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Congratulatory message from the President of the International Union of Physiological Sciences (IUPS) regarding the establishment of world-class research centre (WCRC) Pavlov Centre for Integrative Physiology

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In 2021, one of the most exciting developments in global physiology was the establishment of WCRC Pavlov Centre for Integrative Physiology: Medicine, High-Tech Healthcare and Stress Resilience Technologies in the Russian Federation. I would like to extend my heartfelt congratulations to member of the Academy of Sciences Ludmila Filaretova, who was the central pillar of the monumental undertaking required to accomplish this formidable task. I also wish to pay tribute, in my capacity as the President of IUPS, to the contribution of Russian physiologists to global physiology.

The founders of this new WCRC include the Institute of Physiology and the Institute of Evolutionary Physiology and Biochemistry, named after two distinguished Russian physiologists: Ivan P. Pavlov and Ivan M. Sechenov. Ivan Pavlov, who was the first Russian Nobel Laureate for physiology or medicine, contributed to many areas of physiology and neurological sciences. He is most famous for his work on classical conditioning behaviour. Ivan Sechenov is widely seen as the “father of Russian physiology and scientific psychology” for his evolutionary discovery of higher brain centres inhibiting the spinal reflex. He is also considered one of the originators of objective psychology. Both names are the pride of both Russian and global physiological and scientific community.

Member of the Academy of Sciences Ivan Pavlov founded the Institute of Physiology in 1925 and was its first director. In its early days, Institute research mainly focused on using conditioned reflexes to study the physiology of the brain hemispheres. From there, it expanded to brain functions in primates, structural and physio-chemical foundations of animal and human brain physiology and psychology, evolutionary and comparative physiology in the 1940–1950s; cell biochemistry and biophysics and physiology of sensory and visceral systems in the 1960–1970s. With the advances in cellular and molecular biology and genetics in the 1980s and 1990s, research interests of faculty members were extended to molecular, cellular, genetic and systemic mechanisms of adaptive behaviour, principles of information perception and processing by sense organs and structural-functional organisation of central control mechanisms of the visceral organs. Peripheral and central mechanisms regulating circulation, vascular tone and respiration were introduced in the 2000s. Most recently, the Institute also focused on neurophysiological mechanisms of spinal locomotion and the role of the genes controlling the nervous system, as well as adaptation and learning processes.

At present, the Pavlov Institute of Physiology of the Russian Academy of Sciences is the largest physiological institute in Russia engaged in research

in all the fields of physiology. The Institute in the City of Science built by Ivan Pavlov at Koltushi remains a Mecca for physiologists around the world, and is one of the best places in the world to brainstorm ways to promote physiology, encourage the interchange of ideas and conduct vibrant international research in the field of integrative physiology. I had the pleasure to personally witness the—very successful—first brainstorming event aimed at promoting physiology, which was held at the Pavlov Institute of Physiology on 23–26 September 2019, in conjunction with the 170 Anniversary of the Birthday of member of the Academy of Sciences Ivan P. Pavlov. I deeply appreciate the prominent physiologists from around the globe who accepted the invitation from Professor Ludmila Filaretova to join their Russian colleagues in brainstorming the IUPS mission to “return physiology to centre stage” in contemporary biomedicine. Under the capable leadership of Professor Filaretova, two scientific events—IUPS-BRICS Symposium on Stress and Conference on “Integrative Physiology”—were successfully held at the Pavlov Institute of Physiology, offering excellent lectures and fruitful discussions (Fig. 1).

IUPS is a collective of national societies and regional federations of the global physiological

community. The mission of IUPS is to foster physiology research and education worldwide. Its members hail from six continents; IUPS currently represents more than 60 member organisations worldwide. Steered by a stellar group of physiologists on the Executive Committee and Council, IUPS pledges to provide service to the global scientific community that befits our motto, “Physiology Without Borders”. Our vision is to work with physiological societies and other organisations worldwide to facilitate initiatives that strengthen the discipline of physiology. It is in this vein that—with enthusiastic support of the Executive Committee—I became a strong advocate for the establishment of WCRC Pavlov Centre for Integrative Physiology: Medicine, High-Tech Healthcare and Stress Resilience Technologies as soon as I assumed my tenure as the President of IUPS in 2017. This is because I keenly believe that this WCRC will not only promote the discipline of physiology, but will also significantly contribute to the Physiome Project, one of the most important initiatives launched by the IUPS in recent years.

The Physiome Project and Integrative Physiology are indeed two physiological projects aiming to explain how each and every component in the body works as a part of the integrated whole, both



Fig. 1. Visit to the Pavlov Institute of Physiology, September 2019. Photo by J. Y. H. Chan, 2019

in healthy individuals and those affected by disease. We realise that major chronic diseases, including cancer, neurological and cardiovascular diseases, are complex in nature, involving factors from genes to environment, lifestyle and aging. Integrating knowledge of all these different components into robust and reliable computational models will yield enormous advances in future medicine in the shape of new diagnostic and therapeutic tools. The ultimate goal of the exercise is to piece together a complete virtual physiological human: a personalised 3D model of the individual's unique physiological make-up. Clinicians would then use these virtual individuals for applications such as trialling drugs, personalising medicine and performing virtual "surgery" to gauge the outcome of a proposed operation.

Following the completion of the Human Genome Project and the advent of the large-scale unbiased "-omics" techniques, scientists have come to the recognition of the importance of systems biology to decipher the functional significance of the data collected from multiple omics. Systems biology aims to move away from the traditional reductionist molecular approach, which focused on understanding the role of single genes or proteins, and towards a more holistic approach. This holistic approach would entail studying networks and interactions between individual components of networks (Kuster et al. 2011). This is where integrative physiology takes a leading role in advocating process interconnection and integration at the various levels of complexity and organisation within the pyramid of life (Fig. 2).

Inauguration of the WCRC Pavlov Centre for Integrative Physiology: Medicine, High-Tech Healthcare and Stress Resilience Technologies epitomises



Fig. 2. Integrative physiology.
Figure by J. Y. H. Chan, 2019

both the continuing physiological legacy of the Russian scholars pioneered by member of the Academy of Sciences Ivan P. Pavlov and the new frontiers for promoting research in physiology, encouraging the interchange of ideas and stimulating collaboration between persons and institutions from Russia and other countries to champion excellence in physiology research. I am fully confident that the development of joint integrative physiology programmes by IUPS and WCRC Pavlov Centre for Integrative Physiology will strengthen physiology as a real foundation for medicine and make Pavlov's dream "... that medicine, being daily enriched by new physiological facts, will at length grow into what it ideally must become, namely, the art of repairing the damaged machinery on the human body, based upon exact knowledge or in other words, applied physiology" come true.

References

- Kuster, D. W. D., Merkus, D., van der Velden, J. et al. (2011) 'Integrative Physiology 2.0': Integration of systems biology into physiology and its application to cardiovascular homeostasis. *Journal of Physiology*, vol. 589, no. 5, pp. 1037–1045. <https://doi.org/10.1113/jphysiol.2010.201533>