

RUDN University

Institute of Medicine

THE PROGRAM OF SCIENTIFIC RESEARCH

Direction: 06.06.01 «Biological sciences»

Profile: Genetics: molecular basis of human hereditary diseases

Qualification (degree) of a degree carrier: Researcher. Lecturer-researcher

1. The aim of scientific research

The aims of scientific research are: to acquire practical skills of independent research, collection of data for the thesis, verification of theoretical conclusions and practice suggestions.

2. Tasks of scientific research

Tasks of scientific research are:

- acquisition of scientific research methodology and methods;
- to acquire practical skills in carrying out molecular genetic studies
- the use of modern information technologies;
- to acquire skills in collection, processing, storage, and distribution of scientific information;
- formation of skills and ability to participate in scientific discussion, present results of the research in various forms (presentation, abstract, analytical review, critical review, report, scientific article, etc.)
- collection and analysis of data.

3. The position of scientific research in the Principal educational program

Scientific research is a component of professional training in higher education. It is a kind of a practical activity of students, which includes scientific research within the thesis, approval of the results and writing of the thesis.

Research is a part of the educational component stipulated in the Curriculum.

To be successful in the research a postgraduate student has to have a background in Genetics, Methodology of scientific research, primary skills in scientific inquiry, to be able to work with main information sources, to collect literature on the given subject, to prepare reviews on the research subject, to analyze ideas and conceptions, to have skills in the use of information technologies and data bases.

The research work of the postgraduate student is closely linked to scientific the scientific research practice and provides the formation of competencies necessary for independent planning and conducting scientific research.

4. Forms of scientific research

The main form of scientific research is independent research.

The research is a part of the curriculum of postgraduate students. It includes various types of activity, such as work in the laboratory and analysis of the results and literature data.

The main task of the student is to complete the research for the PhD thesis. For this purpose, a postgraduate student has to follow the supervisor's instructions. The student publishes the research data in peer-reviewed journals, speaks at conferences, seminars, round tables, and prepares the PhD thesis.

At the end of the research a graduate student defends the report on performed work.

5. The place and time of scientific research

Scientific research is carried out in the Laboratory of biomolecular research at RUDN university, other institutions (in case of need), and libraries. The place of the practice depends on the topic of the PhD thesis.

The research is performed during all years of study.

6. The competencies which are formed due to scientific research

- **UC-1.** the ability to analyze and evaluate current scientific achievements, generate new ideas and solve the research and practical problems;
- **UC-2.** the ability to design and perform integrated research, including interdisciplinary research, based on an integrated system of scientific worldview, using knowledge in the field of history and philosophy of science;
- **UC-3.** the readiness to participate in the work of Russian and international research teams;

- **UC-5.** the ability to plan and tackle tasks of their own professional and personal development.
- **GPC-1.** the ability to carry out research in the professional field with the use of modern methods of research and information technologies;
- **PC-1.** the ability to understand modern problems of biology and use fundamental biological ideas in professional activities for the goal setting and solution of new problems;
- **PC-2.** the ability to use the basic theories, concepts and principles in the chosen field of activity, the ability to systems thinking;
- **PC-3.** the readiness for the independent analysis of available information, the goal setting, and problem solving
- **PC-5.** the ability to use modern computer technology in the collection, storage, processing, analysis and transmission of biological information;
- **PC-6.** the ability to present and report the results of scientific research in accordance with rules;
- **PC-7.** the ability to apply the methodological principles of design and performance laboratory research using modern equipment;
- PC-8.** the knowledge of normative documents regulating the organization and methodology of the research, the ability to ensure process safety

7. The structure and content of scientific research

The labour intensity of the practice is **171 credits (6156 hours)**.

№	Stages	Types of activity of postgraduate students	Labour intensity (hours)	Evaluation instrument
1.	Preparatory stage (1 st year)	Studying of Laboratory Operations Manuals	1260	Colloquium
		Concept development		
		Development of the study design		
		Selection of optimal research methods and their adaptation to available equipment and reagents		Colloquium Analysis of control samples
		library-research		Colloquium Analysis of the library-research paper
2.	Main stage (2 nd and 3 rd years)	Sampling	3312	Checking the documentation, including work log, colloquium, analysis of articles and literature review
		collection of samples		
		laboratory studies		
		statistical processing of data		
		Preparation of a literature review on the research topic		
		Publishing of scientific articles in peer-reviewed journals and conference abstracts in accordance with the demands of the university and the Ministry of Education and Science of the Russian Federation.		
	Final stage (4 th year)	Summing up the research		Analysis of the thesis and report,
		Writing a thesis and author's abstract		

3.		Getting acquainted with functioning of the thesis examination board and the rules of execution and submission of the thesis.	1584	Colloquium
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8. The research, scientific, and production technologies used for the research

1. multimedia technologies
2. methods of molecular genetics
3. computer programs for analysis in statistics
4. Electronic resources

9. The methodological support of student self-study work

Student self-study work is carried out in accordance with the individual task made up by a student and a supervisor and approved by the head of the department.

