

## Foreword

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Neuroplasticity has emerged during the last decade as one of the most exciting, fruitful and prominent concepts in neurobiology. After decades of descriptions of the nervous system as a relatively stable structure – once development had taken place – the past years have resulted in more and more compelling evidence of the plasticity of all its elements. The plasticity of the nervous system is a changing field that evolves continuously, and its mechanisms have to be approached in four rather than three dimensions.

Physiologically, neurons and glia are never quite the same at any two different times. Modulation of gene expression, continuous biochemical changes etc. have to be included systematically in the analysis of the response of a cell to a stimulation. Gene transfer techniques have begun to demonstrate that the function of neurons can be directed at all stages of development including in adulthood. Besides neurotransmitters, trophic factors that may alter the general state of neuronal responsiveness and metabolism have appeared as a major class of substances in cell-to-cell interactions. Glia, long considered a maintenance system, are increasingly included in the fine tuning of all neuronal activities. The morphology itself of adult neurons is changing over time and in response to alteration of neuronal circuitry. Synaptic contacts form and retract, according to mechanisms that are progressively revealed. As a last example, but not least, successful transplantation of embryonic neurons into the host nervous system demonstrates the high level of plasticity of neuronal systems and can lead to major anatomical and functional rearrangements. For the decade to come, neuroplasticity will probably widely enter the therapeutic field: functional therapeutics aimed at facilitating the compensation of specific neuronal defects by subsidiary neuronal systems have, for long, been in use; transplantation in Parkinson's disease patients has started; neurotrophic factors are presently under study as treatments in several neurodegenerative diseases, etc.

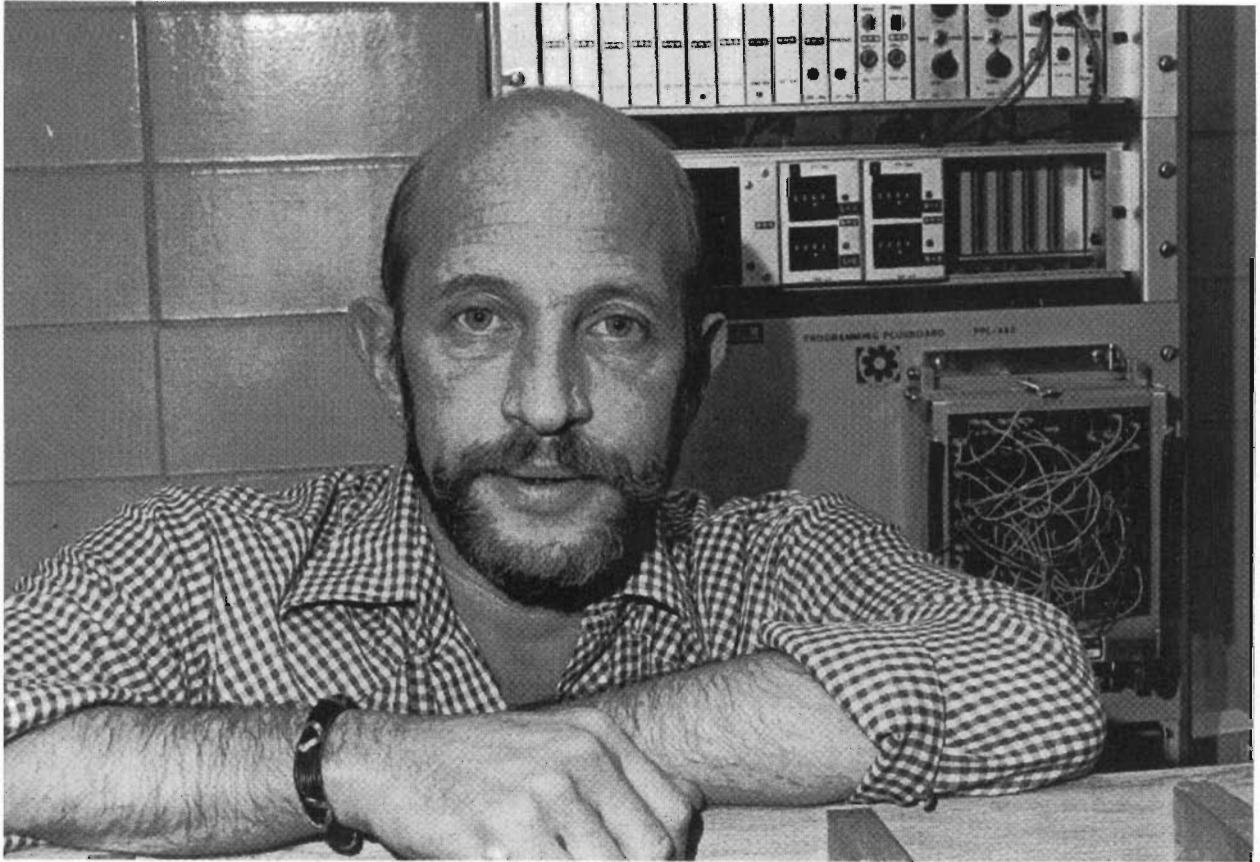
Even though it is a general concept used by many neurobiologists, neuroplasticity is seldom considered in

and by itself in symposia by neuroscientists approaching it differently in their own field. The texts that are presented in this issue of Restorative Neurology and Neuroscience were given during a symposium that was specifically held for that purpose. Restricting the topics to 'Spinal Cord Neuroplasticity', we have tried to confront many views of the concept. The symposium was, thus, organized in six sessions: five dealt, successively, with aspects of neuroplasticity in development, trophic factors, afferent systems to the cord, neuron–glial interactions, grafts and functional recovery; the sixth session was a round-table that specifically concerned the possible future of therapeutics using neuroplasticity.

This symposium was organized in Paris in March 1992 by Marc Peschanski and Michael Goldberger under the auspices of a scientific committee including Y. Ben Ari, H. Ollat, M. Peschanski and A. Prochiantz, with the cooperation of the 'Association Pour la Neuro-Psychopharmacologie' and in collaboration with 'l'Institut de Recherche International Servier'. It is the first of a series on neuroplasticity that will continue on an annual basis. During the course of the preparation of this meeting, Michael Goldberger passed away. Michael's scientific life was committed to the study of plasticity of the spinal cord and it is fitting that his last efforts were devoted to convening an international meeting on this theme and also that this meeting should take place in Paris, a city in which he spent many happy times over the years. His energetic and imaginative contribution to this symposium on spinal cord plasticity that were so characteristic of him were deeply missed. Science is like art, however, a human endeavor that outlasts the lifespan of its actors, such that the influence of his life and his work lives on.

### Acknowledgements

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The symposium and this issue of Restorative Neurology and Neuroscience are dedicated to the memory of Michael Goldberger

The Organizers