

Preface

Neurons are interconnected via axons, a term originally introduced in 1896 by the Swiss physiologist and anatomist Rudolph Albert von Kölliker. The importance and structural variability of axons was beautifully described by the work of Ramón y Cajal. Axons are effectively the primary transmission lines of the nervous system. They conduct electrical signals termed action potentials, initiated at the axon hillock. The frequency of action potentials are the code with which neurons communicate with each other or directly with the effector organs such as muscles, heart and the gastrointestinal tract. Using the squid giant axon as an experimental system, Alan Hodgkin and Andrew Huxley obtained first a quantitative description of the ionic mechanisms underlying an action potential, the well-known Hodgkin–Huxley model.

Ever since, the axon has remained a focus of neurobiological research and a wealth of literature has been published on axonal structure and function. The intention of this book was to highlight some of these aspects. It was never meant to be comprehensive but focuses mainly on recent studies concerning axonal connectivity and its development. We would like to thank all the contributing authors for their willingness to participate in this endeavour and their patience during the composition of this book. We would also acknowledge numerous colleagues that – over time – have influenced our work and thereby contributed to the creation of this book. Furthermore, we are particularly grateful to Laurence Garey for agreeing to write such a nice introductory preface and to deliver it at such short notice. Finally, we are very thankful to Ann Avouris and Melissa Higgs from Springer for the invaluable help during the production of this book on axons.

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