
NEUROPHYSIOLOGICAL MECHANISMS AND THE VEGETATIVE MAINTENANCE OF COGNITIVE ACTIVITY IN THE INDIVIDUAL (GIVING CONSIDERATION TO AGE, ECOLOGICAL AND INDIVIDUAL-TYOLOGICAL ASPECTS)



Director of the school – Ihor Kotsan, Ph. D., Doctor of Biology, Full Professor; Rector of Lesya Ukrainka Eastern European National University; Head of the coordinational board of the Western Ukraine Scientific Centre of the National Academy of Science and the Ministry of Education of Ukraine in the Volyn region; President of the Ukrainian Biophysical Society, and Honoured Figure in Science and Engineering of Ukraine.

Email: kotsan.ihor@eenu.edu.ua

Area of scientific research: evaluation and superintendance of the functional conditions of individuals (neurophysiological, psycho-physiological and ecological aspects).

Scientific output of I. Kotsan. Approximately 236 research papers have been published.

Research supervision of the following Ph. D. theses (Kandydat level and Doctoral):

Zhuravliov O. Peculiarities of Cortical Activity and Cerebral Blood Flow in the Performance of Cognitive Tasks by Individuals Suffering the Effects of the Chernobyl Accident (2006).

Motuziuk O. Features of the Electrical Activity in the Cerebral Cortex during the Process of Creative Literary Activity (2006).

Melnyk S. Functional Status and Adaptive Capacity of Adolescents Residing in the Radioactive Pollution Zone (2007).

Khomych V. Applied Professional Technical Mechanics in Physical Training (2009).

Kachynska T. Stimulated Brain Cortex Activity in Individuals with Different Types of Manual Asymmetry (Age-related Aspect) (2010).

Voinarovska N. Enhancement of Motor Skills of Girls in Grades 5–9 by the Use of Rhythmic Gymnastics (2011).

Cherkashyn R. Methods of Teaching Integrated Power Training Exercises to Students of Higher Educational Establishments in Extracurricular Activities (2011).

Ivaniuk O. The Effect of Early Sports Specialisation on the Nature of Electrical Activity in the Cerebral of Young Men (2012).

Pavlovysh O. Electroencephalographic Correlates of Perception and the Reproduction of Rhythmic Sound Stimuli in People with Different Lateralization Profiles (2014).

Morenko A. Brain Processes during the Performance of Manual Movements in Individuals with Different Alpha-Rhythm Characteristics (2015).

Summary. The scientific traditions and ideas of Volyn physiologists which were established in the 1970^s by Professor L. S. Hittik are based on the principles of the systematic organization of regulatory mechanisms in the brain as a manifestation of physiological activity. Currently, under the supervision of Professor I. Kotsan, the neurophysiological mechanisms and vegetative provision of human cognition (age-related, environmental, individual and typological aspects) have been studied. The study of morpho-functional features and the neurophysiological mechanisms of motor activity has come to be an area of particular development. Of

equal importance is the research into the problem of physical training and of the physical development factor, of integrated impact assessment training sessions for athletes and the formation of positive motivation towards a healthy lifestyle within different population groups.

Under the supervision of Professor I. Kotsan since 2009 at the Institute of Physical Education and Health of the University, a specialized Academic Council dealing with the defense of theses for the Ph. D. (*Kandydat*) degree in Specialty 13.00.02 – Theory and Methods of Teaching (Physical Education and Health Fundamentals) has been in operation.

Under central government sponsorship, a comprehensive study of the topics “Regulatory Mechanisms and the Systemic Organization of Human Psychophysiological Activity (age-related aspects)” and “Neurophysiological Mechanisms and the Systemic Organization of the Individual’s Sensory-motoric Activity” has been carried out. Research is also being carried out with government funding on the topics “The Physiological Correlates of Cognitive Mode of Implementation of Operations, and “Physiological Functions and Integrated Indicators of Physical Health in Modern Exogenous Influences of Different Nature and Intensity”.

