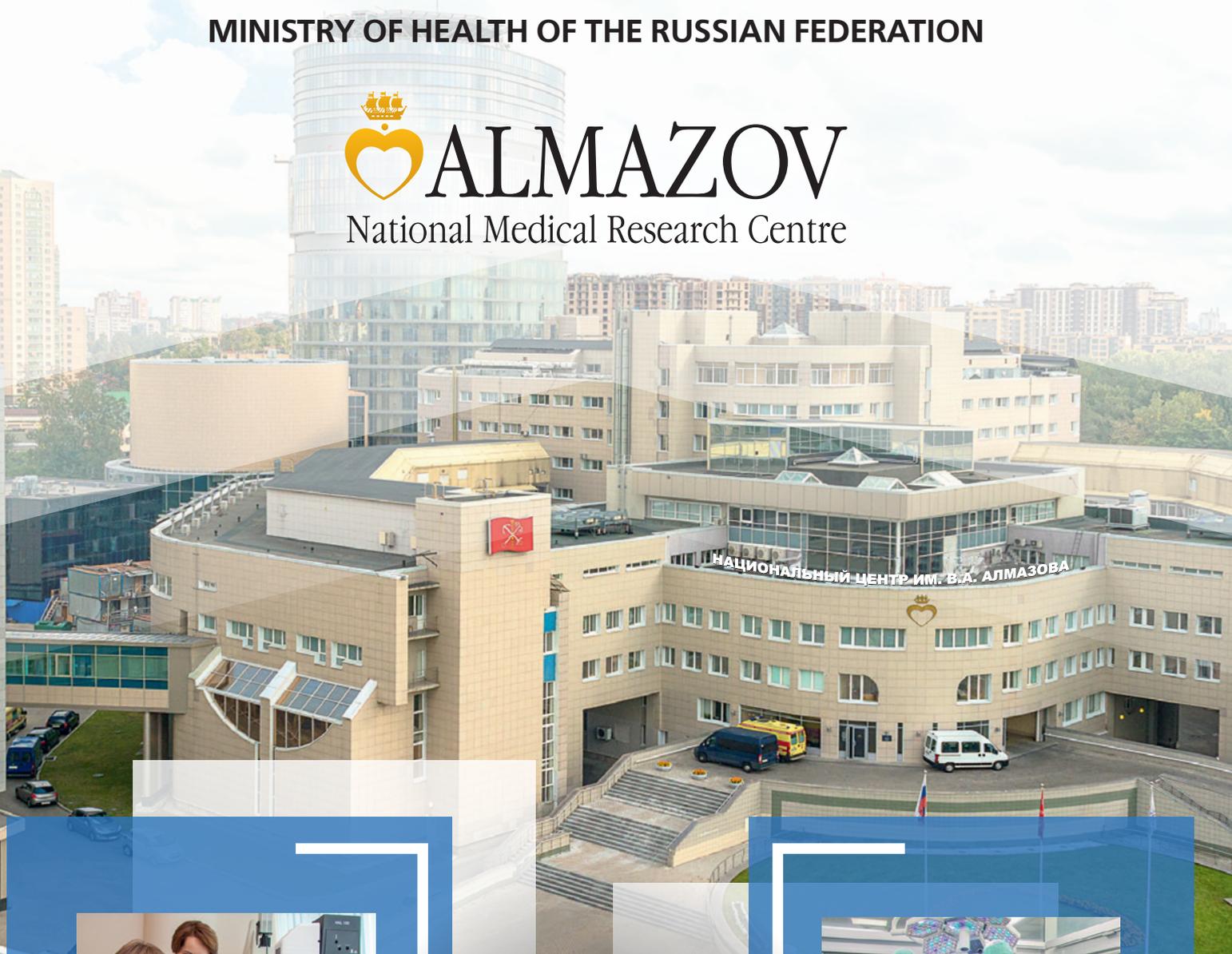


MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION



ALMAZOV

National Medical Research Centre



RESEARCH



EDUCATION



CLINIC

RESULTS 2019

**Dear colleagues and friends,**

I am pleased to present the results of our work in 2019, the year preceding the 40th anniversary of Almazov Center. This year gave a new impetus to further innovative development of Almazov Center as a leading versatile research, clinical and educational facility, not only in Russia but also globally. Today, the Center employs over 7,000 people and provides training to more than 2,000 medical specialists and 200 students.

We have built a well-known Russian scientific and teaching school that practices integrated and interdisciplinary approach to solving the most urgent research, practical and educational tasks in medicine based on breakthrough technologies of fundamental importance to the development of the Russian healthcare. As early as 15 years ago, we laid down the principles of translational research and built a system to create innovations and quickly introduce them into healthcare practice and education.

This past year was a remarkable page in the history of Almazov Center as a facility having an exceptional competence in high-quality training of medical staff. Pursuant to the Presidential Order of 5 July 2017 and relevant Government Decree of 13 January 2018 for the implementation of the pilot specialist training program, we enrolled 120 students. Seventy-five second-year students continued their studies. More than 600 clinical residents receive training in 28 specialties at Almazov Center.

Almazov Center has been an active contributor to the national projects Science, Healthcare, Education and Demography. As part of the consortium comprising 11 entities, Almazov Center participated in the competition to create global centers for genomic research, received 8 new grants from the Russian Science Foundation and launched a unique Russian project to create allogeneic CAR-T cells with genome editing technology.

