IN MEMORY OF PLATON KOSTYUK

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On May 10, 2010, the outstanding world-famous Ukrainian physiologist, academician of the National Academy of Sciences (NAS) of Ukraine Platon Kostyuk, left the world forever. The news of his death quickly spread around the scientific community of the world. O.O. Bogomoletz Institute of Physiology of the National Academy of Sciences of Ukraine, where Platon Grygorovych was a permanent director for 44 years, began to receive numerous letters in which there was a real pain concerning irreparable loss for world physiological science. In addition to the official condolences of statesmen and institutions (President, Prime Minister, Chairman of the Verkhovna Rada of Ukraine (Parliament), scientific societies, and others), many dozens of letters from the scientific community arrived. One can cite words from one of the letters reflecting their general meaning: "The news of the death of Platon Gryhorovych responded with real pain. Surprisingly, although we all understood that Platon Grygorovych was in a respectable age and saw that he had notably passed recently, the news of his death was taken with surprise. As the saying goes, the head understands, but the heart does not believe. Unfortunately, the thought comes that with the departure of Platon Grygorovych, an entire era ended — the era in which intellect, professionalism, decency, intelligence were the main characteristics of a scientist" (from the letter of RAS Member Evgeny Nikolsky, Member of the Bureau of the Department of Biological Sciences of the RAS, Deputy Chairman of the Presidium of Kazan Science Center RAS).

Last year, he turned 85 years old. He devoted more than sixty years to his favorite science — physiology and continued to work fruitfully and faithfully until his death, remaining the flagship and pride of Ukrainian science. By the level of citation in world literature, Platon Grygorovych ranks first among the Ukrainian biologists (the total citation index was 6360 on the day of his death) and has the largest number of publications Ukrainian scientists according to the international SCOPUS rating system. O.O. Bogomoletz Institute of Physiology of NAS of Ukraine, led by Platon Grygorovych, ranked the second place in the rating of institutions of NAS of Ukraine (citing the work of the Institute's staff on the international evaluation system SCOPUS was 2034 publications, 10126 citations and the Hirsch index was 44) second only to the Boholiubov Institute of Theoretical Physics NASU. In this sense, the Institute of Physiology has the best indicators among the institutes of the biological profile. It is significantly ahead of the institutes of a physical-mathematical and chemical profile, which, as a rule, have high

citation rates. How did Academician Platon Kostyuk manage to achieve such high scientific and administrative achievements?

Platon Grygorovych believed that three figures in his life played a decisive role in forming him as a person and a scientist and whom he called his teachers. These are his father Grygorii Sylovych Kostyuk, academician of the Academy of Sciences of the USSR, Academician of the Ukrainian Academy of Sciences Daniil Semenovych Vorontsov (his first scientific adviser), as well Australian scientist, Nobel Prize winner Professor Sir John Eccles, in whose laboratory young Platon worked. I will not list in detail the biographical milestones and achievements of Platon, since they are described by himself in the biographical book "Above the Ocean of Time", and are also repeated or supplemented in other publications and sources, so I will focus on his formation as a scientist, as well as on the quotes from the letters of condolences, which characterize Platon and the attitude to him of the world scientific community.

Platon Grygorovych always told very warmly about his father, Grygorii Sylovych, who covered his way from a rural teacher to an academician. Grygorii Sylovych Kostyuk (1899-1982) is famous Ukrainian psychologist, teacher, founder of the Ukrainian psychological school, specialist in child and educational psychology, a full member of the Academy of Pedagogical Sciences of the USSR (since 1966), head of the psychology laboratory of the Ukrainian Research Institute of Psychology of the Ukrainian SSR and head of Kyiv laboratory for the development of thinking of schoolchildren of the Institute of General and Pedagogical Psychology of the Academy of Sciences of the USSR (1972-1982), Honored Worker of Science of the Ukrainian SSR. In 1945, he achieved the establishment of the Scientific Research Institute of Psychology, which he headed from 1945 to 1972. Shortly, the Institute of Psychology became the center of theoretical, methodological, and applied research on the psychological problems of thinking and intellectual abilities, guiding the individual's mental development. In 1995, the Institute was named after the outstanding Ukrainian scientist-psychologist Academician Grygorii Sylovych Kostyuk.

