

Description of Research	<p>Dr. Benke's research focuses on the cellular mechanisms by which early life seizures (ELS) subvert the processes of normal neuronal development. His research seeks to understand how ELS subsequently mediates autism, learning impairment and other co-morbidities of pediatric seizures and epilepsy. While many brain structures and signaling systems are involved, this work has focused on glutamatergic synaptic transmission in the hippocampus. He and his laboratory are interested in how the in vitro correlates of autism and learning impairment are affected by ELS, namely synaptic plasticity (LTP and LTD) in rodent brain slice preparations using a variety of electrophysiological, biophysical and biochemical techniques. They study how the expression and function of glutamate receptors, themselves actively changing and being modulated by development, are altered by early life seizures. These alterations then influence the induction and expression mechanisms of LTP and LTD. They correlate these findings to behavioral phenotypes determined by a neuropsychological battery of tests. Their published work has shown that a mild seizure in early life results in permanent, hippocampal dependent, learning impairment. This learning impairment is mediated at the synaptic level without gross morphological alterations. Their preliminary data now shows that ELS is associated with an autistic phenotype.</p> <p>Dr. Benke has collaborations in the department of pharmacology; they share joint lab meetings that allow many discussions that cross-pollinate our respective research efforts. He is an active member and user of the Behavioral Core through the IDDRC. Thus, he is uniquely qualified with an extensive background in rodent behavior and the genetics and pharmacology of synaptic transmission that are likely to underlie intellectual disability and autism as mediated by ELS.</p> <p>He is team leader of the Movement-Genetics-Metabolic team at Children's Hospital Colorado where he is responsible for coordination of clinical activities and personnel towards addressing related disorders. This includes Movement Disorders Clinic, Mitochondrial Disorders Clinic, NeuroMetabolic Clinic, NeuroGenetic Clinic and Rett Clinic (Clinic Director). He is the local Neurological Consultant for our Autism Treatment Network site. Thus, he has a broad clinical perspective that appreciates the need for better clinical treatment of autism and intellectual disability</p>
Methodology	Genetics; Molecular and Cellular Biology
Clinical and special developmental populations	Developmental Disorders; Autism
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