

(No.6 2002年2月20日号目次)

特集：バイオテクノロジー関連研究開発機関 その2

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分子遺伝子学研究所（モスクワ）
Institute of Molecular Genetics
Russian Academy of Sciences

I. Name of the Institute (Organization)

In Russian:

Институт молекулярной генетики Российской академии наук

In Russian abbreviation: ИМГ РАН

In English: Institute of Molecular Genetics Russian Academy of Sciences

In English abbreviation: IMG RAS

II. Location

Official address: Kurchatov Sq., Moscow 123182, Russia

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E-mail: img@img.ras.ru

Access (transportation, necessary time):

Moscow International airport Sheremetjevo-2, then one hour driving by car

III. History

The Institute of Molecular Genetics formed on the basis of the Biological Department, Kurchatov Institute of Atomic Energy, Moscow, was founded and occupied its due place among the biological institutes of the USSR Academy of Sciences on January 1, 1978. The recruitment of the Institute's staff and the creation of its funding basis had been started much earlier, at the end of 1950s, when molecular and biological research was initiated at the Institute of Atomic Energy by the physicists, academicians I.E. Tamm, I.V. Kurchatov and A.P. Alexandrov. In August 1958, the Resolution of the Communist Party Central Committee and the Council of Ministers of the USSR "About Atomic Technology-Oriented Research in the Fields of Biology and Radiobiology" was passed, and this task was entrusted to the physicist V.Yu. Gavrilov, three-times winner of the Stalin Prize and awarded the Lenin Order, employed at that time at the nuclear weapons production center "Arzamas-16". V.Yu. Gavrilov became the first Head of the Department named the "Radiobiological Department", or RBD.

In 1998 a corresponding member of the Russian Academy of Sciences E.D. Sverdlov (presently full member) was elected director of the Institute. Having preserved previously formed strong basic molecular genetic lines of investigation, he undertook reorganizations aimed at intensification of the works in the field of human genome and in the field of modern biotechnology. The Institute actively joined the studies within the framework of State Research and Technical Programs. The international scientific contacts were strengthened and further developed. The Institute initiated its own high-technology production that provided the possibility to implement the results of scientific research in practice. There were introduced departments as structural units of the Institute that facilitated the consolidation of the laboratories working in related fields.

IV. Management

Kind of organization: Research Institute

Ownership: State property of Russian Federation

Responsible Ministry: Russian Academy of Sciences

V. Executives

Director: Eugene D. Sverdlov, Member of the Russian Academy of Sciences

Deputy Directors:

- N.F. Myasoedov, corr. member of RAS (science)
- B.O. Glotov (science)
- V.Z. Tarantul (science)
- M.R. Tyurikov
- A.E. Khalizev

VI. Current major activities

The IMG RAS works in the field of molecular genetics and is concentrated on the following studies that logically stem from hot problems of its science:

- structural and functional analysis of genomes, their instability, evolution, and pathologic alternations
- molecular mechanisms of control over expression of genetic material at different levels
- molecular genetic basis of biotechnology
- physiologically active substances, including isotope-labeled ones, to be used in molecular biology, molecular genetics, and medicine
- coding and transmission of information in molecular genetic systems; construction of data banks and methods of computer-aided analysis of molecular biological information

These studies are being conducted on several major objects, the central of them being man. However, mouse, *Drosophila*, yeast, and bacteria are also being intensely investigated. For each of these objects primary emphasis is placed upon the problems which, on the one hand, are of general molecular genetic importance and, on the other hand, are easier to be studied with the given object.

For example, positional cloning of the genes of human hereditary diseases is being performed via the analysis of histories in the families where a given disease is inherited. The genes specifically expressed in brain are also analyzed directly on the human brain. DNA sequences of retroviral origin are being identified on human chromosomes. They came from viruses that infected the ancestors of the modern

humans in the evolution. Other issues are being studied with other model objects. The cell cycle control genes, extremely important for maintaining the genome stability and often damaged during malignant transformation, are being studied in a yeast system. Genetic basis of the position effect, which is fundamental in gene regulation, and the role of transposable elements in the genome are being studied on *Drosophila*. The laboratory investigates the expansion of mobile elements in natural bacterial populations, and fundamental aspects of molecular mechanisms of transcription in studies on structure and function of bacterial RNA-polymerase.

The model for investigation of the fundamental aspects of the molecular mechanisms of transcription is the bacterial transcription apparatus. Mice are used to study gene functions by means of transgenesis, including knock-out. The same purpose is pursued in the intense works on genetics of somatic cells, including embryonic stem cells. Thus, the unified informational space characteristic of the modern molecular genetics is being formed.

The Institute gives much attention to fundamental research in biotechnology, pharmacogenomics, and genetics. Here under study are genes encoding the enzymes important for biotechnology, such as thermostable cellulases and peptidases, and systems for synthesis of antibiotics with wide spectrum of activity (microcins). In the field of pharmacogenomics new generations of physiologically active peptides are designed and produced for medicine, and targets of their action are being studied. An example of such a preparation is Semax, an original nootropic agent.

Research in physico-chemical properties of DNA, as the carrier of hereditary information, have always been and continue to be an important part of the Institute's activity. These studies provide a theoretical basis for directed modification of genetic material, which is important e.g. for gene therapy. Data on the specificity of nucleic acid-protein interactions are also among the fundamentals for understanding the mechanisms of genome functioning. Finally, the Institute, striving to perform the investigations at the up-to-date technological level, gives due place to bioinformatics, construction of databases, and computer analysis of structural and functional characteristics of macromolecules.

