

Short Neuropeptide F Regulates Food Intake in *Drosophila*

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We have cloned the *short neuropeptide F* (*sNPF*) gene from *Drosophila*. It encodes a protein with two putative peptides, sNPF1 and 2, containing the RLRfamamide sequence at the C terminal end. sNPF1 and 2 peptides are ligands for NPF receptor, NPFR76F. *sNPF* is expressed in all developmental stages and clearly seen in the nervous systems of embryos and larvae. In late stage embryos, *sNPF* is expressed in the neurons of brain and ventral nerve cord, and in anterior sensory neurons. In the CNS of the late larval stage, *sNPF* is expressed in the brain and ventral nerve cord. In the developmental Western blot analysis, we found that sNPF produced during all developmental stages from embryos to adults. In late stage embryos, sNPF is localized in the neurons of the brain and ventral nerve cord, and sensilla. In the CNS of late stage larvae, sNPF is clearly localized in the neurons of the brain, the connective axons in the ventral nerve cord, and 6 thoracic ganglions. In the adult brain, sNPF is localized in the medulla and the mushroom body area. The expression and localization of sNPF in nervous systems suggested that the *sNPF* functions in both central and peripheral nervous systems to regulate behaviors. To study the function of the *sNPF* gene, we generated the gain-of-function *UAS-sNPF* and the loss-of-function *UAS-sNPF RNAi* (*5'sNPF3'-3'sNPF5'*) transgenic flies to use the UAS/Gal4 binary system. Two Gal4 line were used in the experiments. One is *MJ94-Gal4*, which is expressed heavily in CNS and PNS during larval and adult stages, and the other is *HS-Gal4*. We tested the feeding behavior using colored food during larval and adult stages. In the adult stage, the number of fed flies significantly increased in *MJ94>sNPF* compared to the number of control flies, but no fed adult was observed in *MJ94>sNPF RNAi*. In the 3rd instar larval stage, the number of fed larvae slightly increased in *MJ94>sNPF* compared to control larvae, but no fed larva was observed in *MJ94>sNPF RNAi*. We repeated the feeding assay with *HS-Gal4* and gained the same results. Then, we assayed the amount of feeding in adults by measuring fed color dye with a spectrophotometer. The flies containing one copy of *MJ94>sNPF* showed higher absorbance than controls and lower absorbance than two copies of *MJ94>sNPF*. The absorbance of flies containing *MJ94>sNPF RNAi* was significantly lower than controls. Data from feeding assay indicate that short neuropeptide F regulates food intake in *Drosophila*.