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ИНСТИТУТ  
ЗА МОЛЕКУЛАРНУ ГЕНЕТИКУ  
И ГЕНЕТИЧКО ИНЖЕЊЕРСТВО  
Универзитет у Београду

INSTITUTE  
OF MOLECULAR GENETICS  
AND GENETIC ENGINEERING  
University of Belgrade

# **DEVELOPMENT STRATEGY OF THE INSTITUTE OF MOLECULAR GENETICS AND GENETIC ENGINEERING 2016-2026**

May, 2016.

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# **DEVELOPMENT STRATEGY OF THE INSTITUTE OF MOLECULAR GENETICS AND GENETIC ENGINEERING 2016—2026**



May, 2016.

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## INTRODUCTION

Institute of Molecular Genetics and Genetic Engineering (IMGGE), University of Belgrade is one of the leading research institutions in Serbia and in the region, where fundamental and applied research in the field of molecular genetics, biomedicine and biotechnology have been performing. We seek for the new scientific discoveries and we want to apply our knowledge in order to improve the quality of life and environmental conditions. Moreover, IMGGE is dedicated to creating an academic environment for the development of highly competent scientists. IMGGE is extremely active at all levels in promoting scientific fields dealt with by the Institute. One of the most important objectives is creating a strategic networking with the leading science centers in our region and all over the world, in order to improve all activities of IMGGE. Successful realization of these goals by IMGGE will support the scientific progress and application of scientific discoveries and it will raise the level of social awareness about the importance of science, scientific progress and technological development.

After 30 years of successful scientific practice and development, in order to further progress and increase social impact, it is necessary to define strategic goals of IMGGE for the period of 2016-2026. It is the purpose of this document.

IMGGE strategy is a general plan of actions that should lead to the achievement of clearly defined objectives, the purpose of which is to improve:

1. **quality and efficiency of fundamental research** which should result in increasing number of implemented scientific projects and publishing a greater number of quality scientific papers in leading international scientific journals;
2. **activities in the field of education** that would promote the formation of a highly competent and competitive scientists, and raise awareness of the population about social and economic importance of scientific progress;
3. **managing existing and development of new resources** that will contribute to the progress and reputation of IMGGE, and accelerate application of knowledge and improvements in health care and economy (goods and services);
4. **activities in the area of innovation** aimed at developing new products and technologies for the market which will allow fostering economic and social development of the country.

These objectives will be achieved through the promotion of cooperation among laboratories within the IMGGE and through the promotion of cooperation with other institutes, universities and industry both at home and abroad.

The strategy aims to provide conditions for scientific research in compliance with the principles of good scientific practice, and to create an environment that motivates associates and encourages their curiosity and creativity. In addition to scientific objectives, the Strategy should define organizational systems, competences, communication between scientific and administrative bodies and responsibilities. In this way, all researchers and particularly all management structures would be engaged in achieving the vision of IMGGE which would lead to more efficient achievement of these objectives.

Strategy aims to raise the level of scientific competence and to improve IMGGE organization in order to increase its visibility towards domestic and foreign institutes, universities, Ministry (the Ministry of Education, Science and Technological Development of the Republic of Serbia, MoESTD RS) and other relevant ministries and State institutions; towards the economy as well as the wider community. In this way IMGGE will intensify cooperation between science on the one hand and health care, the economy, relevant State institutions and citizens on the other.

The Strategy was adopted by the Scientific Council after public hearings in which all permanent employees of IMGGE took part. The strategy is in line with the Strategy of Scientific and Technological Development of the Republic of Serbia for the period 2016-2026 as well as with the General Strategy of economic and social development of the Republic of Serbia.

## ACTIVITIES

IMGGE activities are directed towards fundamental research in molecular genetics, biomedicine and biotechnology. Fundamental research projects of the Institute mainly focus on genome organization and regulation of gene expression in different organisms. Part of IMGGE activities are carried out through biotechnological and commercial applications in human and veterinary medicine, agriculture, food production and pharmaceutical industries.

Since its very foundation in 1986 IMGGE is part of the international ICGBE (International Centre for Genetic Engineering and Biotechnology) network and successfully cooperates with it as an Associate Center in the fields of research and education.

Today, IMGGE consists of six laboratories: Laboratory for Molecular Biomedicine, Laboratory for Molecular Biology, Laboratory for Human Molecular Genetics, Laboratory for Microbial Molecular Genetics and Ecology, Laboratory for Molecular Microbiology and Laboratory for Plant Molecular Biology. In the past five years the number of employees has significantly increased and currently IMGGE has 104 employees, of whom 95 researchers (Table 1).

