The Cerebellum as a Neuronal Machine

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With 165 Figures

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Preface

This book has had a three-fold origin, corresponding to the discoveries made by the three authors and their collaborators during the last few years — mostly since 1962. A most fruitful symposium on the cerebellum was held in Tokyo at the time of the International Physiological Congress in September 1965, and there was then formulated the project of writing this book so as to organize all this new knowledge and make it readily available, and to give opportunity for the conceptual developments that may be seen in Chapters XI, XII and XV in particular.

The present account of the physiological properties of the cerebellar cortex is based to a large extent on systematic investigations that were concerned with discovering the mode of operation of the constituent neuronal elements of the cerebellar cortex. This work was carried out in the Physiology Department of the Australian National University from 1963 to 1966 in collaboration with several visiting scientists — initially Drs. ANDERSEN, OSCARSSON and VOORHOEVE and later Drs. LLINÁS, SASAKI and STRATA — to all of whom grateful thanks are extended for a great many of the figures, and even more significantly for the original and critical contributions that they made to so many aspects of this exploration into the mode of operation of the neural machinery of the cerebellar cortex.

The descriptions of the histological structure of the cerebellum (Chapters I, II, III, IV, VI, VII, VIII, IX, XI, XII, XIII and XIV) are very largely based on investigations that have been supported by grants to Dr. SZENTÁGOTHAI by the Hungarian Academy of Sciences. Dr. J. HÁMORI of the Academy research staff of the Anatomy Department, University of Budapest, has contributed notably by his electronmicroscopic studies of the cerebellum.

The greater part of the physiological investigations described in Chapters XIII and XIV were performed in the Physiology Department of the University of Tokyo. Drs. N. TSUKAHARA, K. TOYAMA, M. YOSHIDA, K. OBATA, and M. UDO not only made valuable contributions to the experimental investigations, but also assisted in the preparation of these two chapters, and some of the figures are derived from their work. The physiological sections of these chapters were written by Dr. ITO during April and May of 1966 when he was a guest of the Neurosciences Research Program (NRP), and grateful thanks are expressed to Professor F. O. SCHMITT for this generous support.

It is most appropriate that full recognition be given to the many skilled technical assistants that contributed not only to the experimental work, but also to preparation of the illustrations and of the manuscript. In Canberra Mr. J. S. COOMBS was responsible for the design of the electronic equipment and Mr. L. M. DAVIES rendered expert technical assistance, while V. PARAL, R. WESTON, A.

Preface

CHAPMAN and Miss C. MACPHERSON prepared almost one hundred of the illustrations. Miss I. SHEAFFE was responsible for most of the manuscript, and the work was continued in Chicago by Miss E. ADAMS. It is a pleasure to acknowledge the assistance in Budapest of Mrs. G. SEBESTYÉN with the electronmicroscopy and Mrs. M. DEÁK with preparation of manuscript and references.

Dr. H. TÁBORÍKOVÁ has given most valuable help in the indexing. Our special thanks go to the publishers for their unfailing courtesy and for their extraordinary efficiency. It is a great pleasure to have such excellent cooperation and understanding.

Chicago,
Tokyo, and
Budapest, 1967.

JOHN C. ECCLES,
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Contents

Introduction 1

Chapter

I. General Survey of the Structure 4

II. Termination of Afferent Fibers 32

III. The Parallel Fibers 43

IV. The Neuronal Pathways forming Synapses on Outer Stellate, Basket and Golgi Cells 58

V. Purkinje Cells and their Responses 71

VI. Topography of the Potential Fields produced by Action of a Parallel Fiber Volley on Purkinje Cells 93

VII. The Mossy Fiber Input into the Cerebellar Cortex and its Inhibitory Control by Golgi Cells 116

VIII. The Climbing Fiber Input and its Excitation of Purkinje Cells 156

IX. The Axon Collaterals of Purkinje Cells 178

X. Spontaneous Activity in the Cerebellar Cortex 188

XI. Architectural Design of the Cerebellar Cortex 195

XII. Operational Features of the Cerebellar Cortex 205

XIII. Inhibitory Action of the Purkinje Cell Axons 227

XIV. Excitatory Signals from the Intracerebellar Nuclei 262

XV. The Cerebellum as a Computer? 300

References 316

Subject Index 328