



Fourth National Congress of Virology with International Participation Days of Virology in Bulgaria

The Fourth National Congress of Virology with international participation, also known as Days of Virology in Bulgaria, was held from 18 to 20 May 2016 in the Great Hall of the Bulgarian Academy of Sciences. The event was organized by the Bulgarian Society for Microbiology at the Union of Scientists in Bulgaria. This major scientific forum was chaired by Academician Angel Galabov, world-renowned virologist. A total of 50 research papers were presented, devoted to the latest advances in the field of medical, veterinary and plant virology. Eminent scholars such as Prof. Francis Delpeyroux from France, Prof. István Tóbiás from Hungary, Prof. Anna Papa from Greece, Prof. Rajarshi Gaur from India attended the congress. Bulgarian virologists were represented by the teams of Academician Angel Galabov and Prof. Tatiana Cherveniakova, Prof. Radka Argirova, Assoc. Prof. Anthony Stoev, Assoc. Prof. Bistra Dikova, Prof. Raiko Peshev, and many others. The scientific forum ended with a round table discussion on “Training in virology at universities”.

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In his opening speech, Academician Galabov emphasized that *“We are happy to be able to get together and discuss our pursuits and achievements in the field of virology in the period after the Third Congress in 2012. We are now going to hear about recent scientific advancement in Europe, Asia, the Balkan region, and Bulgaria, of course, as well discuss current issues relating to the teaching of virology.”* Academician Galabov presented the journal *Acta Microbiologica Bulgarica*, issued by the Bulgarian Microbiology Society. The journal covers the latest advances in all branches of microbiology, and its current issue is dedicated to the Fourth Congress of Virology.

At the opening of this important scientific event, Hristo Naidenski, a corresponding member and director of the Stephan Angeloff Institute of Microbiology at the Bulgarian Academy of Sciences, also addressed the congress participants by focusing their attention to the main themes of the plenary papers, scientific communications and posters, which featured the latest problems of general, med-

ical, veterinary and plant virology. Mr. Naydenski wished the participants of the Congress productive and beneficial work, both for science and society.

Successful days for virology in Bulgaria were wished by Prof. Paskal Zhelyazkov, director of the National Diagnostic and Research Veterinary Institute “Prof. Dr. Georgi Pavlov” in Sofia. Prof. Zhelyazkov said that despite the financial constraints on Bulgarian science, the specialists at the institute headed by him strive to maintain the highest levels of competence in their work and be among the first in the combat against infectious diseases, trying to work to the benefit of society.

The prelude to the forum presentations ended with an exciting speech given by Academician Angel Galabov, dedicated to the work of 97-year-old Professor Petar Andonov, whose merits for the development of medical virology and training in virology in the Faculty of Biology of Sofia University are significant and worthy of deep respect.

In the remote 1958, Prof. Andonov organized a separate Department of Virology at the present-day National Centre of Infectious and Parasitic Diseases. On his initiative, hygienic epidemic stations (HES) were founded in the major cities, with specialized units for virological investigations. It was him who set up and chaired the Specialized Scientific Council of Virology at the Higher Attestation Commission. In 1962, Prof. Andonov introduced a course in virology in the Department of Biology, Sofia University, making this research unit a hotbed

for young virologists. Over the years he held many responsible positions: Deputy Minister of Public Health, Deputy Chairman of the Medical Academy, Rector of the Medical University, editor-in-chief of the journal "Health Front". For his scientific contributions Prof. Andonov gained international acclaim, sat on many committees of the World Health Organization, including the International Commission on Taxonomy of Viruses. He authored the first Textbook on General Virology, as well as more than 200 scientific articles and reviews. He co-authored over 15 scientific inventions. Today, despite his venerable age, Prof. Petar Andonov continues to be vividly interested in innovations in his area of speciality, including the present scientific meeting of eminent virologists from Europe and Asia.

The first plenary lecture at the congress was delivered by Assoc. Prof. Nikolai Petrov, virologist from the Institute of Soil Science, Agrotechnologies and Plant Protection "Nikola Poushkarov" at the Agricultural Academy and the Institute of Microbiology "Stephan Angeloff" at the Bulgarian Academy of Sciences. Assoc. Prof. Petrov presented the role of the so-called small interfering RNA in the fight against human enteroviral infections. He shed light on the defence mechanism of gene silencing - a process in which gene expression is blocked. Each organism is composed of genes (heredity carriers) which are programmed so that certain features become expressed at a certain time of development of the organism. This process occurs gradually, with some genes being blocked, while others are not. When it is time for a gene to be expressed, gene silencing does not kick in. Scientists seek to use this normally functioning mechanism in organisms for a variety of purposes. One of them is to block genes of pathogenic viruses (causing diseases). Thus, the virus cannot develop and is prevented from invading the body. When tumours develop, the virus could again be blocked by means of gene silencing, thus suppressing its expression. In drug tests, it is possible to block certain genes, one at a time, and thus determine at what stage of development, on which gene, a specific drug will act. This is the path of finding new applications for different drugs. Currently, researchers are close to solving the problem of blocking the human immunodeficiency virus (HIV) by the mechanism of gene silencing.