Our Center performs unique cardiac and neurosurgery, implements large-scale programs for heart and bone marrow transplantation, minimally invasive aortic valve replacement and endovascular stent grafting. We successfully develop hybrid surgery, robotic surgery for obstetrics and gynecology, abdominal surgery and oncology. Over the past 2 years, Almazov Center, as part of its regional functions as a national medical research center, has become a recognized expert institution setting the tone in the implementation of the strategy to reduce mortality from circulatory diseases in Russia.

The successfully developing Translational Medicine Cluster grew to include new scientific and educational institutions, business and industrial partners. Cluster Management Company was established to promote the projects of the Cluster and implement its tasks.

Obviously, much remains to be done, and the anniversary year 2020 will be decisive for our fur-



ther development towards the integration of science, clinic and education, and creation of the biomedicine ecosystem in St. Petersburg. Value-added healthcare, patient-oriented approach and the development of smart clinic technologies have become the landmarks of the Center's present and future. The project concerned with digital health and artificial intelligence, to be implemented jointly with partners, should form the basis for a new paradigm of medicine that encompasses high-quality medical professionals and state-of-the-art digital decision support technologies.

The tasks solved by Almazov Center in 2019 went far beyond the traditional scope of scientific, educational and clinical processes. We are on the threshold of exciting endeavors and new achievements and I am confident that 2020, the year marking the 40th anniversary of the Center, will bring to all of us new discoveries and success.

Prof. Evgeny Shlyakhto,  
Director General of Almazov Center  
Academician of the Russian  
Academy of Sciences

Today, Almazov Center is a leading Russian medical center for high-tech care, research, medical education and training.

### RESEARCH

Almazov Center has 7 research institutes (over 100 research departments, laboratories and groups) that bring together 880 researchers.

### CLINIC

The clinic facilities of Almazov Center comprise the Main Clinical Facility, Rehabilitation Clinic, Perinatal Center, Children's Rehabilitation Clinic and the clinic of the Polenov Neurosurgical Institute.

In 2019, the total number of beds in the clinic was 1,519, including 214 beds in intensive care units.

### EDUCATION

The Medical Education Institute of Almazov Center comprises 3 faculties (22 chairs).

The annual number of postgraduates is over 2,000.

The basic higher education program for specialist training in General Medicine has been in place since September 1, 2018.



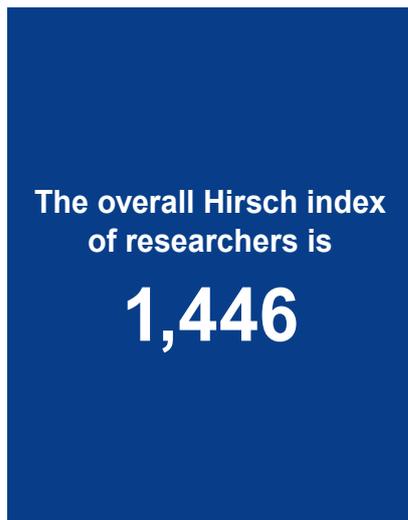
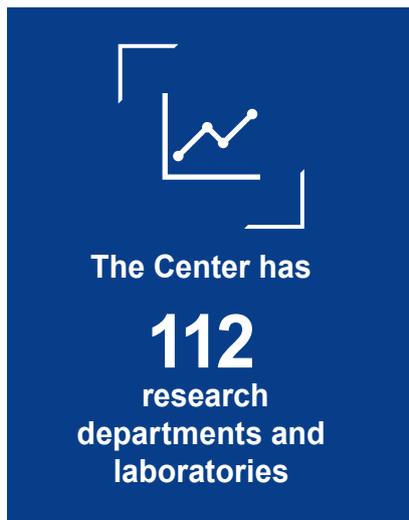
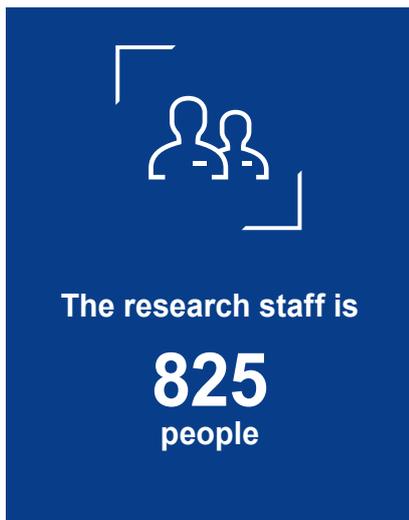


**RESEARCH**

# RESEARCH STRUCTURE

Almazov Center participates in 14 scientific platforms of the Russian Ministry of Health and its specialists are included in the expert groups in six of these platforms. The research teams of the Center were actively involved in shaping the research topics for these platforms.

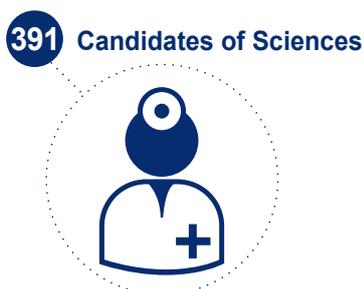
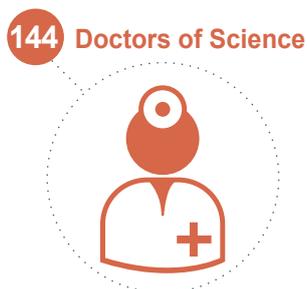
In 2019, the Center carried out research work on 52 scientific topics selected by the experts as part of the state target programs on science.

