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Georgy Fedorovich Lang (on the occasion of the sesquicentennial anniversary)

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Resume

The anniversary article presents the life and creative path of the outstanding Russian Soviet scientist, physician and teacher Georgy Fedorovich Lang (1875–1948), one of the founders of Russian cardiology. The scientific achievements of the scientist are shown, a special place among which is the creation of the concept of hypertensive disease, a disease of the neurohumoral apparatus regulating blood circulation, caused by mental trauma and overstrain of the central nervous system.

Key words: Georgy Fedorovich Lang, hypertensive disease, founder of Russian cardiology, etiology of hypertensive disease

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Георгий Федорович Ланг (к полуторавековому юбилею)

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Резюме

В юбилейной статье представлен жизненный и творческий путь выдающегося русского советского ученого, врача и педагога Георгия Федоровича Ланга (1875–1948), одного из основоположников российской кардиологии. Показаны научные достижения ученого, особое место среди которых занимает создание концепции гипертонической болезни — вызванной психической травматизацией и перенапряжением центральной нервной системы болезни нейрогуморального аппарата, регулирующего кровообращение.

Ключевые слова: Георгий Федорович Ланг, гипертоническая болезнь, основоположник российской кардиологии, этиология гипертонической болезни

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Georgy Fedorovich Lang (Photo 1) is an outstanding internist, scientist and doctor, educator and organizer of healthcare, who plays the historical role of one of the founders of Russian cardiology. He was born on July 16 (28), 1875 in St Petersburg. Georgy was only 10 years old when his father, a Russified German artisan, died. Despite the difficult financial situation of the orphaned family, the gifted son got an excellent education through the efforts of his mother. At first, it was the Peters Schule, the gymnasium of the German community in St Petersburg, a venerable educational institution with long traditions of Russian and German pedagogy. Then there was the brilliant Imperial Military Medical Academy, one of the best medical schools in Russia, which he entered in 1894.

In those years, at the academy, which until 1881 was named The Imperial Medical and Surgical Academy, the leading departments and clinics were headed by students of brilliant scientists — physiologist I. M. Sechenov and therapist S. P. Botkin, who worked at the academy in the second half of the 19th century and left it shortly before the admission of G. F. Lang. Professor Ivan Mikhailovich Sechenov is one of those who opened the way for the world to understand the patterns of the brain, the author of the revolutionary book “Reflexes of the Brain” (1863). Professor Sergey Petrovich Botkin founded modern clinical medicine in Russia, namely therapy, and became the progenitor of many areas bordering on therapy. Characteristic features of thinking in his numerous scien-

Photo 1. Georgy Fedorovich Lang (1875–1948)

tific schools were the consideration of diseases not as local anatomical defects, but as sufferings of the whole organism, in which regulatory connections are disrupted and complex, interrelated pathological processes occur.

G. F. Lang graduated from the Academy in 1899 as a "doctor with honors" and with his name inscribed on the marble plaque of the Academy. Over the next three years, he improved his medical knowledge and skills at the Department of Diagnostics and Therapy of the Academy, which inherited Botkin's principles. Then, due to the traditional privilege created at the academy for the best graduates, in 1903–1904 G. F. Lang worked in the best clinics in Germany and France which were headed by Friedrich Kraus (Berlin), Friedrich Műller (Munich), Ludolf von Krehl (Tübingen), Georges Fernand-Isidore Widal and Anatole Chauffard (Paris). He also visited the Pasteur Institute in Paris (which was guided by that time by Pierre Émile Duclaux). G. F. Lang maintained contacts with foreign colleagues in the future, including the first post-revolutionary years. It should also be noted that I. M. Sechenov and S. P. Botkin, as well as I. P. Pavlov initially became scientists with the participation of the European luminaries — Karl Ludwig, Johannes Peter Muller, Emile Heinrich Dubois-Raymond, Robert Virchow, Ludwig Traube, Claude Bernard, Armand Trousseau, as well as laboratories, institutes and clinics that they headed. There was a convergence of European and Russian scientific medical schools.

