

Marlin-1 and conventional kinesin link GABAB receptors to the cytoskeleton and regulate receptor transport

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The cytoskeleton and cytoskeletal motors play a fundamental role in neurotransmitter receptor trafficking, but proteins that link GABAB receptors (GABABRs) to the cytoskeleton have not been described. We recently identified Marlin-1, a protein that interacts with GABABR1. Here, we explore the association of GABABRs and Marlin-1 to the cytoskeleton using a combination of biochemistry, microscopy and live cell imaging. Our results indicate that Marlin-1 is associated to microtubules and the molecular motor kinesin-I. We demonstrate that a fraction of Marlin-1 is mobile in dendrites of cultured hippocampal neurons and that mobility is microtubule-dependent. We also show that GABABRs interact robustly with kinesin-I and that intracellular membranes containing GABABRs are sensitive to treatments that disrupt a protein complex containing Marlin-1, kinesin-I and tubulin. Finally, we report that a kinesin-I mutant severely impairs receptor transport. We conclude that Marlin-1 and kinesin-1 lin