Platon was with his father in difficult war years in the evacuation in Stalingrad, when his mother and his younger brother remained in occupied Kyiv. In the postwar years, his father helped young Platon in his scientific formation. Grygorii Sylovych was the developer of the conceptual provisions of the personality problem. According to Platon, the main scientific idea of Grygorii Sylovych was that the education of a person should be such as to reveal and emphasize his very abilities and talents. The latter was at variance with the generally accepted concept at that time — about absolute equal capabilities for different people. Using his professional knowledge in child psychology, Platon's father tried to develop precisely those abilities in his children that would contribute to the greatest success in their life. We can say that the scientific idea of Grygorii Sylovych was confirmed by practice. Both of his sons achieved outstanding successes in their

life and career. So, his younger son Alexander G. Kostyuk (1933-2000), known for his scientific works in the field of film studies, musicology, psychology, and aesthetics of music, as well as his elder brother became an academician of the National Academy of Sciences of Ukraine and headed M.T. Rylsky Institute of Art Studies, Folklore Studies and Ethnology NASU from 1988 until his death.

According to Platon, his father was a very pleasant, kind, and amazing person. The father's superior qualities also became inherent in his son, such as modesty, selflessness, kindness combined with unwavering fidelity to civic and scientific duty, which provided Platon Grygorovych's a great deal of respect. Here is how foreign colleagues write about him: "It is sad, with difficulty consciously and irreparably. For me, Platon was a scientists' father. His dedication to science, his ability to work, a broad vision of problems, organizational talent, self-discipline, concern for others, gentleness, wisdom and other wonderful qualities were, are and will be a landmark in my life, as well as in the life of many scientists, and not only scientists. Love and deep respect for him in my heart and soul are forever" (Prof. Peter Brezhestovsky, Mediterranean Institute of Neurobiology, France). "The news of Platon's death filled me with sadness. I have known him for decades, and I will always remember him as a great scientist and a man of extreme kindness. He was a real gentleman" (Prof. Ernesto Carafoli, University of Padova, Italy).

Ironically, the last videos with Platon (December 2009) was dedicated to his father. The video was made on the occasion of the 110th anniversary of Grygorii Sylovych, which was related to the All-Ukrainian scientific and practical conference "Theoretical and applied aspects of personality psychology" and the Second All-Ukrainian psychological congress. Platon, at the end of his story about his father, said that his father contributed to the development of his abilities as a scientist, and the memory about his father is always preserved in his soul.

Platon Grygorovych began his scientific activity as a student of the Faculty of Biology of Kyiv University under the guidance of an outstanding scientist in the field of electrophysiology, Professor (later Academician of the Academy of Sciences of the Ukrainian SSR) Daniil Semenovych Vorontsov (1886-1965), who then taught a course in physiology at this university. Daniil Semenovich graduated from the Mogilev Grammar School and St. Petersburg University, was a student of the outstanding Russian physiologist N.E. Vvedensky. Vorontsov was also the founder and first head (1922-1930) of the Department of Normal Physiology of Smolensk University. From 1930, he was the head of the Department of Physiology of the Physics and Mathematics Faculty of Kazan University, and in 1935-1945 of the Department of Human Physiology of Kyiv Medical Institute. In 1945, he created the Department of General Physiology at the Institute of Physiology at Kyiv University, and in 1956 the Laboratory of Electrophysiology at the Institute of Physiology of the Academy of Sciences of the Ukrainian SSR. Vorontsov D.S. is one of the founders of national electrophysiology. He carried out basic research on the electrophysiology of the heart, skeletal muscles, nerves, spinal cord, and

brain. Back in his student years, D.S. Vorontsov set himself to study the properties and nature of the process of excitation in the nerve and dedicated his scientific career to this. One of the main areas of D.S. Vorontsov's research was a membrane theory of the origin of bioelectric phenomena. For the first time in the world, Vorontsov revealed that the main physiological phenomenon is the action potential, accompanied by trace fluctuations in electrical activity. For a short time in the post-war years in Kyiv, together with the staff, he produced original educational equipment and acquired modern scientific instruments at that time. The latter made it possible to conduct a high-level educational process and intensive scientific work, which attracted Platon Grygorovych to electrophysiological studies.

