SZEGEDI TUDÓS AKADÉMIA
SZEGED SCIENTISTS ACADEMY

SZEGED SCIENTISTS ACADEMY PROGRAM

A new, multigenerational education system for the 21st century

2013 – 2033

MOTTO:

*"He who wants to organize **public education** should sow the seeds of culture in the loam of wide layers of people, like Hungarian sowers do. He who takes care of **scientist education** should be an orchid gardener and deal with each pot individually."*

(Kuno Klebelsberg)

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Introduction

THE NECESSITY OF ESTABLISHING SZEGED SCIENTISTS ACADEMY

Hungary has always abounded in people with creative thinking, which is proved by the fact that we have had **16 Nobel Laureates of Hungarian origin** besides our numerous internationally recognized researchers, such as Brunó F. Straub, János Szentágothai, Zoltán Bay, Ede Teller, Leó Szilárd, Mihály Polányi, Lóránd Eötvös or László Lovász and Tamás Freud). However, we can state that in the field of internationally acknowledged scientific achievements, Hungary is significantly lagging behind the achievements of leading universities abroad, mainly in natural sciences. The number of scientists performing high quality research is decreasing, which inevitably puts both university and academic officials and innovative industries in an awkward situation.

Nobel Laureates and their hosts in Szeged at the conference organized for the 75th anniversary of Albert Szent-Györgyi' Nobel Prize, 2012

The number of teaching faculties and students at universities has increased fivefold in the past 25 years, i.e. it has got significantly thinner to the serious detriment of the quality of education. In the age group 16-36, we provide horizontal education concentrating on a certain period of life or a given type of school, which is **incapable of nurturing outstanding talents**. Although there are some talent management programs, they are also horizontal, unpredictable and they do not provide dynamic vertical advance for the individual. Last but not least, **gifted students lack attractive scientific career models**.

As a consequence of all this, many of the most talented students start their university education abroad, and they are likely to stay there for good. The situation is aggravated by the fact that the best place winners of the National Secondary School Competition are offered scholarships by universities abroad, and thus a great proportion of the best do not even enter the Hungarian higher education system.

It is a vertical, multigenerational talent management system that may offer the solution to the problem. Having become aware of it, in the autumn of 2013, by the initiative of Péter Hegyi and with the lead of András Varró, the Foundation for the Future of Biomedical Sciences in Szeged established **Szeged Scientists Academy (SzSA)** in Szeged.

WHY WAS THE NEW EDUCATION SYSTEM LAUNCHED IN SZEGED?

Szeged is the third largest city in Hungary, in exceptional political situation as it lies at the confluence of the Tisza River and the Maros River in the tri-border area of the South- Great Plain, Vojvodina and Temes regions. Szeged is a 'recipient city' since it provided place for both the Bishopric of Csanád and Franz Joseph University of Cluj-Napoca, which had to flee from Romania after the Treaty of Trianon. Besides being a 'recipient' city, Szeged is also 'tolerant' as in 1921, the Catholic Bishopric found a new home here at the same time as the university with its mostly Protestant

Votive Church in Szeged

Móra Ferenc Museum in Szeged

and Jewish professorial board did. Szeged is also a 'generous' city because it not only received and accepted the university and the bishopric but spent money on them, too, and thus, in only ten years, palaces, clinics and laboratories were erected around the Votive Church, the monumental masterpiece of 20th-century religious architecture.

In ten years the University of Szeged developed into a higher educational institution which was capable of inviting and keeping Albert Szent-Györgyi by providing him with all the necessary conditions for his research, which culminated in the Nobel Prize. Albert Szent-Györgyi is the only Hungarian researcher who was awarded the prize for research completed in Hungary. Naturally, public feelings created by Minister of Religion and Education, Kuno Klebelsberg also contributed to this success. It was **Kuno Klebelsberg** who declared that the centralism of the capital city should be broken in the field of both culture and education.

THE HISTORY OF SZEGED SCIENTISTS ACADEMY

In terms of Hungarian scientific life, 2012 was an important year. This was the year when we celebrated the **75th anniversary of the Nobel Prize award for the world-famous Hungarian scientist, Albert Szent-Györgyi**. Nine Nobel Laureates paid a visit to a series of commemoration events in Szeged in order to show respect and pay tribute to the world-famous researcher of Szeged. During the conference, the Nobel Laureates visited the leading secondary grammar schools in Szeged, met university students and answered questions asked by the young in forums. Secondary school and university students found a common voice with the Nobel Prize winning researchers in an instant, and they had lively debates. The message of the event was unambiguous: students are still extremely open and responsive to intellectual quality.

Enthused by the success, the organizers (Péter Hegyi and András Varró) established the **Foundation for the Future of Biomedical Sciences in Szeged**, whose short-term objective was to make it possible that the young in Szeged be able to meet outstanding representatives of science not only on great anniversaries but regularly, once a year, and thus to deepen the feeling of respect and love for science in the youth in the region.

In order to achieve the **short-term objective**, they invited a Nobel Laureate to the town by the banks of the Tisza River in 2013, too. Since 2012, in nine different events (series of events of **'Meeting of Nobel Laureates and Talented Students'**), altogether 19 lectures by Nobel Laureates were organized in Szeged, which can be considered as a unique achievement even at a European level.

The **long-term objective** of the Foundation is to establish the conditions in Szeged under which the town and Hungary could have a new Nobel Prize awardee. In order to achieve this objective, they wish to follow Kuno Klebelsberg's strategy. The primary goal of the Foundation is **to attract young talents to Szeged and get prominent researchers excelling among them to stay in Hungary**.

To reach this long-term goal, in the autumn of 2013, the Foundation launched **Szeged Scientists Academy Program**, which is an internationally unique initiative.

Dr. Eric F. Wieschaus
(Medicine Nobel Prize, 1995)

Dr. Robert Huber
(Nobel Prize in Chemistry, 1988)

THE INITIAL RESULTS OF SZEGED SCIENTISTS ACADEMY PROGRAM (2013-2015)

Several Nobel Laureates and researchers working at high-ranked universities, such as Cambridge or Oxford, and research centres abroad have joined in the so-called Mentor Program and thus **Nobel Laureate researchers visit Szeged every year**. A biology laboratory with state-of-the-art equipment has been established in **Radnóti Miklós Experimental Grammar School**, which offers the most effective education in biology in the country. The laboratory launched a **special biomedical training** course for grammar school students (Szent-Györgyi Pupils) in June 2015. In 2013, 20 secondary school teachers

Dr. Tim Hunt (Medicine Nobel Prize, 2001)

Dr. Aaron Ciechanover (Nobel Prize in Chemistry, 2004)

and 80 grammar school pupils registered for the program. In 2014, the number of participating teachers increased to 40 and that of the pupils was almost 150. Not only did pupils arrive from regional schools but also from every part of the country, even from the **leading secondary schools** of Hungary. The program became attractive for talented pupils and their teachers as well.

A NEW PERIOD IN SZEGED SCIENTISTS ACADEMY (2016-)

The 12 secondary schools operating as regional centers within the Secondary School Education Program and the 119 Szeged Scientists Academy secondary schools we regularly visit to find talented pupils

THE OPERATIONS MANAGEMENT OF SZEGED SCIENTISTS ACADEMY

At the end of 2015 Szeged Scientists Academy reached a turning point in its history: the fruits of labour were rewarded by the government of Hungary's decision to **support the Academy with over two billion forints** (2028/2015. (XII.29.) Government Decree). The work done by Szent-Györgyi Students and their mentors had proved by then that it was well worth supporting the best with scholarships, grants and opportunities. Meetings organized yearly made it possible for pupils and teachers of several secondary schools to join in the program.

Thanks to this support, Szeged Scientists Academy now has the chance to become both nationally and internationally determining and competitive. At the request of the Foundation, German Nobel Laureate physiologist, **Dr. Bert Sakmann** has accepted the post of **Director of education for Szeged Scientists Academy**. He is in charge of, among others, helping to widen international relations of Szeged Scientists Academy, participating in improving the talent management program by passing on his experience, involving further Nobel Laureates in the program, and also meeting scholarship Students, Mentors of SzSA and secondary school teachers regularly.

The Foundation's concept of talent management is based on a vertical structure, whose basis is the **Secondary School Education Program (SSEP)**. Taking the age characteristics of the secondary school age group into consideration, the Foundation's Board of Trustees decided on asking the most recognized national experts of talent management in biology to supervise this work. At present, there are 15 Senior teachers taking part in the work, so the 12 education regions led by the Senior teachers cover the whole country.

Professional and Operations Managers for the Foundation for the Future of Biomedical Sciences in Szeged, who are also the members of the Education Committee are:

- **Dr. Bert Sakmann**, Director of education
  Nobel Laureate cell physiologist, Max Planck Institute für Neurobiologie, Munich, Germany
- **Dr. Péter Hegyi**, Program director (elaborator of SzSA Program)
  Doctor of Hungarian Academy of Sciences (HAS), Professor of Faculties of Medicine, Universities of Szeged and Pécs
- **Dr. Norbert Buzás**, Managing director
  Associate Professor and Head of Department of Health Economics at the Faculty of Medicine, University of Szeged
- **Sándor Bán**, Deputy director of secondary school education
  Leading biology teacher at Radnóti Miklós Experimental Grammar School, Szeged
- **Dr. Zoltán Rakonczay**, Deputy director of university education
  Doctor of HAS, Professor of the Institute of Pathophysiology at the Faculty of Medicine, University of Szeged.

