horizontal electrophoresis Sub-Cell GT, 15x15 cm, combs for 15 and 20 holes (1 piece each), with stops for filling Bio-Rad 1704402 - 2 pieces Camera for vertical electrophoresis Mini-PROTEAN ® Tetra Bio-Rad 165800 - 2 pcs PowerPack Basic Power Supply

Auditorium type	Equipment the audience	Specialized educational/laboratory equipment, software and materials for the development of the discipline (if necessary)
		<p>Power supply for 4 electrophoretic chambers with output voltage up to 300 V. Bio-Rad 1645050</p> <p>SM - 6M desktop centrifuge with 6M rotor (12 x12ml vials) Elmi</p> <p>Transilluminator TCP-20.MC wavelength 312 and 254 nm, screen size 20 x 20 cm. Vilber Lourmat VL 2161 2017 1</p> <p>Desktop pH Meter Series Starter 5000 Ohaus, Ohaus ST5000, pH meter MettlerToledo</p> <p>Microcentrifuge 5420</p> <p>Microcentrifuge with rotation speed up to 15060 rpm, with the ability to work with standard test tubes on 0,2/0,5/0,6/1,5 and 2 ml and PCR strips. Epp 5420 000.318, Eppendorf</p> <p>Evolution <sup>TM</sup> 201/220 UV-Visible Spectrophotometer 840-210600, Thermo Fisher</p> <p>Multimodal reader ClarioStar Omega BMG LABTECH 415-10</p> <p>Thermoshaker TS-100C, BS-010143-AAI, BioSan</p> <p>Liebherr GNP 3056 freezer, Biryusa-6 refrigerator, Minsk-17 Freezer.</p> <p>Laboratory medical centrifuge ProfMT, Refrigerator ATLANT XM 6026-031, Freezer Minsk-17,</p> <p>Electronic scales AR0640 Ohaus Europe, Spectrophotometer Hitachi F-2700, Distiller GTL-200, Thermostat, Thermoblock PE-4030 36 gn. d-23*45mm, Bi-beam Spectrophotometer U-2900, Centrifuge L7-55</p> <p>HP 280 G2 MT V7 Q81E Intel Pentium Dual-Core G4400 Computer</p> <p>There is an Internet connection</p> <p>Electrophoretic chamber, 1mm, Analytical scales EP214C, Laboratory washing table</p>

Auditorium type	Equipment the audience	Specialized educational/laboratory equipment, software and materials for the development of the discipline (if necessary)
		985*610*900 . Microcentrifuge Eppendorf Minispin Vortex V-1 plus Flow cytometer MACSQuant Analyzer 10, Fume hood, Thermoblock PE-4030 36 gn. d-23*45mm, Spectrophotometer Specord M -40, HP 280 G2 MT V7 Q81E Intel Pentium Dual-Core G4400 Computer
For independent work of students	An auditorium for independent work of students (can be used for laboratory classes and consultations), equipped with a set of specialized furniture. Auditorium 203, 339, RUDN Medical Institute, 117198, Moscow, Miklukho-Maklaya str., 8	A set of specialized furniture, Software: Microsoft products (OS, office application package, including MS Office/ Office 365, Teams), Drying cabinet, Specord M-40 spectrophotometer, dry-air thermostat

## 7. METHODS OF CONDUCTING SCIENTIFIC RESEARCH

Scientific research is carried out both in the structural divisions of the RUDN or in the organizations of Moscow (stationary), and at bases located outside Moscow (mobile).

Conducting scientific research on the basis of an external organization (outside the RUDN) is carried out on the basis of a corresponding contract, which specifies the terms, place and conditions for performing scientific research in the base organization.

The deadlines for scientific research correspond to the period specified in the calendar schedule of the postgraduate program. The terms of the internship can be adjusted in coordination with the Department of Training of Highly Qualified Personnel of the RUDN.

## 8. EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT OF SCIENTIFIC RESEARCH

*Basic literature:*

1. Federal Law No. 127-FZ of August 23, 1996 "On Science and State Scientific and Technical Policy"
2. Decree of the Government of the Russian Federation No. 842 dated September 24, 2013 "On the procedure for awarding academic degrees"
3. Volkov Yu.G. Dissertation. Preparation, defense, registration. M., 2012.

4. Kuzin F.A. Dissertation. The method of writing. Rules of registration. The order of protection. M., 2013.

5. Novikov A.M. Methodology of scientific research [Text]: textbook.- method. manual / A.M. Novikov, D. A. Novikov. – M.: LIBROCOM, 2010. – 280 p.

*Additional literature:*

1. Raizberg B.A. Dissertation and academic degree. M., 2011.

2. Yarskaya V.N. Methodology of dissertation research. How to defend a dissertation. M., 2011.

*Resources of the Internet information and telecommunication network:*

1. EBS RUDN and third-party EBS, to which university students have access on the basis of concluded contracts:

- Electronic library system of RUDN – EBS RUDN  
<http://lib.rudn.ru/MegaPro/Web>

- EBS "University Library online" <http://www.biblioclub.ru>

- ABS Yurayt <http://www.biblio-online.ru>

- EBS "Student Consultant" [www.studentlibrary.ru](http://www.studentlibrary.ru)

- EBS "Doe" <http://e.lanbook.com/>

- EBS "Trinity Bridge"

2. Databases and search engines:

- electronic Fund of legal and normative-technical documentation  
<http://docs.cntd.ru/>

search engine Yandex <https://www.yandex.ru/>

- Google search engine <https://www.google.ru/>

- bibliographic database SCOPUS <http://www.elsevierscience.ru/products/scopus/>

- MedLib Online Medical Library (<http://med-lib.ru/>).