The Institute does not restrict itself to theoretical developments, it conducts them further producing preparations for medicine and agriculture and diagnostic tools designed by the Institute's laboratories. For this purpose, the Institute runs the Center for Thermobiotechnology and Molecular Diagnostics. This strategy makes it possible to immediately use the latest theoretical developments in practice.

The research at the Institute is supported by assistant divisions, however, often combining research and service functions. These are the Scientific Information Center, the Group of Synthesis and Analysis of Genetic Material, the Center of Transgenesis, and the Cell Unit.

Not the least role in the Institute's activity plays the possibility to obtain a wide range of tritium-labeled compounds, which are used, in particular, in pharmacokinetic studies of physiologically active compounds.

VII. Organization chart

Research Units:

- Dep. of Bioinformatics and Molecular Biophysics
- Dep. of Viral and Cellular Molecular Genetics
- Dep. of Molecular Genetics of Animals
- Dep. of Molecular Basis of Human Genetics
- Dep. of Chemistry of Physiologically Active Compounds
- Dep. of Molecular Basis of Biotechnology and Protein Engineering
- Lab. of Molecular Genetics of Yeast
- Lab. of Molecular Genetics of Microorganisms
- Lab. of Synthesis and Analysis of Genetic Material
- Group of Enzymatic Analysis

Production Units:

- Center of Thermobiotechnology and Molecular Diagnostics

VIII. Number of employee

Total Number of Regular Staff - 350

IX. Commercial proposal

Semax - an effective stimulator of the nervous system

Developed by the IMG RAS, in collaboration with the Biological Faculty of the Lomonosov Moscow State University. Produced as 0.1% sterile water solution nasal drops in 3 ml bottles with droppers; preserved with 0.1% nipagine.

Semax is a heptapeptide, synthetic analogue of an ACTH(4-10) fragment of corticotropin, of the following structure: Met-Glu-His-Phe-Pro-Gly-Pro.

Based on one of the endogenous neuropeptides regulating the functions of the central nervous system, Semax is a nonaddictive nootrop of prolonged action capable of stimulating memory and attention. It is characterized by wide spectrum of prolonged action, and the absence of hormonal activity and side effects. Therapeutic action of Semax after single application starts within 1 hour and lasts as long as 24 to 48 hours. Its effective doses (15-50 (g/kg) are roughly 1000 times smaller than those of widely known nootropil (pyracetame).

Semax stimulates predominantly the functions of the anterior cerebrum. It positively affects the processes underlying perception, analysis of information, training and memory. Semax markedly improves the adaptation of the human organism to stress (hypoxia, cerebral ischemia, etc.). It facilitates recovery of mnestic functions after anesthesia. Semax supports high levels of attention, stimulates memory and facilitates

accelerated recovery of intellectual and physical potential. Semax supports active attention and ability to work in conditions of nervous and psychic fatigue like strenuous operator activity. It also accelerates adaptation of the cardiovascular system to increased physical workload. Semax can be used for treatment of intellectual and mnestic disorders, of cerebral vascular diseases, for rehabilitation after craniocerebral traumas, treatment or prevention of post-anesthesia effects as well as for treatment of asthenoneurotic disorders of various geneses including ionizing radiation. Healthy people may take Semax to stimulate their memory and capacity for work, as well as improvement of the mood and neutralization of stress effects.

Semax was tested on operators of the Perm Power Station, and mine rescue workers at the Coal Basin of the Moscow Region (Russia). The results suggest Semax to be potentially used among the following groups of people: operators of atomic and electric power stations, civil and military air traffic controllers, PC users, businessmen and officials during negotiations requiring high concentration of attention and memory, drivers and sportsmen.

Semax has passed complete clinical trials in the Russian Federation. Its production in the form of nasal drops, use, and marketing have been authorised by the Russian Pharmacological Committee (Registration # 94/294/10 of November 10, 1994; License # 64/196/96 of March 28, 1996).

蛋白質研究所（モスクワ州プーシノ）
Institute of Protein Research
Russian Academy of Science
(Scientific Center of Biological Research)

I. Name of the Institute (Organization)

In Russian: Институт Белка, Российской Академии Наук

In Russian abbreviation: ИБ РАН

In English: Institute of Protein Research, Russian Academy of Science

In English Abbreviation: IPR RAS

II. Location

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Access (transportation, necessary time): Institute of Protein Research of the Russian Academy of Sciences, located in the southern part of Moscow Region (120 km from Moscow).

III. History

The Institute of Protein Research was founded June 9, 1967, in accordance with a decision of the former USSR Academy of Sciences to develop fundamental research on problems of protein. Institute of Protein Research, RAS is located in Pushchino, a city of approximately 21,000 people which lies 120 kilometers south of Moscow. The Scientific Center of Biological Research of the former USSR Academy of Science was established here in 1963 to encourage development of fundamental research in physical and chemical biology and biotechnology; today it is a part of the Russian Academy of Science.

IV. Management

Kind of organization: Research Institute

Ownership: State property of Russian Federation

Responsible Ministry: Russian Academy of Science

V. Executives

Director - Alexander S. Spirin

Deputy Director - P. Ovchinnikov

Deputy Director - V. Fedorov

Administrative Deputy Director - N. Shaklunov

VI. Current major activities

Studies of the molecular mechanisms of protein biosynthesis including the following:

- the structural basis of functioning of ribosomes and their components;
- regulation of protein biosynthesis;
- development of a large-scale cell-free system of protein biosynthesis;
- development of cell-free systems of RNA replication.