Postgraduate students use sources on the subject of their research. For this purpose students have to get acquainted with the studies recommended by supervisors and other scientists. Students have to be familiar with information on the topic of their research, published in peer-reviewed journals, available library systems and data bases, access to which is provided by the University. To choose a research problem the post-graduate student and the supervisor should take into account the following recommendations:

- the problem should correspond to the priority areas of scientific research;
- the tackled tasks should be of practical and academic interest.

Students perform research on their own. Plagiarism is forbidden.

The postgraduate student should know the rules of work in the Laboratory of Biomolecular Research, including safety rules.

The activity assumes getting acquainted with functioning of the thesis examination board the rules of execution and submission of the thesis.

Example questions for self-study control:

1. What are the main results published in the last 5 years in journals indexed in the WoS and SCOPUS databases in the field of your research?
2. What is the relevance of your study?
3. What is the scientific novelty of your work?
4. What is the practical significance of your results?
5. What methods of statistical data processing should be used in your research?
6. What are the rules of work in the Laboratory of Biomolecular Research?
7. What are the rules of execution and submission of the thesis?

10. The methodological and data support of scientific research

1. Electronic Library System of RUDN university
2. <http://esystem.rudn.ru/>
3. National Center for Biotechnology Information (NCBI) - www.ncbi.nlm.nih.gov
4. ScienceDirect - <http://www.sciencedirect.com>
5. Scientific electronic library: - <http://elibrary.ru>
6. Google Academy - <http://scholar.google.ru/>
7. Research literature according to the topic of research

11. Equipment and material support of the practice:

- The Laboratory of Biomolecular Research
- Computers; Internet access
- Multimedia equipment

12. Types of control

Intermediate control

Scientific research is followed by an intermediate control of in the form of control questions to which students give oral answers, and genetic problems. During the intermediate control students have to show their knowledge and skills on the topic. The mark may be increased due to participation in the work of the department.

Final control

The final control is carried out in the form of oral interview. In addition, a student has to present a written report with results of the research.

The report contains the information about an individual task, published articles, participation in conferences and work of the department, level of thesis readiness.

Students who failed the practice have to repeat it, otherwise they will be expelled.

Rating scale

Rating Points	Marks	ECTS
95 – 100	5+	A
86 - 94	5	B
69 - 85	4	C
61 - 68	3+	D
51 - 60	3	E
31 - 50	2+	FX
0 - 30	2	F

13. Evaluation instruments

Control of acquired knowledge and skills is carried out in the form of oral colloquiums (the example questions are presented in item 9) and evaluation of the research reports.

The report approved at the meeting of the department. The report should contain information on the implementation of the individual plan, published scientific articles participation of the postgraduate student in Russian and international conferences and the research conducting at the department.

The report shall be accompanied by documents confirming the achievements indicated in the report (copies of the articles, reports, primary data, thesis manuscript, etc.).

Criteria for evaluation:

- depth of scientific research planning;
- consistency of presentation;
- correspondence of the aim and tasks of the research to the topic;
- the adequacy of the research methods;
- the relevance, reliability and completeness of the collected information;
- correlations between tasks and conclusions of the study;
- the content of articles;
- the accuracy of the report and its completeness.

The competencies, stages when they are formed, and evaluation instruments

<i>Competencies</i>	<i>Stages</i>	<i>Evaluation instruments</i>
UC-1, 2, 3, 5	1, 2, 3	Colloquium, analysis of the report, articles and thesis
GPC-1	1, 2, 3	Colloquium, analysis of the report
PC-1	1, 2	Colloquium
PC-2, 3	1, 2, 3	Colloquium, analysis of the report, articles and thesis
PC-5	2	Colloquium, analysis of the report
PC-6	1, 2, 3	Analysis of the report and thesis
PC-7	1, 2, 3	Colloquium, analysis of the report
PC-8	1, 2, 3	Colloquium

The program is designed in accordance with the RUDN educational standards of higher education.

Developer of the program



M.M. Azova

Director of the program



M.M. Azova