Scientific results, quality of personnel and equipment make IMGGE the leading institution for scientific research in the field of molecular genetics in the Republic of Serbia and the region.



Table 1. Number and structure of employees in IMGGE for the period 2009—2015

	2009	2010	2011	2012	2013	2014	2015
<b>1. Researchers</b>	59	62	72	77	86	87	95
Principal Research Fellow	6	6	8	7	9	11	11
Senior Research Associate	6	7	6	7	6	4	6
Research Associate	11	24	25	31	40	44	43
Research Assistant	33	22	22	25	19	15	16
Research Trainee	4	3	10	7	4	5	11
Expert Advisor			1		3	3	4
Expert Associate					5	5	4
<b>2. Administration and accounting</b>	4	4	4	4	5	5	5
<b>3. Technical support</b>	4	4	4	4	4	4	4
<b>Total employees</b>	67	70	80	85	95	96	104

## 1. SCIENTIFIC AND RESEARCH ACTIVITY

### *Science in motion*

IMGGE continuously directs and promotes its activities through fundamental research in the areas of molecular biology and molecular genetics of various organisms as well as through the application of these results in biomedicine and biotechnology. Special attention is paid to monitoring of global trends in relevant areas of scientific research and to the implementation of the most advanced techniques of molecular biology and molecular genetics in order to analyze the structure, function and regulation of gene/protein expression and genome organization. Investigations are taking place at various prokaryotic (actinomycetes, lactic acid bacteria, clinically relevant pathogens, isolates from different ecological niches, laboratory generated strains of bacteria) and eukaryotic model systems (materials of human origin, materials of animal origin, cell lines of human and animal origin, zebra fish, fungi and plants). These areas of research are fully described in the Strategy of Scientific and Technological Development of the Republic of Serbia, especially in priority scientific areas: Biomedicine, Environmental and climate change protection and Agriculture and food.

The importance and quality of scientific research that is carried out within IMGGE is reflected in the large number of scientific papers published in leading scientific journals. IMGGE has successfully responded to the demands of the relevant Ministry and the University of Belgrade, by continually increasing the number of published scientific papers (Chart 1). To continue to prosper and be competitive on the domestic and world scientific scene IMGGE will focus on improving the scientific work and this will increase not only the number but also the quality of scientific papers (Charts 2 and 3), which is one of the goals of this strategy.

IMGGE conducted 16 national and 23 international projects in the past five years. During this period IMGGE coordinated one FP6 and three FP7 projects and in several others IMGGE took part as a partner institution. At the moment IMGGE is coordinating 9 national and 8 international projects and is taking part in realization of another 16 projects. IMGGE is coordinating a project from FP7 program (SERBORDISinn FP7-316088) and the Researchers' Night which is realized within these calls since 2011. IMGGE's further efforts are directed towards integration into the existing European projects within HORIZON 2020 calls in order to be able to establish Centers of expertise in the fields of biomedicine and biotechnology in the near future. Projects and programs of bilateral cooperation are being actively and continuously prepared by IMGGE. Moreover, IMGGE supports and stimulates the initiatives of its researchers and laboratories to compete with other international funds, either for stand-alone or for the collaborative projects.



