
Preface

Ligand-gated ion channels in the brain are a family of membrane receptor molecules critical to the chemistry of synaptic transmission. Since the synthesis of *N*-methyl-D-aspartate by J. C. Watkins in the 1960s, and subsequent pharmacological studies by a number of groups, NMDA receptors have emerged as key molecules involved in neuronal excitation and toxicity. The molecular studies of NMDA receptors began in the late 1980s, thanks to molecular cloning of the genes encoding various receptor subunits. The ability to express, purify, and analyze various forms of recombinant NMDA receptor proteins in a variety of heterologous systems has offered us enormous opportunities for both basic research of the NMDA receptor structure and function, as well as for clinical investigation and high-throughput drug screens for bioactive compounds.

Ion channels have been studied extensively using pharmacological and electrophysiological approaches. *NMDA Receptor Protocols* differs from other books covering various aspects of techniques involved in conducting those experiments in that it details experimental protocols for studying NMDA receptors, with a strong emphasis on state-of-the-art molecular techniques. The wide range of topics includes molecular cloning of NMDA receptor subunits, expression and functional characterization of cloned genes, investigation of NMDA receptor properties using in vivo and in vitro preparations, and design and construction of expression systems suitable for special purposes, such as high-throughput drug screens. Although *NMDA Receptor Protocols* does focus on NMDA receptors, the described methods are applicable to related ligand-gated ion channels. With some modifications, one may extend the techniques to other membrane receptors or signaling systems.

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