



## *In Memoriam* **Andronati Serhiy Andriyovych**

It is with deep sadness that we inform you that on June 29, 2022, at the age of 82, after a long illness, an outstanding scientist in the field of bioorganic and medical chemistry, Doctor of Chemistry, professor, academician of the National Academy of Sciences of Ukraine, adviser to the Presidium of the National Academy of Sciences of Ukraine, honorary director and adviser to the Directorate of the A.V. Bogatsky Physico-Chemical Institute, head of the Department of Medical Chemistry, winner of State prizes of the USSR and Ukraine **Andronati Serhiy Andriyovych** passed away.

Andronati Serhiy Andriyovych was born on September 19, 1940 in Odesa in the family of employees. In 1964, after graduating from the Faculty of Chemistry of the Odesa State University named after I. I. Mechnikov in the specialty “Organic Chemistry” Serhiy Andriyovych began his career. He overcame his career steps confidently and tirelessly: he worked at the Odesa State University (1968–1972) as a senior engineer, senior lecturer and deputy dean of the Faculty of Chemistry. In 1972, S. A. Andronati took the position of senior researcher and later the head of the Department of chemistry of nitrogen-containing heterocycles. After the creation of the Physico-Chemical Institute of the Academy of Sciences of the Ukrainian SSR (the first independent academic institution in Odesa), S. A. Andronati held the position of deputy director for research (1978–1983), and later the director of the Institute (until 2020). He was the head of the Southern Scientific Centre of the National Academy of Sciences and the Ministry of Education and Science of Ukraine; at the same time (since 1998) headed the Department of Pharmaceutical Chemistry of the Odesa State University named after I. I. Mechnikov and was the scientific director of the Chemical and Pharmaceutical Educational Research and Production Complex of the National Academy of Sciences and the Ministry of Education and Science of Ukraine.

The scientific life of Serhiy Andriyovych was brilliant, fast-paced, diverse and extremely fruitful. After completing his postgraduate studies (1970) at the Department of Organic Chemistry of the Odesa State University and in the same year defending his thesis for the degree of Candidate of Chemistry, he has immediately started doing his doctoral investigations and in 1974 successfully defended a thorough research on the problems of synthesis, stereochemistry and biological activity of benzodiazepine derivatives.

The scientific interests of S. A. Andronati involved the issues of bioorganic and medical chemistry. His achievements are the development of methods for the synthesis of biologically active compounds, determination of their structure, conformations, physicochemical, chemical, pharmacological properties, molecular mechanisms of action, the “structure – mechanism of action – activity” relationship, molecular design of potential biologically active compounds, their synthesis. He also made a significant contribution to the development of methods for the synthesis of new derivatives of quinazoline, 1,4-benzodiazepine, 1,3,4-benzotriazepine, 1,5-benzodiazocine, 1,4,5-benzotriazocine, 1,6-benzodiazonines, a number of various macroheterocyclic systems, polynuclear carbo- and heterocyclic compounds, peptidomimetics.

Serhiy Andriyovych also studied the relationship between the structure, stereochemistry, physical, physicochemical, chemical and pharmacological properties of various derivatives of pyrimidine, quinazoline, 1,4-benzodiazepine, 1,5-benzodiazocine, nitrogenous macroheterocycles, polynuclear heterocyclic systems, oligopeptides, peptidomimetics, fluorene, anthracene, etc.

The outstanding scientist was also interested in the problems of fine structure, stereochemistry, and stereodynamics of substances. He studied 1,4-benzodiazepines and related heterosystems in the most detail, finding out that the heteroring of 1,4-benzodiazepines, 1,5-benzodiazocines, and 1,4,5-benzotriazocines had a pseudo-boat conformation. He revealed the main regularities of the relationship between the structure, kinetic and thermodynamic parameters of the inversion of compounds of this class, determined the structure of associates of 1,4-benzodiazepinemolecules, as well as correlations of spectral properties, polarity, basicity, lipophilicity with physicochemical constants characterizing the electronic nature and steric features of substituents.

The works of Serhiy Andriyovych on the search and purposeful synthesis, research on the properties and mechanisms of action of new antihypoxants and actoprotectors aimed at creating effective medicines for the treatment of various diseases accompanied by hypoxic conditions, such as traumatic shock, heart attack, pneumonia, leprosy, etc., are invaluable. The result of these studies was the discovery of a new class of such agents – pyrimidine derivatives, which turned out to be significantly more effective antihypoxants and actoprotectors than the known medicines with similar effects (sodium  $\gamma$ -oxybutyrate, gutimine, dibazole, as well as medicines of the plant origin – ginseng, eleutherococcus).

