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Spectraplakin Couples Microtubule Orientation to Actin During Dendritic Pruning

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Neurite pruning, the elimination of specific axonal or dendritic branches, is an essential mechanism to refine developing neural circuitry. Following local microtubule and actin disassembly, *Drosophila* sensory c4da neurons prune their dendrites during metamorphosis. We previously found that the uniform plus end-in orientation of dendritic microtubules is required for efficient pruning by enabling their coordinated disassembly. How dendritic microtubule organization is established is only incompletely understood. Here, we show that the spectraplakin short stop (Shot), an actin-microtubule crosslinker, is required for c4da neuron dendritic pruning. We find that Shot genetically interacts with known factors governing dendritic microtubule organization, and loss of Shot itself misorients dendritic microtubules. Forced actin depolymerization also causes dendritic microtubule orientation defects, and the actin binding ability of Shot impinges on microtubule orientation. Finally, we show that inhibition of actin depolymerization during pruning also inhibits microtubule disassembly, indicating coordination of local cytoskeleton disassembly. Our data suggest that via Shot-mediated coupling, actin is necessary for establishing plus endin microtubule orientation in dendrites, facilitating pruning.

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