Studies of protein structure and their biological functions including the following:

- processes of formation of 3-D structure of proteins;
 - development of the theory of the 3-D structure of proteins;
 - protein functioning;
 - primary and 3-D structures of proteins by classic methods (X-ray analysis, microcalorimetry, optical techniques etc.);
 - gene and protein engineering;
- chemical synthesis of biologically active polypeptides and protein fragments.

VII. Organization chart

The Institute of Protein Research is the part of the Scientific Center of Biological Research, which is situated in Pushchino

Major areas of research Scientific Center of Biological Research here are:

- Protein biosynthesis and principles of organization of functionally active protein structure
- Microbiological transformation of substances and microbiological technologies
- Protein and gene engineering
- Molecular mechanisms of engineering
- Mathematical modeling in biology
- Autowave processes and dynamics of biological systems
- Soil formation and its management; optimal landuse; environmental studies
- Self-organization and functioning of various biological structures
- Reception and data processing of biological objects
- Biological instrumentation production and number of other fundamental and technological developments playing an important role in medicine, industry and agriculture

The **Center** includes the following institutes:

- **The Institute of Protein Research**
- The Institute of Theoretical and Experimental Biophysics

- The Institute of Cell Biophysics
- The Institute of Biochemistry and Physiology of Microorganisms
- The Institute of Soil Science and Photosynthesis
- The branch of the Institute of Bioorganic Chemistry Research
- Computer Center Special Construction Bureau & Experimental Plant

The **Institute of Protein Research** consists of one department (which includes 6 groups) and 12 research groups:

Department of Ribosome Structure and Function:

- Group of Mechanisms of Protein Biosynthesis
- Group of Structure Studies of the Translational Apparatus
- Group of Cellular Organization of the Protein-Synthesizing Apparatus
- Group of Protein Engineering
- Group of Biochemistry of Viral RNA
- Group of Structure Studies of Ribosomal Proteins

Research Groups:

- Group of Protein Synthesis Regulation
- Group of Molecular Genetics
- Group of Peptide Chemistry
- Group of Protein Physics
- Group of Protein Structure Analysis
- Group of Nucleoprotein Physics
- Group of Cellular Biology
- Group of Electron Microscopy
- Group of Stereochemistry of Proteins and Nucleic Acids
- Group of Supramolecular Protein Structures
- Group of Protein Thermodynamics
- Group of Organic Synthesis

VIII. Number of employee

The permanent research staff of the Institute is 55 scientists; the total staff is 240 including engineers, laboratory assistants, technical and service personnel. About 60 post-graduates and students are accommodated.

IX. Most Important Achievements

Here are the most important achievements of the Institute for the past ten years:

- Cell-free system of preparative expression of isolated and synthesized genes (DNA) in eukaryotic cell extracts has been developed. The system is based on a combination of plant or animal cell extracts with the RNA polymerase of bacteriophages T7 or SP6. The earlier suggested principle of flow is used in the system (the system of continuous functioning) which enables the cell-free protein

synthesis to run for many hours. The conjugated transcription-translation of phage polymerase in the eukaryotic extract makes it possible to obtain different animal and plant proteins eliminating the preliminary synthesis of their mRNAs.

- Crystals of the small 30S ribosomal subunit from the extremal *Th. thermophilus* thermophilic organism are obtained. X-ray (18 *angstroms*) and neutron (60 *angstroms*) data sets have been collected from the crystals of the 70S ribosomes, and the structure of laminar crystals of the 70S ribosomes has been studied by the electron microscopy. The relief of the surface of these crystals has been determined at a resolution of about 70 *angstroms*.
- Gene engineering techniques have been used to determine the complete chemical (primary) structure of elongation factor G, a key cellular protein, in thermophilic bacteria (690 amino acid residues) and in rat liver (858 residues). The nucleotide sequences of the genes of proteins S3, S10, S14, S17, S19, L3, L4, L22, L23, L24 from operons S10 and Spc of *Thermus thermophilus* have been determined.
- X-ray crystallography was used to determine the three-dimensional structure of EF-G without a co-factor with a resolution of 2.85 *angstroms* and in a complex with GDP at a resolution of 2.4 *angstroms*.
- Three-dimensional structures of ribosomal proteins (L1 and S6) from *Th. thermophilus* have been determined with a resolution of 2.0 *angstroms*.
- It is shown that within the cells of *E. coli* bacteria the newly synthesized proteins, prior to their folding into a native (biologically active) globule, interact with the protein particle having a molecular mass of about 10 dalton (GroEL-particle) which decreases their renaturation and prevents non-specific aggregation upon folding.
- Enzyme synthesis of peptides based on the use of inverted trypsin substrates has been developed. An essential difference of this method from the existing ones is that secondary hydrolysis of the synthesized peptides is completely eliminated. The method allows to synthesize various peptides consisting of any amino acids including proline.
- It has been shown on four proteins that cold denaturation is a common feature of globular proteins with a developed hydrophobic core stabilized by van-der-Waals interactions. Solvation of water by non-polar groups destabilizes the protein compact structure with a temperature decrease and at low temperatures leads to disruption of its compact structure, i.e. to cold denaturation.
- A new type of phase transition in globular proteins (the melting globule-coil transition) has been revealed using carbonic dehydratase and *beta*-lactamase.

X. International and domestic relations

The Center has close scientific relations with Russian and foreign institutions and agencies. The links are managed, primarily, through the institutes of Pushchino. International cooperation is maintained in research, information and visitation exchange with various organizations of the USA, UK, Germany, France, Sweden, Canada and East-European countries.