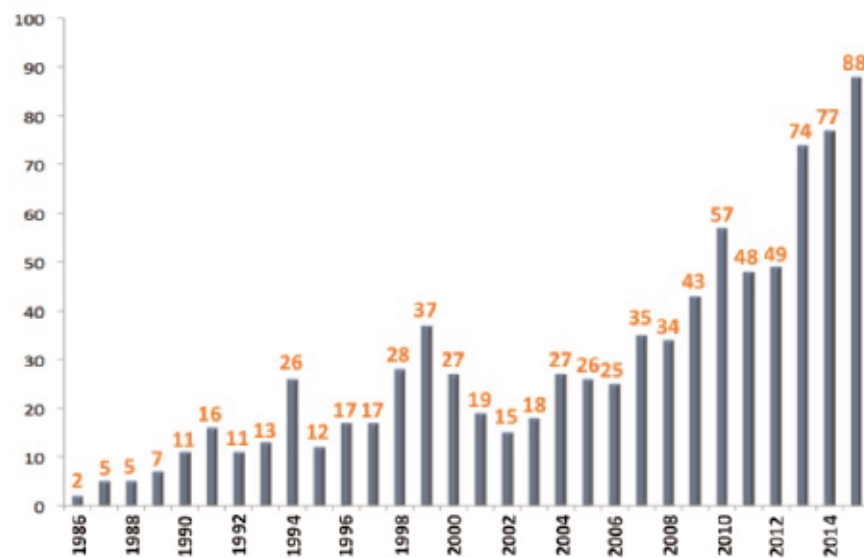


Chart 1. Scientific papers published for the period 1986-2015

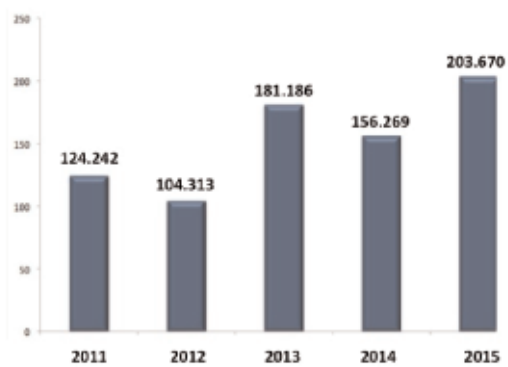


Chart 2. Total IF for the period 2011-2015

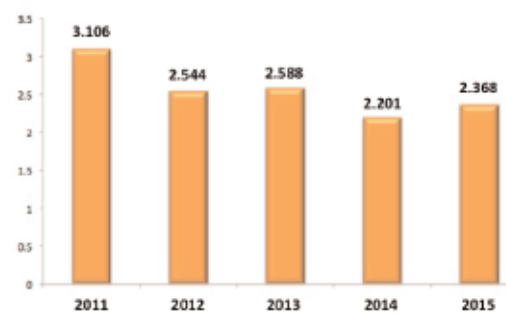


Chart 3. Average IF for the period 2011-2015

## 2. EDUCATION

*We know more, we see further*

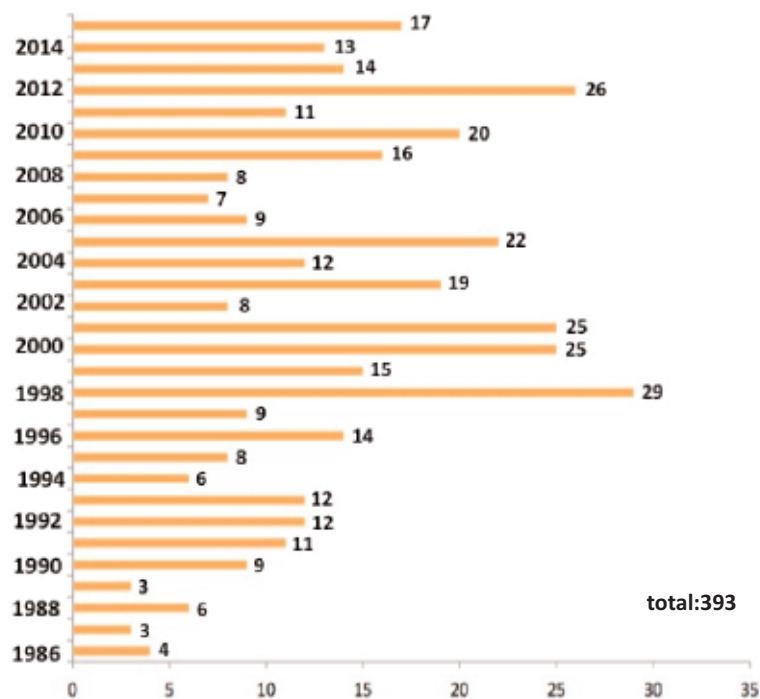


Chart 4. Number of bachelor, magister, master and PhD theses for the period 1986-2015

IMGGE strategy of education is based on excellence in scientific research which would produce new generations of highly competent science experts.