Present members of the Foundation for the Future of Biomedical Sciences in Szeged

- **Dr. András Varró**, Chairman of the Foundation's Board of Trustees
  Doctor of HAS, Professor and Head of Department of Pharmacology and Pharmacotherapy at the Faculty of Medicine, University of Szeged
- **Dr. Péter Hegyi**, Secretary of the Foundation's Board of Trustees
  Doctor of HAS, Professor of Faculties of Medicine, Universities of Szeged and Pécs
- **Dr. Ferenc Bari**
  Doctor of HAS, Dean of the Faculty of Medicine, University of Szeged
- **Dr. László Dux**
  Doctor of HAS, Professor and Head of Department of Biochemistry at the Faculty of Medicine, University of Szeged
- **Dr. Lajos Kemény**
  Doctor of HAS, Professor, Vice-rector for Science and Innovation, University of Szeged
- **Szilvia Krizsó**
  Pulitzer Prize-winning television journalist
- **Dr. Pál Ormos**
  Academician, Director general of Hungarian Academy of Sciences Biological Research Centre, Szeged
- **Dr. Vígh László**
  Academician, Deputy innovation director general of Hungarian Academy of Sciences Biological Research Centre, Szeged

Former members of the Foundation for the Future of Biomedical Sciences in Szeged are

- **Dr. István Leprán**
  Doctor of HAS, representative of the Dean of the Faculty of Medicine, University of Szeged, 2013-2015
- **Dr. László Vécsei**
  Doctor of HAS, former Dean of the Faculty of Medicine, University of Szeged, 2013-2016.

Szent-Györgyi Talents Award

In 2013, the Foundation established Szent-Györgyi Talents Award. The conditions for the award require that the invention, which should be a single discovery (like in the case of the Nobel Prize), be connected to research carried out in Szeged (following the great predecessor). The awardee is to be selected jointly by the members of the Foundation's Board of Trustees and the Nobel Laureate researchers visiting Szeged. The award is to be presented at the gala night of the spring Meeting of Nobel Laureates and Talented Students every year.

Dr. Balázs Papp, the first winner of Talents Award, 2013

Researchers awarded so far:

2013: Dr. Balázs Papp
for *"Disclosing the general characteristics of genetic interaction networks"*
Senior research associate, Institute of Biochemistry Hungarian Academy of Sciences Biological Research Centre

2014: Dr. Csaba Pál
for *"The detailed landscaping of the resistance of bacteria to antibiotics"*
Senior research associate, Institute of Biochemistry Hungarian Academy of Sciences Biological Research Centre

2015: Dr. Gábor Tamás
for *"Identifying sources of slow inhibition in the neocortex and the description of their mechanism"*
Professor of the Department of Physiology, Anatomy and Neuroscience,

Dr. Csaba Pál, the winner of Talents Award, 2014

Institute of Biology, Faculty of Science and Informatics, University of Szeged

2016: Dr. Péter Hegyi
for *"The investigation of the pathomechanism of acute alcoholic pancreatitis"*
Professor of Faculties of Medicine, Universities of Szeged and Pécs
Regarding that in 2016 a member of the Foundation was awarded with the highest professional prize, the award was not handed over. The professional result was acknowledged with a certificate.

Dr. Gábor Tamás (on the left) who got the Award in 2015

2017: Dr. Antal Berényi
for "Advancing the therapeutic potential of electrical approaches in the treatment of epileptic seizures"
Adjunct professor, University of Szeged
Faculty of Medicine, Department of Physiology

Dr. Péter Hegyi who received a certificate in 2016

Dr. Antal Berényi, the winner of Talents Award, 2017

THE OBJECTIVES OF SZEGED SCIENTISTS ACADEMY

The regional objectives are

- to establish an internationally outstanding region for science, which creates the possibility of a bustling scientific life and may serve as a basis for a new Nobel Prize
- to retain the most talented students of the region in Szeged
- to attract the most talented pupils of Hungary and the surrounding countries to Szeged
- to develop the educational institutions of the region
- to attempt to implement a content-based and organizational reform of higher education in Szeged, which may become an important, leading element of the program

The national objectives are

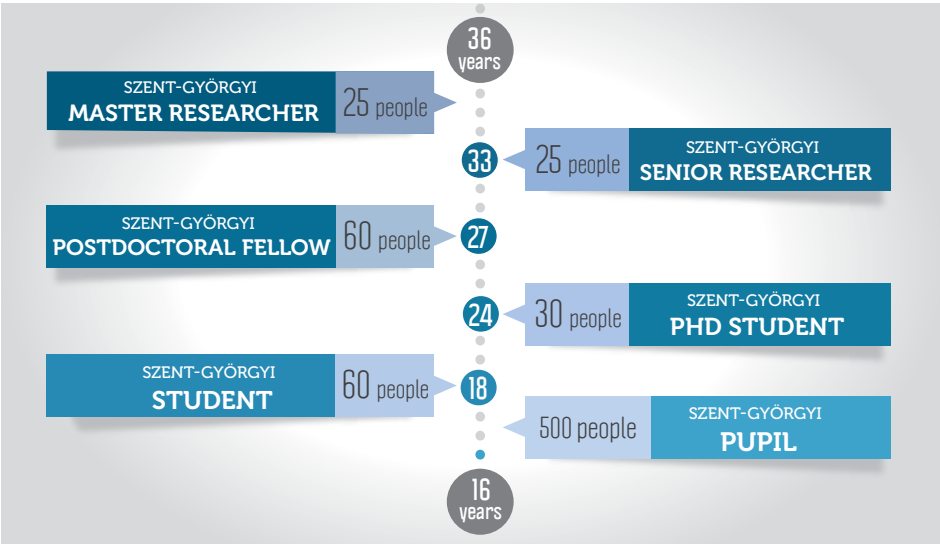
- to retain the most talented students of the country in Hungary
- to find and bring resources from abroad, mostly from the European Union (e.g. European Research Council scholarships) to Hungary in order to increase the budget of our institutions
- to establish a centre which would motivate talented foreign young people to settle down in Hungary

Laboratory of Dr. Márta Széll, Szent-Györgyi Mentor, 2013

Introduction of the new school system

INTRODUCTION OF THE SCHOOL

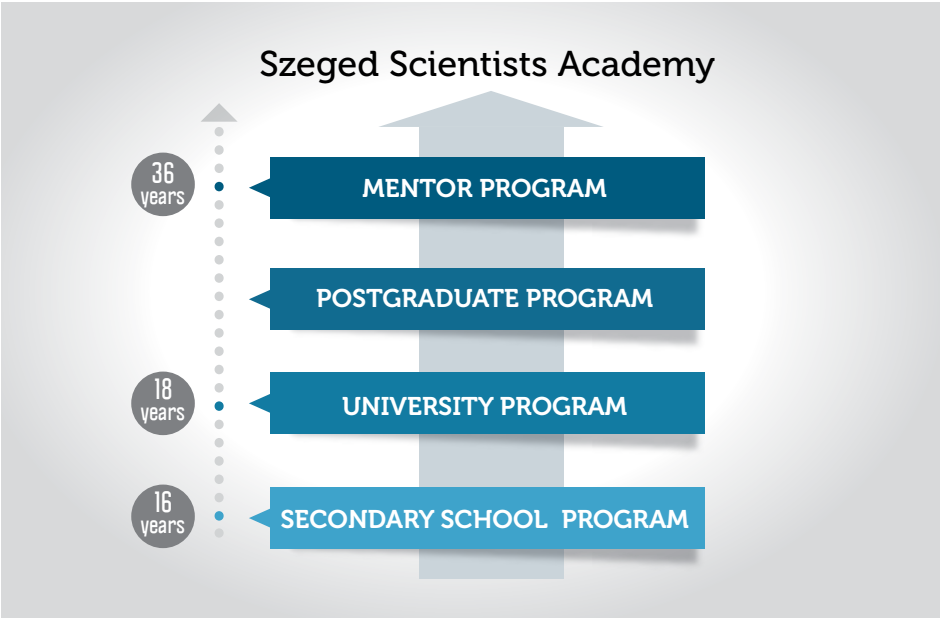
Szeged Scientists Academy, incorporated into the present school system, provides continuous science education for secondary school and university students. The initial education of secondary school students takes place in the laboratories established in the specialized research centres and in the two central student laboratories. TERMOSZ laboratory (Radnóti Miklós Experimental Grammar School in Szeged) and Gyulai József Scientific Laboratory (Németh László Grammar School in Hódmezővásárhely) were established and completed from EU sources. Our goal is to establish close cooperation with these institutions. The government support for the program makes it possible to complete or renovate the laboratory rooms needed for the program in both central schools.



