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Methionine Sulfoxide Reductase Msr Deficiency Leads to a Reduction in Dopamine Levels in Drosophila

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Biological homeostasis relies on protective mechanisms that respond to cellular oxidation caused primarily by free radical reactions. Methionine sulfoxide reductases Msr are a class of enzymes that reverse oxidative damage to methionine. The focus of this study is on the relationship between Msr and dopamine in Drosophila. Dopaminergic neurons in drosophila have comparable roles to those found in humans. A deficit in dopamine leads to the onset of many neurological disorders including the loss of fine motor control—a neurodegenerative condition characteristic of Parkinson’s disease PD. We have found that dopamine levels in the heads of MsrA¹;MsrB¹ mutants are significantly reduced in comparison to the wild type. In addition, we have found that TH protein and expression levels are markedly reduced in an Msr-deficient system. Our findings suggest that it is possible the Msr system plays an important role in maintaining dopaminergic neurons alive, and thus, is protectant of the CNS.