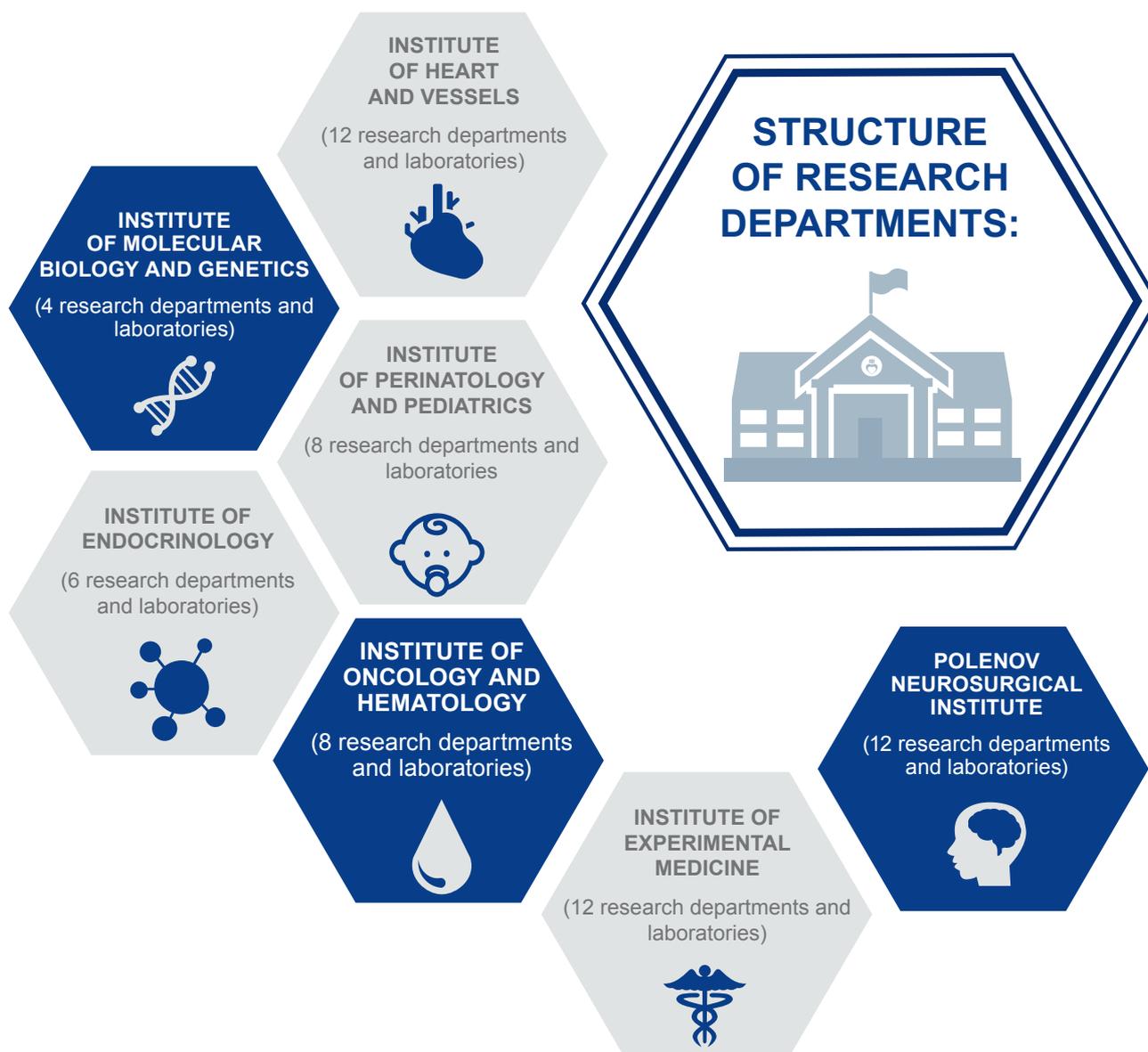


**The Center holds 22 patents and applied for 25 more as a result of research activities in 2019.**

Besides the State Target Program, Almazov Center performed 11 grants of the Russian Science Foundation, 18 grants of the Russian Foundation for Basic Research and 3 grants of the Ministry of Science and Higher Education of the Russian Federation.

The research staff includes:





## New technologies

Almazov Center holds 20 critical scientific technologies and in 2019 mastered new technologies, including intraoperative monitoring of myocardial ischemia/ischemia-reperfusion injury by fluorescence imaging, near-infrared fluorescence imaging, patch clamping of cardiomyocytes and fat cells.

Innovative technologies were introduced into practice, including vagus nerve stimulation for the treatment of heart failure, spinal cord stimulation in patients with refractory heart failure, lingual stimulation in vegetative states, electroconvulsive therapy in patients with akinetic mutism, staged surgical treat-

ment for drug-resistant epilepsy using the technique of extraoperative mapping of the epileptogenic zone, selective endovascular embolization of extra/intracranial malignant tumors, two-level cerebral protection in patients with severe brain injury using physical and pharmacological methods, etc.

As part of the applied research, the Center continued to develop the prototypes of medical devices, 6 inventions and 5 new drugs, conducted the preclinical trials of the drug based on succinic acid for the treatment of osteoporosis, developed the approaches for targeted drug delivery by inorganic nanocarriers.



## Preclinical Translational Research Center

The Preclinical Translational Research Center is a facility for testing the safety and efficacy of new drug compounds in accordance with global standards.