The graduation work was related to aspects of electrophysiology Platon Grygorovychdefended in 1946. Then, a young researcher Platon Kostyuk was first engaged in the study of a nerve cell, its reaction to a stimulus that caused excitation or inhibition on the connection between cells. Platon Grygorovych said that in those days, there was a very poor base of devices at the department, and Vorontsov set a personal example of the ability to create the necessary electrophysiological equipment his own hands. Platon subsequently inherits this approach in his future scientific life: he will contribute to the development of innovative methods, equipment, approaches. Later, in the 70s, he redesigned the experimental base at the Institute of Physiology, which, under his participation, started producing 23 items for electrophysiological research. For the first time in the Soviet Union, the electrophysiological complex that met the world standards of that time was created.

At the same time, Kostyuk P.G. received his second higher education at the medical institute. To the question: "How did you manage to combine your work as a researcher in the laboratory of Daniil Semenovich and at the same time study at the Kyiv Medical Institute?" he answered: "By the power of youth and passion." Platon Grygorovychat, the age of 25, defended his thesis on the subject "Adaptation of a nerve to a gradually increasing electric current" (1949) and received a diploma Doctor of Medicine in the same year. In 1951, the teaching activity of Platon Grygorovych began at the Department of Animal and Human Physiology of Kyiv University, which ended in late December 2009 close to his death, when he took the last exam in his life from students of the Radiophysical Department of Kyiv University and the Kyiv branch of MIPT. Platon Grygorovych was very responsible for teaching and very fond of giving lectures for students. He repeatedly told me that lecturing brings him real pleasure. Even when he was aged, sometimes feeling ill, he still went to classes that were always bright, interesting, and understandable. Here is how a Serbian scientist writes about Kostyuk 's lecture in his letter of sympathy: "I am very shocked and upset to hear such bad news. Professor Platon Kostyuk was our great friend and colleague, a great scientist, and a teacher. He was the man who led over the years the generation of neurophysiologists. He visited our country several times, the last time in 2005, during

the congress at the Military Medical Academy in Belgrade. Everyone was happy to meet him and listen to his inspiring lectures; he really was a legend in neurophysiological science. On behalf of the Serbian Physiological Society and myself, I express my deepest condolences on the death of much-respected Academician Platon Kostyuk. This loss is not only for the Bogomoletz Institute of Physiology, but also for Ukraine, the countries of the former Soviet Union, and the international physiological community. I hope that the Bogomoletz Institute of Physiology will be successful in overcoming such an irretrievable loss and will follow the vision, mission, and spirit of the great man Platon and will remain in the position of one of the best physiological institutes in the world" (Prof. Dragan Djurić, President of the Serbian Physiological Assembly of Societies, Director of the Institute of Medical Physiology, Belgrade University, Republic of Serbia).

Daniil Semenovych was a very brave man; he was characterized by absolute scientific integrity. He was not subjected to administrative pressure on his views; he always openly criticized his opponents in scientific discussions, was courageous in the conditions of the totalitarian Soviet times. It is worth saying that the same features were inherent in Platon; several examples can be cited, one of which is described by President of the National Academy of Sciences of Ukraine B.E. Paton and I also happened to witness: when the State Prize of Ukraine in Science and Technology was awarded (2003) for the work "Synaptic signaling in the nervous system: cellular and molecular mechanisms and ways of correcting their disorders", which took place at the Mariinsky Palace, Platon asked for a word that was not planned according to the award protocol, and appealed to President of Ukraine L. Kuchma that Ukrainian science should be funded appropriately for the development of science to be truly fruitful. Among the other two hundred laureates, no one dared to criticize the authorities in person. Platon Grygorovychalways boldly and critically spoke at meetings of the Presidium of the Academy of Sciences of the Ukrainian SSR (then of the National Academy of Sciences of Ukraine) and other state institutions, if he had his different vision of solving the problem under discussion.