IMGGE is making great efforts in order to provide for students of bachelor, master and doctor's level of studies to gain not only theoretical but also practical knowledge in the course of their study. In this way, they would sooner be ready to take part in the realization of scientific projects thus providing better connections of scientific and educational potential at home and abroad. IMGGE business policy involves continuous theoretical education and monitoring of modern methodological approaches in molecular biology, molecular genetics and biotechnology at all stages of the researchers development – from probationer research student to scientific advisor. Educational activity of the Institute was formally and officially announced in 2004, when the Institute became a part of University of Belgrade. Teaching activity of IMGGE is largely carried out through the realization of programs of the bachelor, master and doctor's studies at the Faculty of Biology (program of Molecular Biology). Furthermore, associates of the Institute take part in doctor's studies at the Faculty of Pharmacy, at specialist studies at the Faculty of Medicine as well as at the other faculties and universities in our country. Staff and spatial resources allow the Institute to participate in both teaching practice and organizing the teaching process, and in the experimental exercises and preparation of master's and PhD theses. 184 graduate, 114 magister and master and 95 PhD theses were realised since the establishment of the IMGGE (Chart

4). It is important to emphasize that selected members of the IMGGE are accredited as mentors for PhD studies by the National Education Council. Future plans include wider cooperation with universities and institutes which will improve multidisciplinary.

IMGGE staff are actively involved in defining and conducting of the teaching and scientific policy of the University of Belgrade through participation in the work of the Senate, the Council, Academic Council of the Institutes, Council of Natural Sciences, Council of Medical Sciences and the Board for Professional Ethics.

IMGGE organizes conferences, professional seminars and training for education of the professionals and transfer of the latest achievements in the field of molecular medicine and molecular genetics. As a part of the Regional Centre for Talents, Belgrade II and "Petnica" Science Centre, IMGGE associates participate in theoretical and practical training programs for high school students. For many years, a team of researchers at IMGGE together with a number of research institutes, universities and cultural institutions in Serbia takes active part in dissemination of knowledge, promotion and popularization of science. In this way, researchers successfully communicate with the public raising awareness of the social and economic importance of scientific progress and technological development. Researchers at IMGGE are active in organizing popular interactive lectures for children and youth.

Educational goal of the Strategy is to make IMGGE a key institution in the country that will provide: i) a framework for the development of highly educated young scientists who are expected to have a leading position in scientific research and university teaching, ii) training programs in the field of molecular biology and molecular genetics and continuing education in the field of biomedicine, iii) promotion of science and communication with the general population, thus raising awareness of the social and economic importance of scientific progress and technological development in the fields of molecular biology and molecular genetics.

## 3. PROUCTS AND SERVICES

*Applying research*

Results achieved in the field of fundamental research and education will provide the framework for the successful application of these results, which would lead to:



### Improving health and quality of life

Fundamental researches in the field of biomedicine are successfully applied in the identification and characterization of new biomarkers, development and introduction of new molecular genetic diagnostic methods and therapies and in the assessment of individual response to the applied therapy. The study and development of the new approaches in the fight against pathogenic microorganisms and antibiotic resistance represent a major challenge and IMGGE is one of the leading research centers in this area in Serbia.

### Improving quality and safeness of food

IMGGE has a rich collection of microorganisms that are a potential source of a unique starter cultures and probiotic strains and directs the researches towards the discovery of new bioactive molecules from a variety of plants and micro-organisms. These should be widely applied in the pharmaceutical, food and chemical industries.

### Improvements in agriculture

The study of genes involved in the plant response to various kinds of abiotic stress as well as the study of genetic markers connected to corresponding characteristics of plants, together with the assisted selection, enable the production of higher quality and resistant plants. These research are of a great importance for agriculture and for the entire economy of a society.

### Environmental protection and the development of biotechnology

The unique collection of soil bacteria enables researchers to find isolates that can be applied in the process of bioremediation and environmental protection. The development of biotechnology helps in finding sustainable “green” solutions for the synthesis of important molecules, and in conversion of waste into valuable materials or biofuel.

## 4. INNOVATIONS

### *Science for life*

Fundamental research is the major activity of IMGGE, and part of the activities are directed towards the application of knowledge and research results in human and veterinary medicine, agriculture, food industry, pharmaceutical industry and environmental protection. In the past three years IMGGE sets its course to the process of technology transfer in order to support economic development of the country and connect with the leading domestic and foreign research and development (R&D) and manufacturing organizations. The idea of innovation development and technology transfer aims at the economic and overall social development of the country. Research and innovations should contribute to the economic growth and prosperity of the society, and should be in accordance with the commitment of the Republic of Serbia to establish social consensus about the importance of investing in knowledge and innovations in order to ensure long-term prosperity of the entire society.

One of the general objectives of this Strategy is to provide stimulating environment for the creative thinking and innovativeness, thus raising the quality of scientific research.

