

History

The Department of Cellular Neurophysiology was founded in 1960 by Radan Beránek, Pavel Hník, and Ladislav Vyklický Sr. as the electrophysiological laboratory of the Department of Physiology and Pathophysiology of the Neuromuscular System headed by Prof. Ernest Gutmann.

The aim of the laboratory at that time was to ensure original neurophysiological research being carried out at the department. This concerned muscle atrophies after denervation, tenotomy, deafferentation and morphogenetic influence of innervation on the development of muscle receptors. Research was then concentrated on the physiology of the neuromuscular junction with emphasis on desensitization, functional organisation of the CNS, pathways involved in pain perception and presynaptic inhibition. The introduction of these projects was enabled by the postdoctoral experience of the founding members of the laboratory: Radan Beránek who spent one year in the laboratory of Prof. Bernard Katz (London, UK), Pavel Hník who worked with Prof. J. L. Malcolm (Aberdeen, UK) and Ladislav Vyklický Sr. who collaborated with Prof. Anders Lundberg (Göteborg, Sweden).

In the early sixties the laboratory was joined by František Vyskočil, who successfully proceeded in the development of microelectrode recording technique after Radan Beránek sudden death. Later, he collaborated with Prof. Lev Magazanik (St. Petersburg, Russia), Prof. Stephen Thesleff (Lund, Sweden) Charles Edwards (USA) and Eugen Nikolsky (Kazan). He used intracellular recording to study the mechanism of nicotinic receptors activation and desensitization and in 1977 he found and further studied non-quantal release of acetylcholine at the neuromuscular junction of mammals.

Ion-selective microelectrodes were introduced and developed by František Vyskočil and Norbert Kříž (Pflugers Arch. 1972;337(3):365-76). These were used to measure and clarify the role of potassium accumulation after neuronal activity in the extracellular space in the spinal cord, central nervous system and working muscle. The study of the role of potassium accumulation in the mechanisms underlying spreading depression (together with Jan Bureš) became a citation classic (Citation Classics, Current Contents 15, 1989, A1989T880500002) (Vyskocil F., Kriz N. and Bures J.,1972)

The patch-clamp technique that allows high-resolution recording of currents from individual cells was introduced by Ladislav Vyklický Jr. in the early eighties. The wide use of this new approach was greatly facilitated by a concentrated effort of several members of the department including the electronic engineer Evžen Ujec and Viktorie Vlachová who substantially contributed to the use of sophisticated quantitative analysis of the biological data. Ladislav Vyklický Jr. gained further experience in this field in the laboratories of Mark Mayer (NIH,

Bethesda, USA) and Prof. Bert Sakmann (Max-Planck Institut für Zellphysiologie, Heidelberg, Germany). Together with his collaborators he has been employing the patch-clamp technique for quantitative studies on glutamate receptor channels on cultured neurones or in spinal cord slices. At present, the patch-clamp method represents the main electrophysiological technique used in the department in the studies of cellular and molecular mechanisms underlying neuronal excitability and synaptic transmission.

The Department of Cellular Neurophysiology was chaired in the past by Radan Beránek (1960-1969), Pavel Hník (1970-1980), Ladislav Vyklický Sr. (1980-1990), František Vyskočil (1990-1999), Ladislav Vyklický Jr. (1999-).



