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In memory of the Academician N.N. Trapeznikov (1928 - 2001) (To the 90th anniversary)

Relevance: The academician N.N. Trapeznikov has led the development of original Soviet titanium knee, shoulder and hip joint endoprostheses. They could completely restore the limb function and were much cheaper than the foreign analogues.

His pedagogical activity, articles, textbooks and manuals also deserve high praise.

Purpose of the study: to show the main milestones of N.N. Trapeznikov's activity.

Results: In 1974, N.N. Trapeznikov was elected a corresponding member of the Academy of Medical Sciences of the USSR, and in 1978 – its full member (RAMS since 1992). In 1977, N.N. Trapeznikov with a group of co-authors was awarded the State Prize of the USSR for the experimental substantiation, clinical development and introduction of the method of large bone allografts. In the future, the successful development of that area of oncology was twice marked by N.N. Petrov's awards of the USSR Academy of Medical Sciences (1980, 1987). A series of works in the field of immunodiagnostics, immunotherapy and immunochemotherapy of tumors published in the late 1970s and early 1980s has put him forward as a prominent clinical immunologist. The most important areas of that field were: specific and non-specific immunotherapy of malignant tumors, immunochemotherapy and prevention of metastasis in skin melanomas, immunotherapy with the patient's activated lymphocytes. At that time, the use of interleukins has been a completely new approach in cancer therapy.

In recent years, N.N. Trapeznikov has been engaged in endoprosthetics of bones and joints in patients with bone tumors. Endoprostheses of knee and hip joints, the diaphysis of the femur, the proximal end of the shoulder from a new isoplastic material are widely used till today to solve a number of problems of stable fixation of implants. The author substantiates a complex approach to therapy using organ-preserving surgical interventions, highly active antitumour drugs, irradiation, and influence on the immune status of the body.

Conclusion: N.N. Trapeznikov has definitely been one of the creators of modern oncology and, above all, of its scientific foundations.

Keywords: *N.N. Trapeznikov, biography, bone tumors, bone allografts, immunodiagnostics, tumor immunotherapy, sarcomas, skin melanoma, bone endoprosthetics in oncology.*

Introduction. The creative heritage of Nikolay Nikolaevich Trapeznikov deserves a careful examination.

Love for the national science was a distinguishing feature of this scientist, organizer, clinician, and teacher. For more than 35 years, N.N. Trapeznikov was heading and continuously managing the Department of General Oncology of N. N. Blokhin National Medical Research Cancer Centre adhering to foremost views on the content and value of that discipline.

N.N. Trapeznikov was born on May 21, 1928, in Gorky in the family of Nikolay Ivanovich Trapeznikov and Elizaveta Nikolaevna Trapeznikova. In his youth, Nikolay Nikolaevich was actively engaged in sports: skiing, volleyball, basketball (he was the captain of the university team, the champion of the city of Gorky). He always had a big passion for history. His selection of a medical path was occasional to a certain degree. Since 1940, his father, a graduate of the Tomsk Polytechnic Institute, was a Chief Utility Engineer at the construction of Kuibyshev Aviation Plant. Nikolay Nikolaevich also had to encounter with aviation: in 1943, in the midst of the Great Patriotic War, he graduated from the 7th grade and was sent to Kuibyshev Air Force Aviation School where he studied till the end of the war. Nikolay finished comprehensive school in the native city of Gorky and had to face a difficult choice of the university: polytechnic or medical. He had to cast lots...



Nikolay Nikolaevich Trapeznikov (1928–2001)

In 1952, N.N. Trapeznikov graduated with honors from the medical faculty of S.M. Kirov Gorky State Medical Institute and entered a residential program. He became

a physician and a scientist under the guidance of Acad. N.N. Blokhin in the walls of the Institute of Experimental and Clinical Oncology of the Academy of Medical Sciences of the USSR (now – N.N. Blokhin National Medical Research Center of Oncology of the Ministry of Health of Russia). He worked there as a junior scientist, senior scientist, and then the Scientific Secretary of the institute. In 1956, he passed his Ph.D. defense on the topic of “Comparative Evaluation of Materials for Surgical Sutures and Ligatures.” In that period, N.N. Trapeznikov got interested in the tumors of bone and soft tissue, and all his further scientific activities were devoted to the development of that area of oncology. He has headed the search for the new approaches to treatment of those malignancies except surgery. He has developed the principles of using regional intra-arterial chemotherapy in sarcomas of extremities which allowed a significant improvement in the survival rate of patients [1, 2].