The Center has an animal house and is equipped with all the facilities for conducting unique experimental studies in compliance with all international regulations. Experimental studies of any complexity are possible here, including the development and testing of new drugs and biotechnological products, the creation of new experimental models. The SPF laboratory animal facility comprises the department of biological models that is equipped to generate transgenic and knockout mice to study the specific activity of the drugs tested.

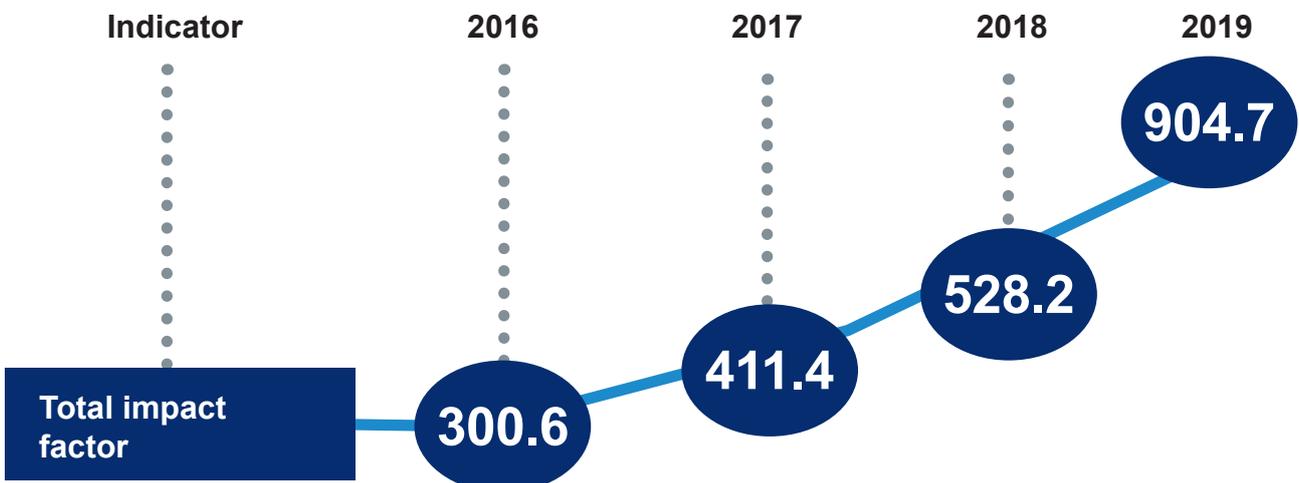
The laboratory unit of the Preclinical Translational Research Center enables assessing the acute and chronic

toxicity of drug compounds, their carcinogenicity, embryo- and immunotoxicity, as well as monitoring drug interaction with specific molecular targets.

## Scientific journals and publications

Almazov Center is the founder of three scientific journals listed in the Russian Science Citation Index, and one of them won the scientific journal competition held by the Russian Ministry of Education and Science. In 2019, a total of 14 monographs, textbooks and guides were published. The specialists of the Center won numerous competitions, grants for young scientists from various societies and conferences and became honorary members of scientific societies.

