The Mechanisms of Cypin Underlying Neurocognitive, Neurodegenerative, and Neurological Disorders

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CURRENT RESEARCH
Elucidating the role of cypin protein in various mental disorders to develop novel treatments

Neurons play an important role of communicating cognitive functions of the brain and producing an elaborate network of dendrites, whose extent of branching is influenced by factors like learning, which increases branching, or alcohol exposure or disease, which decreases branching. In conditions like mental retardation, autism, schizophrenia, and Alzheimer’s disease, there are fewer branches on neurons in the hippocampus and cortex, potentially reflecting the deficits in learning and memory so prevalent in these disorders. Dr. Bonnie Firestein, Professor of Cell Biology and Neuroscience at Rutgers University, studies the role of a protein called cypin as an important regulator of dendrite number in neurons involved in learning and memory. Cypin, also known as Gda, can help increase the number of dendrites and alter or increase the number of synapses or connection sites in neurons involved in learning and memory. Changing levels of cypin, therefore, can protect neurons from damage, and Dr. Firestein and her team use multiple novel tools including mice, cellular assays, and pharmacological assays to develop drugs to alter cypin activity and improve learning and memory, and identify biomarkers that will help diagnose disorders. These drugs are applicable to a number of neurological and neurocognitive conditions, including autism, traumatic brain injury, schizophrenia, and Alzheimer’s Disease.

After identifying cypin over 15 years ago, Dr. Firestein’s laboratory extensively characterized cypin’s influence on dendrite branching and spine stability, which direct the neuron on how to integrate incoming information. Dr. Firestein has also found that changes to cypin protein expression result in alterations at the...