The role of IL-1 receptor accessory protein like1 (IL1RAPL1) in dendrites formation.

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Mutations of the Interleukin-1-receptor accessory protein like 1 (IL1RAPL1) gene are associated with cognitive impairment ranging from non-syndromic X-linked mental retardation to autism. IL1RAPL1 belongs to the family of IL1/Toll receptors and is localized at excitatory synapses, where it interacts with PSD-95, a major component of excitatory postsynaptic compartment.
Deletions in Ig-like extracellular domains of IL1RAPL1 have been found in patients with intellectual disability and autism. Moreover, given that dendritic abnormalities are the most consistent anatomical correlates of mental retardation, we counted the total number of secondary dendrites and the number secondary dendrites that branch of neurons over-expressing full length IL1RAPL1, and several IL1RAPL1 mutants. Interestingly we show that the over-expression of full length proteins and IL1RAPL1ΔC mutant (laking the C-terminal domain) in rat neuron primary culture, leads to a simplification of neuronal arborisation. This effect is abolished when we overexpress mutant lacking the N-terminal domains. These results confirm the importance of the extracellular domains of IL1RAPL1 not only in synaptogenesis but also in dendrite development. Understanding how these mutants act on synapse formation and dendritic morphology can help us to clarify how any changes in IL1RAPL1 pathways can lead to development of cognitive disorders in humans.