

РЯЗАНСКИЙ ГЕНИЙ РОССИИ
(к 170-летию со дня рождения академика И.П. Павлова
и 115-летию присуждения ему Нобелевской премии)

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Статья посвящена 170-летию со дня рождения академика И.П. Павлова и 115-летию присуждения ему Нобелевской премии. Авторами отражены основные направления в научной работе великого ученого и подчеркивается мысль об актуальности результатов его исследований для современной медицины в области физиологии кровообращения, пищеварения и высшей нервной деятельности.

Ключевые слова: академик И.П. Павлов; основные направления научных исследований; значение для медицины.

RYAZAN GENIUS OF RUSSIA
(to the 170th anniversary of the birth of academician I.P. Pavlov
and the 115th anniversary of the Nobel prize)

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The article is devoted to the 170th anniversary of academician I. P. Pavlov (1849) and the 115th anniversary of the Nobel prize (1904). The authors reflected the main directions in the scientific work of the great scientist and emphasized the relevance of the results of his research for modern medicine in the field of physiology of blood circulation, of digestion and of higher nervous activity.

Keywords: academician I.P. Pavlov; main directions of scientific research; importance for medicine.



In 2019 we celebrate the 170th year birthday of a citizen of Ryazan, outstanding physiologist I.P. Pavlov (1849) and the 115th year of awarding him with the Nobel prize (1904). These remarkable dates are celebrated by scientists worldwide.

In the scientific activity of I.P. Pavlov that lasted more than 60 years, three periods, or three directions may be distinguished.



Fundamental research works of the scientist were in the field of physiology of circulation, physiology of digestion and in the final stage of his scientific activity I.P. Pavlov created a new trend – physiology of higher nervous activity. In the laboratory of the clinic of a famous therapist S.P. Botkin, I.P. Pavlov performed a number of research works concerning neuro-reflex regulation and self-regulation of circulation. In these works I.P. Pavlov disco-

vered the augmentor nerve of the heart (1883). The result of the work in the clinical laboratory of S.P. Botkin was the doctor's thesis of I.P. Pavlov «The Centrifugal Nerves of the Heart» defended by him on May 21, 1883. Pavlov's research works served the ground for formation of systemic approach to investigation of physiological functions which later permitted his pupil P.K. Anokhin to create a new trend in physiology – theory of functional systems [1,2].



Fig. 1. I.P. Pavlov (to the right) and P.K. Anokhin (to the left) (1936)

In 1894 I.P. Pavlov started systematic research in physiology of digestion in the first in the world special surgical department for animals opened on money of A. Nobel in Institute of Experimental Medicine [3]. In surgeries, the scientist used all medical achievements of XIX century: asepsis, antiseptis, narcosis.

The determining factor in the scientific work of I.P. Pavlov was aspiration to study the integral organism in conditions approximated to natural ones.

As early as in student years, Ivan Petrovich acquired a good surgical training from his teacher I.F. Cyon and mastered surgical techniques which he used in creation of a new surgical trend – development of surgical operations on digestive organs of animals,

that could permit objective study of their functions [3].

Surgical ingenuity permitted I.P. Pavlov to perform such virtuosic surgeries as Ekk's operation, transection of *vagi* on the neck of an animal, operations with fistula, a 'small stomach' operation (known as 'Pavlov's pouch'), esophagotomy, etc.

Surgery on esophagotomized dogs with the fistula of the stomach, and also on dogs with preliminarily formed 'small stomach', permitted to discover a nervous mechanism controlling gastric secretion, and also to obtain pure gastric juice. As a medicinal agent, this juice was eagerly bought in Germany. Money made from selling juice was poured by Ivan Petrovich in development of his laboratories and in support of the laboratory workers.



Fig. 2. Operations in the first in the world operation room for animals opened in 1894 in Institute of Experimental Medicine, IEM (Saint-Petersburg, 1904)

The idea of the internal reasonability (adaptation) of the functions of animal found full-scale development in Pavlov's works on physiology of digestion. I.P. Pavlov regarded a constant tendency of an organism to the internal and external equilibrium as adaptation (from positions of Darwinian theory) or as reasonability from the point of view of subjective, anthropometric theory. The idea of reasonability was needed by I.P. Pavlov as a source of different scientific hypotheses and as a constant stimulus for studying the essence of life phenomena.

The results of research were generalized by I.P. Pavlov in his classic monograph «Lectures on the Work of the Main Digestive Glands» (1897). The monograph included eight lectures, in each of which Ivan Petrovich touched upon the aspect of 'psychic' secretion as an important factor of digestion.

