Autism spectrum disorders (ASD), one of the most common neurodevelopmental disorders, are now a major public health and social concern throughout the world. The ASD symptoms are grouped in two main diagnostic criteria: social/communicative deficits and restricted, repetitive patterns of behaviours. These symptoms manifest themselves at early childhood, persist into adulthood and limit or impair everyday life. ASD is also accompanied by diversity of comorbid features, as for example, anxiety, hyperactivity, impulsivity, inattention, irritability, sensory abnormalities, aggressive behaviour and cognitive deficits. One of the most troublesome aspects of ASD is that the number of patients has strikingly increased in the last years. As a consequence, costs relating to the treatment and care of ASD patients are also dramatically rising.

Pharmacologic treatment of ASD is mainly targeted at co-occurring problems. Thus, there is an urgent need for a new pharmacotherapy that can effectively treat the core symptomatology of the disease, particularly in the social/communication domain. A wide body of evidence points to the role of cholinergic system, including alpha 7 nicotinic acetylcholine receptors (α7-nAChR), in the pathophysiology of ASD and pharmacotherapy of this disorder. Nevertheless, the strategy based on a direct activation of α7-nAChR has not yet been assessed for the efficacy against core symptoms of ASD in either clinical or preclinical studies. The research hypothesis of our project is that the selective targeting of α7-nAChR can address both core symptom domains and co-morbid impairments. To test this hypothesis we plan to assess the efficacy of selective α7-nAChR ligands (the agonist and positive allosteric modulators) in neurodevelopmental ASD models in rats. Behavioural studies will be complemented by the assessment of neurochemical changes.

The results of the proposed study will provide a preclinical framework for targeting α7-nAChR ligand as a pharmacotherapy of ASD.