Shortly after returning from an internship abroad, starting in 1905 and (with short interruptions) until the end of his life, G. F. Lang was associated with the St Petersburg Women's Medical Institute (later its name was changed: Petrograd Medical Institute, then the I. P. Pavlov First Leningrad Medical Institute and, finally, the First St. Petersburg State Medical University named after I. P. Pavlov, or Pavlov University) Photo 2. The original Women's Medical Institute was the first in Russia and the only higher education institution in Europe to train female doctors, who at that time in our country did not yet have access to education along with men.

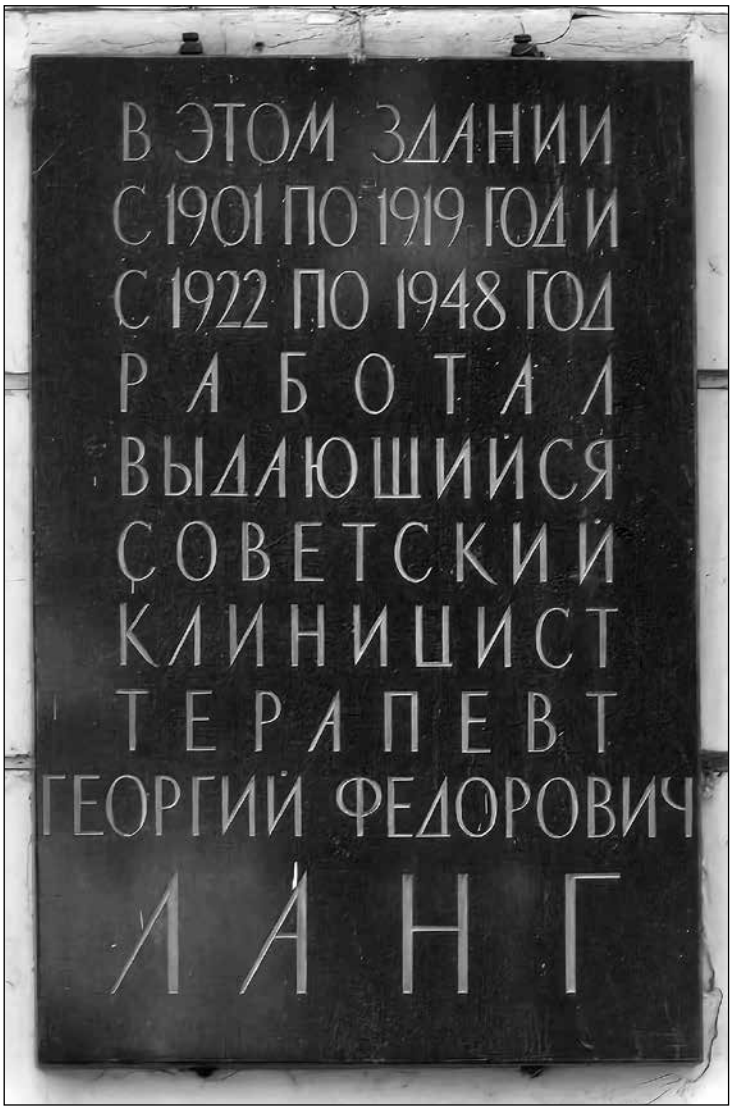

Photo 2. Memorial plaque on the building of the Department of Therapy № 2 with the clinic named after G. F. Lang at Pavlov University (St Petersburg, Russia)

Direct disciples of S. P. Botkin headed many clinics and departments in this new educational institution Photo 3.

G. F. Lang showed interest in research early, he published his first scientific work while studying at the fourth year of the academy. Over time, he turned into an encyclopedic versatile scientist who made significant contributions to many areas of internal medicine (hematology, pulmonology, pathophysiology, gastroenterology and rheumatology). However, his focus was on heart and vascular diseases: endocarditis and myocarditis, cardiosclerosis and heart failure, rhythm and conduction disorders, coronary heart disease, atherosclerosis and arteriosclerosis, arteritis, as well as methods for recognizing these diseases. In 1934, the scientist created the Classification and Nomenclature of Diseases of the circulatory system [1], which was discussed and adopted the following year at the XII All-Union Congress of Therapists, and remains relevant today, despite the clarification of a number of previous concepts and the discovery of new, previously unknown diseases. G. F. Lang's contribution to the description and explanation of the essence of "hypertensive disease" was particularly significant. He classified it as a disease of the "neurohumoral system regulating blood circulation" [1]. The name of the disease he proposed was not a simple translation from any foreign language term, it was successfully adopted in our country, also due to the clear underlying concept.