Also, Strategy defines the process of technology transfer that would, in future, provide funding of fundamental scientific projects and so minimize the financial dependence of the relevant Ministries (Chart 5). Improvement of technological research, fostering innovation and technology transfer will connect IMGGE with the corresponding institutions in Serbia (Center for technology transfer of the University of Belgrade, Department of Intellectual Property of the Republic of Serbia, and other relevant bodies in the field of innovation and technology transfer), through organizing expert seminars and workshops in the field of protection of intellectual property rights and technology transfer.

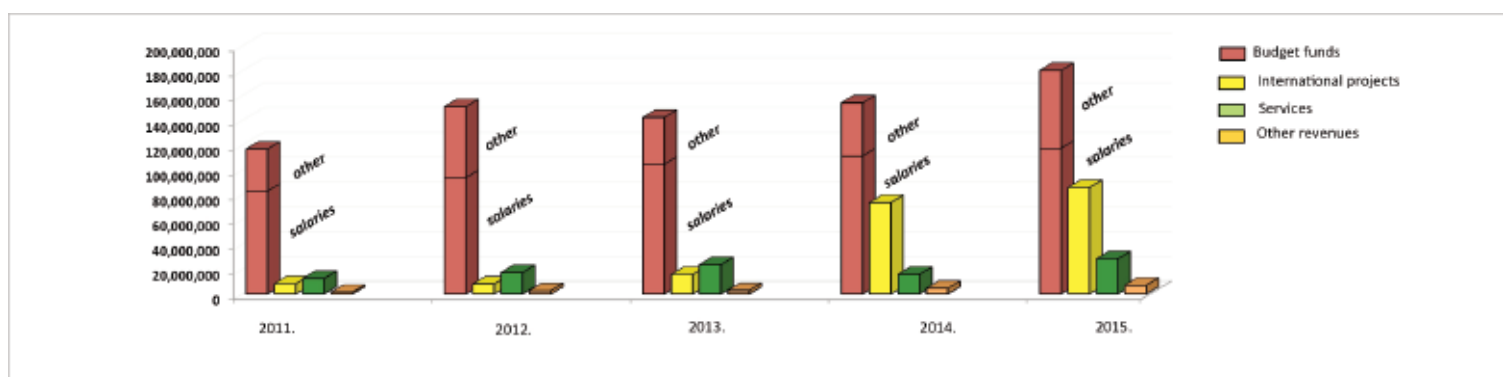


Chart 5. Inflow of financial resources for the period 2011-2015





## VISION

### *Inspired by science*

The vision and inspiration of the employees at IMGGE is acquiring new knowledge and its application in order to improve the quality of life. Vision of IMGGE is to contribute, through scientific results, to the transformation of the country into knowledge-based society. IMGGE will strive to provide an adequate environment and infrastructure that will enable linking fundamental research and practice.

## MISSION

IMGGE mission is realized through the following activities:

- Development of expertise in the field of molecular genetics, biomedicine, and biotechnology, and the application of the gained knowledge to:
  - improve health and quality of life of people and animals,
  - increase food safety and quality,
  - protect and preserve autochthonous food products,
  - improve agriculture, and
  - improve environment;
- Creation of optimal conditions for education and progress of highly competent professionals;
- Establishment of a Centre of Excellence to stimulate spreading the excellence in science, thus contributing to the development of society and the country;
- Active participation in the competitive international scientific environment in order to build links with leading domestic and global research and development (R&D) organizations and universities;
- Continuous active communication with general public, improving the dissemination of information and education of the population on the importance of scientific progress and technological development;
- Development of innovation, introduction of the concept of protection of intellectual property rights and process of technology transfer that are of strategic importance for the economic development of the country;
- Development of IMGGE into the regional leader in the process of transformation of the global economy into knowledge-based economy.

IMGGE will achieve these goals in cooperation with all relevant ministries, and institutes and universities at home and abroad, with medical institutions, the Center for Technology Transfer at University of Belgrade, The Intellectual Property Office of Republic of Serbia, business companies at home and abroad, and with other relevant institutions.



