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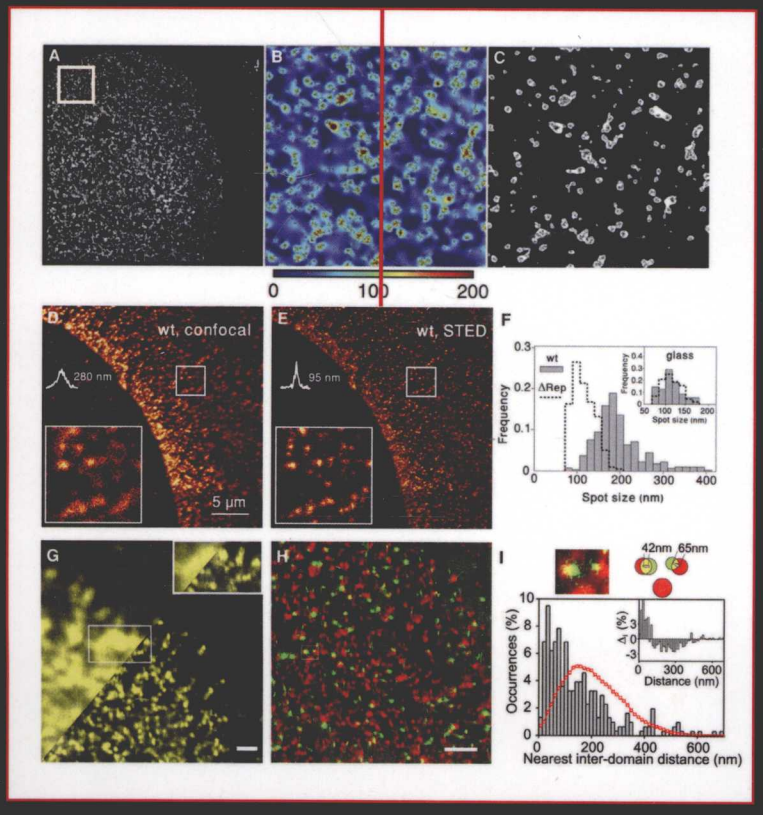
Receptor-Receptor Interactions



Edited by

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Methods in Cell Biology

Receptor-Receptor Interactions

Volume 117

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Methods in Cell Biology

Receptor-Receptor Interactions

Volume 117

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Preface

In the early 1980s, our laboratory showed (Conn, Rogers, Stewart, Niedel, & Sheffield, 1982) that bringing receptors of the gonadotropin-releasing hormone (GnRH) receptor (GnRHR) into close proximity (i.e., 100 Å) resulted in their activation. We named this process "microaggregation" to distinguish it from large-scale patching and capping ("macroaggregation"), associated with internalization of GnRH plasma membrane receptors (Hazum, Cuatrecasas, Marian, & Conn, 1980). We proposed that this was a mechanistic step in hormone action. Microaggregation of the GnRHR also increased the potency of GnRH agonists (Conn, Rogers, & McNeil, 1982), supporting that view.

The observation that receptors could come together and take on different properties was not part of the general view of hormone action 35 years ago: a receptor and ligand combine to make a complex that activated a signaling system. "$R + L \rightarrow RL \rightarrow RL^*$" was the dogma of the day. At the time, we did not know that the GnRHR was a G protein-coupled receptor (GPCR). GPCRs were not even a defined class and G proteins were not yet commonly identified.

Times have changed. The ability of receptors to interact is now called "oligomerization" and it is accepted that GPCRs oligomerize both in the anterograde (endoplasmic reticulum to plasma membrane) and retrograde (plasma membrane to intracellular spaces) modes and in the plasma membrane itself. The relevance of this process appears to differ from receptor to receptor and it is clear that GPCRs can exist as monomers, dimers, and oligomers. Hetero-oligomers are also known to exist (Kuner et al., 1999; Rocheville et al., 2000) and may be responsible for cross talk between systems, as suggested by Yogesh Patel (and others), shortly before his death.

Receptor–receptor interactions are not limited to GPCR, of course. Nuclear receptors and kinases also oligomerize within each class.

Watching this area develop and seeing the different ways in which receptor–receptor interactions are utilized by cells is a fascination to me, so I was pleased to be invited to assemble this book. Understanding the relevance by which protein–protein interactions convey information is one of the main ways that information is transferred. It is a timely topic and one that will benefit from the opportunity to compare and contrast different systems.

I was happy that so many leaders in this field were willing to commit time to contribute to this work. I thank the editors at Elsevier and the senior editors of the series for presenting this opportunity.

