

# **Nikolai V. Konovalov (1900–1966): His Role in the Development of Neurology and the Creation of the Institute of Neurology of the Russian Academy of Medical Sciences**

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*Nikolai V. Konovalov (1900–1966) has left a significant imprint in the history of Russian neuroscience. He was among the coryphaei of international and national neurology. Along with the large number of fundamental scientific papers that have determined several aspects of the development of neuroscience, his contribution has been equally important to the establishment and development of one of the distinguished Russian scientific centers — the Institute of Neurology of the Russian Academy of Medical Sciences, which he headed from 1948 until 1966.*

**Keywords** Nikolai V. Konovalov, Russian neurology, Institute of Neurology, Russian Academy of Medical Sciences, history of medicine

Being among the coryphaei of international and national neurology, Nikolai V. Konovalov (1900–1966) has left a significant imprint in the history of Russian neuroscience. Along with the large number of fundamental scientific papers that have determined several aspects of the development of neuroscience, his contribution has been equally important to the establishment and development of one of the distinguished Russian scientific centers — the Institute of Neurology of the Russian Academy of Medical Sciences. He headed the institute from 1948 up to 1966.

Nikolai V. Konovalov was born to the family of an engineer in St. Petersburg in 1900. He graduated from the Medical Faculty of the Moscow State University in 1924, simultaneously gaining a degree in philosophy at the Philological Faculty of the same university, which shaped his wide interests and manifold erudition. His first academic teacher, for whom he had a lot of gratitude and respect all his life, was Dr. Liveryi Darkshevich, one of the most prominent Russian neurologists. From the very beginning, Konovalov's outstanding abilities drew the attention of his professor. Upon graduating from the Medical Faculty and with Darkshevich's support, Konovalov was granted a position in the oldest neurological clinic in Russia (at "Devichje pole"<sup>1</sup>), which had been instituted in 1890 by Dr. Alexey Kozhevnikov, the founder of the Moscow neurological school. In this clinic Konovalov continued his neurological education as a resident and thus received excellent

<sup>1</sup>"Devichje pole" — is the old name of the place surrounding the Novodevichiy monastery where there are many different hospitals.

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**Figure 1.** Portrait of Nikolai V. Konovalov.

training under the supervision of prominent Russian neurologists, including Dr. Grigory Rossolimo and Dr. Evgueny Sepp. During these years Nikolai Konovalov proved to own outstanding qualities as a subtle clinician and a creative researcher. At the age of 34 years he headed the chair of Neurology at the 3rd Moscow Medical Institute.

From 1935 until 1947, Konovalov was scientific director of the neurological department at the Central Clinical Hospital of the Ministry of Transport. During this period he conducted important research and published a number of papers on the clinical description and pathologic anatomy of various diseases of the nervous system. In 1936 he defended his doctoral thesis *Pathology and Pathophysiology of Cerebellum* that was published as a monograph (Konovalov, 1939). From 1948 until his last days Konovalov was director of the Institute of Neurology of the USSR Academy of Medical Sciences.

His principal research work focused on degenerative diseases of the nervous system, cerebrovascular disease, and neuroinfections. A representative of the Moscow neurological school, he skillfully combined qualities of a brilliant clinician and an excellent neuropathologist; a profound pathophysiological analysis was characteristic in all his work. He wrote 67 papers and 6 books. In his first monograph on multiple sclerosis (1930), written in collaboration with Dr. Vadim Mikheyev and based on a large number of clinical observations, he gave an excellent description of the symptoms, characteristics of the clinical course, and outcomes of the disease. Konovalov considered multiple sclerosis to be an autoimmune disease, which was confirmed later (Konovalov & Mikhejev, 1930).

He conducted studies on chronic epidemic encephalitis as well as on acute poliomyelitis. When an epidemic of poliomyelitis broke out in the 1950s, the Institute of Neurology launched various studies upon his initiative and under his supervision. The results were published in an important monograph on poliomyelitis. His studies of the pathology and pathophysiology of cerebellar disorders, including olivopontocerebellar degeneration,

contributed substantially to the understanding of the functions of the cerebellum and its afflictions. The results of these studies laid the foundation of his doctoral thesis.

He dedicated a substantial part of his life to the fundamental research of relationships between combined injury of the brain and liver. The results of these studies were published in two important monographs devoted to hepatolenticular degeneration, for the second of which he received the Lenin Award from the Soviet government in 1961 (Konovalov, 1948, 1960).