The beginning of G. F. Lang's study of hypertension laid back in 1907–1908. That time (shortly after N. S. Korotkov described the method of measuring blood pressure) G. F. Lang and S. M. Mansvetova (one of the first female doctors in our country) prepared two important scientific reports: "On the issue of the

clinical methodology for determining blood pressure" and "On changes in blood pressure in heart patients with compensation disorder". They were first reported at a meeting of the Society of Russian Physicians, which was chaired and highly appreciated by I. P. Pavlov. Soon, the abstracts of the reports were published in the Society's abstract book [2, 3] and in a leading German journal (The German Archive of Clinical Medicine) [4, 5]. Thanks to this, the reports were noticed and began to be cited abroad. This is how the clinical presentation of the Russian know-how — the method of measuring blood pressure according to N. S. Korotkov took place.

In the clinic, G. F. Lang used a new method primarily to study the variability (behavior) of blood pressure in healthy and sick people, paying attention not only to hypertension, but also to hypotension, which he noted, in particular, in cholera. At the same time, he analyzed the problem theoretically, carefully studying the emerging scientific information. In 1922, he published a detailed article "On hypertension" [6]. In this work, G. F. Lang gave clear and reasoned answers to questions that had been discussed for decades without definite results: about the relationship of arteriosclerosis and glomerulosclerosis with arterial hypertension, rejecting the causal role of these changes in its genesis, as well as about the relationship between hypertension and chronic nephritis, noting their secondary, usually concomitant nature. In connection with these conclusions, the scientist again turned to the question of the etiology of the disease and put forward an original concept.: "*There is no doubt that the increased excitability of the central nervous system, characteristic of some psychoneuroses, can contribute to the development of increased blood pressure and maintain it at a high level. However, this reason is hardly enough to develop hypertension… The blood pressure level is regulated by the combined influence of the nervous system and endocrine gland secretions*" [6].

What was the basis for this statement, or rather, the appearance of this hypothesis? First of all, Lang's own clinical observations, as a doctor, and the logic of Lang's reflections on them, as a scientist who realized the insufficiency of existing explanations for the causes and mechanisms of the disease and felt the need to find a convincing alternative. A powerful external stimulus was the teaching of higher nervous activity and neuroses created at that time by an older contemporary and St Petersburg genius Ivan Petrovich Pavlov.

Together with his collaborators, G. F. Lang paid much attention to the consistent collection of scientific arguments to substantiate his hypothesis of the etiology of hypertension. For this purpose, only clinical observation was available. The behavior of blood pressure in different situations was studied (at rest, including sleep, under physical and psycho-emotional stress, including during professional activity, and when eating). The methodology for studying physiological problems, in particular, the regulation of blood pressure, created by I. P. Pavlov, could serve as a basis for this. The work on the variability of blood pressure in experimental animals was carried out by this scientist as a result of an internship at the Karl Ludwig Institute in Leipzig in 1884–1886 [7, 8]. However, Pavlov's work was original, in many ways prioritized: blood pressure monitoring, pressure dependence on emotional and mental status and other physiological characteristics of the animal.

G. F. Lang believed that *"the underlying dysfunction of the apparatus regulating blood pressure occurs primarily in the cerebral cortex, and then in the hypothalamic centers, and consists in a state of their increased excitability"* [9]. In the first half of the last century, it was impossible to assess the functional state of subcortical centers in patients, as well as in experiments in animals. The validity of this part of the hypothesis was confirmed many decades later by the efforts of neurophysiologists equipped with the most modern experimental methods [10].

Meanwhile, at the Lang clinic, patients with hypertension had their type of higher nervous activity and a history of mental trauma analyzed, and appropriate physiological and pharmacological tests performed. History itself has conducted several large-scale clinical and epidemiological tests. Back in 1922, that is, during the period of post-revolutionary devastation, famine, and civil war, in his article, G. F. Lang noted: *"In recent years … I have had to observe many hypertensive patients … Now, of course, there can be no question of excessive nutrition for a long time… On the other hand, the effects of impaired endocrine function and increased mental and nervous excitability are, in my opinion, even more pathologically important for hypertension than previously thought"* [6].