**401 articles mostly in journals with IF > 0.3**



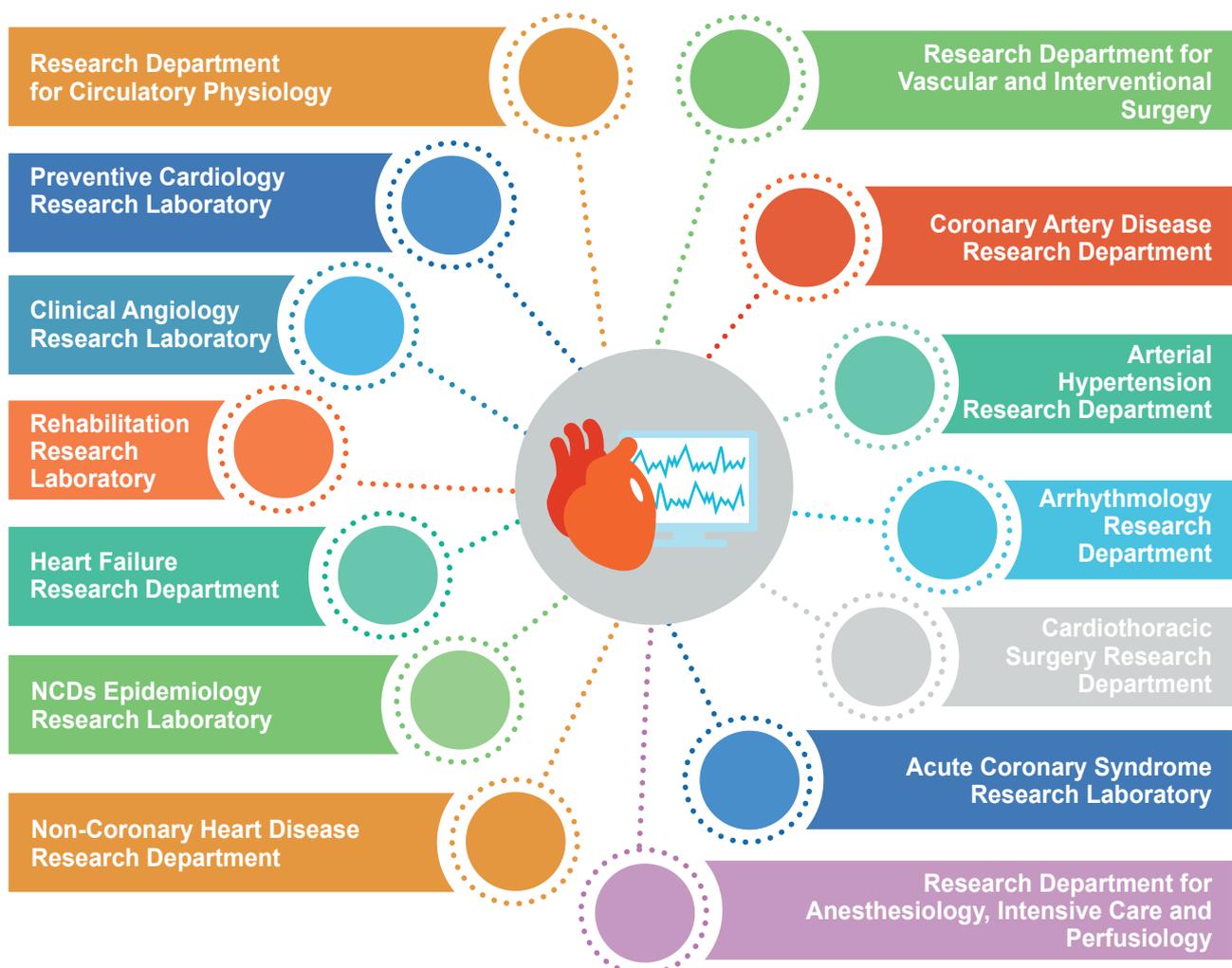
# Institute of Heart and Vessels



**Olga Moiseeva, MD, DSc**  
Director of the Institute

The Institute of Heart and Vessels conducts basic and applied research aimed at developing effective methods for the prevention, diagnosis and treatment of CVDs. Guided by the principles of value-based medicine, the specialists of the Institute provide scientific and methodological guidance for specialized and high-tech medical care and contribute to the training of research and medical personnel within the system of postgraduate education.

**The Institute comprises 14 research departments and laboratories**



# Institute of Molecular Biology and Genetics



**Anna Kostareva, MD, PhD**  
Director of the Institute

Research laboratories of the Institute implement basic research projects on biomedicine.

The specialists of the Institute conduct studies of genetic, epigenetic, molecular and cellular mechanisms underlying the development of monogenic and polygenic human diseases.