Both monographs on this subject, devoted to hepatolenticular degeneration (hepatocerebral dystrophy), are unique in using vast factual data and are characterized by a great depth and thoroughness of analysis of published and his own clinical and histological data, as well as by an unsurpassed mastery of word. In the clinical section of these volumes the author offers a new classification of forms of the disease based on their histopathological and clinical characteristics. He described two new forms of hepatolenticular degeneration designating them as early (rigid arrhythmohyperkinetic) and extrapyramidal-cortical. Further histopathological description and subtle analysis of morphological alterations of the nervous system allowed him to put forward a concept of two principal components — cytological and angiotoxic, which play a decisive role in the clinical manifestations of the disease. The data on the disturbances of protein and copper metabolism obtained through the latest international clinico-physiological and biochemical investigations bear great scientific importance for the understanding of the pathogenesis of the disease. The pathogenetic therapy by thylolic copper eliminating compounds, which was developed on the basis of this data, opened new prospects for treatment of the disease that had been considered lethal previously. The work addressed important problems of theoretical medicine including the relationships between internal organs and the central nervous system, as well as the connection between endogenous and exogenous factors, which are relevant not only for neurology, but also for a number of other medical fields. One could not write openly about genetics in the USSR in those years. However, by analyzing the literature and the author's own observations of families with several children affected by this disease, the thoughtful reader could read "between the lines" about the decisive role of genetics in the origin of hepatolenticular degeneration. The outstanding achievements of Konovalov in the research of hepatolenticular degeneration justified the eponym "Wilson-Konovalov's disease," as it is still called in Eastern European countries.

Konovalov's studies of amyotrophic lateral sclerosis also deserve to be mentioned here. In cooperation with his staff, he managed to collect new data about the clinical picture of this severe disease, and he received important data in particular about its etiology and pathogenesis (Konovalov, 1958). In his monograph *Anterior Subacute Poliomyelitis* (1964), Konovalov presented an excellent description of this chronic disease showing its nosologic entity and at the same time pointing at its relationship with amyotrophic lateral sclerosis (Konovalov, 1964). The last few months of his life, Konovalov was writing a book on amyotrophic lateral sclerosis, but death prevented him from accomplishing the task.

### **The Institute of Neurology in Moscow**

Let us return to the first years after the establishment of the Institute of Neurology Moscow on April 1, 1945, at the place of the former clinic for neurological diseases of the All-Union Institute of Experimental Medicine. The Institute of Neurology was established by Dr. Nikolai Graschenkov, a prominent Soviet neurologist and member of the Academy of Sciences, who headed the institute for a relatively brief period, up to 1948. Graschenkov's contribution as the first director was, in collaboration with a group of



**Figure 2.** Institute of Neurology RAMS.

prominent scientists, to determine the clinico-physiological and morphologic directions of the institute's future work. He invited Dr. Nikolai A. Bernstein, one of the first-rate Soviet neurophysiologists who supervised studies on the problem of pathology of movement. Meanwhile the well-known scientist Alexander R. Luria was working on problems of psychology. During the first years the institute had two main objectives determined by the war and postwar conditions: the study of traumatic injury of the nervous system and neuroinfections. To accomplish this work the institute invited a number of outstanding specialists, including Dr. Ivan Glazunov and Michael Chumakov, a prominent virologist.

From 1947 until 1950 the institute was given the task of conducting research on acute poliomyelitis, as an epidemic had broken out in the USSR at that time. The clinical aspects of the project were studied under Konovalov's supervision at the 1<sup>st</sup> Infectious Diseases Hospital and lasted about 15 years. The virological research was conducted by Dr. Chumakov and his colleagues, and it included experiments on apes and other laboratory animals. The study of severe, at first, heavy, and atypical manifestations of poliomyelitis, later on, and of similar diseases significantly broadened the understanding of acute poliomyelitis and provided the basis for the development of methodological instructions that laid the foundation for fighting this ailment. The attenuated Sabin vaccines that were used in a later phase of the project provided an almost complete eradication of poliomyelitis in the country. The study of poliomyelitis gave a special impetus to the treatment of respiratory failure. This aspect of the research is closely associated with Dr. Lubov Popova, the founder of neuro-reanimation in Russia. She opened the first department for the treatment of respiratory paralysis for patients with bulbar and bulbospinal forms of acute poliomyelitis, using a Swedish-model respiratory apparatus, the first in the USSR.