School system – Future plans of the Szent-Györgyi program

Through investments a new laboratory room is to be established in Németh László Grammar School, which will make it possible for students to perform bioinformatical exercises. The planned expenditure of the development is approximately 30 million forints. In Radnóti Miklós Experimental Grammar School in Szeged, it is the basement of the laboratory building that is to be renovated, where two smaller laboratory rooms are going to be created for molecular biology exercises, and also two other microlabs where the imaging devices that are planned to be purchased will be stored and operated. The planned expenditure of this development is approximately 65 million forints. The education of university students is held in the best equipped laboratories of the Hungarian Academy of Sciences Biological Research Centre and the University of Szeged under the guidance of the most excellent mentors (Szent-Györgyi Mentors). A **group of 40-45 Mentors** are awaiting the students, who start research at the same time as their university studies. The university helps students by providing personal timetables for them, so they can schedule the time to be spent on research in the laboratory individually. Naturally, high-level research work cannot have a detrimental effect on their performance at university.

The work of Szent-Györgyi Mentors is also supported by a group of **60-70 International mentors**, including prominent researchers, several of whom are Nobel Laureates. To accommodate students, SzSA is going to establish **Szent-Györgyi Dormitory**.



We aim to match high professional expectations and outward appearances so that students participating in the program can be accommodated in highly motivating, exclusive surroundings. In the Dormitory, besides several student rooms, there will be two international mentor's rooms, too, where Nobel Laureates and other internationally renowned Mentors will have the chance to meet students in a separate conference room with a private entrance. We plan to organize cultural and light entertainment programs and also debates for the residents of the Dormitory regularly, with the aim of teaching the young to be open-minded and educated individuals who will be useful members of society not only because of their professional qualities.

In the postdoctoral period scholarship students work at renowned universities abroad (Cambridge, Harvard, Göttingen), continuing their education in an organized form. Following this, students are offered distinct possibilities to return home (in the same way as the 'Lendület' [Momentum] Program of the HAS), plus they go on working in SzSA as Mentors.

Dr. Eric F. Wieschaus (Medicine Nobel Prize, 1995) in Ságvári Endre High School, 2015

THE STUDENTS OF THE SCHOOL

SZENT-GYÖRGYI PUPILS (about 500 altogether) can be those who show outstanding interest in life sciences and subjects related to it: biology and/or chemistry. The young, selected upon teachers' recommendations, get the chance to obtain the academic and practical knowledge needed for later improvement and research work, in the laboratories established in secondary schools.

Scholarship Students, who can participate in the 20-year education program, are selected from **SZENT-GYÖRGYI PUPILS**.

Benefits:

- possibility of meeting excellent researchers
- expense account
- laboratory training. In Radnóti Miklós Experimental Grammar School, the methods needed for modern talent management were elaborated following the examples of international (first of all, Göttingen) programs (**Secondary School Training Centre for Life Sciences**). The **Hódmezővásárhely branch of SzSA** (Németh László Grammar School) would **mainly focus on regional secondary school education**, involving neighbouring countries

Consultation of Dr. Bert Sakmann, Director of education, with the Szent-Györgyi Students, 2016

Szent-Györgyi Student's presentation at the 8th Meeting of Nobel Laureates and Talented Students, 2016

The selection of **SZENT-GYÖRGYI STUDENTS** (approximately 60 persons), who are mostly chosen from Szent-Györgyi Pupils, is based on applications and entrance exams, which are offered to winners of the National Secondary School Competition, too, and thus the geographic openness of the program is ensured. Admission requirements include fluency in English (at least intermediate level 'C type' exam in English) and true vocation stated in a motivation letter.

Getting in and dropping out

About 10 persons are accepted yearly. Students who are accepted have to take part in the local Conference of Scientific Students' Association, and at the end of the given academic year both Students and their Mentors have to make a report. At the end of each year the Education

Szent-Györgyi Student's presentation at the 8th Meeting of Nobel Laureates and Talented Students, 2016

Committee of the school decides whether the given student can be a scholarship student next year. The place of the dropout may be taken over by another student meeting the admission requirements.

It is important to mention that the students accepted to the program but not meeting the expectations or taking interest in some other field will drop out of the program, and at the same time, there will be a possibility to invite other talented senior students who, for example, excel in work in the Scientific Students' Association.

Benefits:

- lectures by excellent professors (from the Universities of Harvard and Cambridge)
- individual timetable at the University of Szeged
- research possibilities in the labs of the most prominent Mentors in Szeged
- dormitory accommodation (in all likelihood, from the 2nd term of the academic year of 2018-2019)
- participation in cultural, sport and social activities
- monthly grant

THE TEACHERS OF THE SCHOOL

SZENT-GYÖRGYI BOARD OF TEACHERS

Mentoring activity in the national and cross-border secondary school program is carried out by **SZENT-GYÖRGYI SENIOR TEACHERS** and **SZENT-GYÖRGYI TEACHERS** who are all secondary school teachers.

SZENT-GYÖRGYI SENIOR TEACHERS can be those who are recognized experts in the field of biology or chemistry and who have decades of experience in talent management. SzSA wishes to enter into a contract with about 15-20 teachers from Hungary and 5-10 teachers from the Hungarian language secondary schools in neighbouring countries, thus facilitating their activity in the talent management program. At the moment, talented students are spot by 15 Senior teachers covering the whole country that is divided into 12 regions.

Their main tasks are

- spotting and recruiting the most talented pupils in the given region
- visiting the grammar schools in their region (holding one or two lectures per year)

- participating in common trainings (twice a year)
- entering pupils for the SzSA program, and organizing their participation
- mentoring pupils in the given region

SZENT-GYÖRGYI TEACHERS can be those who, in the secondary school where they teach biology and/or chemistry, spot talented pupils and provide them with additional knowledge, and whose pupils regularly take part in the National Secondary School Competitions and other national and international competitions or tests mostly in the field of natural sciences. The Board of Teachers is continuously increasing. It is Szent-Györgyi Teachers that select the young who are offered the possibility to get to know the program.

Getting in and dropping out
The selection and invitation of Teachers is based on their previous talent management work. It is important to mention that the Teachers accepted to the program but not meeting the expectations will drop out of the program, and their places will be offered to other Teachers. It is the Education Committee that is in charge of inviting or dismissing Teachers.

Benefits:
- assignment fee for their work
- reimbursement

THE MENTORS OF THE SCHOOL

SZENT-GYÖRGYI BOARD OF MENTORS (40-45 persons)

The **SZENT-GYÖRGYI MENTORS** of SzSA are researchers working in Szeged, who carry out scientific work of considerable international reputation, lead their own research teams, and whose publications are published in prestigious scientific journals.

Their main tasks are
- scientific mentoring, teaching and consulting students accepted to the program
- popularizing SzSA
- holding lectures for secondary school and university students

Getting in and dropping out

The selection and invitation of Mentors is based on their scientific work. It is important to mention that the Mentors invited to the program but not meeting the expectations will drop out of the program, and their places will be offered to other Mentors. It is the Education Committee that is in charge of inviting or dismissing Mentors.

Benefits:

- assignment fee for their work
- reimbursement
- full reimbursement for the expenses of their international collaborating researchers (International mentors) coming to Szeged

Dr. András Varró, the Chairman of the Foundation's Board of Trustees and Dr. Péter Hegyi Program Director in Radnóti Miklós Experimental Grammar School in front of the posters recording the visits of Nobel Laureates

SZENT-GYÖRGYI JUNIOR MENTORS OF SZEGED SCIENTISTS ACADEMY

SZENT-GYÖRGYI MENTORS have the opportunity to appoint a young talented researcher working in his/her laboratory who becomes the **JUNIOR MENTOR OF THE SZENT-GYÖRGYI STUDENT** and takes part in the Student's education actively.

Their main tasks are

- taking active part in the Student's education
- taking part in the Meeting of Nobel Laureates and Talented Students organized twice a year

Getting in and dropping out

Szent-Györgyi Junior mentors have at least a PhD degree and are appointed by the Szent-Györgyi Mentors. The invitation is examined and approved by the Drputy director of university education. Junior mentors invited to the program but not meeting the expectations will drop out of the program.

Benefits:

- assignment fee for their work

INTERNATIONAL MENTORS OF THE SCHOOL

SZENT-GYÖRGYI BOARD OF INTERNATIONAL MENTORS (60-70 persons)

SZENT-GYÖRGYI INTERNATIONAL MENTORS of SzSA can be the researchers who work in a research centre abroad, who carry out scientific work of considerable international reputation, lead their own research teams, do original experimental work, whose research findings are published in prestigious scientific journals, and who have (or plan to have) close scientific and research contacts with Mentors in Szeged.

Their main tasks are

- giving a lecture in Szent-Györgyi Dormitory once a year
- mentoring Students

Getting in and dropping out

The selection and invitation of International mentors is based on their former scientific work. It is important to mention that the international mentors invited to the program but not meeting the expectations will drop out of the program, and their places will be offered to other International mentors. It is the Education Committee that is in charge of inviting or dismissing International mentors.