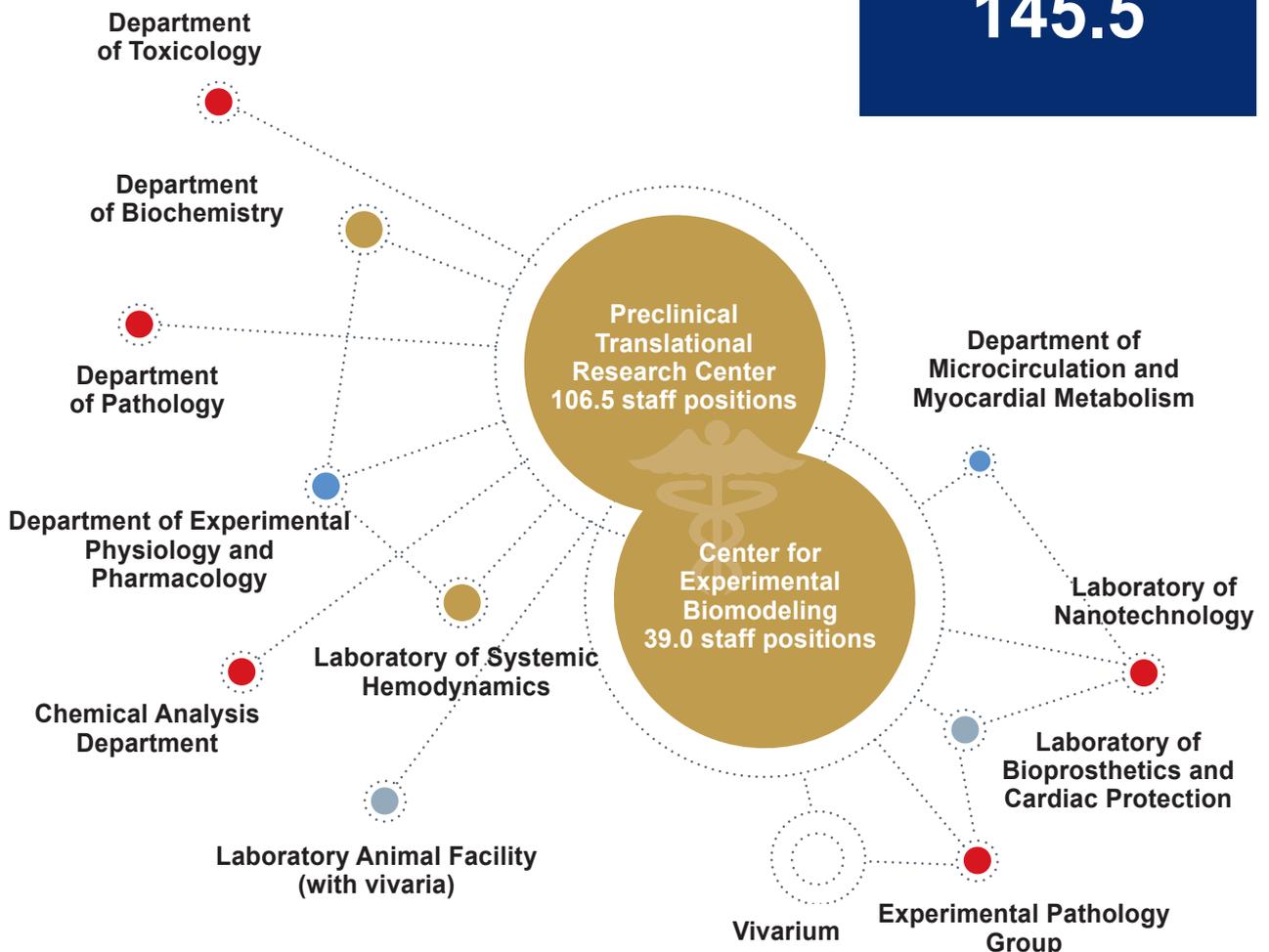
# Institute of Experimental Medicine



The Institute of Experimental Medicine comprises two units:

- Center for Experimental Biomodeling
- Preclinical Translational Research Center

Total staff  
**145.5**



# Institute of Oncology and Hematology



**Prof. Andrey  
Zaritskey, MD, DSc**  
Director of the Institute

As the clinical oncological departments appeared in Almazov Center, it became necessary to build the relevant scientific structure for studying the mechanisms underlying the onset and development of solid tumors and optimizing the methods for their diagnosis and treatment. Accordingly, in 2019, the Institute of Hematology was transformed into the Institute of Oncology and Hematology.

Director of the Institute, Professor Andrey Zaritskey is a leading scientist in the study of the biology of leukemic cells, a prominent hematologist in the Russian Federation, representative of the Society of Hematologic Oncology, member of the Russian Oncohematology Society (ROHS), member of the European Research Initiative on CLL (ERIC), national representative of the International CML Foundation (iCMLf)..

## STRUCTURE

### Department of Fundamental Oncology

- Molecular Oncology Laboratory
- Genetic Engineering and Cell Therapy Group

### Department of Clinical Oncology

- Oncohematology Laboratory
- Pediatric Brain Tumor Laboratory
- Onco-Urology Laboratory
- Gastrointestinal Cancer Laboratory

### Department of Nuclear Medicine and Theranostics

- Radiopharmaceutical Development Group

The newly formed Institute is proud to have  
**5 doctors of science**  
**(including 4 professors)**  
**and 7 candidates of science;**  
**its total staff is 55.**

# Polenov Neurosurgical Institute



**Prof. Alexei Ulitin, MD, DSc**  
**Director of the Institute,**  
**Honored doctor of the**  
**Russian Federation**

The clinic of the Institute has 138 beds. The Institute has state-of-the-art operating rooms that are fully equipped for the most complex surgeries. A comprehensive diagnostic and treatment process is ensured by a multidisciplinary team of highly qualified specialists including not only neurosurgeons but also neurologists, intensive care specialists, diagnostic radiologists, internists, neuro-ophthalmologists and many others.



Number of medical staff

**348**

Number of research staff

**74**

including

**25**

Doctors of Science

# Institute of Endocrinology



Prof. Elena Grineva, MD,  
DSc  
Director of the Institute

The Institute of Endocrinology comprises seven research laboratories, two endocrinology departments, pediatric unit and department of metabolic and endocrine surgery.

Director of the Institute, Professor Elena Grineva is a member of several scientific societies including the Russian Association of Endocrinologists, the European Society of Endocrinology (ESE), the European Neuroendocrine Association (ENEA).



# Institute of Perinatology and Pediatrics



Tatyana Pervunina, MD, DSc  
Director of the Institute

The Institute of Perinatology and Pediatrics was established in 2010 to implement research projects on maternity and child health.

Today, 9 research laboratories and groups continue research in promising scientific areas.

Laboratory for  
Physiology and  
Complications in  
Pregnancy and Delivery

Laboratory of  
Reproduction and  
Women's Health

Laboratory for  
Diagnosis and  
Treatment of Pediatric  
Diseases

Laboratory of  
Reproductive  
Technologies

Laboratory for  
Physiology and  
Diseases of Newborns

Laboratory for  
Surgery of Congenital  
and Hereditary  
Diseases

Laboratory  
of Operative  
Gynecology

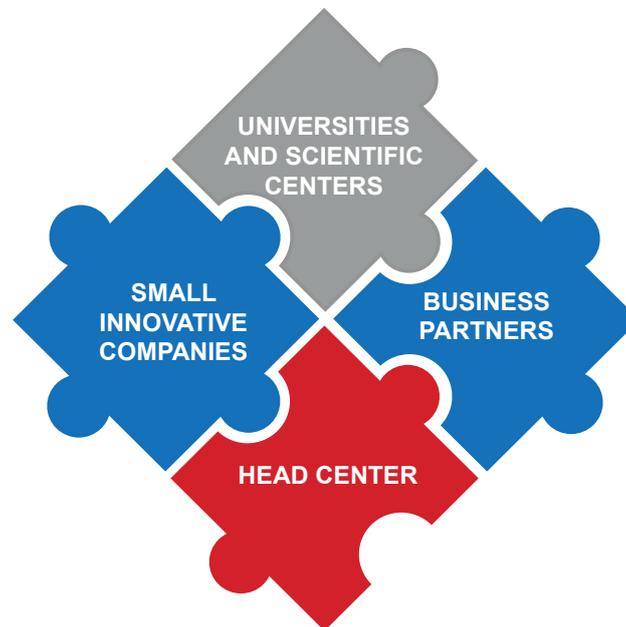
Research Groups:

- Epigenetics and Metagenomics in Perinatology and Pediatrics
- Perinatal Neurosurgery



Department for CVDs  
in Children/Research  
Group for Pediatric  
Cardiac Surgery

# Scientific and Educational Medical Cluster “TRANSLATIONAL MEDICINE”



The concept of creation and Cluster development program were approved by the Board of Trustees of Almazov Center chaired by Valentina Matvienko, the chairwoman of the Federation Council.