The materials obtained during the complex clinical and experimental work were summarized and presented in 1964 in his doctoral thesis “Treatment of Primary Bone Tumors” [3]. N.N. Trapeznikov supervised and participated in determining the indications for the use of preserving surgery in bone neoplasms. The capacity for chemotherapy in the treatment of osteosarcoma metastases was clearly evidenced [4]. Since 1965, N.N. Trapeznikov was the irremovable head of the General Oncology Department at N.N. Blokhin National Medical Research Center of Oncology. In 1967, he was awarded the academic title of Professor in Oncology.

Most of the schemes of radical treatment of malignant tumors of the musculoskeletal apparatus necessarily include extensive surgeries which often cripple and lead to disability. In his numerous papers, N.N. Trapeznikov has developed the principles of remedial treatment of such patients [5]. The team of the General Oncology Clinic has developed and implemented methods for rapid prosthetics after amputations and endoprosthetics. Before those studies, large joints were not subject to prosthetics in oncological pathology. That approach has significantly accelerated rehabilitation of patients and in many cases even allowed restoring their full working capacity [6].

N.N. Trapeznikov has supervised the development of original Soviet titanium endoprostheses of the knee, humeral and hip joints. Those prostheses could completely restore the extremity function and were considerably cheaper than their foreign analogs. The originality of a number of created constructions was confirmed by three inventor's certificates. The priority, relevance and high efficiency of studies and developments headed by N.N. Trapeznikov were highly appreciated by the country's scientific and medical community. In 1974, N.N. Trapeznikov was elected as a corresponding member of the Academy of Medical Sciences of the USSR, and in 1978 – as its full member (since 1992 – the Russian Academy of Medical Sciences).

In 1977, N.N. Trapeznikov with the group of co-authors was awarded the USSR State Prize for his work on the experimental substantiation, clinical development and implementation in practice of the method of large human bone allografts. In the future, the successful development of that direction of oncology was twice awarded with the prizes of N.N. Petrov Academy of Medical Sciences of the USSR (1980, 1987).

N.N. Trapeznikov tended to conduct large-scale and multidiscipline studies in oncology. A range of papers in immunodiagnosics, immunotherapy and immunohistochemistry of tumors published in the late 1970s - early 1980s has promoted Nikolay Nikolaevich to the ranks of outstanding clinical immunologists. The most important matters in that area included the specific and nonspecific immunotherapy of malignant tumors, immunochemotherapy and prevention of metastasis in skin melanomas, and immunotherapy with activated lymphocytes of the patient. The use of interleukins was an entirely new approach to cancer therapy at that time. He headed co-operative study of efficiency of various melanoma and sarcoma treatments methods [7]. His achievements in clinical and experimental area of oncology led to his election as a full member (Academician) of the Department of Physiology of the Russian Academy of Sciences. In his last years, N.N. Trapeznikov headed the activities on endoprosthetics of bones and joints in patients with bone tumors. The endoprostheses of the knee and hip joints, femoral bone diaphysis, proximal end of the shoulder from new isoplastic material became widely used.

Today these endoprostheses allow solving the issues of stable fixation of implants [8, 9]. Preserving surgeries in patients with primary and recurrent tumors of pelvic bones are being developed. During a long period of activity of the General Oncology Department, various schemes of soft tissue sarcoma treatment have been analyzed, with the substantiation of using a complex approach combining organ-preserving surgical interventions, highly active anticancer drugs, radiation therapy, and the impact on the immune status of the body. The use of modern schemes of chemotherapy together with preserving surgery in osteogenic sarcomas has increased the 5-year survival of patients from 10-12 to 50%. The latest innovations include the method of extra-focal compression and distraction osteosynthesis using spike-rod apparatus by Ilizarov to treat pathological fractures of tubular bones. The technique of surgical treatment of the spinal cord decompression in metastatic lesions of the spine was developed together with the Department of Traumatology and Orthopedics of the I.M. Sechenov Moscow Medical Academy. The new methods of osteoplasty, myoplasty and angioplasty in the surgical treatment of bone and soft tissue sarcomas are successfully introduced.

For the results achieved in that direction, in 1999 the authoring team headed by N.N. Trapeznikov was awarded the State Prize of the Russian Federation in the area of science and technology for their paper “Development and Introduction into Clinical Practice of Osteosarcoma Combined Treatment Methods” [1, 8].

