

## Igor Stepanovich Kulaev Celebrates His 75th Birthday



In March 2005, Igor Stepanovich Kulaev, a corresponding member of the Russian Academy of Sciences, Doctor of Biology, a professor at the Department of Molecular Biology in the Faculty of Biology of Moscow State University, and a principle researcher at the Skryabin Institute of Biochemistry and Physiology of Microorganisms, celebrated his 75th birthday.

Kulaev was born in Moscow. He graduated from the Department of Plant Biochemistry in the Faculty of Biology at Moscow State University in 1953 and carried out his postgraduate work in this department, which was headed by Academician A.N. Belozerskii, Kulaev's teacher. Since 1963, Kulaev has been a professor in this department (currently the Department of Molecular Biology). Since 1956, Kulaev has also headed various laboratories, first at the Bach Institute of Biochemistry and then at the Skryabin Institute of Biochemistry and Physiology of Microorganisms. He became a candidate of science in biology in 1957 and a doctor of science in biology in 1969. In 1970, Kulaev was awarded the title of professor. In December 1987, he was elected a corresponding member of the USSR Academy of Sciences in biochemistry.

Kulaev is one of the founders and acknowledged leaders of a scientific school in the area of microbial biochemistry. He is a scholar with an international reputation who is often invited, as an expert biochemist, to the United States, the United Kingdom, Germany, Japan, and other countries.

Kulaev is actively involved in teaching. He lectures students attending the Faculty of Biology of Moscow State University on general biochemistry and the biochemistry of microorganisms. His students have defended more than 85 candidate of science and 21 doctoral dissertations.

The priority of Kulaev and his coworkers has been the localization, metabolism, and physiological role of inorganic polyphosphates in microorganisms occurring at different evolutionary stages. These studies have led Kulaev to a number of important generalizations concerning the evolution of bioenergetic systems.

Kulaev and his collaborators have shown the regulatory role of polyphosphates in the biosynthesis of glycoproteins, antibiotics, and alkaloids and revealed new pathways for the biosynthesis and energy metabolism of polyphosphates in microorganisms. The four enzymes of polyphosphate metabolism that were isolated and characterized in Kulaev's laboratory have been included in the International Enzyme Commission list. Evidence was also obtained in support of the compartmentalization of polyphosphate metabolism in eukaryotes when the metabolism and the function of polyphosphates depend on their location in the cell.

Problems in the field of polyphosphate biochemistry received a contemporary appraisal in Kulaev's monograph *The Biochemistry of Inorganic Polyphosphates*, Moscow: Mosk. Gos. Univ., 1975. The monograph was highly appreciated by biologists and was later (1979) translated into English by Wiley and Sons, Ltd. Modern concepts in polyphosphate biochemistry have been generalized by Kulaev and his pupils in a monograph edited by the same publishing house in 2004.

Study of *Lyso bacter* bacteria led Kulaev and his coworkers to the discovery of a new multienzyme complex possessing bacteriolytic activity. This complex, called lysoamidase, is a unique bactericidal preparation of a nonantibiotic nature. Lysoamidase has proved to be effective against antibiotic-resistant pathogenic bacteria and is endorsed by the Pharmacological Commission of Russia for treating purulent wounds; burns; stomatic, gynaecological, and other diseases; and staphylococcal contamination. It has also found application in otolaryngology and cosmetology. In addition, lysoami-

dase has served as the basis for developing certain veterinary preparations. A comprehensive study of the complex made it possible to determine its composition, to understand the mechanism of its action on the cell wall, and to assess the role of its component polysaccharide in structural maintenance of the complex and regulation of the activity of its bacteriolytic enzymes.

Kulaev's studies on the structure and functions of the cell wall have substantially enlarged our understanding of this important cell compartment. It was shown that the cell wall of yeasts represents a molecular ensemble in which structural proteins bind together polysaccharide molecules and polysaccharide blocks with the aid of specific proteins.

Kulaev and his coworkers always follow the research principles that were laid down by academicians A.I. Oparin and A.N. Belozerskii. These principles provide an evolutionary approach to the study of cell metabolism and analysis of observed physiological and biochemical phenomena in terms of the adaptation of organisms to the ever-changing environmental con-

ditions. It should be noted that problems of evolutionary biochemistry such as the origin of life and the endosymbiotic theory describing the origin of eukaryotic cells from more simple prokaryotic organisms have always been the subject of Kulaev's research interest.

Kulaev is a member of the Russian Supreme Attestation Commission, the Presidia of the Russian Biochemical and Microbiological Societies, and the Presidium of the Research Biological Center in Pushchino. He serves on the editorial boards of a number of Russian and international scientific journals and is a member of several scientific councils. He has participated in the organization of many international biochemical and microbiological conferences.

Kulaev's colleagues and students appreciate his skill, erudition, and benevolence and wish him health, long life, and further achievements in his scientific career.

*Editorial Board*