In 2019, the Cluster was actively developing, there were started the new common projects of the Cluster participants.

On July 17, Almazov Center signed a Memorandum of Understanding with Angioline Interventional Device, a Russian manufacturer of medical devices for interventional cardiology. For import substitution purposes, the researchers of the Department for Vascular and Interventional Surgery at Almazov Center initiated the domestic development of innovative products: stent grafts, aortic stents, stentless prosthetic heart valves and peripheral nitinol stents.



Director of Angioline Interventional Device A. Kudryashov and Director General of Almazov Center, Academician of the Russian Academy of Sciences E. Shlyakhto

On October 18, Almazov Center signed a Memorandum of Understanding with VERTEX which includes the development of the medicine composition and dosage form, patenting, preclinical, clinical and other laboratory studies, the registration of drugs and the elaboration of technology in production. The new drug compositions are formulated with modern substances that have proven to be effective and safe for the treatment of arterial hypertension.

For the further Cluster development it's essential to interact with authorities, help with healthcare development.



Director General of Vertex G. Pobelyansky and Director General of Almazov Center, Academician of the Russian Academy of Sciences E. Shlyakhto

On December 10, 2019, in St. Petersburg was held the first meeting of the Medical Council under the Governor of St. Petersburg. The Council members are 30 chiefs of large clinics and medical universities of the city, including Director General of Almazov Center and Academician of the Russian Academy of Sciences Evgeny Shlyakhto.

On June 5, Almazov National Medical Research Center held a working meeting chaired by Healthcare Minister Veronika Skvortsova and dedicated to the implementation of Health and Demography national projects in the Northwestern Federal District. Among the participants of the meeting were Alexander Gutsan, Presidential Plenipotentiary Envoy to the Northwestern Federal District; Anna Mityanina, Vice Governor of St. Petersburg, directors of key departments of the Russian Ministry of Health, chief visiting specialists of the Russian Ministry of Health and regional ministries, vice governors of constituent entities of the federal district, health officials of the Northwestern Federal District. As part of the meeting took place the exhibition of medical innovations from the Cluster participants.



*Working meeting dedicated to the implementation of Health and Demography national projects in the Northwestern Federal District*

On August 28, Almazov National Medical Research Center held a meeting of the leading research and edu-

catinal institutions in biomedicine entitled “Medicine in Saint Petersburg: 5-Year Prospects”.

The Cluster actively establishes collaboration with innovative institutions of the Russian Federation. On November 26, 2019, Almazov Center was visited by Kirill Kay, Senior Vice President for Innovations of the Skolkovo Foundation and Anton Pavlyukov, Acceleration Director of Biological and Medical Technology Cluster at Skolkovo.

Considering the mutual interest, Almazov Center and Skolkovo Innovation Center signed a Memorandum of Cooperation.

The Cluster actively participates in big all-Russian projects. In 2019, consortium of scientific and educational organizations headed by the Almazov Center took part in a competition for creating and developing world-class genomic research Centers in the Russian Federation.



*Senior Vice President for Innovations of the Skolkovo Foundation K. Kay and Deputy Director General of Science, Almazov Center, corresponding member of the Russian Academy of Sciences A. Konradi*



*Signing the Memorandum of Cooperation with Skolkovo Innovation Center*

In 2019, was also laid the foundation for the new big Cluster project. On November 20, 2019, the Board of Trustees of the Almazov Center chaired by Valentina Matvienko, the chairwoman of the Federation Council of the Russian Federation, endorsed the concept of submitting in 2020 an application to create a world-class scientific center in the priority area of science development as part of the strategy for scientific and technological development of the Russian Federation for the period until 2030, i.e. personalized medicine technologies.



Meeting of the Board of Trustees of the Almazov Center ▲

The infrastructure of the Cluster is also actively developing. In 2019, the decision of the Cluster Coordinating Council was implemented and there was registered the Cluster management company - Innovations and digital technologies in Healthcare. An important part of the Cluster work is to inform the society about the Cluster capabilities in scientific and educational fields.

During the St. Petersburg International Scientific and Educational Salon held on October 25–27, Almazov Center presented its educational programs and scientific innovations. Evgeny Shlyakhto, Director General of Almazov Center and Academician of the Russian Academy of Sciences, took part in the opening ceremony and the panel discussion, where he talked about the conceptual and promising areas for the development of medical education.

