

ANNIVERSARIES AND DATES



VIKTOR GEORGIEVICH KARTSEV
(On the occasion of his sixtieth birthday)

Professor Viktor Georgievich Kartsev celebrated his sixtieth birthday on October 1, 2010. He is a Doctor of Chemical Sciences, Academician and Member of the Presidium of the Russian Academy of Natural Sciences, chairman of the Board of Directors of InterBioScreen, and chairman of the International Scientific Partnership Foundation.

Prof. Kartsev was born on October 1, 1950 in Pavlograd in the Dnepropetrovsk region. After graduation from a high school with a gold medal, he entered the Faculty of Chemistry of M. V. Lomonosov Moscow State University in 1967. In his second year he began to work in the Nitrogen Compounds Laboratory of the Organic Chemistry Department under the supervision of Professor A. N. Kost and showed considerable research talent. For his graduation thesis *Vinylpyridines in the Diels-Alder reaction*, Kartsev was awarded a medal of the USSR Ministry of Higher Education. In 1972, he began his graduate studies at the Faculty of Chemistry of Moscow State University and already by 1975, under the supervision of Prof. Kost the young researcher defended his candidate's Dissertation *Vinylpyridines as Dienes in 1,4-Cycloaddition Reactions* which earned him a medal of the USSR Academy of Sciences.

In the middle 1960s, a new area of basic research on chemical reactions in biological systems has become the focus of attention at the USSR Academy of Sciences under the direction of Academician N. M. Emanuel, an eminent scientist. Academician Emanuel invited the young talented chemist to head the synthetic section of the Division of the Kinetics of Chemical and Biological Processes at the Institute of Chemical Physics of the USSR Academy of Sciences at Chernogolovka.

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A working group on the chemistry and technology of medicinal compounds was organized in 1977 under the direction of V. G. Kartsev for the further development of this research. This group was reorganized in 1987 into the Laboratory for the Chemistry of Biologically Active Compounds. Within a few years, V. G. Kartsev's laboratory had carried out an important range of research projects on diazocarbonyl compounds, for which he and his colleagues were awarded the Lenin Komsomol Prize in Science and Technology in 1983. These studies formed as the basis for V. G. Kartsev's doctoral dissertation *Synthesis and reactions of functionally substituted diazoketones* in 1988.

The research on diazoketones revealed the remarkable variability in reactivities of these compounds which formed the basis for modern fine organic synthesis.

α -Diazoketones have found a wide use in the synthesis of various classes of organic compounds. The most important and general class of these transformations involves intramolecular cyclization and, primarily, intramolecular alkylation yielding new or difficult-to-obtain carbo- or heterocyclic systems serving as the structural basis for various biologically active compounds. The outcome of these studies has been the formulation of a new important concept of the anchimeric assistance occurring in the course of biological alkylation. The concept summarizes the mechanisms of the action of alkylating antitumor compounds and has made it possible to work out methods for the prediction of cytostatic activity, which formed the basis for a large number of inventions. Studies of V. G. Kartsev and his colleagues on light-sensitive diazoketones were honored with gold, silver, and bronze medals of the Exhibition of National Economic Achievements in Moscow.

We should note the conceptual approach of Kartsev to the solution of any scientific problems. The effect of heterofunctional pesticides on the metal ligand homeostasis in living systems is among his basic scientific concepts. The concept stated the importance of molecular mechanisms for the action of heterofunctional pesticides as ligand-active agents, thus permitting a generalization of mechanisms by which pesticides of various chemical classes including fungicides, herbicides, and insectoacaricides. This concept was formulated and experimentally tested in a comparative analysis for trace elements of the structures of a large number of pesticides containing heteroatomic groups and structurally similar analytical reagents. This work was published in 1991 in book form under the title *Bioinorganic Chemistry of Plant Protection*. The targeted synthesis of more than 500 new compounds was carried on the basis of this concept, among which were highly active pesticides not inferior in activity to the corresponding standards.

The concept of free-radical photodynamic stress formulated in the 1980s made it possible to clarify a specific role of modulators of photodynamic herbicide agents (PHA) in the development of the photoinduced phytotoxic effect, keep these processes under control as well as to develop protective agents and antidotes.

The principle of modification of biological sensitivity based on an integrated study of the effect of lipotropic amines and their derivatives on the structure and function of biological membranes has allowed new approaches to the modification of pharmaceutical compounds, permitting regulation of the transport of active species across cell membranes with a significant reduction in effective doses.

The so-called *Floating Principle* for the development of medicinal compounds and bioregulators with membrane-active properties is a new approach proposed by V. G. Kartsev for the design of membrane-attached biologically active compounds capable of displaying high biological activity in low and extra-low doses due to localization of the functional groups at membrane-bound sites.

Starting from the 1990s, V. G. Kartsev's research interests in heterocyclic chemistry have been focused on the application of reactions based on the *o-tert*-amino effect (the term T-reactions was proposed by Kartsev in 1999) which involved a broad spectrum of studies on the synthesis and modification of natural products. The use of different types of T-reactions for the design of analogs and mimetics of alkaloids has led to the development of ingenious methods for the synthesis of the most diverse new or difficult-to-obtain heterocyclic systems. For example, T-modifications of the alkaloid cytosine have produced the first benzoanalogs of the alkaloid anagyrine. A comprehensive study of the modification of the alkaloid cotarnine and other isoquinoline alkaloids (with K. A. Krasnov)

led to the development of efficient methods for the synthesis of spirocondensed systems and the discovery of a series of new rearrangements. The stereoselectivity of T-reactions, including in the solid phase, was investigated for the first time.

