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IN MEMORIAM

EFREMOV D. GEORGI
(1932–2011)

FOUNDER OF THE MOLECULAR BIOLOGY IN THE REPUBLIC OF MACEDONIA – BIOCHEMIST, GENETICIST

Efremov Dimitar Georgi (Kratovo, 08.12.1932 – Skopje, 06.05.2011), biochemist, geneticist, founder of the molecular biology research in the Republic of Macedonia and the founder of the Research Centre for Genetic Engineering and Biotechnology within the Macedonian Academy of Sciences and Arts.

Professor Georgi D. Efremov was a world renowned expert in the field of hemoglobin research and one of the most prominent scientist in the field of biomedicine and biomolecular sciencies in Macedonia and in the region.

Professor Georgi D. Efremov was born in Kratovo, Republic of Macedonia on December 8, 1932. In 1956 he graduated from the Faculty of Veteri-

nary medicine, University of Zagreb. In 1959 he was appointed as a junior assistant at the Faculty of Agriculture, University of Skopje. In the period 1961–1962 he was attending postgraduate studies in biochemistry, Department of physiology and biochemistry, Faculty of Veterinary medicine, University of Belgrade (1963), where he defended his Ph.D thesis on fetal and animal hemoglobins. As a postdoctoral fellow he spent two years at the Department of Internal Medicine, Veterinary College of Norway, Oslo, (1963–1965), and two years at the Department of Biochemistry, Medical College of Georgia, Augusta, USA, (1968–1970).

He was elected Docent of Biochemistry in 1967, Faculty of Agriculture, University of Skopje; Associate Professor in 1973 and Full Professor in 1980. In 1995 he was elected Full Professor of Physiology, Faculty of Agriculture, University of Skopje.

In the period 1978–1979 he was Full Professor of Biochemistry, Medical College of Georgia, Augusta, USA and Associate Director of the Comprehensive Sickle Cell Center. In the period 1965–1980 he was a Scientific Adviser 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 moleculrar biology and hematology at the Universities in Skopje, Belgrade, Novi Sad and Zagreb. He was a coordinator of the interdisciplinary postgraduate studies in molecular biology and genetic engineering at the University of Skopje. He has been a mentor of more than 40 doctoral and master students at the universities in Havana, Sofia, Maastricht, Zagreb, Belgrade and Skopje.

Prof. Efremov was the founder and driving force of the Research Center for Genetic Engineering and Biotechnology (RCGEB) established as a scientific unit of the Macedonian Academy of Sciences and Arts in 1986. Under his guidance, the RCGEB became a hub for research in the field of biomolecular sciences in the Republic of 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 Center for Genetic Engineering and Biotechnology "Georgi D. Efremov".

Prof. Efremov was also the founder and head of the National (since 1970) and then of the International Reference Laboratory for Hemoglobinopathies (since 1995). He was a head of the International Informative Centre for Abnormal Hemoglobins and Thalassemia. His laboratories have been visited by more than 30 scientists from abroad and around 30 experts and researchers from the Republic of Macedonia, to complete a training within their specializations or for

the purposes of preparing master or doctoral thesis. 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.

The main scientific interest of Academician Efremov were biotechnology of proteins and enzymes and the application of genetic engineering in the study of the molecular bases of the most common monogenic diseases, such as: hemoglobinopathies, cystic fibrosis, hemophilia, muscular dystrophy, spinal muscular atrophy, Huntington's disease etc. In the mid 80-ties he introduced the DNA methods for prenatal diagnosis of several common monogenic diseases. The greatest scientific contribution of Prof. Efremov was in the field of human hemoglobin research, i.e. epidemiology and molecular bases of thalassemias and abnormal hemoglobins among the populations of the Republic of Macedonia, former Yugoslavia, Albania, Bulgaria and other countries in the world. With his associates he has discovered 12 new hemoglobin variants and 23 mutations leading to thalassemia. By systematical screening of more than 40 000 school children he has determined the prevalence and the distribution of hemoglobinopathies in former Yugoslavia.

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 that introduced the DNA markers in the human DNA identification, paternity testing and criminal investigations in the R. Macedonia.

He has been a principal investigator of more than 30 projects, funded mainly by foreign governmental institutions. As an invited speaker, he has held a number of introductory lectures on international, Yugoslav and national scientific meetings. He has organized tens of international scientific meetings. He was an author of more than 500 scientific papers, 250 of which have been published in international journals and he is the most cited scientist from the Republic of Macedonia in the filed of biomedical sciences. He was the President of the Macedonian Society for Biochemistry and the Macedonian Society for Human Genetics. He was a member of: 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. He was the Editor in Chief of the international scientific journal *Balkan Journal of*

Medical Genetics (1997–2011), Associate Editor in Chief of the international journal *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.

He was elected a corresponding member of the Macedonian Academy of Sciences and Arts in 1978, and a full member in 1983. He was Minister of Science of the Republic of Macedonia (March 1991 – September 1992) and acting Minister of Education (June 1991 – February 1992). He was President elect of the Macedonian Academy of Sciences and Arts, (January 2000 – June 2001) and Ambassador of the Republic of Macedonia in the PR of China (April 2002 – November 2004). His accomplishments were acknowledged with the highest honors by the governments of the Former Yugoslavia and the Republic of Macedonia.

Polenakovic Momir
Plaseska-Karanfilska Dijana