Significantly more severe conditions of historical experience were observed two decades later during the World War II. During the siege of Leningrad, in the active army, including at the front line, during the evacuation from the territories occupied by the enemy, the staff of the G. F. Lang clinic continued to study the occurrence and course of hypertension. Summarizing these scientific observations, he wrote in his mono-

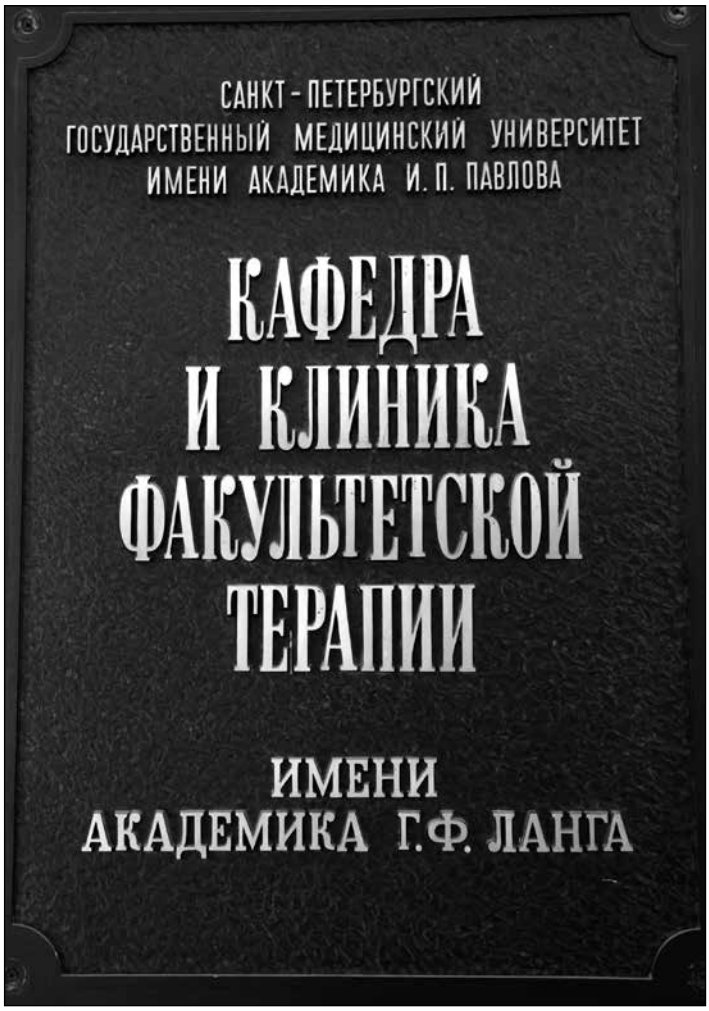

Photo 3. A plaque at the entrance to the Clinic of Internal Diseases № 2 named after academician G. F. Lang at the Pavlov University, St Petersburg

graph: *"All Leningrad authors unanimously note that mental trauma is a decisive factor in the development of hypertension*," and as another argument cited the history of hypertension that he developed during the siege of Leningrad and the subsequent evacuation.

G. F. Lang died on July 24, 1948. In 1950, the fundamental monograph "Hypertension" was published [9]. The book is the result of four decades of work on the problem, and it concludes: *"I do not deny the importance of endocrine and other factors in the etiology and pathogenesis of hypertension, and I fully admit that in some cases they may be significant… In the vast majority of cases, the factor of mental trauma and overstrain of the central nervous system by negative effects and emotions plays a decisive role in the development of hypertension."* [9].

Conflict of interest/ Конфликт интересов
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Author contributions

V. N. Khirmanov — general, drafting the manuscript, critical review, manuscript approval

Вклад автора

В. Н. Хирманов — концепция, написание рукописи, научное редактирование, критический обзор, критическая оценка интеллектуального содержания рукописи, утверждение текста рукописи.

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