The Center annually holds nearly 70 conferences and symposia

エンゲルガルド分子生物学研究所（モスクワ）
Engelhardt Institute of Molecular Biology
Russian Academy of Sciences

I. Name of the Institute (Organization)

In Russian: Институт Молекулярной Биологии им. В.А.Энгельгардта, Российской Академии Наук

In Russian abbreviation: ИМБ РАН

In English: Engelhardt Institute of Molecular Biology, Russian Academy of Sciences

In English Abbreviation: IIMB RAS

II. Location

Official address: 32 Vavilova st., Moscow 119991, Russia.

Mail address: 32 Vavilova st., Moscow 119991, Russia.

Tel: (+7-095) 135-97-81

Fax: (+7-095) 135-1405

E-mail: bioinf@genome.eimb.relarn.ru

Access (transportation, necessary time): Moscow international airport Sheremetjevo-2, then about one and half hour by car.

III. History

The Institute was founded in 1959 by academician Vladimir A. Engelhardt (1894-1984). His aim was to gather under one roof physicists, chemists, and biologists investigating biological problems at a molecular level. The Institute is named after academician Vladimir A. Engelhardt, its founder and first director. In 1984 academician Andrei D. Mirzabekov was appointed to a post of director of the Institute.

IV. Management

Kind of organization: Research Institute

Ownership: State property of Russian Federation

Responsible Ministry: Russian Academy of Science

V. Executives

Director - Academician Andrei D. Mirzabekov

VI. Current major activities

Institute is incorporated in the Department of Physicochemical Biology of the Russian Academy of Sciences. At the present time, the research in the Institute is carried out in the following directions of molecular biology:

- structural and functional genomics, the human genome;
- physics and chemistry of nucleic acids, proteins, and their components;

- biologically active substances;
- molecular enzymology and protein engineering;
- cell molecular biology, differentiation, oncogenesis;
- biotechnology;
- bioinformatics;
- biological microchips

Main directions of scientific investigations:

- genome structures
- molecular bases of genome activities.
- carcinogenesis. Immunity.
- proteins, nucleic acids and their complexes
- molecular enzymology
- protein engineering
- molecular biology of a cell
- virology and antiviral drugs
- Computerization of scientific investigations

The major research topics developed in the Institute in the past years include structural studies of nucleic acids, primary and three-dimensional structure of proteins; mechanism of action of many enzymes of amino acid metabolism, enzymes of genetic apparatus and protein biosynthesis; structure of some nucleoprotein complexes, including nucleosomes; studying genetic apparatus of different organisms, mechanisms of the cell activity regulation, synthesis of numerous amino acid and nucleotide analogues and derivatives as potential physiological compounds; molecular immunology, physics of biopolymers, fluorescence methods of cell investigations, genetic engineering, and many other sections of molecular and cell biology and bioorganic chemistry. The high level of investigations carried out in the Institute is determined both by the original ideas underlying these studies and the usage of a great arsenal of modern methods of investigation.

The Institute plays the key role in the Scientific Council on Molecular Biology and Genetics, and the Scientific Council of the Russian National Human Genome program.

VII. Organization chart

The Institute consists of 39 scientific departments including 2 research centers, 28 laboratories and 9 research groups.

Scientific departments (Laboratories and Research Groups)

- Biological microchips center (Head - Andrei D. Mirzabekov)
- Nuclear acids biosynthesis (Head - Georgii P. Georgiev)
- Genome mobility (Head - Yurii V. Ilyin)
- Chemical and biological analysis of biopolymers and cells (Head - Marina K. Kukhanova)
- Molecular bases of oncogenesis (Head - Lev L. Kisselev)

- Chemistry of enzymatic regulation (Head - Radii M. Khomutov)
- Chemical bases of biocatalysis (Head - Tatyana V. Demidkina)
- Dna-protein recognition (Head - Georgii V. Gursky)
- Antibody engineering (Head - Serguei M. Deyev)
- Functional morphology of chromosomes (Head - Alexander V. Zelenin)
- Structure and function of chromatin (Head - Vadim L. Karpov)
- Protein inhibitors of cell processes (Head - Juri V. Kozlov)
- Enzymology of transcription (Head - Sergei N. Kochetkov)
- Evolution of eukaryotic genomes (Head - Dmitry A. Kramerov)
- Physics of biopolymers (Head - Mikhail A. Livshits)
- The human genome structure information center (Head - Yuri P. Lysov)
- Conformational stability of proteins (Head - Alexander A. Makarov)
- Stereochemistry of enzymatic reactions (Head - Sergey N. Mikhailov)
- Molecular immunology (Head - Sergei Nedospasov)
- Molecular-genetic immunology (Head - Oleg L. Polanovsky)
- Cell engineering (Head - Vladimir S. Prassolov)
- Hormones and receptors (Head - Peter M. Rubtsov)
- Computer and structural analysis of biopolymere (Head - VIVdimir G. Tumanyan)
- Protein synthesis chemistry (Head - Vladimir L. Florentiev)
- Cell proliferation (Head - Peter M. Chumakov)
- Genome organization (Head - Nickolai A. Tchurikov)
- Enzymology of nucleases (Head - Gennady I. Yakovlev)
- Molecular bases of differentiation and development (Head - Alexander V. Belyavsky)
- Biomedical microanalysis (Head - Yuri Yu. Vengerov)
- Molecular bases of biological recognition (Head - Yuri M. Yevdokimov)
- Analytical chemistry of proteins and pepriides (Head - Tsezi A. Egorov)
- Human genome sequencing and mapping (Head - Vladimir M. Zakharyev)
- X-ray crystallography (Head - Lucy V. Malinina) and
- Electron microscopy (Head - Vladimir I. Popenko)
- Molecular and cellular technology (Head - Andrey I. Poletaev)
- Molecular genetic individualization of organisms (Head - Pavel L. Ivanov)
- Isotope block (Head - Yurii S. Skoblov)

VIII. Number of employee

The staff of 416 people includes 250 research scientists. Among them, there are 3 full members and 2 corresponding members of the Russian Academy of Sciences, three members of the Academia Europaea; 47 doctors of sciences and 130 candidates of sciences.

