IBSCA research seminar

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Title:

A century-old assumption regarding neurons and brain learning is undermined by new types of experiments

Abstract

According to the long-lasting computational scheme each neuron sums the incoming electrical signals via its dendrites and when the membrane potential reaches a certain threshold the neuron typically generates a spike. We present three types of experiments indicating that each neuron functions as a collection of independent threshold units, where the neuron is activated following the origin of the arriving signals. In addition, experimental and theoretical results reveal a new underlying mechanism for the fast brain learning process, dendritic learning, as opposed to learning which is based solely on slow synaptic plasticity. The learning occurs in closer proximity to the neuron, dendritic strengths are self-oscillating, and weak synapses play a key role in the dynamics.