One of the papers relating to this mechanism was delivered by Prof. Rajarshi Gaur from India, who presented the results of his team's studies on begomoviruses responsible for the reduced yields

of a number of vegetables in the world, leading to significant economic losses. The data quoted by Prof. Gaur show that begomoviruses are expanding their host range. Therefore, researchers seek to find an efficient way of resistance to the viral invasion. This is the aim of the gene silencing strategy developed in India, which may be used for control of begomoviral symptoms in plants. *"This problem is very important not only for India but also for Europe. We are working on a joint project with Dr. Nikolai Petrov and are preparing a book authored by specialists from around the world. In Bulgaria the book will come out in July this year - underlined Prof. Gaur. - It is a book about the origins and history of plant viruses, about which crops become infected and how farmers can fight plant diseases, ensuring their protection by means of various technologies"*.

Special interest provoked the paper of Prof. István Tóbiás from Hungary, which reviewed the periodic appearance of the virus causing tomato spotted wilt (TSWV). The fight against that virus initially involved insecticides and insect traps against thrips carrying the infection. Later on, it also included attacks against weeds that are hosts for the virus. Then, a resistance gene to this particular virus was introduced in some varieties of pepper. However, sporadically in 2010, then more frequently in 2012, the resistance seemed to be overcome by a strain of the same virus. *"In Hungary, tomato and pepper production is extremely important for the country, said Prof. Tóbiás. That is why we are looking for ways to deal with the virus. The aim of our research work is to find new sources of genetic resistance in tomatoes and peppers"*.

The question of plant resistance against aggressive phytopathogenic viruses was examined from various angles in a series of scientific communications by renowned specialists. Assoc. Prof. Bistra Dikova of the Institute of Soil Science, Agrotechnologies and Plant Protection presented the spread of cucumber mosaic virus and the diseases it causes in aromatic medicinal plants with have promising perspectives for essential oil extraction. Her main recommendation was that special attention should be paid to the damage to plants caused by the cucumber mosaic virus. Assoc. Prof. Antoni Stoev from the same institute discussed some peculiarities of viral plant diseases that are of importance to agro-ecosystems. In his view, the extent of damage in plants depends both on the aggressiveness of the viruses and on the possible stress on the environment. *"We cannot destroy viruses but*

we must learn to coexist with them”, emphasized Assoc. Prof. Stoev, quoting the founder of plant virology in Bulgaria, Prof. Dr. Dimitar Atanasov.

Another large group of papers dealt with viral aggression in animals, leading to diseases that have a significant economic importance, as well as diseases dangerous to humans: infectious bovine rhinotracheitis; mucosal disease; chlamydia; rickettsia, etc. Prof. Raiko Peshev from the National Veterinary Institute reviewed the features of malignant catarrhal fever, studied by his team in Sofia and Varna zoos two years ago. He also pointed to the possible measures to curb the disease in zoos and farms, as well as to block the routes leading to infections in humans.

The question of the eternal fight between micro- and macro-organisms - between viruses and Nature’s most biologically complex organism, *Homo sapiens* - was raised at this congress again. The participants showed a special interest for the paper of Prof. Francis Delpyroux of the Pasteur Institute in Paris. Prof. Delpyroux, who is a leading specialist in genetics of enteroviruses, discussed the current possibilities of control and eradication of polioviruses of the enterovirus species group, causing poliomyelitis (polio). While working with his team on the island of Madagascar, in Nigeria and Cameroon, he studied the effect of the combination of coxsackieviruses with Sabin’s polio vaccines. *“We need to make more effective and safer vaccine that will save more lives, said Prof. Delpyroux, because we know how to manipulate the genome.”* He emphasized that *“I am really delighted to work with Academician Galabov, who is a leading European specialist in discovering drugs against enteroviruses. Studying the effects against viruses together is a pleasure for me. We both believe that it is important to find effective drugs to help people”*. One of the future intentions of the eminent French professor is to recruit young people in his team, who are interested in science work on the creation of new antiviral therapies. He is convinced that researchers in the field of virology should direct their efforts in favour of different countries and share their experience - scientific, life, human. *“This is important if we want to make the world a better place”*, said Prof. Delpyroux. In the same vein is his vision on the possibility of introducing new criteria for the preparation of vaccines: *“This is both difficult and easy. It is important to have the support of a large international organization of public health and be careful what you are doing. Each molecule must undergo a test before being used on patients”*. For

virologists this is a guiding ethical rule, as was repeatedly affirmed during the congress.