- Higher Attestation Commission (HAC) - <http://vak.ed.gov.ru/>

- Library of the National Center for Biotechnological Information  
(<https://www.ncbi.nlm.nih.gov/>)

- Scientific electronic Library (<https://www.elibrary.ru/defaultx.asp>)

- Scientific electronic library "CyberLeninka" (<https://cyberleninka.ru/>)

*Educational and methodological materials for scientific research\*:*

1. Methodological guidelines for the preparation of dissertations, scientific publications.

\* - all educational and methodological materials for scientific research are placed in accordance with the current procedure on the practice page in TEIS!

## **8. EVALUATION MATERIALS AND EVALUATION SYSTEM OF STUDENTS BASED ON THE RESULTS OF SCIENTIFIC RESEARCH**

Mandatory activities of the student:

1 year of study:

- independent study of the recommended methodological literature necessary for carrying out research work, familiarization with the research program;



- preparation of a work plan for conducting scientific research (together with the supervisor);
- formulation of the purpose, objectives, and prospects of the study. Determination of the relevance and scientific novelty of the work. Formulation of the topic and structure of scientific work (together with the supervisor);
- preparation and discussion at the department of the thesis concept and approval of the topic;
- study and review of scientific literature (foreign and domestic) on the subject of dissertation work;
- familiarization with scientific methods, technology of their application, methods of processing the empirical and experimental data obtained and their interpretation;
- writing the first chapter of the dissertation "Literature Review" on the research topic;
- participation in the research work of the profile department
- presentation at a scientific conference.

#### 2 year of study:

- conducting scientific research on the topic of research work;
- collecting and summarizing material;
- statistical processing and analysis of the received data;
- preparation and discussion of the part of the dissertation at the department;
- presentation at scientific conferences, congresses, seminars with mandatory publication of abstracts;
- publication of at least two scientific articles, including one scientific article on the research topic in a publication included in the list of the Higher Attestation Commission and/or the RUDN or SCOPUS, Web of Science and others, equated to them and/or approved by the Scientific Council of the RUDN;
- participation in the research work of the profile department.

#### 3 year of study:

- conducting scientific research on the topic of research work;
- collecting and summarizing material;
- statistical processing and analysis of the received data;
- preparation and discussion of the part of the dissertation at the department;
- presentation at scientific conferences, congresses, seminars with mandatory publication of abstracts;
- publication of at least two scientific articles, including one scientific article on the research topic in a publication included in the list of the Higher Attestation Commission and/or the RUDN or SCOPUS, Web of Science and others, equated to them and/or approved by the Scientific Council of the RUDN;
- participation in the research work of the profile department.

#### 4 year of study:

- interpretation of the results obtained, formulation of conclusions, conclusions, practical recommendations based on the results of research work;
- preparation of the entire dissertation and presentation to the supervisor;
- publication of at least three scientific articles, including two scientific articles on the research topic in publications included in the list of the Higher Attestation

Commission and/or the RUDN and SCOPUS, Web of Science and others, equated to them and/or approved by the Scientific Council of the RUDN;

- speaking at conferences;
- participation in the research work of the department;
- summarizing the results of research work;
- preparation of a scientific report and presentation;
- discussion of the results of scientific research at the meeting of the department;
- writing the abstract of the dissertation.

According to the results of the stages of identifying scientific research, the graduate student submits a detailed oral or written report to the supervisor or to the meeting of the department. The report includes information characterizing the content of the graduate student's work and reflecting the performance of scientific research.

The report should include the following information:

- about the degree of readiness of the dissertation;
- on the preparation and publication of articles in journals included in the list of the Higher Attestation Commission, RSCI, Scopus, Web of Science and others, equated to them and/or approved by the Scientific Council of the RUDN;
- about the participation of a graduate student in scientific and technical events on the topic of his research;
- about participation in the research work of the department (with participation);
- other things.

During the interim certification, the supervisor provides feedback on the quality, timeliness and success of the postgraduate stages of scientific (research) activities.

The results of scientific research for each year of study are determined by conducting an intermediate certification with grades "excellent", "good", "satisfactory", "unsatisfactory" and in the ESTS system (A, B, C, D, E). The basis for their placement is the point-rating system adopted at the University.

**DEVELOPERS:**

Head of the Department of Biochemistry Post, Department	 Signature	V.S. Pokrovsky Name
Associate Professor of the Department of Biochemistry Post, Department	 Signature	E.V. Neborak Name

**HEAD OF THE DEPARTMENT:**

Department of Biochemistry Name of the Department	 Signature	V.S. Pokrovsky Name
------------------------------------------------------	--------------------------------------------------------------------------------------------------	------------------------