As the head of the largest cancer center in Russia and Europe (since 1993), N.N. Trapeznikov could not stand aside from the solution of methodological issues related to the organization of cancer control. Years of work at the International Anti-Cancer Union, close contacts with foreign colleagues from Europe and the USA, an excellent knowledge of the situation with cancer morbidity and the operation of the cancer service in Russia led him to the idea of the need to create the Russian Anticancer Society. It was established in 1994 as an independent and non-professional organization with the goal to engage the public in solving the cancer-related issues. The main priorities in cancer control were defined that allow a quick and efficient reduction of mortality and morbidity.

ty such as a primary prevention of malignant tumors, including fight against smoking and anti-nicotine propaganda, as well as secondary prevention (early detection of cancer through screening programs), the enhancement of fundamental science in order to define the causes and mechanisms of tumor growth, further improvement of methods of diagnostics and treatment of cancer patients, information support and training of staff for cancer service in Russia. Those priorities were presented in the order in which they, according to N.N. Trapeznikov, contribute to the improvement in mortality and morbidity rates of patients.

N.N. Trapeznikov has also done a lot as a lecturer. Since 1975, he was the head of the Department of Oncology of I.M. Sechenov Moscow Medical Academy at N.N. Blokhin National Medical Research Center of Oncology. Traditionally, each academic year started from an introductory lecture of the head of the chair on the achievements and prospects of oncology development. For the thousands of the Academy graduates, their first acquaintance with oncology has started at that Chair, and for some of them, it determined their future life as they became oncologists.

N.N. Trapeznikov has constantly paid a lot of attention to fostering and training of specialists and scientific personnel. Every year, young doctors from many regions of Russia and CIS countries received residency training and postgraduate education at the General Oncology Department. N.N. Trapeznikov was the scientific supervisor for more than 40 doctor and 50 candidate theses. His students have become directors and deans of medical institutes, professors (more than 10), heads of chair and clinical departments.

The Moscow Department of the European School of Oncology (ESO) opened in 1992 at N.N. Blokhin National Medical Research Center of Oncology offers quarterly courses on various aspects of clinical oncology for specialists in oncology. N.N. Trapeznikov has been the regional director and scientific coordinator of ESO operations in Russia and CIS countries [2, 6].

N.N. Trapeznikov is the author of 10 monographs, a textbook on oncology for medical institutes, has near 400 scientific publications. He possessed outstanding organizational abilities and has done a lot in organization of science. He was the manager of the oncology direction of the State Scientific and Technical Program "National Priorities in Medicine and Healthcare", chaired the Interdepartmental Scientific Council on Malignant Tumors, was a presidium member of the All-Russian Scientific Society of Oncologists, the chief oncologist of the Medical Center at the Administrative Department of the President of the Russian Federation, a member of a number of medical, surgical and cancer societies and foundations in Europe and the United States. In 1990, he supervised the establishment of a scientific-practical journal "Vestnik of N.N. Blokhin National Medical Research Center of Oncology" and remained its editor-in-chief till his last days. He was also editorial board member of several Russian and foreign journals.

N.N. Trapeznikov was the Vice-President of the Union for International Cancer Control (UICC), one of the

founders of the WHO International Melanoma Committee, the head of the CMEA Coordination Centre on Oncology. He has initiated the formation of the Board of Directors, followed by the Association for Director of Institutes of Oncology and Radiology and Nuclear Medicine, CIS & Eurasia in January 1994. In December 1996, N.N. Trapeznikov was elected the President of the 1st Congress of Oncologists of CIS countries by more than 1,000 participants of that scientific forum. He was also the scientific supervisor of the 2nd Congress of the Association in 2000 in Kiev.

The merits of N.N. Trapeznikov in cancer control and his achievements in clinical activity were awarded with prestigious state awards — the Order of the October Revolution (1989), the Order of the Red Banner of Labour (1981), the Order of October Revolution (1989), the Order of Friendship of Peoples and of Honor (1994), "For Merit to the Fatherland" III degree (1998), many medals of the USSR and Russia, as well as foreign awards [1].

Nikolay Nikolaevich has died on September 27, 2001. He loved teaching and conducted practical classes with students and doctors besides lecturing. He read a lot, was always aware of the latest novelties in surgery and oncology, could perfectly deliver his thoughts, and widely and successfully used those skills in his lectures.

Modern doctors lovingly honor the memory of the most important representatives of the Soviet and Russian medicine, including the talented scientist and great patriot Nikolay Nikolaevich Trapeznikov.

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