Mms19 facilitates neurite outgrowth in the developing *Drosophila* nervous system

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Mms19 has a multifaceted role in various cellular processes, including nucleotide excision repair, iron-sulfur cluster assembly, and mitotic activity regulation. Additional and more recent evidence shows that Mms19 directly binds to microtubules and facilitates spindle assembly and orientation in *Drosophila* neural stem cells. Another microtubule-dependent process is the formation and growth of neurites. Here, we investigate the function of Mms19 in *Drosophila* Mms19 in neurite outgrowth by employing a combination of genetic techniques, cell culture models, and the induction of mutant clones. We find that primary larval neurons in culture derived from Mms19 homozygous mutants show reduced neurite length and fewer branching points as compared to control neurons. We also used genetically induced RNAi to specifically knock down Mms19 expression in larval class IV sensory neurons. Surprisingly, this led to a complete absence of this neuronal population. Finally, we carried out an Mms19 loss-of-function clonal analysis (MARCM) and showed that mutant clones are less frequent than control clones in the adult brain. Our findings may open new avenues for developing interventions to modulate neurite development and promote neural circuit formation, with the ultimate goal of advancing our understanding of the intricate wiring of the brain and its implications for human health and disease.

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