Anna R Moore, J Mol Genet Med 2018, Volume 12
DOI: 10.4172/1747-0862-C3-030

Molecular regulation of experience dependent plasticity

Anna R Moore
Temple University Philadelphia, USA

Sensory experience plays an important role in shaping neural circuitry through activity-dependent regulation of both synaptic connectivity and intrinsic properties of individual neurons. Identifying the molecular players responsible for converting external stimuli into altered neuronal output remains a crucial step in understanding experience-dependent plasticity and circuit function. Using the mouse visual system as a model, we investigated the role of the activity-regulated, non-canonical Ras-like GTPase Rem2 in ocular dominance plasticity. Our in vivo analysis reveals that a primary function of Rem2 signaling is to stabilize the intrinsic excitability of cortical neurons in order to maintain proper levels of network activity. Consistent with these findings, both in vitro and in vivo recordings reveal increased spontaneous firing rate in the absence of Rem2. In addition, our data establish a novel, cell-autonomous role for Rem2 in regulation intrinsic excitability of layer 2/3 pyramidal neurons, prior to changes in synaptic function. Taken together, we propose that Rem2 functions as a calcium-sensitive cytoplasmic signal transduction molecule and works to convey changes at the membrane into changes in gene expression in the nucleus to regulate intrinsic excitability. Our molecular studies promise to yield significant insight into the transcriptional program by which a neuron instructs its intrinsic properties.

Biography

Anna Moore is a Assistant professor in the department of biology at Temple University, Philadelphia,USA. She has a long standing interest in understanding how the brain develops and adapts to the world around it. She was trained as an electrophysiologist during her PhD where she explored the emergence of electrical activity in cortical neurons during development. For her postdoctoral work, she went on to expand her skill set to include molecular biology, mouse genetics, and calcium imaging to identify novel molecules important for synapse formation.

moore@temple.edu

Notes: