To Each Neuron Its Own? Dynamic Regulation Of Excitatory-Inhibitory Ratio And Cortical Circuit Plasticity By Experience-Induced Secreted Molecules

ELSC cordially invites you to the lecture given by:

Ivo Spiegel
Department of Neurobiology Weizmann Institute of Science

On the topic of:

To Each Neuron Its Own? Dynamic Regulation Of Excitatory-Inhibitory Ratio And Cortical Circuit Plasticity By Experience-Induced Secreted Molecules

The lecture will be held on Thursday January 5th, 2017 at 17:00

at ELSC: Silberman Bldg., 3rd Wing, 6th Floor,

Edmond J. Safra Campus

Light refreshments served at 16:45

Abstract:

The maintenance of the proper ratio between excitation and inhibition (E/I ratio) is critically important for the normal function of neural circuits, but the molecular mechanisms that dynamically regulate E/I-ratio are not well understood. Our recent studies in the cortex reveal that different types of neurons respond to
sensory experience by expressing distinct sets of secreted molecules, suggesting that these molecules modulate specific synapses in a cell-autonomous and local manner. Our findings on the insulin-like growth factor 1 (IGF1) support this idea: IGF1 is expressed and experience-induced in the cortex selectively in VIP- (Vasoactive Intestinal Protein) expressing GABAergic neurons and VIP neuron-derived IGF1 promotes inhibitory inputs onto VIP neurons in a manner that is necessary for the experience-dependent development of the visual cortex. I will discuss these findings in the context of previous literature and will propose a model whereby cortical neurons maintain their cell-intrinsic E/I-ratio by inducing the expression of secreted factors that modulate a neuron’s synaptic connectivity in a cell-autonomous and local manner according to a circuit-wide homeostatic logic.

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