# STRATEGIC SCIENTIFIC AND RESEARCH FRAMEWORKS

## Molecular Genetics and Biomedicine

### Fundamental research

- The study of the structure and function of genes in various model systems
- Molecular mechanisms in physiological and pathophysiological states
- Genomics and population genetics
- Development of new diagnostic, prognostic and therapeutic approaches
- Personalized medicine
- Regenerative medicine
- Functional analysis of bioactive compounds
- Resistance to drugs
- New materials/systems in biomedicine
- Bioinformatics and biostatistics

### Education

- Teaching at bachelor, master and PhD studies
- Execution of master and PhD theses
- Courses and trainings
- Promotion and popularization of science

### Services

- Research contracts
- Genetic analyses
- Regenerative medicine
- Consulting services

### Innovation

- Development of new diagnostic and prognostic markers
- Development of new therapeutic approaches
- Regenerative medicine





## Biotechnology

### Fundamental research

- Biodiversity of microorganisms and plants
- Identification of marker genes of interest for breeding and selection of plants
- Identification and characterization of microbial genes of interest
- Study of biocatalysts and biocatalytic process for the production of different compounds
- Development of functional food and food quality control
- Biotechnology in the improvement of food quality
- Biotechnology in the protection and improvement of health and the environment
- Bioinformatics and biostatistics

### Education

- Teaching at bachelor, master and PhD studies
- Execution of master and PhD theses
- Courses and trainings
- Promotion and popularization of science

### Services

- Research contracts
- Detection, identification and quantification of microorganisms
- Detection, identification and quantification of GMO
- Identification of the animal DNA in food
- Development of starter cultures, probiotics and bioinoculants

### Innovation

- Development of green technologies
- Development of new functional food and additives
- Molecular breeding of plants

## SWOT ANALYSIS

To define important strategic objectives and envisage their implementation, it was necessary to analyze the current situation at IMGGE and set up a good starting point.

The four principles of SWOT analysis are shown below.

### Strenghts

- S1.** Highly qualified scientific staff, modern equipment and adequate space are our strongest resource.
- S2.** 30 years of successful fundamental research in molecular biology, molecular genetics and genetic engineering. Long tradition in scientific research and a large number of papers published in renowned scientific journals confirm the expertise and experience of researchers in IMGGE.
- S3.** IMGGE is a part of University of Belgrade.
- S4.** We actively participate in educational programs, dissemination and advancement of knowledge through:
  - organizing and conducting bachelor, master and PhD studies in molecular biology,
  - organizing courses, trainings and summer schools,
  - giving annual award for the best theses in the field of molecular biology and
  - activities related to the popularization of science.
- S5.** We are oriented toward the application and commercialization of scientific results in the field of human and veterinary medicine, agriculture, food production and in the pharmaceutical industry.
- S6.** Accredited analyses for the detection of mutations in human genes that are important for diagnosis in medicine, GMO testing according to ISO 17025 as well as a number non-accredited analyses are performed at IMGGE.
- S7.** We have equipment and experience to participate in the realization of national projects (financed by the MoESTD RS) and international research projects.
- S8.** IMGGE has a wide network of associates and is open for cooperation with universities, scientific research and medical institutions, and the agricultural and pharmaceutical industries.
- S9.** IMGGE researchers are members of various national and international organizations, associations, research networks, advisory bodies and commissions, which increases visibility and credibility of IMGGE in the scientific and professional circles.
- S10.** Members of IMGGE are top scientists with years of experience and capacity for work on various problems in the field of molecular biology and molecular genetics. Teams of scientists organized in six Laboratories are open, flexible and willing to adopt and study the most challenging scientific issues from the broader scientific field.
- S11.** IMGGE possesses sufficient resources for research in the field of molecular biology and molecular genetics in selected model systems.
- S12.** IMGGE has established Ethics Committee and Ethics Commission for protecting the welfare of experimental animals.
- S13.** IMGGE has established Sector for Laboratory Examinations and Sector for Technology Transfer.



## Weaknesses

- W1.** Lack of financial support significantly affects the quality of the research.
- W2.** A small number of projects that are not fundamental project financed by relevant Ministry. The lack of national and international interdisciplinary and multidisciplinary research programs, innovation and biotechnological projects.
- W3.** Inadequate (non-pyramidal) employees structure — a small number of young researchers due to the absence of possibility to be engaged in the projects financed by the relevant Ministry.
- W4.** The lack of real opportunities for undergraduate students, PhD students and PhDs from other countries to work, get trained or educated at IMGGE, because there are no defined adequate programs and contracts with the relevant Ministry.
- W5.** Insufficient interconnection with other institutes, and lack of contacts with representatives of the industry at home and abroad. Not systematized and inadequately coordinated collaboration among scientific institutions in Serbia and the region that could enable the transfer of knowledge and rational use of the available equipment.
- W6.** The lack of directed scientific policy and undefined modalities for formation of new research interests or groups/laboratories.
- W7.** Researchers are overburden with various non-research assignments, and the number of non-scientific staff is insufficient.
- W8.** Lack of cost-benefit analysis when making decisions involving greater financial investments and hiring associates (ISO, adaptation of premises, purchase of equipment).
- W9.** Not sufficient contacts with the diaspora and with former employees of the Institute (alumni).
- W10.** Insufficient training of researchers with PhD degree on the new methodologies and management.
- W11.** Weak sustainability of infrastructure.
- W12.** Not sufficiently organized presentation of IMGGE (insufficient marketing, poor coverage and presence in the media, sporadic participation in debates on issues of public importance).
- W13.** Applicability and commercialization of scientific results are still at the initial phase.
- W14.** Poor collaboration between Laboratories and lack of strategies for joint appearances that would represent the best interests of IMGGE.