Another, a more everyday example happened during the international conference "Receptors, Channels, Mediators" held under the auspices of the International Brain Research Organization (IBRO) in Yalta in 2004. A boat excursion along the sea coast had been planned. And when the conference delegates, among whom there were many foreign guests, came to the pier, there was a three-point storm at sea throwing the boat like a chip. The guide categorically refused to board the boat, and then I asked Platon Grygorovychwhat to do because everyone had come to the tour. Platon Grygorovych, who was then 80 years old, hopped onto the boat without hesitation, and other conference participants followed, although a small part remained on the shore. Platon Grygorovychwas also brave in science, *as* Voltaire said: "The success of science is a matter of time and brave of the mind." His scientific courage and foresight consisted of strategic thinking about the de-

velopment of neuroscience, the development of new methods, and scientific ideas; he tried to implement in his department the latest techniques that appeared in the laboratories of the world.

Subsequently, at 32, Platon defended his doctor of science dissertation "Central processes in the simplest reflex arc" (1956) and became a professor of the chair and shortly, after the transition of D.S. Vorontsov to Bogomoletz Institute of Physiology, Academy of Sciences of the Ukrainian SSR, the head of the laboratory of the Institute of Physiology at the University. In 1956 D.S. Vorontsov organized and headed the laboratory of electrophysiology at the Bogomoletz Institute of Physiology AN USSR. During his work there, D.S. Vorontsov and his staff performed experiments on the study of physical electroton in nerves and muscles. The electroton characteristic was given for different strengths, durations, and directions of the polarizing current and different functional states of the nerve. The effect of various pharmacological preparations, including metabolic inhibitors, on the development of electroton was studied. As a result of fruitful methodological developments, Vorontsov created a thorough guide to general electrophysiology. Thus, we can assume that D.S. Vorontsov paved the way for his student Platon in the field of electrophysiology, which was still new, little known, and inaccessible, and became an example of the boldness of scientific thought.

Independent Platon's work started in 1958, already at Bogomoletz Institute of Physiology. He headed the laboratory of general physiology and subsequently wrote his first book, Microelectrode Technology (1960) was the beginning of his great scientific future. As Platon Grygorovychwrote, "The introduction of microelectrode technology in neurophysiology is my kind of "space flight". Platon was a persistent experimenter. He repeatedly told his assistants how he had made glass microelectrodes, heating glass tubes, and using his hands to stretch them to make electrodes for the intracellular recording of action potentials. Since that time, there had been no special equipment or micromanipulators.

Moreover, this "physicochemical" line of research in physiology was considered by many venerable scientists of that time to be erroneous. He was the first among the USSR physiologists to use intracellular electrodes and obtained accurate information about the duration, synaptic delay, and the course of single exciting and inhibitory effects. The scientific community highly commended this work.

The first intracellular microelectrode studies were conducted by American scientists Ling and Gerard on fibrils of frog muscle in 1946 and on the cells of the central nervous system in 1951 in the laboratory of the Australian neurophysiologist Eccles. According to Platon Grygorovych, at the international conference to which he came almost by accident (Soviet scientist's traveling abroad was then quite rare), he reported his electrophysiological studies using microelectrode technology. John Eccles, who was surprised by the microelectrode achievements of a young Soviet scientist, approached him and asked where he learned this tech-

nique? To this, Platon Kostyuk replied, "I myself learned. So, Professor Eccles invited Platon Grygorovych to his laboratory, where the most advanced microelectrode studies were conducted.