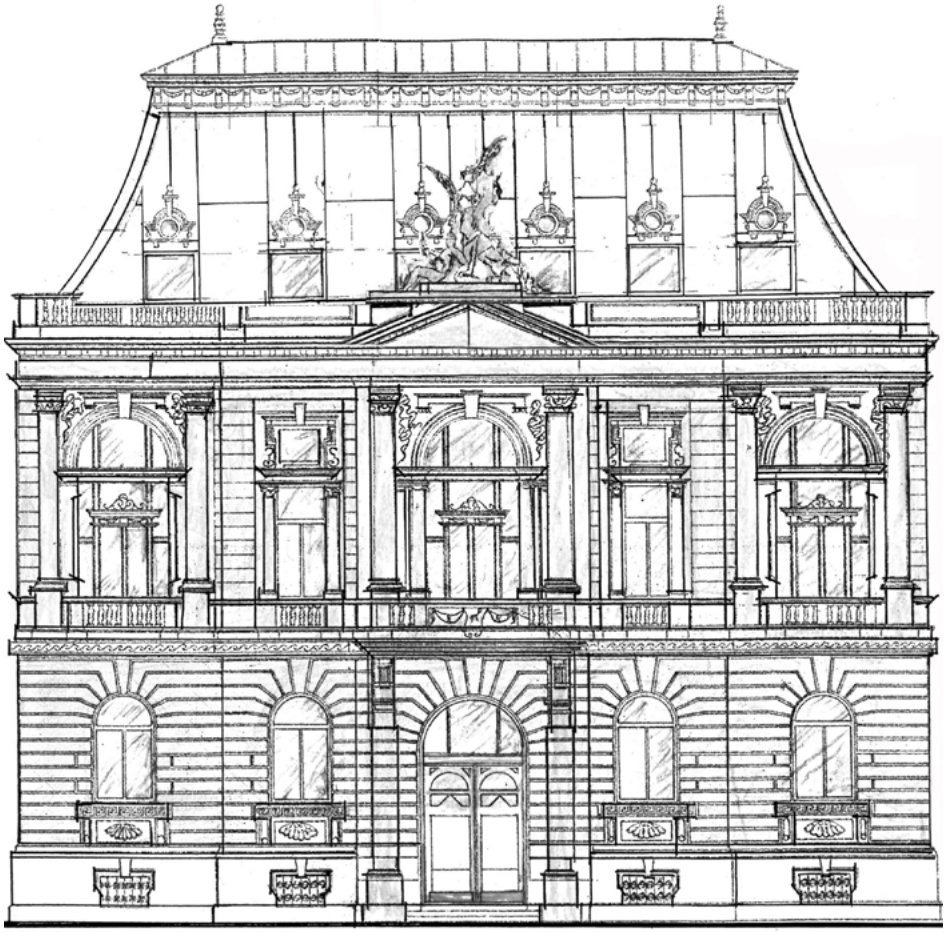
Benefits:

- full reimbursement for the expenses of travelling to collaborating researchers in Szeged
- recruiting talented young researchers for their laboratories

SUMMARY

The prospective benefits brought by the new school system are invaluable. It can launch a new type of school and communication channels, which has been unprecedented in the history of Hungarian education since Kuno Klebelsberg. As reflected in the name of the Foundation for the Future of Biomedical Sciences in Szeged, initially it wishes to work in the field of medical biology. Later the Foundation wishes to invite leading researchers in other fields of sciences (e.g. chemistry, physics, mathematics, social sciences) as well, in order to acquaint them with the secondary school and university students and the citizens of Szeged and its region. The long-term aims of the program include establishing similar schools in other cities in Hungary, based on the example of Szeged.

Szent-Györgyi Dormitory of Szeged Scientists Academy



The building of the future Szent-Györgyi Albert Dormitory

HISTORY OF THE BUILDING

After the Great Flood in Szeged in 1879, the town was rebuilt according to Lajos Lechner's plans. This concurred with the preparations for the celebration of the Hungarian Millennium in 1896, which was one of the most fruitful and prosperous periods of economic and cultural life in Hungary. Szeged Chamber of Commerce and Industry was established in 1890, whose head office was soon started to be built. The new building of the Chamber was finished in 1896, and it served as the centre for economic life in the Great Plain up to 1949. Having been nationalized, the building was used for other functions: first, for a short time, it was a dormitory for medical students, then it was converted into a casino and, finally, it housed Béla Bartók Cultural Centre – 'The Bartók'.

'THE BARTÓK'

If you want to speak about the building at 3 Vörösmarty Street in Szeged, it is no good explaining that it is next to the Theatre. The elderly might know what you are talking about if you mention the Chamber of Commerce and Industry, but what, undoubtedly, everyone knows is 'The Bartók'.

Everyone in Szeged still remembers the emblematic cultural centre of the city. When the decision was made on closing down the centre eight years ago, employees and citizens showered the local government with letters in desperation.

Visiting 'Bartók', 2016

Here is a quote from one of these letters:
" 'The Bartók' is a beautiful building inside out and is perfect solely for a cultural centre. I used to go there frequently when it housed amateur art clubs, study circles, youth clubs... Wonderful wooden stairs lead you upstairs, which deserve to be saved."

This is the building that has been purchased by Szeged Scientists Academy with the support of the government. This is where the dormitory, which will accommodate the most talented students of the renowned University of Szeged, is going to be established.

THE DORMITORY

The building of the former Chamber of Commerce and Industry and, later, Béla Bartók Cultural Centre will be Szent-Györgyi Dormitory of Szeged Scientists Academy. The building will contain modernly furnished rooms, common rooms, mentor's apartments and a lecture hall. Most talented Szent-Györgyi Scholarship Students will be provided with all the conditions for making good use of their talents in the most efficient way. The Director of education of the institution, Nobel Laureate researcher, Bert Sakmann and the over 100 Hungarian and foreign experts in cooperation with him will fast-track young talents in their studies. The dormitory will house professional lectures, debates and discussions, which may be visited by anyone interested in science.

Besides excellent housing and working conditions, the Academy is also concerned about its students' intellectual development and physical endurance. 'Non-professional' programs are arranged and supervised by the dormitory psychologist, an educator and the members of the directory board.

In accordance with the contract with the National Theatre of Szeged, the students can visit theatre performances for free or at reduced prices. Director and conductor of the theatre, Sándor Gyüdi offered to hold short lectures for students to help them understand forthcoming opera performances better. Students can also count on getting help from the theatre with developing their articulation, lecturing techniques and body movement, which will make it easier for young scientists to appear at conferences later.

Thanks to Szeged Philharmonics and Szeged Music Academy, the city has a bustling musical life. Szent-Györgyi Students will be provided with tickets and season tickets to the performances of the Philharmonics and the teachers and students of the Music Academy.

In accordance with the contract with the IH Event Center Students can visit the performances of the guest artists there for free or at reduced price. It is also possible to watch films shown in the ArtMovie-Grand Café, and to take part in discussions on movies, which are led by well-known critics and aestheticians.

In the past years English has become the language of science so passing the intermediate language exam is an admission requirement for the students. However, an insufficient knowledge of English must not prevent young talented scientists from

communicating, so the Academy provides them with the chance of improving their knowledge by their own standards, which may be realized in the form of traditional language classes or assistance in preparing for English language lectures and presentations.

To be successful, you do not only need intellectual development, but a healthy lifestyle should also be part of it. The dormitory will provide a gym inside the building for use of students, but if they are interested in other sports, through contracts with different sports facilities, the Academy will ensure the possibility of pursuing sports elsewhere, for example, by renting tennis or basketball courts or buying season tickets to the swimming pool.

Many parts of the program will have been launched before students can move in to the dormitory. Thus, for example, some cultural programs and the English language courses are already available in the 2016/2017 school year. Enthusiastic and successful students deserve to be trusted because their success brings everyone joy and satisfaction.

Visiting 'Bartók', 2016

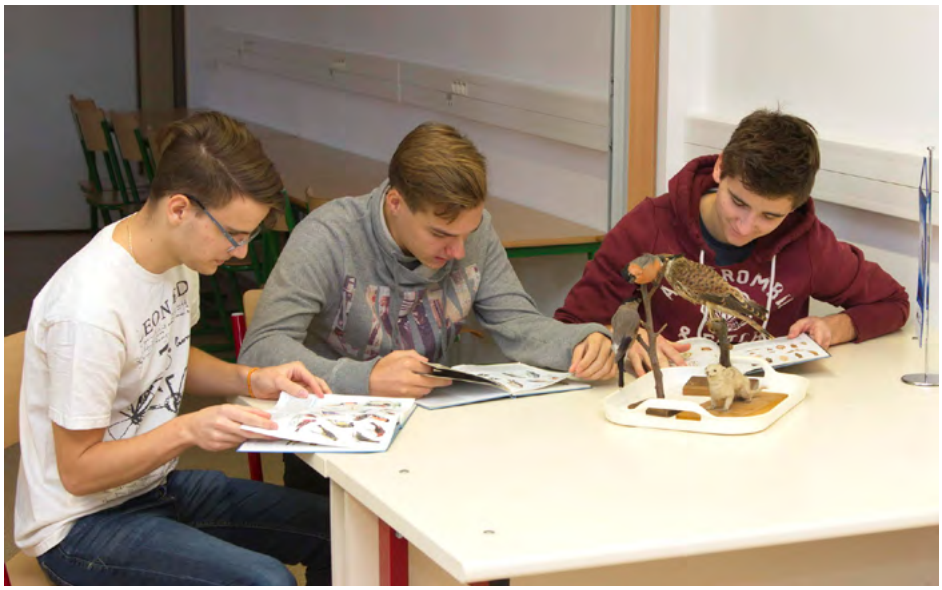
The Secondary School Education Program of Szeged Scientists Academy

One of the most significant novelties in the education process of Szeged Scientists Academy established by the Foundation for the Future of Biomedical Sciences in Szeged is the fact that it guides students through the steps of becoming a scientist from high school age. Accordingly, the first stage of the established education program focuses on the secondary school age group. The new feature in the initiative being unique in talent management in Hungary lies in integrating the developmental experience of secondary school experts with the professional knowledge of university academic staff. This makes it possible to introduce a novel form of education in which modern professional content assisted by the best didactic methods can provide several hundreds of young, interested students with getting insight into or even joining in the process of the most modern medical research.