Of great importance are the scientific achievements of the scientist in creating fundamentally new medicines for the treatment of oncological diseases and acute viral infections belonging to the class of nonspecific immune stimulants. The study of the relationship between the structure, antiviral and interferon-inducing properties of fluorenone, anthracene and acridine derivatives allowed him to find highly effective compounds among them.

S. A. Andronati's work on the synthesis of new regulatory peptides made it possible to obtain new promising modified analogs of tyroliberin and melanostatin. In the course of these studies, new methods of the peptide synthesis based on the use of crown ethers were developed.

The scope of Serhiy Andriyovych's studies is truly impressive. It seems that there is no field of medical chemistry he left overlooked. In particular, he discovered a number of regularities concerning the "structure – psychopharmacological properties" relationship of 1,4-benzodiazepines and their cyclic homologs, as well as other heterocyclic substances related to 1,4-benzodiazepines, the metabolism pathways and pharmacokinetics of compounds with psychotropic, antihypoxic and antiviral properties. S. A. Andronati together with his team obtained important data on the molecular mechanisms of action of neurotropic agents interacting with the GABA-benzodiazepine receptor-ionophore ensemble, serotonin and dopamine receptors. The results of these studies allowed them to form an idea about the nature of the pharmacophore fragment of the substances specified, as well as the influence of conformational factors on their activity.

An important part of Serhiy Andriyovych's scientific heritage is research in the field of biotechnology, in particular, enzymatic and microbial synthesis. Thus, with the participation of the scientist, a convenient method for obtaining optically active 1,4-benzodiazepines was developed and a number of enzymes immobilized on organic and inorganic carriers with a high degree of activity and multiple use were obtained. The processes of hydroxylation, acetylation, and hydrolysis of carbo- and heterocyclic compounds catalyzed by them were studied. As the result of the studies conducted, the medicine "Elastotherase" was created for the treatment of burns and wounds.

Recently, S. A. Andronati led research in the field of medical chemistry of antithrombotic agents. His research team obtained peptidomimetics promising for the treatment of cardiovascular diseases with a high antithrombotic activity, and discovered the mechanism of action of these substances.

S. A. Andronati is the founder of the scientific school in the field of bioorganic and medical chemistry. Under his supervision, 4 Doctoral theses and 31 PhD theses were defended.

Based on the fundamental research of the scientist and his colleagues in cooperation with pharmacologists, a number of highly effective medicines were created. Among them one should mention the first domestic anxiolytic, hypnotic and anticonvulsant medicine “Phenazepam”, the anxiolytic medicine of daytime action “Hidazepam”, the first oral interferon inducer with antiviral properties “Amixin”, the original hypnotic and the anxiolytic medicine “Levana® IC” (Cinazepam).

The scientific heritage of this outstanding scientist includes 9 monographs, more than 600 articles, 130 patents and author’s certificates for inventions. He was a member of the editorial boards of the following journals: “Reports of the National Academy of Sciences of Ukraine”, “Ukrainian Chemistry Journal”, “Science and Innovation”, “Journal of Organic and Pharmaceutical Chemistry”, “Bulletin of Psychiatry and Psychopharmacology”, “The Odesa Medical Journal”. S. A. Andronati was the first president of the Odesa Junior Academy of Sciences “Prometheus”.

For his scientific and pedagogical activities, S. A. Andronati was awarded numerous state orders, medals and prizes, government, regional and city diplomas and badges.

S. A. Andronati was not only an outstanding scientist, a recognized luminary in the field of chemical science, but also a unique example of human and scientific ethics for thousands of people who were lucky enough to study and work with him. Colleagues of S. A. Andronati speak of him as an intellectual, a leader, a deeply decent and kind person who was characterized by inexhaustible energy, exceptional diligence and efficiency. He had deep knowledge of many areas of science, culture, and art, was demanding of himself and his employees, always ready to support and help them in solving scientific, organizational tasks, and everyday problems. He was an exemplary family man, a reliable support for parents, a loving husband, a real example for his children and grandchildren.

The death of Serhiy Andriyovych Andronati is a huge, irreparable loss for relatives, colleagues and friends. It is difficult to find words of comfort when the heart of a person who was important in life stops, but the bright memories of Serhiy Andriyovych, who left behind good deeds and lived his life honestly, will always be stronger than death.

***We are deeply mourn for this irreparable loss and express our sincere condolences to his family.***