Editorial

N-methyl-D-aspartate receptors (NMDARs) are indispensable for brain development and function. Both NMDAR hypo- and hyperfunction are thought to contribute to the pathophysiology of a variety of neurological and psychiatric diseases. In the central nervous system, the number and subtypes of NMDARs present at individual synapses and their functional properties are tightly regulated according to the developmental and functional requirements of a neuron. Following the cloning of all NMDA receptor subunits in the last decade, recent studies have provided insight into the molecular mechanisms underlying NMDA receptor expression. The subunit composition is a crucial determinant of functional properties of NMDARs. The composition of NMDARs is regulated at the level of gene transcription as well as at multiple levels following transcription. The papers collected in this special issue of *NeuroSignals* review and critically evaluate our current knowledge regarding the post-transcriptional regulation of NMDAR expression.

Karen Waters and Rita Machaalan review the expression of NMDARs in the fetus and newborn, and the response of NMDARs to noxious stimuli during early

development. Isabel Pérez-Otaño and Michael Ehlers present recent evidence and synthesize our current views regarding the dynamic events underlying post-translational processing, subunit assembly, intracellular trafficking and the localized control of endo/exocytosis of NMDARs to and from the cell surface. Antonius and Hendrika VanDongen give an overview of the mechanisms that control the efficacy of NMDA receptor subunit mRNA translation. Rema Vazhappilly and Nikolaus Sucher summarize the experimental evidence for translational regulation of NR1, the subunit common to all NMDARs.

We hope that this special issue of *NeuroSignals* will further stimulate exciting research aimed at understanding how cellular and synaptic regulatory events modulate the NMDA receptor expression and function to meet the developmental and functional requirements of neurons. We anticipate that this line of scientific investigation will contribute to the development of new therapeutic approaches for neurodegenerative and neuropsychiatric diseases.

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