

# METHODS IN MOLECULAR BIOLOGY

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# **G Protein-Coupled Receptor Signaling**

## **Methods and Protocols**

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## Preface

G protein-coupled receptors (GPCRs) represent the largest transmembrane protein families in the proteome of most living organisms. They have evolved as key communication players by virtue of sensing extracellular cues such as light, odorants, tastants, and also a wide variety of chemically distinct molecules found in our body and environment. The sensing step triggers a series of intricate conformational changes in GPCRs which allow reshaping the receptor to recruit additional signaling proteins to ultimately relay the information inside cells via chemical reactions. This modus operandi permits GPCR systems to regulate most physiological functions in humans such as, for instance, vision, olfaction, smell, blood pressure, locomotion, memory, and thought process. In line with their widespread role in humans, deficiencies in GPCR systems have been linked to numerous diseases. In fact, approximately 40% of currently prescribed drugs target GPCRs. In spite of decades of GPCR research, a full knowledge of GPCR biology has yet to be achieved. This is of medical importance for improving current available therapeutics with improved efficacy and fewer undesirable side effects. In this volume, I have assembled chapters that comprehensively describe protocols to assist with the study of structural, molecular, cell biological, and in vivo facets of GPCRs and to enable the development of experimental tools for screening novel GPCR drugs. Protocols will be of interest to life scientists working in a variety of research fields including molecular pharmacology, cell and developmental biology, brain behavior and physiology, and drug development and screening.

This volume would not have been possible without the help of key people. First and foremost, I want to thank all the contributors for their efforts. I am enormously indebted to all of them for their willingness and generosity in providing their time and expertise to diligently write their expert protocols. I am also extremely grateful to Dr. John Walker, the editor in chief of *Methods in Molecular Biology* series, for his great guidance and support throughout the making of this volume. I want also to thank Patrick Marton, the executive editor of *Springer Protocols*, and Kursad Turksen, editor in chief of Springer's *Stem Cells and Regenerative Medicine*, for their enthusiastic support and valuable advice in the initial phase of making this volume. Lastly, my heartfelt thanks go to David C. Casey, the editor of *Springer Protocols*, for his efforts to assist me with the completion of this volume.

*Ottawa, ON, Canada*

*Mario Tiberi*

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