

# **Handbook of Neurochemistry and Molecular Neurobiology**

## **Neural Protein Metabolism and Function**

Abel Lajtha (Ed.)

# **Handbook of Neurochemistry and Molecular Neurobiology Neural Protein Metabolism and Function**

Abel Lajtha & Naren Banik

With 102 Figures and 73 Tables

 Springer

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# Preface

This volume discusses aspects of neural protein metabolism. Although this subject is clearly very important and has numerous functional aspects, it did not always get the attention it clearly deserves. Perhaps there are many explanations for researchers hesitating in the past to focus on protein metabolism. Among the reasons, it must be that it was thought there is little or no regeneration in the brain; hence, its proteins must be stable. Stability, it was thought, is required in an organ that serves as a depository of information—the storage of memory. The structural and functional complexities and heterogeneity of brains may also have indicated that this organ compared to other tissues or even microbial systems may represent too much of a challenge. Technical difficulties also seemed to be discouraging. We have made significant progress, but still do not know much. For example, we now realize the multiple functions and activities of proteases in the nervous system; still, their activity, their specificity, and their controls in the living tissue remains a challenge to approach experimentally.

The chapters in this volume clearly show that protein metabolism is very much “alive and active” in the nervous system and represents an essential part of brain functions. Proteins can and do undergo changes—modifications, partial or complete breakdown, structural and physical changes, and translocations—and are mostly in a dynamic state. It is true that the differences of processes between those in the living body and those in isolated systems—even complex isolated systems—are very large for proteins. Still, proteins are essential components and participate in practically all the processes in the nervous system, just as much as in other processes throughout living organisms. As proteins represent and are responsible for a great variety of functions and structures, their activity is complex. It is likely that the function and metabolism of a protein is different depending on its location. Clearly, some aspects of protein metabolism are not specific for the nervous system, but as they affect neural function, it is important to understand specifically their role in the nervous system. The many important aspects are clearly illustrated in this volume. It is as it should be focused on specific neural aspects and general aspects are left to other textbooks.

Neuroscience has advanced during the past decades probably more than most biosciences; it represents a very exciting field. Probably no other field has the potential of influencing the future of mankind than studies of processes that underlie human behavior—all aspects: learning, memory, aggression, aging, and perhaps creativity. In some respects, it represents the ultimate challenge—scientifically as well as ethically. As our knowledge advances, our understanding of the functions of proteins represents an important segment. The fact that we begin to understand the role of proteins in neural and behavioral pathology represents an exciting opportunity for novel therapeutical approaches—some of which are discussed in this volume. The work described here should give us all hope of further advancing our knowledge and our possibility to cure mental and neurological illnesses in the not too distant future.

This volume, as the others in the Handbook, is planned to be added to and brought up-to-date as new information is available and willing contributors can join. The field of neural proteins is large and full of possibilities, and we can expect rapid advance.

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