Through the planned activities, the pupils can familiarize themselves with the outstanding scientific results of the University of Szeged, and experience the atmosphere of two significant towns of the South-Great Plain region, Szeged and Hódmezővásárhely. By ensuring pupils' continuous improvement, we wish to offer them all these advantages in the hope of getting pupils to choose the University of Szeged to continue their studies at.

The professional background of the Secondary School Education Program (SSEP) is given both by the traditional talent management of biology and chemistry education in Hungary and by successful foreign examples. On these grounds, we worked out a detailed education plan of the SSEP, which includes autonomous learning, group lectures and conversations following them, taking part in conferences and laboratory exercises which can be performed in several locations.

The process contains important assessment steps because we will need continuous reflections on the program to ensure its sustainability. Therefore, after each event and program, the opinions and experiences of participants are to be asked, and on the basis of these, the education program is to be revised and modified if needed, with the aim of improving its efficiency.



Workshop in Ságvári Endre High School, 2015

PRESENT POSSIBILITIES FOR TALENTED SECONDARY SCHOOL PUPILS

The education system in Hungary maintains highly efficient traditions in talent management in the field of mathematics and natural sciences, which is proved not only by the well-known results of Hungarian Nobel Laureates but also by the fact that talented Hungarian secondary school pupils regularly achieve excellent results of worldwide importance in these subjects. The medals awarded in International Olympiads and the success achieved in Science and Engineering Innovation Competitions all prove the effectiveness of these traditions. Also, in the past 8-10 years it has become obvious that top-notch higher education institutions abroad are delighted to welcome our most successful pupils. It is a sad experience, however, that only a tiny proportion of pupils going abroad at this age return to their homeland, which means that, virtually, other countries will benefit from these pupils' excellent secondary school education.

It is important to emphasize that present practice does not ensure that pupils spotted as talented at secondary school be offered all the possibilities of becoming successful at university. After getting admitted to universities, students - even the ones excelling at secondary school - usually have to go back to square one in the process leading to success. Apart from a few exceptions, there are no university programs in Hungary which make it possible for first or second year students to get close to research fast. Excellent research skills are hard to spot and measure, although some of the students possessing these skills can already be found in secondary schools. The first years of university are wasted for both these students and the research teams, who could much earlier start collaboration with students with proper training and endurance.

Laboratory work in TERMOSZ laboratory (Radnóti Miklós Experimental Grammar School), 2015

THE OBJECTIVES OF SECONDARY SCHOOL EDUCATION PROGRAM

When specifying the objectives of the program, we considered not only the above-mentioned facts but also the opinions of leaders of secondary school and university research teams. We strove to convert the specified requirements into a well-established system of objectives.

To offer an effective alternative to studying abroad

The experience gained in the analysis of the situation led the leaders of the Foundation to create a special talent management program offering pupils talented at natural sciences a real available alternative to chances offered by universities abroad, thus, to early emigration. Naturally, this alternative will work only on condition that pupils get to know about the program at the beginning of their secondary school studies, namely, before they decide which country they would like to continue their studies in.

We aim to offer pupils involved in our system a university program as a real alternative, with special educational benefits and also financial and intellectual support for committed pupils.

The introduction of the South-Great Plain region as place for learning and settling down

Both Szeged and Hódmezővásárhely have several attractive features that are needed for the long-term establishment of a research career. The level of education at the University of Szeged and the available research centres offer the possibility for building a career, while the infrastructure and the cultural background in the two towns give the chance of settling down. The planned effective direct public transport connection between the two towns opens up the possibility of an even closer cooperation.

We aim to familiarize the participants in the program with the complex life and career options offered by the South-Great Plain region.

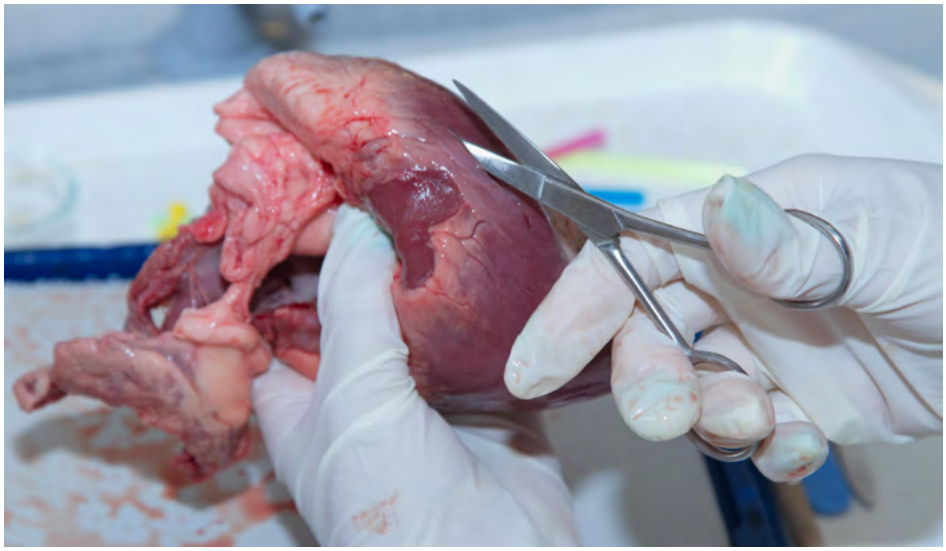
Laboratory work in Németh László Grammar School in Hódmezővásárhely, 2015

The introduction of the University of Szeged, as an attractive choice for higher education

The University of Szeged, with its nearly 100-year-old local and several-century-long distant traditions, has been one of the most dynamic higher education institutions in Central Europe. In the field of biomedical research, the outstanding results achieved in Szeged have been appreciated by numerous analyses abroad. The Nobel Laureate Conference organized in 2012, and the series of conferences following it prove the recognition of this field of science.
We aim to demonstrate the high level of education and research to the participants in the program.

Effective help in biology education at secondary schools

The traditions of secondary school biology education in Hungary can be traced back to the extremely thorough work of excellent predecessors. At the same time, due to the rapid development of the sub-disciplines of biology, Hungarian biology education seems to be lagging behind the international top level. This is, first of all, the consequence of the fact that the further education system has not passed on the novelties of this dynamic science to formerly graduated teachers. The backlog is particularly noticeable in the cases of the methods for the quantitative analysis of biological phenomena and certain topics, such as molecular biology or the immune system.
We aim to offer content-based professional assistance with our program to secondary school teachers and their pupils.



Laboratory work – heart dissection

Laboratory work, 2015

Community building and social sensitivity

It is an essential element in the work of the SSEP that talented pupils be spotted in locations where they have hardly had any chance to join in such a program so far. Social equality requires that in the field of talent management in biology we somehow compensate the well-known effects of inequality between Hungarian secondary schools. It is a principal educational aim for us to show that success in research is a socially fair notion: the results one can achieve in scientific research are irrespective of both gender and origin. Pupils talented in a certain field of science usually know each other quite well, and form a collaborative community. This confirms to them that what they are engaged in is valuable, and thus, it will be possible to build community on shared values.

We aim to enforce a fair worldview and build a community based on such values.

Sándor Bán Deputy director of secondary school education and Dr. Tim Hunt (Medicine Nobel Prize, 2001) in Radnóti Miklós Experimental Grammar School

Bringing teachers working in the field of talent management together

It might be obvious from the above that secondary school teachers taking part in talent management have a key role in the effectiveness of a program like this. Therefore, it is secondary school teachers that are considered to be the most important strategic partners in the SSEP. They are the ones who spark young pupils' interest and the ones whose work is not only respected but also wished to be helped by us through this program. It is important to emphasize one of the significant aspects of the program according to which each pupil can improve most remarkably in his or her own school and with the help of his or her own teacher. Consequently, we wish to facilitate this process rather than take over teachers' role.

We aim to build a community of secondary school teachers in order to facilitate their dedicated work.

