Preface

Muscarinic acetylcholine receptors have played a key role in the advancement of knowledge of pharmacology and neurotransmission since the inception of studies in these fields. Indeed, the classical work of Loewi, which led to the identification of acetylcholine as the Vagusstoff released by nerve stimulation, thus showing that synaptic transmission was chemical and not electrical, was based on the actions of neurotransmitter at muscarinic receptors. The physiological actions mediated by muscarinic receptors were known and exploited for both therapeutic and nontherapeutic purposes for hundreds of years before the existence of the receptors themselves was recognized. It is remarkable that the study of muscarinic receptors continues to provide new and surprising insights not just to the cholinergic system, but to the broad areas of neurobiology, cell biology, pharmacology, and therapeutics.

Like other members of the G-protein-coupled receptor superfamily, the application of molecular biological approaches to the study of the muscarinic receptors provided dramatically increased knowledge of both their biological complexity and therapeutic potential. The identification in the late 1980s of multiple genes encoding distinct muscarinic receptor subtypes provided the opportunity to develop drugs that would target discrete subsets of muscarinic receptors with decreased global side effects. The more recent demonstration that drugs can act both positively and negatively on the receptors at sites distinct from the acetylcholine binding region has provided even further promise for increasing the therapeutic specificity of muscarinic drugs.

We hope that this volume will provide a broad yet detailed review of current knowledge of muscarinic receptors that will be valuable both to long-time muscarinic investigators and to those new to the field. It describes the detailed insights that have been obtained on the structure, function, and cell biology of muscarinic receptors. This volume also describes physiological analyses of muscarinic receptors and their roles in regulating the function of the brain and of a variety of peripheral tissues. Finally, it demonstrates how the increased knowledge of the
basic biology, pharmacology, and physiology of the muscarinic receptors can be
translated into improved therapeutic applications.

We also hope that this book highlights both the excitement of the study of
muscarinic receptors and the amazing range of advances that have occurred in
recent years. We are sure that the future will continue to yield information on facets
of the muscarinic receptors that we have not yet imagined.

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Contents

Part I  Muscarinic Receptor Pharmacology and Signaling

Overview of Muscarinic Receptor Subtypes  ............................................ 3
Richard M. Eglen

Structure–Function Studies of Muscarinic Acetylcholine
Receptors ................................................................. 29
Katie Leach, John Simms, Patrick M. Sexton, and Arthur Christopoulos

Polymorphisms in Human Muscarinic Receptor Subtype Genes .......... 49
Martin C. Michel and Christine A. Teitsma

Muscarinic Receptor Trafficking ...................................................... 61
Cindy Reiner and Neil M. Nathanson

Physiological Role of G-Protein Coupled Receptor
Phosphorylation ............................................................... 79
Adrian J. Butcher, Kok Choi Kong, Rudi Prihandoko, and Andrew B. Tobin

Novel Muscarinic Receptor Mutant Mouse Models  ......................... 95
Jürgen Wess

Part II  Muscarinic Receptors in the CNS

Muscarinic Receptor Pharmacology and Circuitry for the
Modulation of Cognition ........................................................ 121
Michael Bubser, Nellie Byun, Michael R. Wood, and Carrie K. Jones
Muscarinic Agonists and Antagonists in Schizophrenia .......................... 167
Amanda R. Bolbecker and Anantha Shekhar

Muscarinic Pain Pharmacology: Realizing the Promise of Novel Analgesics by Overcoming Old Challenges ......................... 191
Dennis F. Fiorino and Miguel Garcia-Guzman

Muscarinic Modulation of Striatal Function and Circuitry .................. 223
Joshua A. Goldberg, Jun B. Ding, and D. James Surmeier

Muscarinic Receptors in Brain Stem and Mesopontine Cholinergic Arousal Functions ................................................................. 243
John S. Yeomans

Part III  Muscarinic Receptors in Autonomic Effector Organs

Muscarinic Receptor Agonists and Antagonists: Effects on Ocular Function ............................................................. 263
Frederick Mitchelson

Muscarinic Receptor Agonists and Antagonists: Effects on Cardiovascular Function ............................................................. 299
Robert D. Harvey

Muscarinic Receptor Antagonists: Effects on Pulmonary Function ............................................................. 317
Kalmia S. Buels and Allison D. Fryer

Muscarinic Agonists and Antagonists: Effects on Gastrointestinal Function ............................................................. 343
Frederick J. Ehlert, Kirk J. Pak, and Michael T. Griffin

Muscarinic Agonists and Antagonists: Effects on the Urinary Bladder ............................................................. 375
Donna J. Sellers and Russ Chess-Williams

Part IV  Muscarinic Receptors and Mediation of Hormonal Effects of Acetylcholine

Muscarinic Receptor Agonists and Antagonists: Effects on Inflammation and Immunity ............................................................. 403
Norah G. Verbout and David B. Jacoby
Contents

Muscarinic Receptor Agonists and Antagonists: Effects on Keratinocyte Functions ...................................................... 429
Sergei A. Grando

Muscarinic Receptor Agonists and Antagonists: Effects on Cancer ......................................................................... 451
Eliot R. Spindel

Activation of Muscarinic Receptors by Non-neuronal Acetylcholine ................................................................. 469
Ignaz Karl Wessler and Charles James Kirkpatrick

Index ......................................................................................................................................................... 493
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