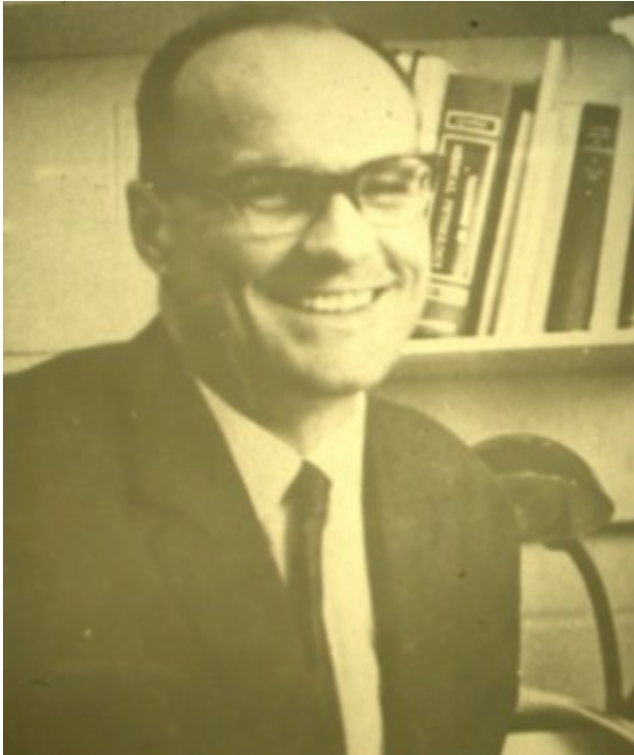
Portrait of the members of the Department around 1966. Back row: Štěpita Klauče, Ladislav Vyklický sr., Pavel Hník, Radan Beránek, Zdeněk Vít, Evžen Ujec, Vladimír Dvořák. Front row: František Vyskočil, Hanka Karoušková, Eva Štolcová, Linda Servítová, Bohumil Dobiáš.



Prof. Arnošt Gutmann, M.D., Dr.Sc.

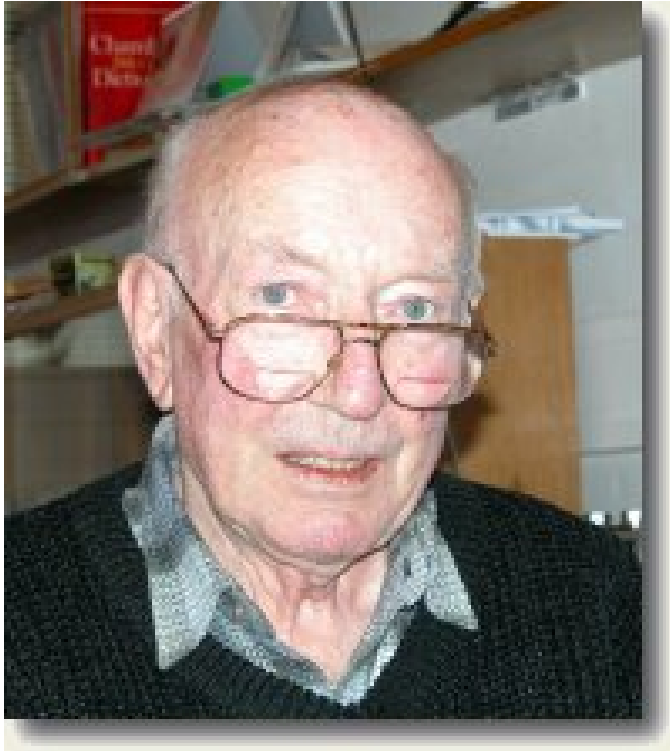
He studied medicine at the German Faculty of Charles University. After graduation he specialized in neurology and before the Second World War he immigrated to England. During the war he worked on the research of regeneration of the peripheral nerves with Professor J. Z. Young at the Department of Anatomy at Oxford. Young's team obtained an important anatomical and physiological knowledge of the ability to regenerate nerve fibers. This research summed Gutmann at work for which he received his PhD at Oxford. Later, this topic was published as German monography on nerve regeneration (1958). With this work he defended his D.Sc. degree at the Czechoslovak Academy of Sciences. After the war, although Young wished to Gutmann continued working in Oxford, Ernest decided to return to Prague. In May 1945 he helped as a doctor against epidemic typhus in Terezin, and after the epidemic he started to work in Haskovec's research group at the Charles University in Prague.

In 1949 he founded the Second department of Institute of Physiology, where came after from Haskovec's group Radan Beranek, Gerta Vrbova, Fantis A. and L. Polak. After moving into the building of Biology institute CSAS in Dejvice followed Olga Hudlicka, Zdenek Vodicka, Pavel Hnik and later Arnost Bass and Jirina Zelena. (†6.8.1977)



Radan Beránek, M.D.