THE ORGANIZATION OF THE SECONDARY SCHOOL EDUCATION PROGRAM

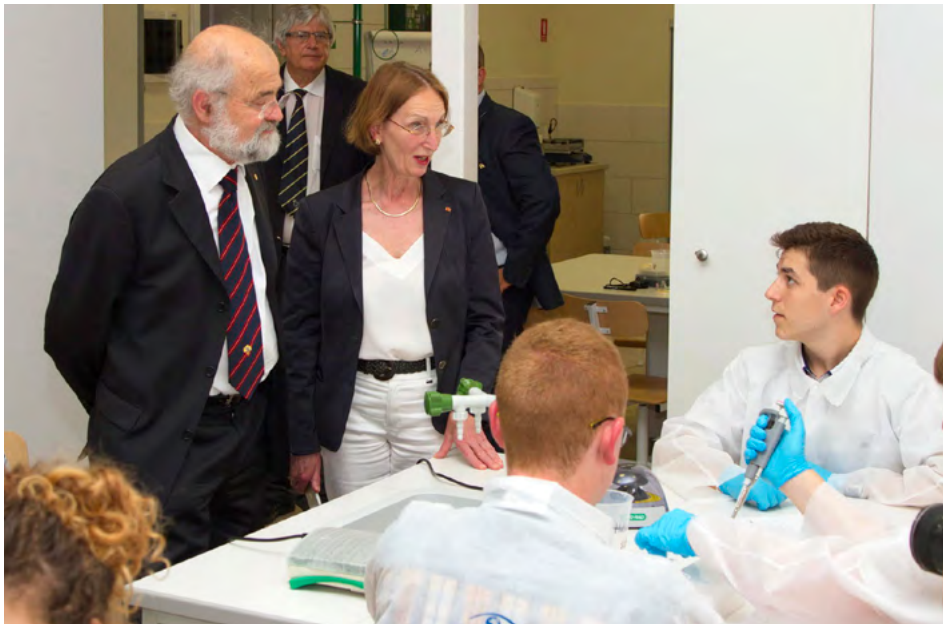
The leaders of the program find it most appropriate to set up a system which makes it perfectly possible to achieve the objectives outlined above. One of the most important aspects of the system is covering the whole area of the country, and thus providing opportunities for as many pupils as possible but, at the same time, avoiding unnecessary bureaucracy impeding the processes. In accordance with these principles, we have established a two-stage organization, whose central figures are Senior teachers coordinating educational tasks in a given region.

National Education Centre

The National Education Centre is based in Szeged. Its most important tasks are coordinating nationwide work, providing administrative support and developing education materials (workbooks for academic teaching materials and laboratory exercises). The head of the centre is the Deputy director of secondary school education supported by an assistant in arranging day-to-day issues. The National Education Centre keeps records of all schools, pupils and teachers, participates in organizing national events (conferences, summer camps) and maintains relations with Szent-Györgyi Senior teachers and Szent-Györgyi Teachers.

Schools housing central laboratories

The Specialized Laboratory for Scientific Education (TERMOSZ Laboratory), located in Radnóti Miklós Experimental Grammar School in Szeged, and József Gyulai Scientific Workshop (József Gyulai Laboratory) in Németh László Grammar School in Hódmezővásárhely are of major importance in the project. As national centres, these secondary school laboratories, besides their core activities, undertake implementing complex biological laboratory exercises for pupils and their teachers arriving from any region of the country. SzSA will, therefore, provide help in renovating or expanding the laboratories and also in providing them with equipment and chemical substances needed for achieving the aims of the SSEP. During the school year the two labs continuously welcome pupils visiting them, and during the spring conference of SzSA, the laboratories are available for those interested. Besides investments, in the framework of professional development, the training of the staff of the two labs are also included in the project.



Dr. Eva-Maria Neher and Dr. Erwin Neher (Medicine Nobel Prize, 1991, shared with Dr. Bert Sakmann) in TERMOSZ laboratory (Radnóti Miklós Experimental Grammar School), 2015

Szent-Györgyi Senior teachers and Regional Base Schools

The most important aspects of selecting Senior teachers were ensuring territorial coverage and the fact that the chosen Teachers have considerable experience and recognition in the field of talent management. In accordance with these, we divided the country into 12 regions for a start, each of which belong to a Base School. In each Base School there is a Teacher who – on top of his or her daily work - deals with popularizing the SSEP and organizing local programs. In each region about 50 pupils have registered, who keep in touch with their Senior teachers, at present, via emails but, as planned, later on, on some online educational website.

Senior teachers in charge of regional coordination regularly participate in further trainings, where they can discuss current organizational issues, occasional difficulties and they can share good exercises with the help of which they can carry on with development activities in their own regions. In further trainings they can also learn the methodology of modern molecular biology exercises, which then they can have pupils perform.

Szent-Györgyi Teachers and Partner Schools

As we have already highlighted it in the Introduction, the priority of the Foundation is to support talent management in its natural location, namely at secondary schools. For this purpose, we are striving to establish good partnership with the teachers of talented pupils, which involves recognition for their results and respect for the loads of extra work put in talent management by them. As part of this good partnership, naturally, we also welcome teachers besides the pupils to all of our programs because common learning experiences might create mutual motivating situations. Being selected for the title of a Szent-Györgyi Teacher can serve as a major driving force for secondary school teachers in itself, just like the opportunity to take part in Nobel Laureates conferences or receiving the accessible teaching materials and methodological guidance, with the help of which the SSEP wishes to contribute to the methodological development of biology education in Hungary in its modest way.

THE ACTIVITIES OF THE SECONDARY SCHOOL EDUCATION PROGRAM

The activities of the SSEP were designed to be essential for achieving the pursued objectives. Among the activities, we can find academic education based on the individual work of pupils or on team work, but we put great emphasis on improving practical skills, too. Some parts of the activities can be performed at home, while others take place in the regional or the national centres. The common goal of each activity is to impart, using the most modern pedagogical methods, valuable knowledge hardly or not at all acquirable within the framework of normal public education. This imparted knowledge will all contribute to successful participation in research later on.

Online teaching materials

Modern education is inconceivable without online elements. E-learning enables pupils to get on with the given topic at their own rate. In support of this, we use an online platform, which ensures the equivalence of requirements and, at the same time, personal learning styles as well. Each elaborated topic starts with a short theoretical overview in Hungarian, using scientific terminology and containing complementary diagrams to promote understanding. Besides, to every topic, we offer free-access, English-language animations and videos for covering the topic, plus there are two or three publications in the given sub-discipline available for the pupils. Checking for

understanding includes multiple choice questions (MCQ), calculation tasks and essay tasks. Responses to MCQ are automatically graded by the system, while calculations and essays are assessed by Senior teachers according to authorized answer keys. The number of elaborated topics is planned to be growing steadily. The topics that are currently being elaborated (and will be available from the beginning of our second school year) are as follows:

- Basic neurological phenomena (particularly processes at the cellular level)
- Membrane transport processes and channel types
- The structure and function of the immune system; immunological methods in biological research
- Spectroscopic methods in biomedical research
- Cell biology (cell membranes, vesicular transport, cytoskeleton)
- Cardiology (particularly the examination of heart function)
- Biomathematics and bioinformatics
- Transmission processes

Laboratory exercises

Biomedical research means largely experimental work, which those pupils will be able to join in effectively who are familiar with at least the basic techniques of modern laboratories. Therefore, practical training is a priority within the objectives of the SSEP. There are two types of practical activities in the program: practice courses that develop skills in basic laboratory techniques and project-based, several-day-long practice courses.

Courses developing skills in basic laboratory techniques are organized and conducted in regional Base Schools by Senior teachers. Senior teachers learn about the scientific background and teaching methods of these laboratory exercises in further trainings. Purchasing the necessary equipment, which most Hungarian secondary schools are lacking, can be considered as remarkable development in Hungarian biology education as a whole. As a result of the investment a group of up to 30 pupils will be able to perform basic molecular biology exercises in 14 locations instead of the single well-equipped secondary school biology lab existing at present. The basic practical knowledge of modern research technology includes using automatic pipettes, gel electrophoresis equipment and spectrophotometers, and also the correct interpretation of information acquired by using these devices. Passing on this practical knowledge is virtually entirely missing from Hungarian secondary school education due to lack of knowledge and funding. Therefore, supplying regional Base Schools with standard molecular biology equipment is regarded as a significant

development in Hungarian public education. SzSA provides not only the equipment and substances needed for the planned exercises, but also the necessary methodological background in the form of workbooks and teacher's manuals. The teaching aids available from the second school year will contain theoretical introductions, tests for checking learning, and also every step of the laboratory exercises, from preparation to performing the experiments. The topics of the laboratory exercises introduced in Base Schools are, for the time being, the following:

- Basics of restriction analysis; analysis of λ phage DNA
- DNA testing with PCR reaction
- Expressing GFP (green fluorescent protein) in model organisms
- Human Genetic Analysis by examination of PV92 DNA segments
- Spectrophotometric protein determination by the Bradford method

Having learnt simple techniques, pupils will be able to perform complex, multi-stage examinations modelling research processes. Pupils staying for several days can perform these examinations in the central national laboratories in Szeged or Hódmezővásárhely. When planning these exercises, we put emphasis on modelling real research processes rather than teaching the techniques since those have already been taught to pupils in regional base schools. We wish to make it possible that pupils be able to perform each stage of a given research process locally, thus become familiar with the complex process of biological research. Complex laboratory exercises are focused on the following topics:

- The vast potentials of chromatography in biological research
- Protein determination in biological research
- The complex examination of bacterial protein production
- The potentials of using PCR methods in biological research
- Organs of vertebrates - dissection and histology exercises
- Enzyme kinetic examinations

Team development programs performed in regional base schools

As it has been shown above, Szent-Györgyi Senior teachers have a key role in the operation of the SSEP. This form of activity makes it possible to gather pupils from a certain region and invite a Szent-Györgyi Mentor and/or a Szent-Györgyi Student to speak about their own research. The account given by them can then be discussed in the form of team work. Senior teachers are also entitled to conduct other activities where pupils are shown how to solve calculation exercises or write essays. These

occasions are also perfect for pupils to get to know each other and make friends with others from the same region.

