

Neurotrypsin and mental retardation

One of the fundamental questions in neuroscience is to understand how memories are formed. Cognitive functions, including learning and memory, are based on adaptive functional and structural changes in the central nervous system (CNS). The neuronal serine protease neurotrypsin has been recognized to play an indispensable role in cognitive processes in humans and its deficiency results in severe mental retardation. Previous studies revealed that neurotrypsin is essential for the formation of dendritic filopodia, which are membranous protrusions found primarily on dendritic processes of developing neurons that may be the sites of new synapses. Although formation of new dendritic filopodia accompanies some forms of synaptic plasticity and learning, the role of neurotrypsin in these processes is not yet defined. The project aims to identify mechanisms leading to induction of dendritic filopodia by neurotrypsin pathway, to investigate during which phase of learning and memory formation neurotrypsin is crucial and to use this knowledge for development of new anti-mental retardation treatments.