ERA-NET Neuron
NEWSLETTER 20

Dr. Vera Kalscheuer

Molecular mechanisms of brain function in mtor-deficient intellectual disability syndromes (mTOR-DIDS)

Project Coordinator: Dr. Vera Kalscheuer, Max Planck Society, Berlin, Germany.
Project Partners: Dr. Vania Broccoli, Ospedale San Raffaele s.r.l., Milan, Italy,
Prof. Susann Schweiger, Universitätsmedizin Mainz, Mainz, Germany,
Prof. Rainer Schneider, Leopold Franzens Universität Innsbruck, Innsbruck, Austria.

Intellectual disability (ID) is characterized by significant limitations on both intellectual functioning and adaptive behaviour, which covers many everyday social and practical skills. It affects 1-3% of the general population and can be caused by a broad spectrum of factors, including birth complications and gene mutations. The number of novel genes linked to cognitive impairment is rapidly increasing, but our current understanding of their function and the underlying pathophysiologic mechanisms lags far behind. One common pathway in the pathogenesis of ID is the mammalian target of rapamycin (mTOR), which has been shown to play an important role in the uptake and processing of nerve cell stimulation.

In mTOR-DIDS, a collaborative study between four groups from three countries, we investigate the relationship between mTOR deficiency and cognitive dysfunction in Rett syndrome (RTT), CDKL5 disorder (CD) and Opitz/BBB/G syndrome (OS) using in vitro and in vivo model systems. All three syndromes are characterized by ID to varying degrees. A clear knowledge of cellular processes and molecules that are involved in ID could pave the way towards the identification of novel targets that can be used for the development of drug therapies for genetically caused ID.