

IN MEMORIAM



GEORGI D. EFREMOV

December 8, 1932 – May 6, 2011

It is with great sadness that I inform you that Professor Georgi D. Efremov, the Co-Editor of the Balkan Journal of Medical Genetics (BJMG), died on May 6, 2011 after a long and courageous battle with cancer. At 78, Professor Efremov had a full life as a scientist, manager (director), journal editor, minister of science in the Government of the Republic of Macedonia (R. Macedonia), ambassador, President of the Macedonian Academy of Science and Arts, president of different professional societies. Yet, his restless energies never slowed and he still had enough ideas, enthusiasm and projects to fill many more fruitful years. We are greatly diminished by his loss.

Professor Efremov was a world renowned expert in the field of hemoglobin (Hb) research and a very prominent scientist in the field of biomedicine and biomolecular sciences in the R. Macedonia and in the surrounding regions. He was instrumental in the characterization of polymorphic protein variants in domestic animals and had published hundreds of papers on

detection and characterization of different Hb variants and thalassemia alleles. Professor Efremov was the founder of molecular genetic research and diagnostics in the R. Macedonia and made a major contribution in the molecular detection and characterization of many inherited monogenic diseases, malignancies and infectious diseases.

Professor Georgi D. Efremov was born in Kratovo, R. Macedonia on December 8, 1932. He graduated from the Faculty of Veterinary Medicine, University of Zagreb, Croatia in 1956 and in 1963 he defended his Doctoral thesis at the University of Belgrade, Serbia. The lifelong academic career of Professor Efremov at the Faculty of Agriculture, University "St. Cyril and Methodius," Skopje, R. Macedonia started in 1959 when he was appointed as a junior assistant of the physiology of domestic animals, rising to Assistant Professor of Biochemistry in 1967, Associate Professor in 1973 and Full Professor in 1980. He retired from the Faculty of Agriculture in 2001 as a Professor of Bio-

chemistry and Physiology. In the period 1978-1979 he held the position of Full Professor of Biochemistry at the Medical College of Georgia and Associate Director of the Comprehensive Sickle Cell Center, Augusta, GA, USA. In the period 1965-1980 he was a Scientific Advisor at the Department of Pediatrics, Faculty of Medicine, University of Skopje. He has been a visiting professor at a number of universities in the USA, Cuba, Libya and Kuwait. He has held lectures on postgraduate studies in molecular biology and hematology at the universities in Skopje, R. Macedonia, Belgrade and Novi Sad, Serbia and Zagreb, Croatia. He was a coordinator of the first interdisciplinary postgraduate studies in molecular biology and genetic engineering at the University of Skopje, Skopje, R. Macedonia. He has been a mentor of more than 40 doctoral and master students at universities in Havana, Cuba, Sofia, Bulgaria, Maastricht, The Netherlands, Zagreb, Croatia, Belgrade, Serbia and Skopje, R. Macedonia.

His rich scientific career included publication of more than 500 peer-reviewed reports in international and national journals and several chapters in books and monographs. Professor Efremov's greatest scientific contribution was in the field of Hb research. He started his scientific career with the investigation of fetal and adult animal Hbs, which was part of his Ph.D. thesis. In 1963 he received a fellowship from the Royal Norwegian Council for Science and spent 2 years at the Department of Internal Medicine, Veterinary College of Norway in Oslo headed by Professor M. Braend. During this time he studied the Hb of sheep heavily invaded by intestinal parasites. This work led to the discovery of the first abnormal Hb in domestic animals, that was published in *Nature* in 1964. Studies of other anemic sheep showed that this Hb variant (Hb N or Hb C) is a normal Hb that is expressed only under conditions of hypoxic stress. Forty years later, this Hb serves as a model for study of the expression of globin genes.

When he returned to Macedonia in 1965, he initiated systematic investigation of hemoglobinopathies in the R. Macedonia, and later in all the Republics of the Former Yugoslavia and Bulgaria. In 1968, he was invited by Professor Titus H.J. Huisman to join his group at the Department of Cell and Molecular Biology, Medical College of Georgia, Augusta, GA, USA; they were studying the structure, function, synthesis and expression of normal and abnormal human Hbs. This was the start of a very productive relationship

that lasted for 30 years and resulted in numerous publications. Hemoglobin was a primary research interest of Professor Efremov until the end of his life. His work conducted on the population of the republics of the Former Yugoslavia and Bulgaria resulted in the characterization of 12 new and 17 previously discovered Hb variants and 23 new types of thalassemia. Professor Efremov was the founder and head of the National (since 1970) and International Reference Laboratory for Hemoglobinopathies (since 1995). He also served as a head of the International Informative Centre for Abnormal Hemoglobins and Thalassemia.