A communication presented by a team of young researchers headed by Academician Angel Galabov caught the attention of virologists with studies on the therapeutic options for enterovirus-like infections. Enteroviruses are easily changeable and can become resistant to every drug used against them, which is observed in the use of monotherapy courses. Combinations of two agents may also result in virus resistance (so-called double resistance). The new method is a consecutive alternative application of combinations of anti-enteroviral substances with known mechanisms of action. Researchers have witnessed an optimal antiviral effect with a triple combination, which is of tremendous practical importance for the management of diseases such as summer flu, meningitis, eye infections, pericarditis, myocarditis, etc.

A serious factor against the invasion of HIV infection has been the introduction of the so-called protease inhibitors therapy, reported by Prof. Radka Argirova. According to her, these products have changed the entire HIV/AIDS epidemic, and have transformed it from an inevitably fatal disease into a chronic manageable condition. Since 2012, there have been talks about the body’s ability to fight off HIV infection through different routes of eradication. Research in this direction also benefits the battle against hepatitis C infection, is Prof. Argirova’s strong belief.

The communication of Prof. Anna Papa from the Department of Microbiology at the Medical University of Thessaloniki focused on infections caused by arboviruses in the Mediterranean countries in recent years. Among the main factors leading to the spread of these diseases Prof. Papa pointed the change in the environment and globalization. Dealing with the problem, in her opinion, must involve competence and greater awareness of the health care providers, correct reporting of unusual cases and cooperation between experts from different countries around the world.

Very useful for clinical practice was the study on viral gastroenteritis, carried out by a team of Prof. Tatiana Chervenikova from the Specialized Hospital for Infectious and Parasitic Diseases “Prof. Ivan Kirov” in Sofia. The study group included 22 students (17 boys and 5 girls) from the Professional High School of Computing and Technology Systems in Pravets, aged 14 to 18, with severe gastroenteritis. The therapeutic approaches successfully implemented were: oral and parenteral rehydration,

medication for the symptoms of gastroenteritis, and appropriate diet.

An analysis of data obtained from virological studies and from the clinical course of influenza and respiratory syncytial virus infections in patients at the Hospital of Infectious Diseases “Prof. Ivan Kirov”, Sofia, was presented by Ivan Ivanov, together with the work of a team of researchers from the same hospital, from the Medical University in Sofia and from the National Centre of Infectious and Parasitic Diseases. For the period from December 2015 to March 2016, the team determined A (H1N1) pdm09 and type B as the predominant influenza strain, which caused infections requiring hospitalization. For the same period, respiratory syncytial virus was the primary etiological agent among children under 5 years of age, leading to prolonged illness and slow recovery.

Interesting results of recent studies with a potential for new developments were presented by a group of virologists from Varna. The research work of Assoc. Prof. Lilia Ivanova, head of the Department of Microbiology and Virology at the Medical University, Varna, and of Zhivka Stoykova from the Clinical Laboratory at “St. Marina” Hospital showed that cytomegalovirus infection is most widespread among the population in North-Eastern Bulgaria and occurs mainly in the first years of life. Another study reported high incidence of Epstein-Barr virus infections also among the population of North-Eastern Bulgaria, with the greatest risk of developing Hodgkin’s lymphoma in the first three years following the infection.

A new challenge in virology is occult hepatitis B, studied by researchers from Varna among 55 patients at “St. Marina” Hospital. All patients

showed clinical evidence of liver dysfunction and elevated liver enzymes. A comparative analysis with previous studies allowed the authors to confirm the expected result that patients with HBV-infection and liver disease are the most vulnerable.

It is difficult to enumerate all the reports which discussed the most recent developments in the major branches of virology. The congress proceeded in a highly academic atmosphere and ended with a discussion on the question of the public benefit from the knowledge of virology and training in this discipline in the universities in Bulgaria. According to Assoc. Prof. Lilia Ivanova, different universities give priority to different aspects of microbiology, and this situation must change. *“Virology and bacteriology are studied on an equal basis, and all our lectures accentuate the need for preventive and therapeutic strategy against diseases, said Assoc. Prof. Ivanova. Currently, there is a tendency where doctor virologists are replaced with biologists and molecular biologists. This means loss of the much-needed clinical opinion in therapy. A doctor-virologist is the one who can best interpret laboratory data, taking into account the clinical manifestations of the individual patient. It does not suffice to make a diagnosis. It takes at least two methods to verify the results to ensure their validity.”*

From beginning to end, this great scientific forum was filled with practical ideas of benefit for people, as well as with innovative, inventive spirit, and creative, bold outlook into the future. So, it will not be an exaggeration to say that the Fourth National Congress of Virology has, in a way, become a gateway to new scientific conquests.

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