**Figure 3.** Portrait of Roman A. Tkachev.

In early 1960s the institute started a new direction of studies of amyotrophic lateral sclerosis and spinal amyotrophy, as well as of demyelinating diseases and slow neuroinfections. These studies were supervised by Dr. Ovakim Khondkarian, a prominent neurologist.

At the end of 1964, under the guidance of Konovalov the existence of the Institute of Neurology took a new turn: it moved to a new building at Volokolamskoe Shosse and was able to expand and to create new departments and laboratories, including a neurogenetic department that became the first unit with this specialization despite the persecution of genetics in the USSR. Dr. Roman Tkachev headed the department and it is by the efforts of this excellent clinician, successor to the prominent neurogeneticist Dr. Sergey Davidenkov, that a new school of neurogenetics was established that is still active today and uses the most advanced molecular-genetic methods of research.

During the 18-year period in the director's office at the Institute of Neurology, Nikolai Konovalov managed to transform it into a brilliant institution with several clinical departments working on cerebrovascular pathology (etiology, pathogenesis, treatment, rehabilitation) and so-called "slow neuroinfections." The institute created the first clinical department of neurogenetics and the respiratory-reanimation unit. Well-equipped laboratories of morphology of the central nervous system, biochemistry, electrophysiology, psychology, etc., which were headed by well-known scientists, were created: Drs. A.N. Koltover, F.V. Bassin, E.A. Zhirmunskaya, Yu.S. Yusevich, E.S. Bein, L.G. Chlenov, Z.Lurie, A.A. Mittelschtedt, and others. They all worked in close collaboration with clinicians.

The work of Dr. Fillipp Bassin, an outstanding pathophysiologist, bears significance for the understanding of the pathophysiology of organic and functional disorders of the nervous system. In his papers he analyzed signs characteristic for a breakdown of the so-called "psychological defense forces" of the organism. These ideas were further developed in his

theoretical works devoted to problems of neurism,<sup>2</sup> psychosomatic medicine, and of the unconscious conditions. In his monograph *The Problem of the Unconscious* (Bassin, 1968), which was translated into many languages, Bassin criticized certain aspects of psychoanalysis and put forward an original concept of unconscious psychic activity and its role in clinical pathology (Bassin, 1968).

Speaking about the brilliant team of the Institute of Neurology of those years — a well-deserved object of pride of Nikolai Konovalov — special attention should be given to Dr. Evgeny V. Schmidt, who was deputy director since 1949 and headed the institute after Konovalov's death in 1966 until 1985.<sup>3</sup> Konovalov and Schmidt had worked together at the Neurological clinic at the First Moscow Medical Institute during several years. They were true “companions-in-science,” associates in science and life alike: for many years they shared one office, solving complex scientific and organizational problems together.

Under Schmidt's guidance the institute launched research of vascular disorders of the brain and he himself is considered by right to be the founder of vascular neurology in the country. Later vascular diseases of the brain became the principal object of the scientific work of the institute.

One of the most significant achievements made by the institute in the field of cerebrovascular diseases was the organization of a large program of investigations of the role of pathology of extracranial arteries in the genesis of ischemic stroke. These studies, initiated in our country by Schmidt and continued by a large team of researchers — clinicians, morphologists, radiologists (Drs. N.V. Vereschagin, D.N. Dzhibladze, A.N. Koltover,



**Figure 4.** Portrait of Nikolai V. Konovalov and Evgeniy V. Schmidt.

<sup>2</sup>Pavlov's doctrine of “neurism” — the view that all physiological operations and adaptations were regulated by the nervous system.

<sup>3</sup>From 1985 till 2004 the Institute of Neurology was headed by Dr. Nikolai Vereschagin, a member of the Academy of Medical Sciences; from 2004 until present time Dr. Zinaida Suslina is the director of the institute.

L.K. Bragina, L.G. Lyudkovskaya, I.V. Ganushkina, and others) — contributed to the development of new approaches to diagnostics and treatment of vascular diseases of the brain (including surgical methods).

Regarding the research methods it should be mentioned that the staff of the Institute of Neurology had the doubtless leadership in the development and introduction to a wide neurological practice in our country of a number of most significant and, for the period, new diagnostic and research technologies — cerebral angiography (L. Bragina functional), electroencephalography (Drs. E.A. Zhirmunskaya and V.A. Chukhrova), electromyography (Dr. Yu.S. Yusevich), and Doppler ultrasound (Y. Nikitin).

