ELSC Seminar: Edi Barkai

November 13, 2014

On the topic of: Learning-induced modulation of intrinsic neuronal excitability: mechanism and functional significance?

ELSC cordially invite you
to the lecture given by:

Edi Barkai
Sagal department of neurobiology, Haifa university

On the topic of:

Learning-induced modulation of intrinsic neuronal excitability: mechanism and functional significance?

The lecture will be held on Thursday, November 13, 2014 at 17:00, at ELSC: Silverman Bldg., 3rd Wing, 6th Floor, Edmond J. Safra Campus

Light refreshments at 16:45

Abstract:

Learning-induced enhancement in neuronal excitability is evident in hippocampal and piriform cortex pyramidal neurons following a complex olfactory-discrimination operant conditioning task. Such enhanced excitability is manifested in reduced spike frequency adaptation that results from reduction in the slow afterhyperpolarization (AHP), which develops after a burst of action potentials. AHP reduction is apparent throughout the pyramidal cells neuronal population.

The post-burst AHP reduction is mediated by decreased conductance for a specific calcium-dependent potassium current, the sIAHP. This long-lasting reduction is dependent on persistent activation of the PKC and ERK second messenger systems. Similar long-lasting AHP reduction can be induced in-vitro by repetitive synaptic stimulation or by kainate application. Such activity-dependent AHP reduction is mediated by activation of the GluR6-sutype glutamate receptor.

Olfactory-learning induced enhanced neuronal excitability in CA1 pyramidal neurons is also accompanied by enhanced learning capability in a novel hippocampus-dependent task, the Morris water maze.

We suggested that AHP reduction is the cellular mechanism that enables neuronal ensembles to enter into a state which may be best termed "learning mode". This state lasts for up to several days and its behavioral manifestation is enhanced learning capability in tasks that depend on these particular neuronal
ensembles.

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