'Meeting of Nobel Laureates and Talented Students' Conferences

Every autumn and every spring, the Foundation organizes a conference, where we invite mainly secondary school pupils as guests.

It is senior secondary school pupils (11th and 12th graders) that we are expecting to meet at the autumn conference because they are the ones who are to decide on a career soon. Therefore, as part of the official conference program, they will get the chance to visit the Mentors' laboratories and get acquainted with the research carried out there. Thus pupils can get an answer to their questions directly from the Mentors or the university students taking part in the research.

We count on the participation of 10th and 11th graders in the spring conference. On this occasion, Szent-Györgyi Students give accounts of current results of their research, which makes it possible for secondary school pupils to get first-hand information about the university section of the program. These spring occasions also offer the chance to get to know the cultural life of the towns, and, of course, the two central laboratories are eager to welcome the guests.

SUMMARY

Throughout the establishment of SzSA SSEP, we endeavoured to provide secondary school pupils and their teachers with a diverse program consisting of several modules. Our intention is that the offered forms of education with state-of-the-art equipment and modern teaching methods should enable pupils to improve their skills and knowledge acquired at secondary schools. Also, we hope to manage to convince receptive pupils that it is worth joining in biomedical research and that the two towns of the South-Great Plain region and the University of Szeged provide ideal venues for this.

8th Meeting of Nobel Laureates and Talented Students, 2016

Szeged Scientists Academy – Professional Concept of University Education and Training

SZEGED SCIENTISTS ACADEMY - MISSION

The primary goal of the Szeged Scientists Academy is to provide world class scientific training for students at University of Szeged and the Hungarian Academy of Sciences Biological Research Centre. The Academy actively propels scientifically

ambitious students towards hands-on research in the best research laboratories. The Academy is an elitist establishment having cutting edge research as reference and setting scientific excellence as the ultimate goal to be pursued for its Students and Mentors. At the same time, SzSA is not intended to support the cultivation of science on an average level or to promote studies that are part of university education. SzSA training effectively supplements university studies and the Academy wants to see the University's recognition of the time spent in the Mentors' laboratory as credit points.

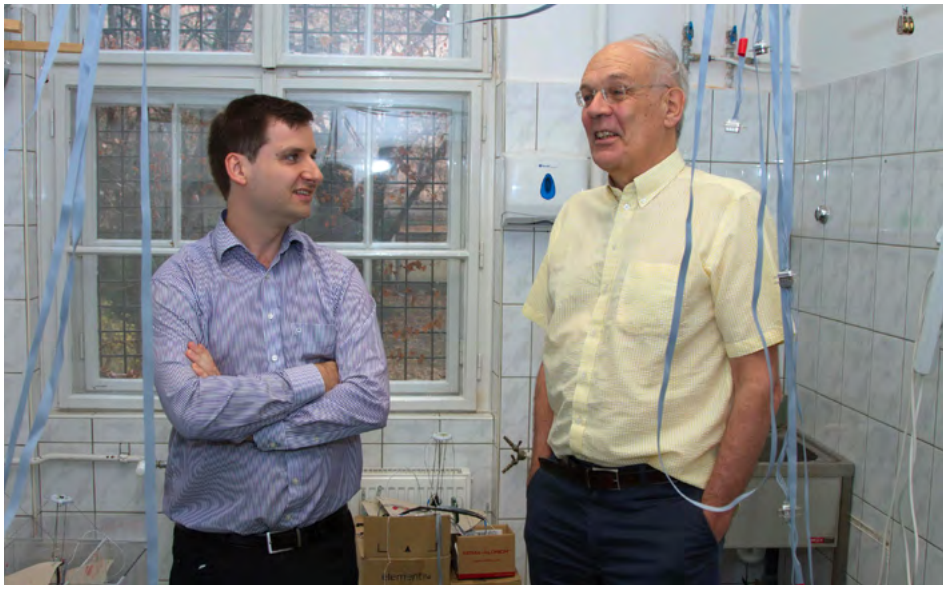
Presentation of Dr. Zoltán Rakonczay, Deputy director of university education, 2014

Conceptually, education through the Academy serves long term guidance for students starting as university novices and finishing as fully independent research group leaders capable of attracting resources at the highest national and European level (e.g. Momentum grantees of the Hungarian Academy of Sciences or ERC String grantees of the EU). To this aim the Academy provides a competitive scholarship exceeding any publicly founded alternatives during career stages from undergraduate years through doctoral studies until junior/senior postdoctoral training.

SZEGED SCIENTISTS ACADEMY – DIRECTION OF TRAINING

The university education requirements of the Scientists Academy are under the supervision of the Foundation for the Future of Biomedical Sciences in Szeged, i.e. its Director of education and Deputy director of university education. The Deputy director proposes the training methods, participates in the meetings of Nobel Laureates and Talented Students, has regular meetings with the Szent-Györgyi Students and Mentors, and takes part in the selection process of International mentors. The Deputy director is in charge of communication with Students and Mentors.The Deputy director of university education brings together the scientific activity of Students

and Mentors, actively investigates potential interaction between Students working in methodologically and thematically different laboratories. The Deputy director meets the Students and Mentors once in a semester while the second semester meeting also serves as a preparation for the annual report. Based on the annual reports submitted by the students the Deputy director forwards a recommendation to the Academy concerning the continuation, temporary interruption or termination of the students' scholarship or mentors' remuneration.



Dr. Bert Sakmann in the laboratory of Dr. Antal Berényi, 2016

SZEGED SCIENTISTS ACADEMY - ADMISSION

Each year 10-15 undergraduate Students are admitted to the SzSA. There are two ways of admission:

1) First year undergraduate students of the University must compete successfully in a series of tests measuring creativity, scientific problem solving abilities, English language skills and psychological fitness. The tests are organized by the Deputy director of secondary school education and the Deputy director of university education with the involvement of a professional psychologist.

2) The Academy also encourages applications from second to sixth year undergraduate students. Higher grade students must have a record of excellence in scientific research matching the best of their classes. This requires documented success in scientific

publication(s) with first or contributing authorship of the candidates and/or an awarded presentation at the Local and National Students' Research Conference.

SCIENTIFIC STUDIES

The research career of admitted students is helped by the Deputy director of university education. Within 3 months after admittance, the Deputy director negotiates with the Student regarding the topic of research and the selection of a Mentor and checks if the entering undergraduate students' research topic and Mentor suit the requirements of SzSA (see below).

Scientific workshop, 2016

Szent-Györgyi Mentors and the Junior mentors support the Students to acquire the needed laboratory skills. The International mentors (annually 30-60 recognized researchers with publications in prestigious journals) also take a serious part in the training process of a Student. The International mentors regularly visit Szeged, they lecture and lead discussions.

SZEGED SCIENTISTS ACADEMY - REQUIREMENTS FOR STUDENTS

Students of SzSA are engaged with their university studies in the mornings, while in the afternoons and evenings they perform laboratory activities or have discussions with the International mentors. Students receiving scholarship from the SzSA are required to achieve contributing authorship in an original article of a scientific paper (top 25%) by the end of the third year supported. The scientific contribution should be presented by the student at National Student's Research Conference or, alternatively, at a research conference. Students are required to submit a first authored paper to a respectable journal (top 25%) by the end of the 5th (MSc) or 6th (MD) year to facilitate

progress towards a PhD degree. (Most doctoral schools in Hungary require a first authored and a co-authored paper for a PhD.) Accordingly, these requirements aim for an MSc-PhD or MD-PhD equivalent curriculum.

7th Meeting of Nobel Laureates and Talented Students, 2015

CAREER MODEL AT THE SZEGED SCIENTIST ACADEMY*

**For the time being the Foundation can finance the training program up to the end of the graduation of Szent-Györgyi Students. New sources should be involved for the realisation of the PhD level.*

Szent-Györgyi Student

Students admitted to the Academy receive a scholarship (HUF 50,000/month). After the fulfillment of the above requirements Students receive a certificate, and the three best performing ones are rewarded with so called gold, silver and bronze certificates (HUF 1,000,000, 500,000 and 250,000). Students who earned the Academy certificate are encouraged to apply for the next stage which is the Doctoral School, i.e. status of a PhD student. The admitted PhD Student receives HUF 250,000 as one-time entry payment. In case s/she drops out prior to finishing the four-year course the sum should be reimbursed.

Szent-Györgyi PhD Student

In the first round Szent-Györgyi Students are admitted into the program for Szent-Györgyi PhD students. The scholarship amount at this level is HUF 150,000/month (on top of the scholarship provided by the University). The long-term goal of the Szeged Scientists Academy is to provide automatic admission to the university's doctoral school. Any remaining places in the program will be advertised. A new applicant may join the grant system with at least 2 publications (top 25%, one of which has to be first author).