Sir John Carew Eccles received in 1963 the Nobel Prize in Physiology and Medicine "For the discoveries regarding ionic mechanisms involved in excitation and inhibition in peripheral and central parts of the membrane of nerve cells". The main Eccles's studies, which started at Oxford University, were associated with synaptic transmission in the central and peripheral (ganglion of the sympathetic) nervous systems, smooth and cardiac muscles. In his research, he used a new technique at that time in electrophysiology, such as amplifiers and cathode oscilloscopes. Eccles shared the Nobel Prize with world-class physiologists Andrew Fielding Huxley and Alan Lloyd Hodgkin, who are the founders of the theory of ionic conduction, based on modern ideas about the generation of nerve impulses. In 1952, they described a model that explained the ionic mechanisms that underpin the initiation and propagation of action potentials in giant squid axons. For the first time, Hodgkin and Huxley advanced the hypothesis of the presence of ion channels in the membrane, which had not yet been discovered.

In 1960-1961 in Canberra (Australia), Platon, together with Prof. J. Eccles, conducted a study of the nature of inhibition and its importance in the reflex activity of the brain. While working in Eccles's laboratory, Platon published three papers in the Physiological Journal of Great Britain: "Central pathways responsible for the depolarization of primary afferent fibers", "Presynaptic inhibition of the central actions of the flexors of reflex afferents" and "The effect of electrical polarization of the spinal cord on central afferent fibers and their excitatory synaptic action". Interestingly, in his Nobel lecture "Ionic mechanisms of postsynaptic inhibition", Eccles used one of the figures from his paper published together with P. Kostyuk and Japanese Prof. M. Ito from the international journal "Nature". Platon's working in the laboratory of John Eccles, as he said, filled him with new ideas, methods, freedom of scientific thought, and democratic relations in the team. Platon Grygorovych carried these achievements through all his scientific activity and was guided by them until the end of his life.

The further scientific career of Platon Grygorovych developed very quickly. He became a world-wide scientist, organizer of science, and a wonderful administrator. He worked very effectively and unchanged as director of Bogomoletz Institute of Physiology NAS of Ukraine from 1966 until his death (2010). One of the greatest achievements of P.G. Kostyuk, together with his students O.A. Kryshtal and V.I. Pidoplichko was the development and implementation of the method of intracellular dialysis or perfusion, for which, in my opinion, they should have won the Nobel Prize. They were ahead of German scientists Erwin Neher and Bert Sackman. They, at that time, had advantages in electrical equipment. They received Nobel Prize for developing methods for measuring potential changes caused by single ion channels in the cell membrane (patch-clamp meth-

od) in 1991. After the death of P. Kostyuk, Professor Erwin Neher (Nobel Prize Laureate, Max Planck Institute for Biophysical Chemistry, Göttingen, Germany) writes: "Platon was an outstanding scientist who was highly appreciated by colleagues and friends. His death marks a unique period in physiology, in which quantitative approaches and understanding of mechanisms were a top priority. We must make efforts to maintain this heritage, which will always be associated with Platon G. Kostyuk". I was lucky to work in the laboratory of Erwin Neher, and I can say that he respected Platon very much, and the words he said came out really of his soul.

Over the years, P. Kostyuk created a worldwide school of neurophysiologists, including two Academicians of NASU (O.A. Krishtal and M.S. Veselovsky), two Corresponding Members of NASU (G.G. Skibo and Ya.M. Shuba) and a large number of worldwide scientists. Among the achievements of the school, there are many scientific discoveries of world significance. Hundreds of neurophysiologists, who were lucky to study at the graduate school and conduct research under direct P. Kostyuk 's supervision, have kept their memory as an excellent educator, scientific father, sensitive person, tactful and at the same time demanding and principled. One of his many students, Yuri Usachev, who is now working in the USA, in the difficult times for the Institute after the collapse of the USSR, sent the prepaid journal "Neuron" to the Institute, writes today: "This is incredibly sad news and a huge loss for the scientific community. My scientific career would not have been possible without Platon, and I am sure that this is true for hundreds of his former students. He meant so much to many of us" (Yuri Usachev, Iowa State University, USA).