In 1965 a rehabilitation department, the first clinical department of this type in the country, was established at the institute. The institute became a pioneer and a recognized “trendsetter” in studying the recovery of higher cortical functions thanks to, first of all, the outstanding neuropsychologists and aphasiologists working there (Alexander Luria and E. Bein).

The Neurosurgical School of the Institute has deep roots. In the early 1960s, a small surgical group headed by Dr. Yu.V. Bogatyrev was formed at the institute. In 1965, a full-fledged neurosurgical department was established. Konovalov invited Dr. Eduard I. Kandel, an prominent scientist and a pioneer neurosurgeon, to head the department. Kandel is considered the founder and a classic of stereotaxic and functional neurosurgery in the country. Results of stereotaxic surgery of extrapyramidal diseases have been presented in numerous monographs that were published in our country and abroad (Kandel, 1965).

The pathophysiological school of the Institute of Neurology originates from the work of Dr. B. Klosovsky, a well-known researcher and a member of the USSR Academy of Medical Sciences. The serious experimental facilities during many decades distinguished the institute from the majority of other neurological institutions and guaranteed a fundamental character of the corresponding research. Among the most significant results in this field are a concept of autoregulation of brain blood flow, new features of collateral circulation in the brain in normal and pathological conditions, and the study of the role of autoimmune processes in the nervous system in various disorders.

For decades the institute coordinated research in neurology at a national level. It became a World Health Organization regional center on neurosciences. The institute has always worked to strengthen international scientific contacts: the history of a many years collaboration includes a number of leading scientific centers in Japan, France, the United States, Canada, Israel, Poland, Romania, Slovakia, and other countries.

Nikolai Konovalov managed to create a unique scientific school and devoted much attention to young researchers. He trained numerous disciples in the best traditions of Russian neurology, developing skills of profound clinical analysis, thorough assessment of structural alterations, and pathophysiological studies of disease. Open-mindedness, classic academic traditions, a brilliant talent as a clinician, and a humane attitude to patients were the features that struck everyone who came in contact with Konovalov at work. He possessed outstanding teaching skills: his lectures were impressive and always gathered large audiences that enjoyed deepness and originality. He was notable for his honesty and uncompromising attitude. In 1952 during the “case of the cosmopolitans” and the “Doctor’s Plotcase of physicians,”<sup>4</sup> he was among the few who refused to sign the letter that accused innocently convicted prominent doctors and scientists.

<sup>4</sup>A group of prominent medical experts, mostly Jewish, who worked or did consultations at the Kremlin hospitals had been arrested and charged with plotting to poison or to assassinate (through mistreatment) the leaders of the Party and government. A month after Stalin’s death (March 5, 1953) the new leadership admitted that the charges had been entirely invented by Stalin and his followers. All of the doctors were soon released.

Konovalov was a charming and brilliantly educated person. Deep knowledge of history, literature, and the arts made him an utterly interesting interlocutor. He was able to speak many foreign languages and had knowledge of ancient Greek and Latin, which he used to read classics in the original translation. He had a wonderful family. His wife was a well-known infectiologist in Moscow and a woman of rare beauty and personal merit. Their children became prominent specialists each in their sphere: the elder, Academician Alexander N. Konovalov is now director of the Institute of Neurosurgery, a talented and prominent neurosurgeon, while the younger son, Yury Konovalov, is a well-known architect. Many of Konovalov's disciples became prominent scientists, heads of departments, professors, and leading specialists (L.M. Popova, D.K. Lunev, N.V. Lebedeva, N.V. Vereshagin, L.G. Stolyarova, I.V. Gannushkina, T.L. Bunina, E.D. Markova, D.N. Dzhibladze, I.A. Ivanova-Smolenskaya, A.S. Kadykov, I.A. Zavalishin, and others). Some of these outstanding neurologists deserve personal tributes to be given in special papers covering more recent achievements of the Institute of Neurology, which is not a subject of this article. Konovalov has left a bright and deep imprint in the history of neurology and is indeed among the coryphaei of international and national medicine.

His disciples continue his work, inspired by his achievements and the memories of this outstanding and talented researcher. This memory will be passed to the next generations. Konovalov's work and image continue to inspire young clinical researchers who, despite all complexity of today's life, have committed themselves to neurology and the preservation of the scientific traditions set out by Nikolai Konovalov.

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