IX. International and domestic relations

The research work in EIMB is financially supported by over 120 grants from different Russian National Foundations and Programs, as well as by 57 personal State scientific grants, 7 State scholarships for young scientists, and 42 grants of different foreign Scientific Foundations, including the International Association for the promotion of co-operation with scientists from the new independent states of the former Soviet

Union (INTAS), Howard Hughes Medical Institute, Volkswagen-Stiftung, Fogarty International Center, DOE, etc.

Scientists are members of the editorial boards of leading international scientific journals and scientific societies (European Molecular Biology Organization, Human Genome Organization, International Cell Research Organization, UNESCO, etc.).

生物工程センター「Bioengineering」(モスクワ)
Scientific Center “Bioengineering” of the Russian Academy of Sciences

I. Name of the Institute (Organization)

In Russian: Научный Центр “Биоинженерия” Российской Академии Наук

In Russian abbreviation: НЦ “Биоинженерия” РАН

In English: Scientific Center “Bioengineering” of the Russian Academy of Sciences

In English abbreviation: SC “Bioengineering” of the RAS

II. Location

Official address: 117312 Moscow, 7, 60-Letie Octiabria Prospect, Bld. 1

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Access (transportation, necessary time):

Sheremetjevo-2 Moscow International Airport, then one hour by car

III. Management

Type of organization: State Research Center of Russia

Ownership: State property of the RF

Responsible Ministry: Ministry of Science & Technology, Ministry of Defense, Russian Space Agency

IV. Executives

Director: Konstantin Georgievich Skriabin, Academician of the RAAS

Deputy Directors for scientific works:

Sergey Mnatsakanovich Kagiants, DSc. (Chem.)

Dmitry Borisovich Dorokhov, DSc.(Biol.)

Orkhan Akhmedovich Zeinalov, DSc.(Biol.)

V. Current major activities

- Researches in the field of organization and regulation at the molecular level of gene expression in plants
- Development of an approach to optimized allogeneic genes expression in yeast and plant cells for fundamental and applied researches
- Development of yeast strains superproducers of practically precious albumens
- Investigation of the mechanisms of plasmid replication and stability in different types of yeasts
- Investigation of the mechanisms of albumen secretion in yeast cells

- Heterologous expression of components of P450-dependent animal multifermentive monooxygenase complex as a model for investigating albumen-albumen interactions, membrane topology and metabolic engineering; development of chimera virus particles with inserted antigen sites for vaccine fabrication
- Investigation of the dynamics of plant genome under the impact of different factors
- Investigation of biodiversity
- Molecular phylogenesis
- Investigation of the co-evolution and interaction of nuclear and cytoplasmic genome of plants
- Development of methods of molecular identification of cultivated plants genotypes
- Synthesis of new affine and pseudo-affine sorbents
- Application of metal-chelate albumen complexes in chromatography and electrophoreses
- Development of patterns of highly-purified albumens and ferments precipitation from natural sources and recombinant strains
- Development of oligosaccharides chromatographic fractionation methods
- Development of active strains of biologically-active substances
- Solution of scientific issues as concerns the research of the direct transport of biologically-active substances and medicinal compounds into cell-targets, development of models for investigating these processes
- Development on the base of genetic engineering technologies of advanced antitumor preparations (immunotoxins and cytotoxic conjugates) of direct action
- Development of new-generation antiviral vaccines and prognostic markers of hepatitis C
- Researches into flavinogenesis genetics
- Researches into biological activity of modified steroid compounds
- Chemical synthesis of amidophosphites and hydrophosphoryl derivatives of nucleosides
- Synthesis of nucleoside-bearing polymeric carriers
- Chemical synthesis of nonstandard amidophosphite links
- Synthesis of oligodesoxyribonucleotides of natural structure
- Synthesis of modified oligonucleotides

Methods of VEZHH-analysis and characterization of oligodesoxyribonucleotides

VI. Organization chart

Laboratories:

- Laboratory of genetic engineering
 - ✓ Group of plant genetic engineering
 - ✓ Group of yeast genetic engineering
- Laboratory of plant genome
- Laboratory of steroid biotechnology
- Laboratory of ferment engineering
- Laboratory of antibiotics bioengineering

- Laboratory of cell processes bioregulation
- Laboratory of albumen design and engineering
- Laboratory of nucleotide synthesis
- Laboratory of microorganisms genetics
- Laboratory of plant cell engineering
- Laboratory of medicinal preparations

Research groups:

- Group of computer analysis of DNA and albumens successions
- Group of molecular cloning systems
- Group of microorganisms classification and identification
- Group of information and technical support of Interbranch Commission on Genetic Engineering Problems
- Research and Managerial Division