Scientific activity of the school. Just in the last ten years, ten theses for the Ph. D. (*Kandydat*) degree in biology and one thesis for the doctoral degree in biology have been defended. Research corresponding to the topics on the government-funded program has been carried out and completed, or is still in the process of being carried out, and some grants have been received:

- research into the action of biologically active substances and their compounds with aluminum on the dynamics of muscle contraction (project manager – Professor I. Kotsan, 2008);

- the electroencephalographic correlates of the decision-making process (project manager – Associate Professor I. P. Kuznetsov, 2012);

- travel grant program for Eastern Europe and developing countries in Asia, 52nd Annual Meeting Society for Psychophysiological Research, New Orleans, USA (Project manager – Assistant Professor T. Kachynska, September 19–23, 2012);

- Travel grant program for Eastern Europe and developing countries in Asia, 53rd Annual Meeting of the Society for Psychophysiological Research, Florence, Italy (project manager – Assistant Professor – T. Kachynska, October 2–6, 2013);

- Student Travel Award, 53rd Annual Meeting of the Society for Psychophysiological Research,

Florence, Italy (Project performer a postgraduate student N. Yevpak, October 2–6, 2013);

- More than 500 scientific works have been published within the school, including four monographs. At the present time, research is being carried out for four doctoral theses and four *Kandydat*-level theses.

Members of the School

Alevtyna Morenko, Ph. D., Doctor of Biology, Full Professor, Head of the LUEENU Department of Human and Animal Physiology at LUEENU.

Email: Morenko.Alevtyna@eenu.edu.ua

Area of scientific research: individual peculiarities of human brain processes during the course of manual movements.

Natalia Kozachuk, Ph. D. in Biology, Associate Professor at the LUEENU Department of Human and Animal Physiology.

Email: natashakozachuk@gmail.com

Area of scientific research: neuron and psychophysiological peculiarities involved in creative thinking.

Andrii Poruchynskyi, Ph. D. in Biology, Associate Professor, Dean of the LUEENU Faculty of Biology.

Email: an-poruch@ukr.net

Areas of scientific research: neurophysiological mechanisms and autonomic human cognitive activity (age, environmental, geographic and individual typological aspects); physiological functions and integrated indicators of physical health in modern exogenous influences of different nature and intensity.

Illia Kuznetsov, Ph. D. in Biology, Associate Professor in the LUEENU Department of Human and Animal Physiology.

Email: Kuznetsov.Ilyia@eenu.edu.ua

Areas of scientific research:

- the psychophysiology of consciousness and social interaction;

- the fundamental basis of biofeedback;

- mathematical modeling of physiological functions.

Oleksandr Motuziuk, Ph. D. in Biology, Associate Professor in the LUEENU Department of Human and Animal Physiology.

Email: cmoplutsk@gmail.com

Area of scientific research: morphological and functional changes in ischemic muscle fibers during the action of additional stress factors.

Olga Ivaniuk, Ph. D. in Biology, Assistant Professor in the LUEENU Department of Physical Education and Health, a Ukraine Master of Sports in cycling.

Area of scientific research: the impact of sports activity on human intellectual performance.

Natalia Voinarovska, Ph. D. in Pedagogy, Associate Professor in the LUEENU Department of Fitness and Recreation, a Master of Sports (USSR) in sports gymnastics.

Area of scientific research: methodology of developing athletic capacities by means of mixed rhythms (various types of gymnastics).

Roman Cherkashyn, Ph. D. in Pedagogy, Assistant Professor in the LUEENU Department of Olympic and Professional Sports; Master of Sports of Ukraine in athletics.

Area of scientific research: methodology of teaching high-exertion exercises.

Viktor Khomych, Ph. D. in Physical Education and Sports.

Area of scientific research: mechanisms for managing the profession-related and applied physical training of future professionals