Platon Kostyuk created a scientific school known not only in the countries of the former Soviet Union but also far beyond its borders. Professor Norio Akaike from Kumamoto University, Japan, writes, "I am deeply saddened to hear of the sudden death of the distinguished scholarly world, Prof. Platon Kostyuk. Accept my sincere condolences in this sad event. I can well imagine what a great sorrow it is for all of you at the Bogomoletz Institute. He was also my great mentor, who taught me how interesting science is. I will never forget his kindness and attention". Among the students of Platon were not only employees of the Institute of Physiology, but also scientists from other countries of the world who came to the Institute of Physiology and studied new techniques and gained new knowledge. Professor Merab Tsagareli from Beritashvili Institute of Physiology, Tbilisi, Georgia, writes in his mournful letter: "With deep sorrow, we learned about the death of Platon, an extraordinary and talented scientist and organizer of science, his works made a huge contribution to modern physiology. It is no exaggeration to say that over the past 40 years, he has been a leading scientist in central and Eastern Europe, including the Soviet Union. He left a school of world importance in cellular physiology, which will always be proud of its founder. Please accept my sincere condolences from our Institute of Physiology and personally from me.

The departure of Platon, a world-class scientist, is a loss not only for Ukraine but for the entire international community of modern neuroscience". Prof. Tamas Freund, Director of the Institute of Experimental Medicine, Budapest, Hungary, writes: "You told me the sad news about Platon. He was the main figure in the field of neuroscience and was an icon in the physiology of our region. We must keep him in our best memories for decades to come".

Platon Gryhorovych was also the founder of many scientific organizations and institutions; one of them is the UNESCO Chair at the Institute of Physiology. We received a letter from this organization regarding Platon's death "With deep sorrow and regret, I found out that Academician Platon Kostyuk left. It is a huge loss for the institute, which he brilliantly led for many years, for the Ukrainian Academy of Sciences, for neurophysiology, and the world scientific community. Here, at UNESCO, we will especially grieve over the loss of this exceptional scientist. Platon was one of the very few academic leaders from the Eastern European region who were awarded the UNESCO Science Chair, in recognition of his outstanding achievements at the forefront of neurophysiology. He was an outstanding personality, a talented researcher, a visionary leader, and at the same time, a modest and warm person. Those blessed to know him personally will miss him forever" (Prof. Maciej Nalech, Director of the Department of Fundamental and Engineering Sciences of UNESCO).

I want to complete a short story about Platon G. Kostyuk by words of the American scientist Martin Morad from Georgetown University (USA) "I cannot imagine the world without him, without his love of science, perfection, beauty, and art. He loved science and devoted his entire career to making a first-class scientific level of the institute in Kyiv and preparing many top-class scientists. He has reached more than any of us expected".

Brief curriculum vitae: Platon Kostyuk (August 20, 1924, Kyiv — May 10, 2010, Kyiv). Physiologist and biophysicist, organizer of science, teacher, public figure. Academician of the National Academy of Sciences of Ukraine (1969) and the Academy of Medical Sciences of Ukraine (1994), academician of the Russian Academy of Sciences (1974), European Academy (Academia Europaea) (1989), member of the German Academy of Natural Sciences "Leopoldina" (1966), Academy of Sciences of Czechoslovakia (1990), Hungarian Academy of Sciences (1990). Honored Worker of Science and Technology of Ukraine (2004).

He graduated from Kyiv University named after T. H. Shevchenko (1946) and Kyiv Medical Institute named after O.O. Bogomoletz (1949). He was head of the Department of general physiology of the nervous system founded in 1958 at O.O. Bogomoletz Institute of Physiology, AS USSR; director of the same Institute (from 1966), founder and head (from 1982) of the educational base department of molecular physiology and membrane biophysics at Kyiv's branch of the Moscow Institute of Physics and Technology, which works at the Institute of Physiology. Moreover, he was founder and director of the International Center for Mo-

lecular Physiology of NAS of Ukraine (from 1992); Founder and Head of the UNESCO International Department of Molecular and Cellular Physiology, opened in June 2000; Founder and president of the Foundation for Basic Research of Ukraine (2001); Academician-Secretary of the Department of Physiology of the Academy of Sciences of the USSR (1975-1988); Member of the Presidium of Academy of Sciences of the USSR (1975-1990); Vice-President of the NAS of Ukraine (1993-1999); Member of the Presidium of NAS of Ukraine (1999-2004); Member of the Presidium of the Academy of Medical Sciences Ukraine (2005-2010); Vice-President of the International Organization for Brain Research (IBRO); Chairman of the Ukrainian Physiological Society (which now bears his name) and the Society for Neuroscience of Ukraine, *etc.*