In 1950 Dr. Beranek graduated from the Faculty of Medicine at Charles University in Prague. For several years he engaged to neuropathology and locomotion disorders at the Rehabilitation institute in Janske lazne and at Department of Neurology at Charles University. Later, he worked as a researcher at the Institute of Physiology of the Czechoslovak Academy of Sciences. He was a founding member of the laboratory of Cellular and Comparative neurophysiology at Institute of Physiology CSAS. In the years 1960-1969 he was head of the Department of Cellular Neurophysiology. He collaborated with foreign scientists and worked at the Yale University (Connecticut) and the Miami University (Ohio). He was editor of the jurnal *Physiologia Bohemoslovaca* (later *Physiological Research*) and was the author of several publications. (†18.3.1969)



Pavel Hník, M.D., D.Sc.

Dr. Hník graduated from the Faculty of Medicine, Charles University in Prague in 1951. After a year in clinical neurology he started to work at the Institute of Physiology of the Czechoslovak Academy of Sciences. He defended his Ph.D. thesis in 1956 and D.Sc. in 1966.

In 1964-65 he spent a year in Aberdeen (Scotland) as a Wellcome Foundation Fellow and in 1969-70 he was a Visiting Professor in Salt Lake City (Utah). He is a Member of the British Physiological Society since 1966 and was elected a Member of the New York Academy of Sciences in 1987. In 1992 he became an Honorary Member of the Czech Physiological Society.

Dr. Hník initiated the Joint Meeting of The Physiological Society (GB) and the Czech Physiological Society which was held in Prague in June 1998 of which he was Honorary President. He worked for many years as editor and foreign language editor of two physiological journals (Československá Fyziologie and Physiological Research - formerly Physiologia Bohemoslovaca).

His main research interests concerned the physiology and pathophysiology of the neuromuscular system, especially the problems of muscle atrophy and hypertrophy, nerve regeneration, the effects of deafferentation upon spinal cord functions and long-term effects of neonatal nerve crush on muscle reinnervation and locomotor disturbances. Since 1993 he was an Emeritus Member of the Institute. (†29.5.2008)



Ladislav Vyklický Sr., M.D., D.Sc.

Dr. Vyklický, after graduation from the Medical Faculty of Charles University Prague in 1950, spent 10 years in clinical neurology. Later, with prof. Anders Lundberg (Sweden), he was engaged in the intracellular recordings from spinal dorsal horn neurons. He was a visiting scientist at the University of Rostock (Germany), at the Brain Research Centre in Zurich and at the Biocenter in Basel (Switzerland). He worked at NIH (Bethesda) and at the University of Pennsylvania (Philadelphia) where he became interested in the neuronal pathways of pain, and later in cellular mechanisms of nociception. He was a Director at the Institute of Physiology for 10 years and, later, a Head of the Department of Cellular Neurophysiology for another 10 years. He was the founding member and an Honorary Member of the International Association for the Study of Pain (twice elected a council member) and acted as a field editor of the journal Pain. He carried out research at several other institutions in USA, Switzerland and Germany. He became an Honorary Member of the Czech Physiological Society and was awarded by several prestigious prizes, including the J.E. Purkynje Award of the Czechoslovak Physiological Society, Gold and Silver Medal, and Laufberger Medal of the J.E. Purkynje Medical Society. (†23.11.2008)



Evžen Ujec, Dipl. Ing., Ph.D.

Dr. Ujec graduated in 1954 from the Electrotechnical Faculty at University of Technical Engineering in Prague. In years 1954 - 1961 he worked at the Research Institute of Specialized Radiotechnology in Prague and after he started to work at the Institute of Physiology of Academy of Sciences, where he defended his Ph.D. thesis in Biological Sciences in 1991. At the Department of Cellular Neurophysiology he participated in the development and construction of equipment and apparatuses for measuring basic electrophysiological parameters. He was a visiting scientist at the Physiological Institute of Munich University, at the Merton College in Oxford, at the Physiological Institute in Homburk and Tbilisi and at the USSR Academy in Leningrad. (†17.10.2007)