

The Light Chain 1 Subunit of the Microtubule-Associated Protein 1B (MAP1B) Is Responsible for Tiam1 Binding and Rac1 Activation in Neuronal Cells

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Microtubule-associated protein 1B (MAP1B) is a neuronal protein involved in the stabilization of microtubules both in the axon and somatodendritic compartments. Acute, genetic inactivation of MAP1B leads to delayed axonal outgrowth, most likely due to changes in the post-translational modification of tubulin subunits, which enhances microtubule polymerization. Furthermore, MAP1B deficiency is accompanied by abnormal actin microfilament polymerization and dramatic changes in the activity of small GTPases controlling the actin cytoskeleton. In this work, we showed that MAP1B interacts with a guanine exchange factor, termed Tiam1, which specifically activates Rac1. These proteins co-segregated in neurons, and interact in both heterologous expression systems and primary neurons. We dissected the molecular domains involved in the MAP1B-Tiam1 interaction, and demonstrated that pleckstrin homology (PH) domains in Tiam1 are responsible for MAP1B binding. Interestingly, only the light chain 1 (