In 1987, Professor Efremov established the Research Centre for Genetic Engineering and Biotechnology (RCGEB) as a scientific unit of the the Macedonian Academy of Sciences and Arts at Skopje, R. Macedonia. Since then his research interest expanded into the molecular basis of different human inherited, malignant and infectious diseases. With his collaborators from RCGEB he published numerous papers on the molecular characterization of cystic fibrosis, muscular dystrophy, spinal muscular atrophy, hemophilia, Fragile X syndrome and other monogenic diseases. He studied the molecular bases of several malignancies, such as colorectal, lung, breast and ovarian cancers. He also studied the molecular epidemiology of some infectious diseases, such as the hepatitis virus B and C, the human papiloma virus and the Chlamydia trachomatis infection. He was the first to introduce the DNA markers in the human DNA identification, paternity testing and criminal investigations in the R. Macedonia. He was a principal investigator of more than 30 projects, funded mainly by foreign governmental institutions.

Under his guidance, the RCGEB became a hub for research in the field of biomolecular sciences in the R. Macedonia, being one of the first institutions in the region that applied these new technologies in molecular diagnostics of human diseases and becoming an international center for training in basic and advanced methods in these sciences. Immediately after his death, the Presidency of the Macedonian Academy of Sciences and Arts renamed the center in his honor as the Research Centre for Genetic Engineering and Biotechnology "Georgi D. Efremov."

His laboratories have been visited by more than 30 scientists from abroad and around 50 experts and researchers from the R. Macedonia, to complete their training in their specializations or for the purposes of

preparing masters or doctoral theses. In the period 1991-1999, he organized five international advanced courses on Nucleic Acid Methods (Recombinant DNA technology) in Human and Veterinary Medicine, with participation of more than 120 young scientists from 23 countries. He also organized several international scientific meetings, including the Balkan Meeting of Human Genetics in 2006.

Professor Efremov was the Co-Editor of the BJMG (1997-2011), Associate Editor of Hemoglobin (1998-2011) and Editor-in-Chief of Prilozi (1999-2002), the scientific journal of the Macedonian Academy of Sciences and Arts. He was also a member of Editorial boards and referee of numerous international and national scientific journals in the field of biomolecular sciences.

Professor Efremov became a corresponding member of the Macedonian Academy of Sciences and Arts in 1978, a full member in 1983 and served as its President from 2000-2001. He was Minister for Science in the first Government of the independent R. Macedonia (1991-1992) and the ambassador to the People's Republic of China (2002-2004). He was the president of the Macedonian Society for Biochemistry and the Macedonian Society for Human Genetics. He was a member of numerous professional societies, such as the New York Academy of Sciences, the Bulgarian National Academy of Medicine, the Serbian National Academy of Medicine, a Member of the European Academy of Sciences, the World Academy of Arts and Sciences, the Mediterranean Academy, the American Association for the Advancement of Science, the Federation of European Biochemical Societies, the International Society of Hematology, the American Society of Hematology, the International Society of Forensic Medicine, the American Association for Clinical Chemistry and the Macedonian Medical Association. His accomplishments were acknowledged with the highest honors by the governments of the Former Yugoslavia and the R. Macedonia.

I had the privilege of working with Professor Efremov for almost 25 years from the very beginning of my career. He was passionate about science and new discoveries, extremely hard working, intuitive, demanding, innovative in his research, devoted to his work, and challenging to his students. It is said that a great teacher never dies but lives on in his students. The hundreds of students, and especially the hundreds of researchers trained under Professor Efremov are

testimony to this truth. Many of his students have gone on to train more students and scientists, generating a living legacy of Professor Efremov's very fruitful life. All of us, as well as countless colleagues, friends and others who have interacted with Professor Efremov are grateful and recognize the continuing effect he exerts on our lives. He leaves us his memory to cherish with the implicit reminder that with integrity, passion, loyalty, determination, and drive we can all accomplish the impossible in life, and like him, pursue our dreams of excellence.

Professor Efremov was an initiator and co-editor of BJMG for almost 15 years, since the beginning of BJMG in 1997. During these years, and especially since 2001 when the journal has been published in Skopje, R. Macedonia, Professor Efremov raised the quality and reputation of the journal, attracted renowned experts for the Editorial board, introduced peer-review and expert editorial assistance, and succeeded in including the journal in many databases. Besides the print version, he ensured that the journal is freely available online for reading and submission.

As Professor Efremov's successor in the role of co-editor of the BJMG and together with Professor Draga I. Toncheva (Sofia, Bulgaria), I will put all my efforts to continue his successful work. Our responsibility will be to ensure that we continue to attract good quality papers across our broad and dynamic field, and provide the very best service to our authors and readers by communicating the most important scientific advances quickly and accurately. Professor Efremov's goal and wish to make BJMG part of PubMed is also our primary goal and we hope that very soon it will become a reality.

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