VII. Number of employees

Personnel - 50 persons

VIII. International and domestic relations

- Russian-Netherlandish Research Cooperation (in cooperation with the Center for Plants Selection and Reproduction, Vageningen, Netherlands).
- "Genetic modification of flower structures of compositae *Chrysanthemum*"
- International Project on the Program INCO-COPERNICUS (in cooperation with the Fund "Elba", Italy, and other organizations)
- "Biocatalytic analytical devices on the base of semi-artificial and recombinant cytochromes P450"
- International Project on the Program INTAS (in cooperation with the University of Milano, Italy; Max-Planck-Institute, Germany, and Technical University of St. Petersburg, Russia)
- "Evolution of self-transferring genetic elements: replication mechanisms and phagous plasmides control N 15 и P4." INTAS 95-1492
- International Project on the Program INTAS (in cooperation with the INMI of the RAS, University of Gent (Belgium) and University of Girona (Spain)
- "Molecular and genetic analysis of biological diversity of microflora of swampy soils of the Middle Zone of Russia"
- International Project with the University of Compiègne, France
- Application of multifunctional chelate gels for investigating albumen-albumen interactions.

細胞遺伝子学研究所
(ノヴォシビルスク州ノヴォシビルスク - 90)
Institute of Cytology and Genetics
The Siberian Division of the Russian Academy of Sciences

I. Name of the Institute (Organization)

In Russian:

Институт цитологии и генетики Сибирского отделения Российской академии наук

In Russian abbreviation: ИЦГ СО РАН

In English: Institute of Cytology and Genetics the Siberian Division of the Russian Academy of Sciences

In English abbreviation: ICG SD RAS

II. Location

Official address: 630090, Novosibirsk-90, Lavrentyev aven., 10

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Access (transportation, necessary time): Novosibirsk International airport Koltsovo, then two hour driving by car

III. History

The Institute of Cytology and Genetics of the Siberian Branch of the Russian Academy of Sciences was founded in 1957 among the first institutes of the Siberian Branch. Its first director was Academician N.P.Dubinin. From 1959 to 1985, the director was Academician D.K.Belyaev who made a great contribution to the creation of the Institute and revival of genetics in Russia. At present the Institute is headed by Academician of the Russian Academy of Sciences Vladimir K. Shumny.

IV. Management

Kind of organization: Research Institute

Ownership: State property of Russian Federation

Responsible Ministry: Russian Academy of Sciences (The Siberian Division)

V. Executives

Director of the Institute - Vladimir K. Shumny, academician, Prof., Dr.Sci

Vice directors of the Institute:

- Nikolay A. Kolchanov, Prof., Dr.Sci.
- Suren M. Zakian, Prof., Dr.Sci.

- Anatoly V. Kushnir, Ph.D.

Scientific secretary of the foreign affairs of the Institute - Galina N. Kiseleva, Ph.D.

VI. Current major activities

The Institute of Cytology and Genetics of the Siberian Branch of the Russian Academy of Sciences is a centre of genetics well-recognized in the country, which carries out research in a wide range of problems of modern genetics, molecular and cellular biology. During the recent years, in the Institute there is a progressive general tendency of integration of molecular, cellular and genetic approaches. This process leads inevitably to disappearance of clear-cut borders between different directions of research, increase of interdisciplinary contacts, a considerable enrichment with techniques and ideas.

According to the objects and scientific techniques, and also to the traditions developed at the Institute, one can distinguish conventionally seven main branches of research:

- Molecular genetics.
- Cytogenetics.
- Theoretical genetics.
- Human genetics.
- Plant genetics.
- Animal genetics.
- Physiological genetics.

The main efforts of the scientists of the Institute are directed to solution of two fundamental problems: the first one is concerned with the investigation of the structure and functioning of genome, the second one with the cognition of laws of evolution and selection.

VII. Organization chart

Molecular Genetics Section

- Laboratory of Biochemical Animal Genetics.
- Laboratory of Animal Molecular Genetics.
- Laboratory of Gene Expression Control.
- Laboratory of Genome Structure.
- Sector of Molecular Neurogenetics.
- Sector Molecular-Genetic Mechanisms of the Interactions Protein-Nucleic Acid.
- Sector of Medicine Genetics.
- Sector of Virology.

Cytogenetics Section

- Laboratory of Human and Animal Cytogenetics.
- Laboratory of Cell Division.
- Laboratory of Cell Biology.
- Laboratory of Molecular Cytogenetics.
- Laboratory of Cell Ultrastructures.
- Laboratory of Cells Differentiation.

Theoretical Genetics Section

- Laboratory of Theoretical Molecular Genetics.
- Laboratory of Molecular Genetic Systems.
- Laboratory of Molecular Evolution.
- Sector of Methods of Genetic Analysis.

Human Genetics Section

- Human Molecular Genetics Sector.
- Sector of Human Molecular and Evolutionary Genetics.

Plant Genetics Section

- Laboratory of Plants Heterosis
- Laboratory of Experimental Modelling of Evolutionary Processes.
- Laboratory of Populational Plant Genetics.
- Laboratory of Genetics of Mutations and Mutation Process.
- Laboratory of Plant Cytology and Apomixis.
- Wheat Genetics Laboratory.
- Laboratory of Experimental Mutagenesis.
- Laboratory of Chemical Technology.
- Laboratory of Cytogenetics.
- Plant Genepool Sector.
- Sector of Gene Engineering of Plants.
- Sector of Physical-Chemical Biology.
- Sector of Genetic Bases of Plant Selection.
- Sector of Wide Hybridization and Tissue Culture of Plants.
- Sector of Molecular Genetics of Cereals.
- Wheat Genetics Sector.
- Group of Developmental Genetics of Plants.