P. Michael Conn
Portland, Oregon
September 2013

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Color Plate

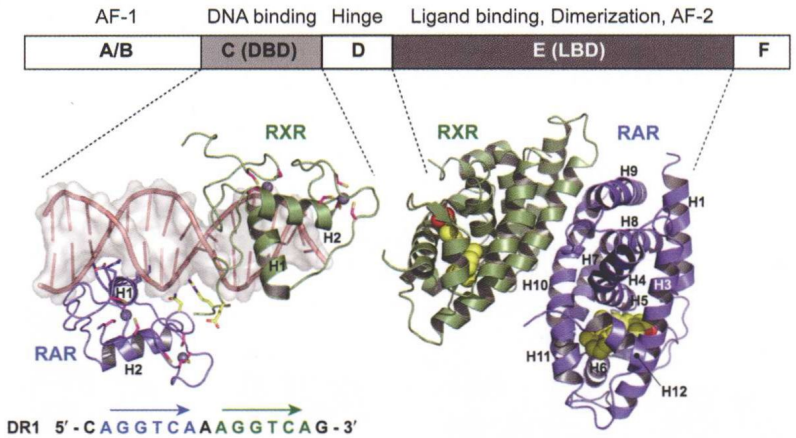

PLATE 1 (Fig. 2.1 on page 23 of this volume).

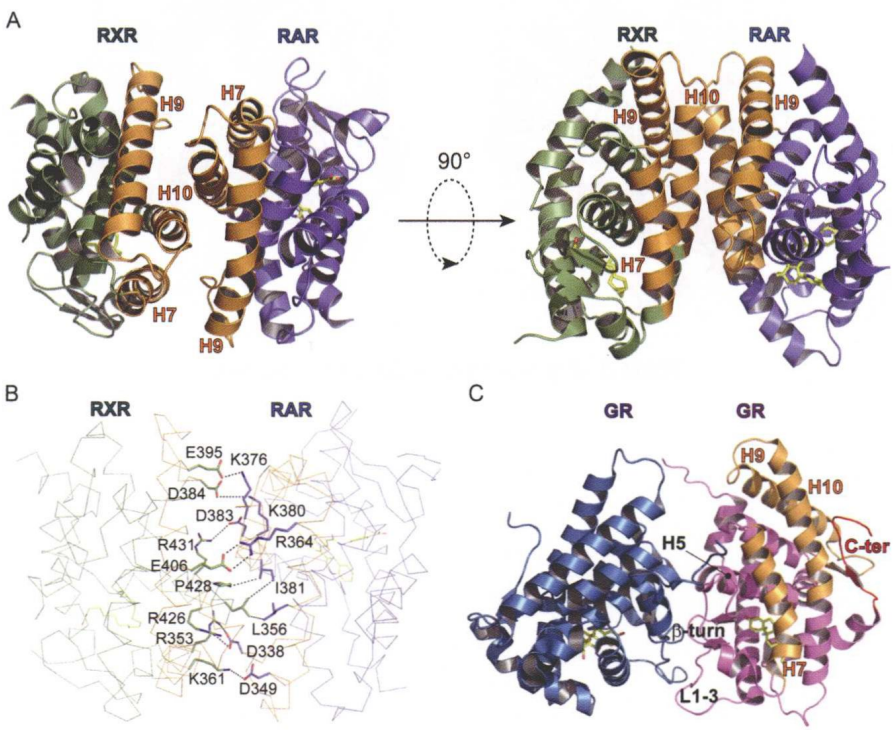

PLATE 2 (Fig. 2.2 on page 25 of this volume).