## Opportunities

- O1.** Applications to the new national and international research project calls.
- O2.** Capacities for participation in:
  - teaching at bachelor, master and PhD studies,
  - development of services and innovation,
  - quality control as a referent center for molecular genetic analyses/genotyping/GMO,
  - organization of individual and group courses and trainings,
  - popularization of science.
- O3.** Availability of European and international funding institutions in Serbia.
- O4.** Participation in local and regional initiatives.
- O5.** The existence of spatial capacity for development.

- O6.** The participation of researchers from the IMGGE in working bodies at the ministries, University, Serbian Association of Institutes, economic entities and organizations.
- O7.** The establishment of formal collaboration with former associates of IMGGE who work abroad.
- O8.** Formation of the Center of Excellence at IMGGE.
- O9.** Obtaining exclusivity for selected services.
- O10.** Organization of periodic scientific conferences.
- O11.** Commercialization of services in agriculture, pharmacy, veterinary medicine, medicine, etc.
- O12.** Coordinate activities with funds and ministries.
- O13.** Providing consulting services in the field of molecular biology and molecular genetics.
- O14.** Realization of new cooperation through strategic partnerships and signing contracts with universities, economy etc.
- O15.** The possibility of forming a national biobank for human and microbiological samples.

### Threats

- T1.** Reduction of national funding for science in the future. It is expected that IMGGE provides financial support for research from the European funds, which are also reduced.
- T2.** Relevant Ministry dictates:
  - categorization of researchers which is contrary to international standards,
  - youth employment and employment of returnees,
  - non-overlapping project financing,
  - changes of legal regulations and regulations.
- T3.** Limited impact of working bodies at the University, Serbian Association of Institutes, etc. on scientific policy and strategy of MoESTD RS.
- T4.** Continuous brain-drain due to the bad economic situation.
- T5.** Science and education are strategic objectives of the State policy only in the declarative way.
- T6.** Untimely respond to the changes of scientific trends in the world, legal and other regulations.
- T7.** Bulky State administrative apparatus connected to purchasing, importing, obtaining a license, the co-financing of research activities, etc.
- T8.** Lack of reliable funding for maintenance and development of infrastructure of IMGGE.
- T9.** The existence of competition — hospitals, private laboratories and others that offer the same services as IMGGE.
- T10.** IMGGE is not recognized by companies.
- T11.** IMGGE's services are not recognized by relevant institutions that could be potential users.
- T12.** Underdeveloped and unfavorable legal regulations in the areas where IMGGE operates or intends to operate.



## ANALYSIS OF INTERESTED PARTIES

A stakeholder can be a person, group or institution that has certain links with the analyzed organization and can gain or lose due to the actions of this organization.

Stakeholder analysis includes identification of interested parties and determination of interests of each party. The Table 2 shows the analysis of the level of interest and authority in order to assess the overall importance of each of the interested economic parties. The total significance level is obtained by multiplying the level of interest with the level of authority of each interested party, which means that greater significance indicates a greater need for undertaking activities that would improve cooperation with that interested party.

On the basis of a particular interest and importance, the last column in Table 2 shows the list of activities to access to interested parties so their influence would be used in the best possible way (increase positive or reduce negative impact).

Table 2. Analysis of stakeholders.

