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PERSONALIA

Vladimir Petrovich Skulachev
Seventy-fifths Anniversary Greetings

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The prominent Russian scientist, Academician Vladimir P. Skulachev, reached seventy five on February 21, 2010. There is no doubt that in Russia he is #1 in bioenergetics and that he made a pivotal contribution to the development of this discipline at the world level. He was a student of Academician S.E. Severin and his scientific career began in the Department of Animal Biochemistry in the Biological Faculty at the Moscow State University. By working there on the problem of body thermoregulation, he came to one of his first scientific ideas, namely, he inferred that there bound to be thermoregulatory uncoupling of oxidative phosphorylation. When the Laboratory of Molecular Biology and Bioorganic Chemistry was founded in Moscow State University, he held a position of the Head of the Department of Bioenergetics. He became a Chief of the Laboratory in 1973, when A.N. Belozersky died, and he took up the directorship in 1991, when the Laboratory was reorganized into the A.N. Belozersky Institute of Physico-chemical Biology.

In the 1960th he elaborated, in collaboration with E.A. Liberman, lipophilic ions (later coined by David Green as Skulachev's ions) harboring a delocalized electrical charge, which enable them to cross lipid membrane and accumulate in cellular compartments with transmembrane electric potential difference, such as mitochondria. These ions became a very effective tool to test the chemiosmotic theory. During the last four decades of the 20th century V.P. Skulachev put forward the idea that extended coupling membranes should function as an electrical cable, and in 1986-1989 he succeeded in obtaining conclusive experimental evidence in favor of that. Together with A.D. Kaulen and L.A. Drachev, he developed an approach allowing direct measurements of the electric current generated by reconstituted proton pumps in artificial membranes. Particularly, this group succeeded in clear demonstration of electrogenesis mediated by reconstituted bacteriorhodopsin, thereby validating its transport function. One more direction V.P. Skulachev focused on was the study of uncoupling effects of fatty acids and their impact on mitochondrial functions. The analysis carried out led to a fruitful idea–and finally to its proof–that in mitochondria, antiporters play a critical role in transport of fatty acids in an anionic form.

A deep insight into a role of free radicals in cellular survival and death was provided by recent studies directed by V.P. Skulachev. His concept on programmed elimination of systems responsible for overproduction of reactive oxygen species (ROS), such as mitochondria, cells, and organisms (mitoptosis, apoptosis and phenaptosis correspondingly), has originated a novel field of research and allowed one to propose a strategy for fighting with consequences of excessive ROS production occurring under oxidative stress conditions. Consistently, Skulachev's efforts were directed on developing the antioxidant strategy that was relied on mitochondria-targeted antioxidants, which in fact were Skulachev's ions with antioxidative moiety. During the last five years he arranged a megaproject, which was largely supported by a nongovernmental private business, to unveil a beneficial role of these compounds as a remedy for a number of pathologies. Promising data obtained by Skulachev's team pointed to exciting potential of modified Skulachev's ions in medicine to treat inherited and acquired diseases associated with oxidative stress.

Vladimir P. Skulachev is the most widely cited modern Russian biologist. According to ISI, the publications authored by V.P. Skulachev were referred to more than 12000 times in total. This fact perfectly illustrates his high productivity and efficacy in different fields of biology. In parallel, the Belozersky Institute leaded by V.P. Skulachev got the highest, among Russian research institutions, citation index normalized to the number of staff researchers. This is an expressive example of the wise staff policy and balanced scientific course conducted by V.P. Skulachev as a Director, which together underlie a world-wide recognition of the Belozersky Institute as one of the leaders in the modern physico-chemical biology.

The Editorial of the journal *Biologicheskie Membrany* genially congratulates Vladimir Petrovich Skulachev on the jubilee. We cordially wish him many years of creative and fruitful work in science.

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