Animal Genetics Section

- Laboratory of Ecological Genetics and Animal Genetic Resources.
- Laboratory of Developmental Genetics.
- Laboratory of Evolutionary Genetics.
- Laboratory of Genetics of Insect Stress.
- Laboratory of Immunogenetics.
- Laboratory of Genetics of Populations.
- Meiosis Laboratory.

- Sector of Immunogenetics of Pig.

Physiological Genetics Section

- Laboratory of Genetic Neuroendocrinology.
- Laboratory of Behavioural Phenogenetics.
- Laboratory of Physiological Genetics.
- Neurogenetics of Social Behavior Sector

VIII. Number of employee

Total Number of Regular Staff - 750

IX. International and domestic relations

The Institute participates in the elaboration of large programs of national economy concerned with creation of new high-productive plant varieties, animal breeds, and strains of microorganisms, working out new technologies used in agricultural industry, human and veterinary medicine.

The successful development of science is promoted by international scientific contacts. The scientists of the Institute are collaborating with many scientific institutions of the countries: USA, Great Britain, Germany, Japan, Sweden, France, Canada, Denmark, Italy, Finland etc.

The Institute is one of the organizers of the Altai International Centre on Biospheric and humanitarian research. In order to carry out the research in this Centre on ecological genetics, animal, plant and human genetics and preserving the gene pool invite the interested scientists all over the world to cooperation

応用微生物学研究センター（モスクワ州オボレンスク）
State Research Center of The Russian Federation
State Research Center for Applied Microbiology

I. Name of the Institute (Organization)

In Russian: Государственный Научный Центр Российской Федерации
Государственный исследовательский центр Прикладной Микробиологии.

In Russian abbreviation: ГНЦ РФ ГИЦ ПМ

In English: State Research Center Of The Russian Federation State Research Center
for Applied Microbiology

In English Abbreviation: SSC RF SRCAM

II. Location

Official address: Obolensk,142279,Moscow region,Russia

Mail address: Obolensk,142279,Moscow region,Russia

Tel: (+7-0967)72-77-61,72-76-12,77-26-37

Fax: (8-27)77-27-14

E-mail: rad@niciam.serpukhov.su

Access (transportation, necessary time): Moscow international airport
Sheremetjevo-2, then about two and half hour by car.

III. History

All-Union Scientific Research Institute for Applied Microbiology was founded in 1975 in accordance with the Decree of the Government. In 1994 it became the State Research Center for Applied Microbiology.

Within 20 years the unique experimental and industrial complex has been created, that makes it possible to perform researches in microbiological biotechnology, both medical and agricultural, by using the latest advances in molecular biology and gene engineering. The laboratory and experimental basis is available to conduct researches involving and biological material of high risk including pathogens of anthrax, glanders, and meliodosis in compliance with the international containment measures requirements.

Biotechnology today is a new scientific and practical trend, on which the solution of key environment, medicine, energy and practical trend, on which the solution of key environment, medicine, energy and supply problems of mankind are greatly dependent.

The Center has an enormous potential for the problems to be solved. The center employs highly qualified personnel among which there are 10 Doctors of science and 150 Ph. D. Scientists in microbiology and biotechnology. Over 8,000 papers are issued in periodicals, both national and foreign, and collections.

(SRCAM) in accordance with the Decree . 648 of the Government, RF dated June 5, 1994.

IV. Management

Kind of organization: State Scientific Center of Russian Federation

Ownership: State property of Russian Federation

Responsible Ministry: Russian Ministry of Public Health

V. Executives

Director - N.N.Urakov

VI. Current major activities

- Development of a novel generation of therapeutics and prophylactic preparations against pathogens causing infectious diseases in humans and animals by using the results of fundamental researches and methods of molecular biology and gene engineering.
- Development and improvement of laboratory and pilot-industrial technologies for production of vaccines, probiotics, sera, diagnostics and other therapeutically and prophylactic preparations.
- Development of high technologies and means for application of environmental preparations for biopurification of polluted objects as well as for preventing the biodamages of engineering systems.
- Development of microbiological preparations for protection as well as of the production technologies and application schemes.
- Development of methodologies and procedures to conduct preclinical trials of novel biopreparations.
- Development of bases for microbiological media being used in medicine, agriculture and industrial biotechnology.
- Designing of devices and equipment for researches and control for biotechnological production processes.

Availability of unique technologies, sophisticated equipment and a staff of proficient scientists promote greatly scientific and technical advances in microbiology, gene engineering, bio-technology and instrument-making. Among most successful R&D accomplishments of our center are as follows:

- Functionally active sites in molecules of some components of the anthrax exotoxin are localized in detail. All known components of the toxin are cloned in *E. coli* cells, that makes it possible to realize the novel approaches in order to increase the immunogenicity of a chemical vaccine as well as to reduce reactogenicity of the live vaccine STI.
- Genetic constructs determining the stable capsule formation in a plague microbe by salmonella cell are developed.
- Unknown earlier antigens of microbes causing glanders, melioidosis and legionellosis, administration of which to animals infected with lethal doses produces the protective effect, are isolated and identified.
- The generic construct, which under optimal conditions of cultivation of *E. coli* recombinant strain yields cell material of 20 g and substance of gamma-interferon of 1 g (20,000 doses) per liter of culture fluid is developed.

•The unique technologies for production of some probiotics so as to treat and prevent salmonellosis, colibacteriosis, diarrhea, both bacterial and viral, disbacteriosis and other diseases are devised. The probiotics are currently being manufactured.

Regulations concerning the industrial and experimental production of preparations are evolved.