AN INTERESTED PARTY	INTEREST	Level of interest [1..10]	Authority [1..10]	Importance (NI x A)	Planned activities
<b>State institutions</b> 1. The Ministry of Education, Science and Technological Development 2. The Ministry of Agriculture and Environment 3. The Ministry of Health 4. The Ministry of Finance 5. Certification bodies 6. The Intellectual Property Office	Scientific results Innovation Transfer of technology Participation in education Help to the social economy Sustainable business Protection of intellectual property rights	1. 6-7 2. 2 3. 2 4. 1 5. 5 6. 2	1. 10 2. 5 3. 8-9 4. 10 5. 7 6. 5	1. 60-70 2. 10 3. 16-18 4. 10 5. 35 6. 10	Publication of scientific results Development of innovation Increasing number of services Increasing number of international projects Larger number of contacts with industry Contacts with medical institutions Lobbying Introduction of additional certificates Assessment of needs for the protection of patents and intellectual property rights
<b>International institutions</b> 1. International donor organizations 2. The European Commission 3. The World Bank 4. Central European Initiative	Development of science at the national level, Regional connectivity and integration in the international scientific trends Higher visibility	4-5	6	24-30	Engaging persons to write project proposals Lobbying Alumni
<b>Associates (strategic partnerships)</b> 1. Faculties 2. Institutes 3. Clinics 4. ICGEB	Support in teaching programs (bachelor, master and doctoral studies) Joint projects and publications Promotion of science Ranking of University of Belgrade on the Shanghai list Transfer of technology Joint use of equipment	9	7	63	Proposing joint projects Active participation in educational programs and bodies Joint research projects and publications Contribution in creating scientific and educational policies
<b>Users of the services</b> 1. Medical institutions (public and private) 2. Economic entities (both at home and abroad) 3. Ministry of Agriculture 4. Customs administration 5. Universities 6. Specialized laboratories 7. Civic associations (NGO) 8. Professional associations 9. Retail clients	Expertise in the field of molecular genetics, biomedicine and biotechnology Services according to the specific requirements of users Fast, high-quality and economically reasonable services Certificate of quality of service Protection of intellectual property rights	10	6-7	70	Improvement of equipment for performance of analysis Continuous improvement and maintaining flexibility of the system Active monitoring of changes in the law Innovative approaches, market research — going to fairs, congresses (study of supply and demand) Greater visibility (recognizing of services) Analysis of customer satisfaction and service needs of users Membership in professional associations
<b>Competition</b> 1. Research institutions 2. Specialized laboratories	Profit Larger number of users Larger number of personnel engaged Specialization of staff	8	8	64	High professionalism Capacity building; The adoption of business principles of acting; Innovative approaches; Extracting specific services and the development of monopoly position; Monitoring of services that are delivered abroad and plan for their delivering in the country.



## STRATEGIC GOALS

In order to achieve the vision of development, Scientific Council of IMGGE recommended that in the period 2016—2026 the following strategic objectives should be implemented.

### 1. Fundamental research

Being in the top 10 % of Scientific Research Institutes on Balkan region in the field of molecular genetics and biomedicine and biotechnology through:

1. Increased number of applications for participation in national and international research projects by 10-20 % annually.
2. Increased average annual IF at 3.0 and increased H (Hirsch) index at 45\* in the next 5 years.
3. Increased investment in training of researchers to improve excellence of scientific staff.
4. Maintaining and developing strategic networks with leading institutes and universities in order to increase productivity and better equipment utilization.
5. Established Center of Excellence in the next 5 years.

\*H index IMGGE in 2015 is 39

### 2. Education

Establish academic environment for the development of highly competent scientific personnel and transfer knowledge to experts and the general population through:

1. Improvement of conditions for education and career development of IMGGE associates.
2. Exchange of knowledge between IMGGE and universities and institutions of the wider scientific areas.
3. Increasing impact on public opinion.
4. Improvement of IMGGE recognition through publishing activities.

### 3. Products and Services

Achieve recognition by the relevant users and expand the range of products and services through:

1. The establishment of a centralized system for conducting and administering services over the next 5 years.
2. Improvement through continuous conversion of scientific results of IMGGE into services and the introduction of new technologies.
3. Continuous increase of the number of contracts concluded with institutions and companies.
4. Introduction of consulting services of IMGGE.

### 4. Innovation

Innovation will become an integral part of all IMGGE activities through:

1. Increased number of innovation project applications to 5 applications per year.
2. Continuous promotion and stimulation of entrepreneurship and innovative thinking.
3. Establishing cooperation with three business partners within the next 5 years.
4. Increased number of filed patent applications on 5 over the next 5 years.

**Fundamental research, education, development of products and services, and innovation** as primary activities of IMGGE are implemented with the **support activities** that involve the process of human resources management, legal and other administrative tasks. Achieving the primary strategic objectives will be supported by continuous improving and synchronizing of those ancillary activities.





**Chapters**  
**ACTION PLAN and MONITORING AND CONTROL OF IMPLEMENTATION OF THE STRATEGY**  
**are not presented**