The trends of P.G. Kostyuk's scientific research are neurophysiology, molecular biology, and cell biophysics. He created a school of researchers in neurophysiology, cellular, molecular physiology, and biophysics. For the first time in the world science, he developed a technique for intracellular dialysis of a nerve cell soma and used it to study the membrane and molecular mechanisms of this cell. For the first time in the USSR, he applied the microelectrode technique to study the structural and functional organization of nerve centers, biophysical and molecular mechanisms of excitation, and nerve cells inhibition. He made a significant contribution to the discovery of calcium ion homeostasis in nerve cells and its disorders in specific forms of cerebral pathology: hypoxia/ischemia, diabetes mellitus, phenylketonuria, Alzheimer's disease, and epilepsy.

He is the author of more than 1050 scientific articles and 16 books, 12 monographs and four textbooks. Under his leadership, 28 doctor theses and 97 Ph.D. theses were defended. Over many decades he led a great pedagogical activity. He taught students of the Kyiv branch of the Moscow Institute of Physics and Technology, Department of Radiophysics, Shevchenko Kyiv University, Kyiv Polytechnical Institute (KPI), and Kyiv Mohyla Academy. He is the author of the popular textbook "Physiology of the Central Nervous System", editor and co-author of the textbook "Biophysics". He was a regular participant and organizer of international scientific forums; editor-in-chief of the scientific and theoretical journal of the Presidium of NAS of Ukraine "Reports of the National Academy of Sciences of Ukraine" and the founder of the international journals "Neurophysiology" and "Neuroscience", member of editorial boards of several journals, including "Experimental and clinical physiology and biochemistry", "Ukrainian Neurological Journal" and others.

He is a Laureate of the State Prizes of the Ukrainian SSR and Ukraine in the field of science and technology (1976, 1992, 2003), the USSR State Prize in the field of science and technology (1983), and many nominal prizes: I.P. Pavlov Prize of Academy of Sciences of the USSR (1960), I.M. Sechenov Prize of Academy of Sciences of the USSR (1977), A. A. Bogomoletz Prize of Academy of Sciences of the Ukrainian SSR (1987), and Luigi Galvani Prize, USA (1992).

He was a Member of Parliament of the Ukrainian SSR of the IX, X, and XII convocations; at the XII convocation of the Verkhovna Rada of Ukraine, he was elected Chairman of the Ukrainian Parliament.

For the outstanding achievements in the development of physiological science, significant contribution to the preparation of highly qualified scientific personnel, and active social activity, P.G. Kostyuk was awarded two Orders of the Red Banner of Labor (1967, 1974), two Orders of Lenin (1981, 1984), and the title Hero of Socialist Labor (1984), Diploma of the President of Ukraine for his significant personal contribution to the development of neurobiological science and the creation of a national school of neurobiology (1993) with the Order of Merit III degree (1993), the Order of Prince Yaroslav the Wise V degree (1998), Gold Medal No. 2 Vernadsky of NAS of Ukraine (2005). For a significant contribution to international science, he was awarded the highest international award, namely the World Medal of Freedom, USA (2006). Awarded the gold medal for Ukraine, USA (2007), Awarded the title Hero of Ukraine (2007) and the Leonard Euler Medal of the European Academy of Natural Sciences, Hannover (2009). He was awarded the title "Honorary Doctor of Taras Shevchenko National University of Kyiv" (2009). He was awarded by I.M. Sechenov gold medal of RAS (2009) and many other awards.