Under the direction of V. G. Kartsev were studied transformations in a large number of natural products. The stereoselective addition of tryptamines to the alkaloid securinine (together with S. G. Skachkov) resulted in the formation of epimargaritarine and its derivatives. V. G. Kartsev and A. G. Dybenko discovered the oxidative rearrangement of benzharmicinone to benzcanthines. V. G. Kartsev and K. A. Krasnov discovered the rearrangement of 1-indolylcotarnines to 3-indolylcotarnines. Also performed were the targeted syntheses of analogs of alkaloids xylopinine, and villagorgine; polycondensation reactions were carried out for colchicine, colchamine and sinomenine.

Special mention should be made of the general rearrangements discovered by V. G. Kartsev and A. A. Zubenko in natural and synthetic hemiaminals leading to 3-benzazepine systems. As result, analogs of alkaloids nauclederine and naufoline were obtained for the first time.

The talent of V. G. Kartsev as a scientist and administrator was clearly demonstrated in the publication of a series of monographs and textbooks in Russian and English: *Textbook of the Biological Aspects of Organic Chemistry*, *Textbook of Biological Chemistry*, *Chemistry of Naphthostyryls*, *Synthesis and Biological Activity of Oxiranes*, and a unique two-volume *Fundamentals of the Chemistry of Natural Products*, which was well received by the scientific community. The series *Selected Methods for the Synthesis and Modification of Heterocycles* both in its Russian and English versions, as well as the collection of papers given at Conferences on the Chemistry and Biological Activity of Natural and Synthetic Compounds (CBC). V. G. Kartsev has been chairman of the organic chemistry section of these conferences since 2001. Furthermore, V. G. Kartsev has published more than 500 papers and obtained more than 15 patents. A considerable number of Chem. Sci. candidate and doctoral dissertations have been defended under his direction. Over the past decade, V. G. Kartsev has given more than 40 plenary lectures at international conferences. He has worked on the organizing and program committees of many conferences and symposia devoted to problems in organic and medicinal chemistry both in Russia and abroad.

We should especially note Kartsev's gift for organizing. Over many years, V.G. Kartsev has been heading the International Scientific Partnership Foundation, whose activities have extended far beyond the borders of Russia. This foundation organizes international conferences, publishes scientific monographs, distributes grants, and offers stipends to gifted young scientists, presents awards and medals of the foundation to outstanding scientists and scientific organizations throughout the world. Gold Medals for Contributions to World Science were presented to Nobel Laureates E. J. Corey, R. Noyori, and J.-M. Lehn and Silver Medals for Contributions to Science and International Cooperation were awarded to a great number of outstanding scientists, scientific organizations, and scientific journals in Russia and other countries. The Medal "In memory of prof. A.N.Kost" established by the Foundation jointly with M. V. Lomonosov Moscow State University and the D. I. Mendeleev Russian Chemical Society was awarded to Russian and international scientists who have made the greatest contribution to the development of heterocyclic chemistry, the list also includes the journals *Khimiya Geterotsiklicheskikh Soedinenii (Chemistry of Heterocyclic Compounds)* and *Heterocycles*. The Memorial Medal "In memory of Academician N. M. Emanuel " established by the Foundation together with the Russian Academy of Sciences was awarded to a number of scientists throughout the world for achievements in the field of chemical and biochemical physics.

V. G. Kartsev is a member of the editorial board of the *Khimiya Geterotsiklicheskikh Soedinenii*, *Targets in Heterocyclic Systems*, and *Jordan Journal of Chemistry*. He has been elected an honorary full member of the Egyptian Heterocyclic Chemistry Society and the Indian Society of Chemists and Biologists, and an honorary professor of Kollhapur University. He was awarded the European Union Twenty-First Century Leader Diploma in Vienna, Austria in 2002, the Grand Prix de la Qualité medal and diploma in Geneva, Switzerland in 2005, and a medal and diploma of an Honorary Member of the International Association for European Cooperation and Integration in 2005.

In 2007, V. G. Kartsev was elected full member of the Russian Academy of Natural Sciences, and in 2008, he was elected a member of the Presidium of the academy. He was awarded the Distinguished V. I. Vernadskii Silver Medal for High Scientific Achievement and Great Contribution to the Development of Russia and in 2010, he was awarded the Medal "In memory of prof. A.N.Kost" by the decision of the Prize Commission for achievements in heterocyclic chemistry.

The scientific interests of V. G. Kartsev are presently tightly linked to the arts. A well-known patron of the arts, he actively assists artists in Russia and Ukraine, organizes many art exhibitions, and publishes albums of contemporary artists. In 2008, V. G. Kartsev organized the first international plein air session in Montenegro, which hosts annually up to 150 of the best painters from Russia and neighboring countries. A collector and chairman of the board of directors of the Cultural Heritage Foundation, in 2010 V. G. Kartsev was elected a member of the Peter the Great's Academy of Sciences and Arts. In 2008, he was awarded order Knight of Sciences and Art, and in 2010, he won the P. M. Tretyakov Medal for the Development of Culture and Art of the International Academy of Natural and Social Sciences.

V. G. Kartsev is actively helping his native city, Pavlograd. In 2010, he was awarded an Order for Services to the City of Pavlograd and the title Honorary Citizen of the City of Pavlograd.

On behalf of his colleagues, students, friends, and scientific and cultural community of Russia, we heartily congratulate V. G. Kartsev on his sixtieth birthday and wish him good health and long years of productive work.

O. N. Chupakhin and S. F. Vasilevskii

The editorial board of the journal *Khimiya Geterotsiklicheskikh Soedinenii (Chemistry of Heterocyclic Compounds)* congratulates Academician V. G. Kartsev on his sixtieth birthday and wishes him health and further scientific success and expresses its hope for his continued cooperation in our work.