BOVERICEL, TRICHOCEL, PENTOFAG, BACTORHYT, ASTUR (sporeless) - for plant protection and LARVIOL and SFERIX - for sucking insects control.

There is a wide range of media based on non-foody raw materials, which are being produced.

The collection of microorganisms that can degrade the industrial materials and compositions with biocidal and anticorrosive activity is available. The efficient techniques to protect expensive electronic equipment are devised.

A large collection of bacterial and fungus strains, oxidizing intensively petroleum hydrocarbons at normal and low temperatures is created. Based on the collection, the biopreparations in order to remove environmental air pollutants are being development.

Novel devices permitting to conduct free-flow electrophoresis of suspensions and solutions are designed.

At present .BIOELECTROFOR-1. device is successfully in operation at the space station.

Pilot models of the new NMR-relaxometer in order to exercise stage-by-stage control over product quality and biotechnological processes are engineered.

Participation in the international co-operations ensures research activities at the level of the latest achievements of science and technology and great contribution to Russia's economic development.

VII. Organization chart

- Directorate
- Research Programs Managers (Deputy Directors)

- Management and Development Department
- R&D Department
- Foreign Affairs Department
- Production Sector

- Department for Genetic Cultures Development
- Department for Protein Engineering
- Department for Development of Gene-engineering Preparations
- Department of Microbiology for Sporulating Cultures

- Department of Genetics of Producers for Plant Protection Means
- Department of Microbiology of Vegetative Forms
- Department of Cultural Collection
- Department of Nutrient Media
- Department for Microbiological Plant Protection Means
- Department for Environmental Biotechnology
- Department of Physical and Biological Methods
- Department of Radiospectroscopy
- Department of Space Biotechnology
- Department for Environmental Monitoring
- Department for Microorganism Cultivation
- Department of Preclinical Trials
- Department for Commodity Forms
- Department for partent
- Department of Computing Machinery
- Department for Metrology

VIII. Number of employee

Personnel - 1350 persons

IX. Major facilities

- Laboratory Complex of P-3 Level of Physical Protection for Studies on the Agents of Severe Infections
- Central Collection of Microorganisms of State Research Center for Applied Microbiology

免疫学研究所（モスクワ）
State Research Center Of The Russian Federation
Institute of Immunology

I. Name of the Institute (Organization)

In Russian: Государственный научный центр Российской Федерации Институт Иммунологии.

In Russian abbreviation: ГНЦ РФ ИИ

In English: State Research Center Of The Russian Federation Institute of Immunology

In English Abbreviation: SSC II

II. Location

Official address: 24-2, Kashirskoye Shosse, Moscow, 115478, Russia

Mail address: 24-2, Kashirskoye Shosse, Moscow, 115478, Russia

Tel: (+7-095) 117-3382, 1118301, 117-15-11

Fax: (+7-095) 117-10-27

E-mail: immgen@glas.apc.org

Access (transportation, necessary time): International airport Sheremetjevo-2, then about one and half hour by car.

III. History

The Institute of Immunology has been created in 1979 in order to conduct further researches in the field of general and applied immunology and allergology. The idea to create such an Institute belonged to Academician Rem Petrov and he became the Director of the Institute and occupied this position up to 1988. In 1994 the Institute of Immunology got the status of State Research Center of Russian Federation.

IV. Management

Kind of organization: State Scientific Center of Russian Federation

Ownership: State property of Russian Federation

Responsible Ministry: Russian Ministry of Public Health

V. Executives

Director - R.M.Khaitov.

VI. Current major activities

- Molecular-genetically and cellular bases of immunity
- Molecular and cellular mechanisms of allergy, clinical allergology

- Immune biotechnology: Vaccines of new generation therapeutic immunomodulating preparations, diagnostics
- AIDS: creation of diagnostic, therapeutically and prophylactic preparations
- Human and animal Immunogenetics
- Immunoecology and immunotoxicology
- Immunopharmacology and immunorehabilitation
- Standardization and meteorological supply of immunological research

VII. Organization chart

Directorate

Department of Immune Biotechnology

- Laboratory of Genetic Control of Immune Response
- Laboratory of Artificial Antigens
- Laboratory of Cell Interaction
- Laboratory of Biotechnology
- Laboratory of Pharmaceutical and Diagnostic Formulae
- Laboratory of Preparative Biochemistry and Antigens
- Laboratory of Peptides
- Laboratory of Immunity Activation
- Laboratory of Experimental Technology of Immunopreparations

Department of Immunogenetics

- Laboratory of Genetics of Human Tissue Comparability
- Laboratory of Tissue Typing
- Laboratory of Immunochemistry

Department of Cellular Immunology

- Laboratory of Cellular Mechanisms of Allergy and Immunomodulation
- Laboratory of Differentiation of Lymphocytes
- Laboratory of Nonspecific Immunity
- Laboratory of Experimental Animals

Department of Radioassay Methods of Investigations

Department of Immunodiagnostics and Immunocorrection

- Laboratory of Immunology Processes Modeling
- Laboratory of Clinical Immunology

- Laboratory of Immunocorrection
- Laboratory of Acquired Immunodeficiencies
- Laboratory of Immunoepidemiology

Department of Clinical Immunology and Allergology

- Unit of Science-Consultation
- Unit of Immunodeficiencies of Adults
- Unit of Bronchial Asthma
- Unit of Allergology
- Unit of Reanimation and Intensive Therapy
- Laboratory of Molecular Mechanisms of Allergy

Chair of Immunology and Allergology

Editorial Board of the Journal “Immunology”

VIII. Number of employee

Number of employees (average) - 500 persons.