

Obituary

Tribute to Henricus G.J.M. Kuypers
(1925-1989)

Henricus Gerardus Jacobus Maria Kuypers, head of the Department of Human Anatomy of the University of Cambridge, died suddenly on September 26, 1989.

The name and work of Hans Kuypers is associated with a research that has had major impact in the neurosciences and has had implications for the neurology ward. With his death, the neuroscience community lost a glowing leader, to whom many important advances and trends in the study of the brain should be credited. Hans was one of the most influential figures of modern neuroscience, and in particular of modern neuroanatomy: throughout his life, he promoted with great determination the idea that the knowledge of neural connections is a fundamental clue for understanding the function of the brain. In an article which appeared after his death, Hans wrote: "I started my medical career in Neuroanatomy and Clinical Neurology. My interest in Anatomy came from the wish to unravel the fibre connections of the brain and to understand their function in the control of movements. I still remember, as a medical student, seeing for the first time the complicated network of neurones and nerve fibres in the brain as visualized by the Bielschowsky silver impregnation technique. Being convinced, as I still am, that the function of the brain depends on the fibre connections between the neurones, I wondered how the nerve fibres could be traced from their neuronal cell bodies to their terminals"*.

His concepts on the organization of the motor system, and his innovation of techniques for tracing neural connections evolved during his career in parallel with his passionate devotion to his work until the last days of his life.

Hans was born in Rotterdam in 1925 and obtained his MD and Ph.D. in Leiden where he made his first steps as neuroanatomist under the tutorship of S.T. Bok. In the early '50s he visited Walle J.H. Nauta in Zurich, who was at that time developing a new silver impregnation of degenerating fibers for tracing pathways in the nervous system. Hans was so enthused by the then budding Nauta technique that he decided to dedicate all his efforts to neuroanatomical research. He relinquished his ties with Clinical Neurology in Holland, and in 1955 he accepted a position as assistant professor in the Department of Anatomy at the University of Maryland in Baltimore. In 1962 he was appointed full professor at Case Western Reserve Medical School in Cleveland, Ohio. He returned to Europe in 1966, as Professor of Anatomy at the Erasmus University in Rotterdam and, since 1984, at the University of Cambridge. He was one of the founders of the European Brain and Behaviour Society, established in 1969, and of the European Neuroscience Association, established in 1974, of which he was the third president. Among the many recognitions of his scientific contributions, his most cherished may have been the appointment as member of the Royal Dutch Academy of Sciences in 1982, and as a Fellow of the Royal Society in 1988.

Hans's outstanding insight focused on the motor system and in particular on the role of descending pathways in movement control. He outlined a subdivision, now classical, of the pathways descending from the brain stem in two groups: a ventromedial one controlling mainly proximal muscles, and a dorsolateral one controlling mainly distal muscles of the limbs. His works on the pyra-

*In: *Neurologia e Scienze di Base, Vita e Pensiero*, Milano, 1989, p. 93.

midial tract in 1968 with Donald Lawrence demonstrated the unique role played by corticospinal connections in the performance of highly fractionated distal extremity muscles and, in particular, of relatively independent hand and finger movements. In collaborations with Deepak Pandya, Cobia Brinkman, Rob Haaxma and Lou Moll, Hans did pioneering work in the exploration of the anatomical and behavioural aspects of cortico-cortical connections as an important key to understanding the role of the cortex in motor guidance. He addressed his attention also to the thalamic input to the frontal cortex and, in collaboration with Job Kievit, published the first report of a direct projection to the frontal lobe from the basal forebrain and proposed a novel interpretation of the general organization of thalamocortical connections.

Like Nauta twenty years earlier, Hans added a most powerful technique to the repertoire of neuroanatomists with the introduction of fluorescent retrograde markers instrumental for the visualization of neuronal populations projecting to different targets by means of axonal collaterals. These tracers have made major advances possible in the field of neural development and plasticity, and their use resulted in elegant demonstrations of simultaneous anterograde and retrograde tracing, and in sophisticated combinations of axonal tracing with immunohistochemistry and histofluorescence. At a time when most investigators would have been satisfied to harvest the products of such new methodological innovations, Hans embarked on yet another major endeavour and, in collaboration with Gabriella Ugolini, earned once again the gratitude of neuroanatomists who were enabled, thanks to the transneuronal transport of viruses, to trace multisynaptic chains of connections. Hans was very talented as teacher and was always willing and eager to dedicate a generous portion of his time to the many young collaborators who were attracted to his laboratory. Among these, several came from Italian laboratories and clinical institutions and, perhaps, Hans had a special place in his heart for his Italian crew. Two of us (M.B. and A.R.) had the privilege of a long association with him during this tenure at the Erasmus University in Rotterdam; the experience we gained from working with him and the contact with his vigorous, unconventional mind and contagious enthusiasm, have profoundly influenced our lives and choices. All three of us have lost a great friend. The work that continues to grow and emerge from the impact of his ideas and scientific production is among his extraordinary legacies to the neuroscience community.

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