

Transmitters and Modulators in Health and Disease

New Frontiers in Neuroscience

S. Shioda • I. Homma
N. Kato (Eds.)

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 Springer

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Foreword

It is a great pleasure and honor to present *Transmitters and Modulators in Health and Disease*. This is a memorable scientific publication for Showa University, prepared in conjunction with the 5th International Symposium for Life Sciences, held at the university in 2008. This symposium was supported in part by Grants for the Promotion of the Advancement of Education and Research in Graduate Schools, in the program of Subsidies for Ordinary Expenses of Private Schools from the Ministry of Education, Culture, Sports, Science and Technology, Japan.

On behalf of Showa University, it is a privilege to see the publication of this volume of scientific research articles for the advancement of knowledge on brain function and morphology.

Akiyoshi Hosoyamada, M.D., Ph.D.
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Showa University, Tokyo, Japan
January 2009

Preface

The 5th Showa International Symposium was hosted by Showa University at the university's Kamijo Auditorium on September 2, 2008. This symposium titled *Transmitters and Modulators in Health and Disease*, brought together various areas of neurosciences under a number of research themes. Six prominent researchers invited from overseas and eight speakers from Showa University gave lectures, which were followed by lively and productive discussions.

This volume includes a description of the effects of neuropeptides and biogenic amines on feeding, respiration, and other autonomic functions as well as behavior. It also considers the future use of bio-imaging tools for clinical use with patients, especially children, with neurodegenerative diseases. In the first chapter, we focus on the regulation of the blood-brain barrier function by several kinds of neuropeptides and proteins, receptors, and transporters, and in addition, on the regulatory mechanisms underlying feeding behavior and metabolism. The second chapter is concerned with the modulation of higher brain functions by neuropeptides and biogenic monoamines. Furthermore, the bio-imaging methods, using new and powerful brain-imaging techniques, also reveal human brain functions, which are presented in detail. The neuronal information processed within the brain via the auditory system and various examples of sensory information can be studied in depth with this method. The third chapter deals with the nervous system and ischemic neuronal damage by brain ischemia, as well as with hippocampal neurogenesis in the adult mouse brain. The functional significance of pro-inflammatory cytokines, pituitary adenylate cyclase-activating polypeptide (PACAP), and free radicals are also included. The results of animal experiments as well as the results of research on human tissues and organs are described. Moreover, the topic of neuroregeneration in adults, associated with regenerative medicine, is also discussed. In addition to the above-mentioned research presentations, eight poster announcements were made at the same event, generating good discussions.

The effects of employing morphological or physiological techniques to study neuropeptides and neuromodulators influencing higher-order functions or the brain stem functions, particularly of the hypothalamus, were spelled out clearly at the symposium. There was also discussion of the potential for human brain function to be investigated and for specialized medical treatment to be provided (as in the case of a vascular obstruction) by using such tools as brain navigation systems and fMRI to achieve normal higher brain function.

It would not have been possible to host the symposium without the cooperation and assistance of Showa University, for which we express our sincere gratitude.

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January 2009

Contents

Foreword	V
Preface	VII
Contributors	XIII
Color Plates	XXI

Neuropeptides and Behavior

Evolution of Neuropeptide Concepts Illustrated by MIF-1 and MSH W. Pan and A.J. Kastin	3
Increased Leptin Supply to Hypothalamus by Gene Therapy Confers Life-Long Benefits on Energy Homeostasis, Disease Cluster of Metabolic Syndrome—Diabetes Type 1 and 2, Dyslipidemia and Cardiovascular Ailments—and Bone Remodeling S.P. Kalra	19
Feeding Regulation in the Brain: Involvement of Neuropeptide W F. Takenoya, H. Kageyama, Y. Date, M. Nakazato, and S. Shioda	31
Feeding Regulation in the Brain: Role of Galanin-Like Peptide (GALP) H. Kageyama, F. Takenoya, and S. Shioda	41

Neuropeptides, Bioamines, and Clinical Implications

Neuropeptide Y and Its Role in Anxiety-Related Disorders Y. Dumont, J.C. Morales-Medina, and R. Quirion	51
The Search for a Fetal Origin for Autism: Evidence of Aberrant Brain Development in a Rat Model of Autism Produced by Prenatal Exposure to Valproate T. Ogawa, M. Kuwagata, and S. Shioda	83

Sexually Dimorphism and Social Brain Circuit: Its Implication to Autism H. Yamasue and N. Kato	89
---	----

Functional Mapping of Sensory and Motor Brain Activity

Stimulating Music: Combining Melodic Intonation Therapy with Transcranial DC Stimulation to Facilitate Speech Recovery After Stroke B.W. Vines, A.C. Norton, and G. Schlaug	103
--	-----

Serotonin Release Acts on 5-HT ₂ Receptors in the Dorsomedial Medulla Oblongata to Elicit Airway Dilation in Mice M. Kanamaru and I. Homma	115
--	-----

Breathing Is to Live, to Smell and to Feel Y. Masaoka and I. Homma	125
---	-----

Role of the Medial Frontal Wall for Readiness of Motor Execution M. Inoue, Y. Masaoka, M. Kawamura, Y. Okamoto, and I. Homma	137
---	-----

Poster Presentations

Ryanodine Receptor Type 1 / Calcium Release Channel in the Endoplasmic Reticulum as the Target of Nitric Oxide to Cause the Intracellular Calcium Signaling H. Oyamada, T. Yamazawa, T. Murayama, T. Hayashi, T. Sakurai, M. Iino, and K. Oguchi	155
---	-----

Decreased Sensitivity to Negative Facial Emotions and Limbic Lesions in Patients with Myotonic Dystrophy Type 1 M. Kawamura, A. Takeda, M. Kobayakawa, A. Suzuki, M. Kondo, and N. Tsuruya	161
---	-----

Generation of Rac1 Conditional Mutant Mice by Cre/loxP System
 D. Suzuki, A. Yamada, T. Amano, A. Kimura,
 R. Yasuhara, M. Sakahara, M. Tamura, N. Tsumaki,
 S. Takeda, M. Nakamura, T. Shiroishi, A. Aiba,
 and R. Kamijo 175

Orexin Modulates Neuronal Activities of Mesencephalic Trigeminal Sensory Neurons in Rats
 K. Nakayama, A. Mochizuki, S. Nakamura,
 T. Inoue 179

Investigation of the Anxiolytic Effects of Kampo Formulation, Kamishoyosan, Used for Treating Menopausal Psychotic Syndromes in Women
 K. Toriizuka, Y. Hori, M. Fukumura, S. Isoda, Y. Hirai,
 and Y. Ida 183

Activation of Microglia Induced Learning and Memory Deficits
 S. Tanaka, H. Ohtaki, T. Nakamachi, S. Numazawa,
 S. Shioda, and T. Yoshida 191

Increased Behavioral Activity with Regular Circadian Rhythm in PACAP Specific Receptor (PAC1) Transgenic Mice
 S. Arata, T. Hosono, Y. Taketomi, H. Kageyama,
 T. Nakamachi, and S. Shioda 199

Expression and Localization of Pituitary Adenylate Cyclase-Activating Polypeptide (PACAP) Specific Receptor (PAC1R) After Traumatic Brain Injury in Mice
 K. Morikawa, K. Dohi, S. Yofu, Y. Mihara,
 T. Nakamachi, H. Ohtaki, S. Shioda, and T. Aruga 207

Key Word Index 211

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