I.P. Pavlov's concept of the psychic reflex being an important factor of regulation of digestion on different levels of the gastrointestinal tract, is of special importance nowadays. I.P. Pavlov's psychic reflex, as a complex regulator of feeding behavior, included many concepts of the modern science of be-

havior. Use by I.P. Pavlov of such concepts as reasonability, purposeful nature of feeding behavior, demand, shows his attention to psychophysiology of behavior. In the diploma of the Nobel prize it was stated that I.P. Pavlov 'recreated' physiology of digestion. A Scandinavian physiologist Tigerstedt wrote that Pavlov's works in the field of physiology of digestion were fundamental for all times [4].

Classic works of I.P. Pavlov on physiology of digestion gained him the glory of a classic of natural sciences and opened the prospects for construction of other important sections of physiology, first of all, physiology of the higher nervous activity. I.P. Pavlov turned from physiology of digestion to research in the new field – physiological bases of purposive behavior of animals and humans. Being an experimenter from top to toe, I.P. Pavlov refused from the method of subjective psychology and turned to objective examination of the psychic events.

In October 1904 the Professor Council of Karolinska Institute (Sweden) awarded I.P. Pavlov, the first Russian scientist and the first world physiologist, the Nobel prize in physiology and medicine.

The formula of the award sounded: «In recognition of his works on digestion, through which knowledge of vital aspects of the subject has been formed or enlarged».

I.P. Pavlov concluded his Nobel speech with such words: «Actually, only one thing is of interest in life – our psychic content. However, its mechanism was and remains to be buried in deep darkness. All human resources, art, religion, literature, philosophy, historical sciences – all these things united their efforts to cast light on this darkness. But a human has one more powerful resource at his disposal – natural science with its strictly objective methods» [5].

It was a challenge if to remember what was said about psyche by a famous English physiologist Charles Sherrington in 1904: speaking about the problem of studying psyche he said that psyche as the final and highest organization of an organism remains unclear and is still in the place where Aristotle left it 2000 years ago.

Through use of the universal method of the natural science – experiment – I.P. Pavlov managed to proceed to investigation of the higher nervous activity the results of which

were generalized in the classic works «20-Year Experience of Objective Study of Higher Nervous Activity (Behavior) of Animals» (1923) [6] and «Lectures on the Work of Large Cerebral Hemispheres» (1927) [7].

Works of I.P. Pavlov and of his pupils in this direction provided new understanding of mechanisms of formation of temporary connections in conditioning, of the types of higher nervous activity of animals and humans, of the mechanisms of dynamic disorders in the higher nervous activity in experimental neuroses, of systemic character of the work of cerebral hemispheres. I.P. Pavlov's views on the fundamental mechanisms of some physiological functions permitted him to discuss the psychosomatic interrelations in different mental and neurologic diseases with clinicians [8].

It is difficult to reflect all depth and multifacetedness of the scientific heritage of academician I.P. Pavlov in a small memorial article. However, the facts obtained in modern scientific research, confidently confirmed the truth of the views of the great Scientist on the ways of development of physiology and on the necessity to use its achievements in modern medicine.

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Дополнительная информация [Additional Info]

Конфликт интересов. Автор декларирует отсутствие явных и потенциальных конфликтов интересов, о которых необходимо сообщить, в связи с публикацией данной статьи. [**Conflict of interests.** The author declares no actual and potential conflict of interests which should be stated in connection with publication of the article.]

Участие авторов. Загрина Н.А., Козеевская Н.А. – сбор, перевод материала, написание текста, Лапкин М.М. – концепция статьи, редактирование. [**Participation of authors.** N.A. Zagrina, N.A. Kozeyevskaya – collection, translation of material, writing, M.M. Lapkin – article concept, editing.]

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Цитировать: Загрина Н.А., Лапкин М.М., Козеевская Н.А. Рязанский гений России (к 170-летию со дня рождения академика И.П. Павлова и 115-летию присуждения ему Нобелевской премии) // Российский медико-биологический вестник имени академика И.П. Павлова. 2019. Т. 27, №3. С. 413-417. doi:10.23888/PAVLOVJ2019273413-417

To cite this article: Zagrina NA, Lapkin MM, Kozeyevskaya NA. Ryazan genius of Russia (to the 170th anniversary of the birth of academician I.P. Pavlov and the 115th anniversary of the Nobel prize). *I.P. Pavlov Russian Medical Biological Herald*. 2019;27(3):413-7. doi:10.23888/PAVLOVJ2019273413-417

Поступила/Received: 15.08.2019
Принята в печать/Accepted: 16.09.2019