THIRD ALL-UNION CONFERENCE ON THE ELECTROPHYSIOLOGY
OF THE NERVOUS SYSTEM

-USSR-

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The Third Conference on the Electrophysiology of the Nervous System and the Symposium on "Fundamental Problems of the Electrophysiology of the Central Nervous System" were held in Kiev 27 June-2 July 1960. The two were organized by the Institute of Physiology imeni A. A. Bogomolets of the Ukrainian SSR Academy of Sciences, jointly with the All-Union Physiological Society imeni Pavlov and the Institute of Animal Physiology of the Kiev University.

The conference was attended by about 600 persons, including 300 physiologists from Moscow, Leningrad, Tbilisi, Yerevan, Gor'kiiy, Odessa, Vil'nys, Karanganda, and other cities of the Soviet Union. Owing to the large number of applications for submission of reports, the conference was organized into three parallel sections to permit the participants to hear the maximum number of reports. This arrangement enabled the conference participants to hear more urgent reports; the remaining ones were published in conference abstracts.

The conference was opened with a plenary session devoted to the basic problems of electroencephalography. Prof A. F. Makarchenko gave a brief introductory address. The address was followed by the report: "Some Notes on the Neurophysiological Significance of Electric Phenomena of the Cerebral Cortes," delivered by Prof P. K. Anokhin. Rapt attention greeted Prof N. V. Golikov's report: "Synchronization of Slow and Fast Potentials as an Index of Nerve Cell Reactivity and Excitability," and Prof F. N. Serkov's report: "Genesis of the Alpha-Rhythm."

During the conference there were held 15 sectional sessions and one plenary session devoted to electrophysiological research methods. A report entitled "Electrotonus as a Membrane Process" was delivered by one of the oldest electrophysiologists of our country, Prof D. S. Vorontsov, at the "Nature of Bioelectric Potentials" session. Making use of personal findings as well as literary
data, D. S. Vorontsov showed that the membrane is most closely linked
with the cell's metabolic system, maintaining the membrane's potential
and regulating its stability. Electrotonus constitutes an extremely
sensitive means for understanding a number of cellular processes.
Major interest was evoked also by the reports delivered by G. A.
Kurell, Ye. A. Liberman and L. M. Tsol'ina, and M. F. Shuba. Note
should be taken of G. Yu. Belitskiy's report: "Analysis of Bioelec-
tric Characteristics of Living Tissues," which was delivered at the
session devoted to the electrophysiology of the nerve fiber and nerve-
muscular transmission. The reporter believes that the physiological
properties of tissues must not be assigned to the constant values of
such characteristics as electric resistance, potential, and capacity.
M. F. Korzon and S. A. Chepurny's report: "Functional Characteris-
tics of the Calmar Giant Axon" and N. M. Shamarina's report: "Mechanism
of the Synaptic Conduction Block in N. Ye. Vvedenskiy's Inhibition"
were attentively received. One of the central reports delivered at the
session devoted to the electrophysiology of afferent and efferent
tracts in the nervous system was that of Prof. M. G. Udel'nov, G. N.
Activity of the Vegetative Nervous System." The authors have ob-
tained data enabling them to clarify the quantitative relationship
existing between the efferent and afferent activity of vegetative
reflex tracts. The session devoted to the evoked potentials of the
cortex of the cerebral hemispheres and cerebellum heard with interest
the report of Professors N. N. Dzidzishvili and T. D. Dehavrishvili:
"Problems of the Cortical Electric Activity in Ontogenesis." New
data on the electrophysiology of receptors and sensors were supplied
in Prof. G. V. Gershuni's report: "Investigations into the Central
Influences Which Modify the Activity of the Auditory System's Peri-
pheral Neuron." The reporter cited data showing that a drop in the
amplitude of total electric response of auditory nerve fibers is
conditioned by influences originating in the central nervous system
and transmitted to the cochlea along the central fibers of the oliva-
cy-cochlear tract, or along some other efferent fibers. Of the re-
ports devoted to the electric activity of the cortex of cerebral
hemispheres in conditioned reflex function, we shall note the report
of Professors M. N. Livinov, N. A. Gavriloa, and G. I. Shul'gina
entitled: "Local Changes in the Bioelectric Mosaic of Cerebral Cortex
Induced by the Development of the Conditioned Motor Reflex," and
the report of Professors L. G. Trofimov and N. N. Lyubimov: "Study
of the Potentials of Various Brain Structures in Development of Con-
ditioned Reflexes to Rhythmic Sound and Light Stimulations." A large
number of reports dealt with the electrophysiology of the brain stem,
electrophysiology of the spinal cord, general problems of electro-
cephalography, and with the electroencephalogram of man in normal
and clinical electroencephalography. We should mention Professors
A. F. Naka'renko's and N. L. Gorbach's report: "Desynchronization
and Reduction in Electric Activity of Human Brain in Certain Physio-
logical and Pathological Conditions." The data obtained by them show a definite connection between low-amplitude variations in EEG and the diencephalic and subcortical disturbances. The authors are of the opinion that we must not regard all low-amplitude EEGs from the standpoint of desynchronization originating as a result of non-specific activation of the cerebral hemispheres' cortex by the reticular formation of the brain stem. The examination of correlation features in stimulation and inhibition processes at different stages of ontogenesis, as supplied in Prof. V. S. Sheveleva's report: "Mechanisms of Development of Stimulation and Inhibition in the Nervous System in Ontogenesis When Receptors are Stimulated" contributes to the understanding of pathological reactions in the organism arising from the application of extremely powerful stimulations.

A special symposium was convened in order to provide the opportunity for a profound discussion of the fundamental theoretical problems of electrophysiology of the central nervous system. Leading electrophysiologists of the Soviet Union, Professors V. S. Rusinov and M. N. Livinov, presided over its sessions. The first session heard Prof. P. G. Kostyuk's report: "Electrophysiology of the Neuron," which examined the problems dealing with the analysis of general properties of and differences in the electric activity of individual neurons. P. G. Kostyuk devoted particular attention in his report to the nature of polarization and electric activity of the nervous system, to the mechanism of synaptic action, the mechanism of generation of radiating stimulation within the cell, and the inhibition mechanism. The second and third sessions heard the reports of Prof. A. I. Ryzhak, "Evoked Potentials of the Cortex of Cerebral Hemispheres," and Docent Ye. N. Sokolov, "Mechanisms of the Phonol Rhythm of the Cortex of Cerebral Hemispheres." Owing to the keenness of discussion problems raised at the sessions and the advance familiarization of the symposium participants with the text of reports, there unfolded a lively discussion which revealed both the positive aspects and the shortcomings of the basic theories regarding the origin of bioelectric potentials, the mechanisms of the rhythmic electric activity of cerebral hemispheres, the nature of various phases of primary responses by the cortex, and a number of others.

The conference and the symposium helped to examine critically the experimental material obtained in recent years in USSR laboratories on the electrophysiology of the nervous system, to coordinate significantly the activities of various laboratories working in this area, and to map further avenues of progress of Soviet electrophysiology.