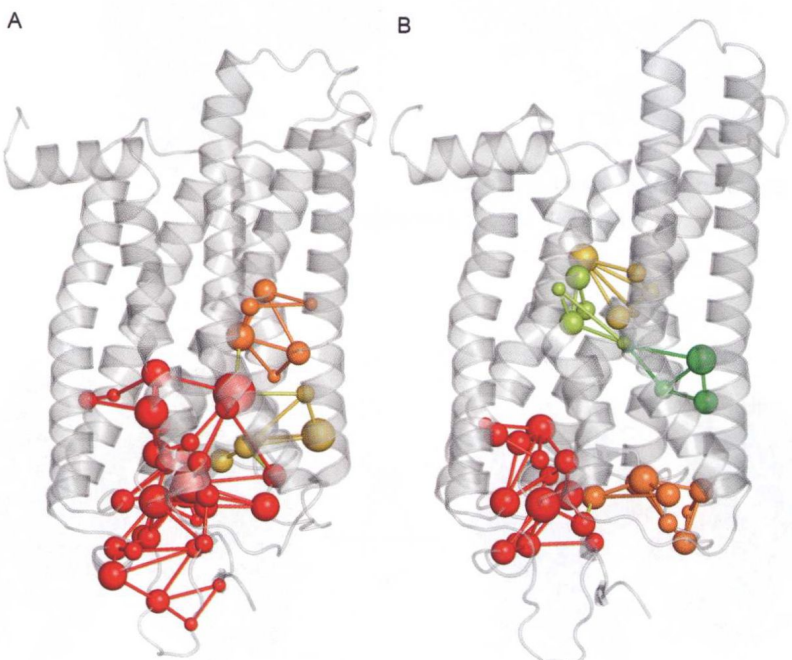

PLATE 3 (Fig. 3.2 on page 53 of this volume).

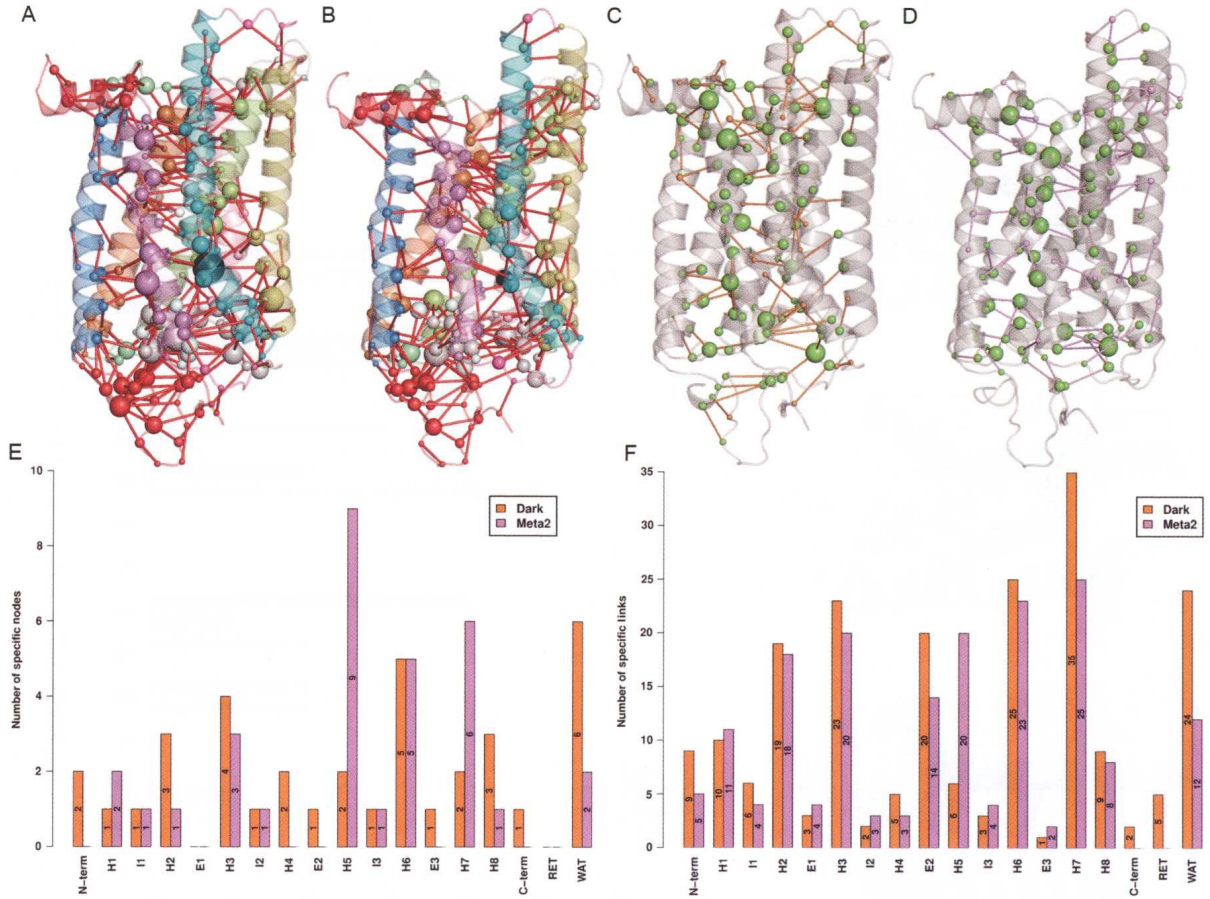

PLATE 4 (Fig. 3.3 on page 54 of this volume).