## Cluster founders

- Federal State Budgetary Institution “Almazov National Medical Research Center” of the Ministry of Health of the Russian Federation (Almazov Center)
- Federal State Autonomous Educational Institution of Higher Education “Peter the Great Saint-Petersburg Polytechnic University” (Polytech)
- Federal State Autonomous Educational Institution of Higher Education “Saint Petersburg National Research University of Information Technologies, Mechanics and Optics” (ITMO)
- Federal State Autonomous Educational Institution of

Higher Education “Saint Petersburg Electrotechnical University” (LETI)

- Federal State Budgetary Institution of Higher Education “Saint Petersburg State Chemical-Pharmaceutical Academy” of the Ministry of Health of the Russian Federation (SPCPA)
- Federal State Budgetary Institution of Higher Education “Lesgaft National State University of Physical Education, Sport and Health”



## International collaboration

**Almazov Center has achieved a broad international outreach, in particular through international cooperation in joint research, educational programs and clinical trials.**

**Almazov Center collaborates with a number of medical institutions and universities around the world. Today it has 42 memoranda of understanding with foreign partners.**

### WHO Collaborating Centre



*The designation ceremony of WHO Collaborating Centre*

On October 18, 2019, took place the designation ceremony of Almazov Center as a World Health Organization (WHO) Collaborating Centre. The major areas of collaboration are cardiovascular diseases, health technologies and value-based healthcare. Almazov Center thus became a part of international network of leading research, clinical and scientific institutions in healthcare.

### Collaboration with the Shanghai Cooperation Organization

An important area of cooperation between Almazov Center and countries of Asian region is a partnership with the intergovernmental international organization the Shanghai Cooperation Organization (SCO).



*The delegation from the Qinghai Provincial Health Department in Almazov Center*

On June 5, 2019, was signed an agreement on partnership and cooperation between Almazov Center and the Secretariat of the Shanghai Cooperation Organization in order to strengthen business relationships of the parties and implement mutually beneficial programs and projects in medicine and healthcare.

### International events held at Almazov Center

Every year, as a part of scientific and practical activities Almazov Center holds events with international attendance (forums, congresses, conferences, seminars, workshops and symposia). In 2019, the Center was a venue for more than 50 events with international participation.



National Medical Innovation Forum



Scientific-practical conference "2nd Saint Petersburg Lymphology Forum. 21st Century Lymphology: New Approaches and Relevant Research"

### Attendance in foreign scientific events

Every year the specialists of Almazov Center participate in many international events, they lead scientific and program committees, make reports, take part in joint publications and publishing of printed matter and guidelines. In 2019, the specialists of Almazov Center took part in 80 foreign congresses with presentations and posters.

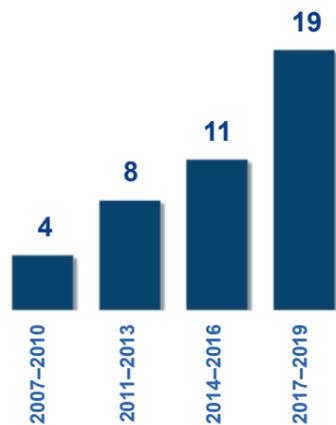
### Major events with participation of specialists of Almazov Center

JANUARY   FEBRUARY   MARCH   APRIL   MAY   JUNE   JULY   AUGUST   SEPTEMBER   OCTOBER   NOVEMBER   DECEMBER					
<p>11-13  EuroPrevent 2019 Лиссабон, Португалия</p> <p>29-01  The 4th World Heart Congress Киото, Япония</p>	<p>20-22  XXI Московский международный конгресс по эндоваскулярной хирургии TCT Russia-2019 Москва, Россия</p> <p>21-24  The 29th European Meeting on Hypertension and Cardiovascular Protection Милан, Италия</p> <p>22-26  33rd International Epilepsy Congress Бангкок, Тайланд</p>	<p>16-20  The 55th European Association for the Study of Diabetes Annual Meeting 2019 Барселона, Испания</p> <p>19-21  The 58th Annual Meeting of the European Society for Paediatric Endocrinology Вена, Австрия</p> <p>27-01  European Society for Medical Oncology Congress 2019 Барселона, Испания</p>	<p>11-12  Acute Stroke Interventions &amp; Carotid Stenting. ICCA STROKE 2019 Нью-Дели, Индия</p> <p>16-18  The American College of Cardiology's 69th Annual Scientific Session Новый Орлеан, США</p> <p>17-18  EHRA European Heart Rhythm Association Congress 2019 Лиссабон, Португалия</p> <p>12  ELN LeukemiaNet ELN Symposium 2019 Мангейм, Германия</p> <p>22-25  Leipzig Interventional Course 2019 Лейпциг, Германия</p>	<p>18-21  21st European Congress of Endocrinology Лион, Франция</p> <p>21-24  Congress of the European Association of Percutaneous Cardiovascular Interventions (EuroPCR) 2019 Париж, Франция</p> <p>22-25  68th Congress of the European Society of Cardiology and Endovascular Surgery Гронинген, Нидерланды</p> <p>24-25  Евразийский конгресс урологов Уфа, Россия</p> <p>25-28  Heart Failure 2019 - 6th World Congress on Acute Heart Failure Афины, Греция</p> <p>26-29  87th EAS The 87th European Atherosclerosis Society Congress Маастрихт, Нидерланды</p>	<p>31-04  European Society of Cardiology Congress 2019 together with World Congress of Cardiology Париж, Франция</p> <p>11-13  II Съезд Евразийского сообщества детских нейрохирургов. Международная школа ISFN Нур-Султан, Казахстан</p> <p>27-31  American Heart Association's Scientific Sessions 2019 Пенсильвания, США</p> <p>23-25  The 15th Congress of World Federation of Interventional and Therapeutic Neuroradiology Неаполь, Италия</p> <p>27-31  XXIV World Congress of Neurology Дубай, ОАЭ</p>

## Geography of international collaboration



## 42 memoranda of understanding



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