Students who enter the School at this level are no longer under publication pressure since their PhD requirements are already satisfied. For this reason they can join a major, relatively long-term project that may even span a number of years. During this phase, Students can concentrate on high-quality research at an international standard which will also expressly benefit the laboratory.

The researcher must attend at least one international conference a year, and both Mentor and Student must submit a report at year's end. At the end of each year, the Board of Trustees will vote on whether a particular student will continue to receive the scholarship in the following year.

Within the PhD studentship period of four years the researcher must publish at least three articles with an IF of over 5, of which she/he is the first author in at least one. If the PhD student fails to satisfy the criteria, she/he may request an extension with a detailed justification, on which the Board of Trustees will make a determination. The deadline for completion may be extended by a period of no more than two years, but no scholarship will be disbursed during that period. PhD students who meet the criteria will get a certificate at the end of their PhD training. The three most successful candidates receive gold, silver, and bronze certificates (and the sums of HUF 2,000,000, HUF 1,000,000, and HUF 500,000). If the PhD student enters the next level of training, she/he will receive a one-time sum of HUF 500,000 upon entry. If the student drops out of the system within six years, she/he must repay this amount to the Foundation.

Szent-Györgyi Postdoctoral Fellow

The program for Szent-Györgyi Postdoctoral fellows is a six-year scheme, during which a researcher spends 3-4 years at a domestic research laboratory and 2-3 years at a foreign one. The scholarship amount at this level is HUF 250,000/month (on top of her/his salary). The Mentor and Postdoc can decide together which parts of the cycle

she/he will spend abroad. A foreign facility may be selected if it has been accepted as a foreign research laboratory by the Board of Trustees. The only laboratories that may be considered are those which publish in prestigeous multidisciplinary science journals. In Hungary, a Postdoctoral fellow must win her/his own research grant during the cycle. The main aim for the Postdoctoral fellow is to become independent within the six years and to gain experience abroad which can be used domestically later – ideally at the same level (as a Szent-Györgyi Senior researcher) or at the cutting edge of a particular specialized field (as a Szent-Györgyi Master researcher).

Getting in and dropping out:
Szent-Györgyi PhD Students are admitted into the program in the first round. It is possible to enter the program during one's studies if place is available and the candidate meets the above criteria. The Postdoc fellow must attend as a lecturer at least one international conference a year, and both Mentor and Fellow must submit a report at year's end. It is during this period that the International mentor joins the training, and thus the report must then be written by all three. The International mentor will also receive recognition from the Foundation (and/or from the University of Szeged, the City, and/or the Hungarian Science Academy) based on a method to be developed at a later date. At the end of each year the Board of Trustees will decide whether a particular Postdoc will continue to receive the grant the following year. A Postdoc who drops out of the program may be replaced by another Student, provided she/he can meet the standards.

Within six years the candidate must publish at least three articles with an IF of over 8, of which she/he is the first author in at least one. If the candidate fails to satisfy the criteria she/he may request an extension with a detailed justification on which the Board of Trustees will make a determination. The deadline for completion may be extended by a period of no more than three years but no scholarship will be disbursed during that period. Postdocs who meet the criteria will get a

Laboratory of Dr. Zoltán Rakonczay and Dr. Péter Hegyi Szent-Györgyi Mentors, 2014

certificate at the end of their PhD training. The three most successful candidates receive gold, silver, and bronze certificates (and the sums of HUF 3,000,000, HUF 1,500,000, and HUF 750,000).

Szent-Györgyi Senior Researcher and Master Researcher

Szent-Györgyi Senior researchers and Szent-Györgyi Master researchers have at least 15 years of experience in high quality research and have received professional training at outstanding domestic and international laboratories. A researcher who has earned a Szent-Györgyi postdoctoral certificate receives a one-time sum of HUF 2,000,000 upon entry into this level. The scholarship amount at this level is HUF 2,000,000/month for Szent-Györgyi Master researchers and HUF 1,000,000/month for Szent-Györgyi Senior Researchers.

Goal:
For those with serious research potential to strengthen either Hungarian industrial research or science especially in Szeged and to participate in teaching the next generation.

Getting in and dropping out:
The Szent-Györgyi Master researcher and Szent-Györgyi Senior researcher scholarships begin if the candidate satisfies the set requirements. The title of Szent-Györgyi Master researcher is conferred on those who have published articles in high-prestige multidisciplinary science journals (e.g. Science and Nature) as a corresponding author based on research conducted at a centre in Szeged. The title of Szent-Györgyi Senior researcher is conferred on those who have published in leading specialized journals (e.g. Gastroenterology and Circulation) as a corresponding author based on research conducted at a centre in Szeged. The scholarship may be disbursed for up to three years as of the publication of the particular article, if the researcher demonstrates that she or he is conducting research which may potentially be accepted for publication in a journal of similar rank. If the researcher wins a large sum through an international grant (e.g. from the European Research Council or Wellcome Trust) within the three years, the Szent-Györgyi Senior researcher or Szent-Györgyi Master researcher grant may be extended for another two years. Szent-Györgyi Senior researchers and Szent-Györgyi Master researchers are expected to act as Mentors in the Szent-Györgyi–Klebelsberg School while their laboratories function as part of the program. If the researcher fails to present a publication of similar rank in three years or to win a major grant, the scholarship will no longer be disbursed until the candidate satisfies the above requirements.

SzSA aims to support primarily PhD Students and Postdoctoral fellows from the ranks of previously supported undergraduate students to prove the success of its educational model, however, the Szeged Scientists Academy also considers researchers of exceptional talent and results as new recipients of scholarships during their PhD or postdoctoral studies. The SzSA aims for a fair but thorough selection of candidates, leading to a decreasing number of scholars as their age progresses (less than 15 PhD Students and maximum 7 Postdoctoral fellows).

Gala at the National Theatre of Szeged, 2016

SOCIAL LIFE

The SzSA will give place for its Students in the new dormitory which will host visiting lecturers/researchers as well thus provide opportunities for the free interaction with them. It is anticipated that the Students will form a tight community not only by attending regular scientific programs, but also by taking part in social events (e.g. theatre, music, or other cultural and communicational projects).

SZEGED SCIENTISTS ACADEMY - REQUIREMENTS FOR MENTORS

There are three types of mentors involved in the work of the Szeged Scientists Academy: Szent-Györgyi Mentor, Junior mentor, and International mentor. Mentors and Junior mentors receive a regular assignment fee. The Mentors are leaders of internationally recognized laboratories at the University of Szeged or at the Hungarian Academy of Sciences Biological Research Centre. The Mentor is encouraged to nominate a talented young researcher who will become a Szent-Györgyi Junior mentor and who will have an active role in the day-to-day training of the Student.

The International Mentor is a researcher who works in a foreign laboratory, who has a serious international scientific reputation, who leads a research group working on original research and whose results are published in prestigious multidisciplinary scientific journals. The International mentor is invited personally by one or more Szent-Györgyi Mentors upon the approval of the Board of Trustees.

Szent-Györgyi Mentors:

- provide the opportunity and secure the conditions to the Student to join and take part in the activities of the research team they lead
- take the responsibility to personally guide the talented Student's training and education
- take part in presentations and by inviting international collaborating partners (International mentors) actively participate in the series of lectures organized for the Students
- take part and lecture at the Spring and Fall Meetings of Nobel Laureates and Talented Students
- mentor no more than two Students
- have an active research project which contains financial resources for the research work of the Mentor's laboratory (financial resources covering only the staff costs cannot be accepted)
- have at least one original publication in each 5-year period which is at least of impact factor 5 and/or published in an top 10% journal (the latter applies in case the given scientific field has no impact factor 5 journals.)

Junior mentors:

- have at least a PhD degree;
- personally take part in the process of training and education of the talented Student;
- take part at the Spring and Fall Meetings of Nobel Laureates and Talented Students

International mentors:

- have an active collaboration with a Mentor's scientific laboratory located either at University of Szeged or at the Hungarian Academy of Sciences Biological Research Centre
- take active role in the training process of the SzSA free of charge (the Academy covers the travel and accommodation costs)
- during their stay in Szeged they give presentation/s followed by discussion/s with the Students
- agree to invite Students to their laboratory or research group in order to facilitate their international connections

GETTING IN AND DROPPING OUT OF SZEGED SCIENTISTS ACADEMY

The decision about getting in or dropping out of the training program of the Szeged Scientists Academy - let it be a Student or Mentor – is made by the Education Committee of the Foundation for the Future of Biomedical Sciences in Szeged. A Junior mentor is nominated by a Mentor and has to be approved by the Deputy director of university education.

Getting in the training program:

- Students should meet the requirements of and admission procedure
- Students can work exclusively with Szent-Györgyi Mentors who are registered by the Szeged Scientits Academy
- Szent-Györgyi Mentors are nominated by the Deputy director of university education
- Junior and International mentors are nominated by Szent-Györgyi Mentors

Dropping out of Students and Mentors of the program:

- if the requirements given by the Szeged Scientists Academy are not met in due time
- in case of professional or ethical misconduct
- if resignation is submitted
- during a Student's passive semester

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