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Editorial

Nicotinic acetylcholine receptors as therapeutic targets: emerging frontiers in basic research and clinical science – Editorial comments

The field of nicotinic acetylcholine receptors has advanced considerably over the past decade in terms of both basic research and clinical science. An important breakthrough was made some twenty years ago, with the pioneering work of a few laboratories including those of Jean-Pierre Changeux (Institut Pasteur, Paris) and Stephen Heinemann (Salk Institute, San Diego) that led to the cloning the genes that encode for the muscle nicotinic acetylcholine receptors. This facilitated the subsequent discovery of an entire family of genes encoding the neuronal nicotinic acetylcholine receptors. Expression of these receptor subunits in heterologous expression systems, followed by their detailed in vitro and in vivo analysis further advanced our knowledge and enabled us to study the physiological, pharmacological and pathophysiological roles of nAChR subtypes at a molecular level.

Concurrent with the increased understanding of receptor biology, drug discovery efforts at several pharmaceutical and biotech laboratories in the United States and elsewhere led to the identification of novel ligands – agonists, antagonists and allosteric modulators – targeting distinct receptors/subunit combinations, and subsequent validation of the therapeutic potential on nAChRs for treating diseases of unmet medical need. The advancement of a series of studies ranging from phase 1–3 and beyond including the recent emergence in clinical practice of novel nicotinic acetylcholine receptor-based therapeutics such as varenicline (Chantix®) is a reflection of progress and a testament to the clinical potential of the nAChR platform.

Articles in this special issue synthesizes latest concepts in basic science and clinical advances, analyzes breakthrough findings in the elucidation of nAChR biology in a physiological and pathological context and define approaches and targets for drug discovery and development in a range of indications including attention deficit hyperactivity disorder (ADHD), Alzheimer's disease, schizophrenia, pain, smoking cessation and addiction.

Several of the contributors to this special issue participated as speakers at the Society for Neuroscience (SFN) Satellite symposium on “Nicotinic Acetylcholine Receptors as Therapeutic Targets: Emerging Frontiers in Basic Research and Clinical Science” held in San Diego, CA, October 31–November 2, 2007. The Guest Editors sincerely thank all the authors for their dedicated efforts in contributing state-of-the-art and timely articles to this special issue. We are also indebted to Lynne LeCount, Cindy Martin and Elsevier staff for their support for bringing this issue together.

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