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Study of human metabolic disease using the *Drosophila* model:
Drosophila neuropeptide F signaling regulates food intake
and body size

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Neuropeptides regulate a wide range of animal behavior including food consumption, circadian rhythms, and anxiety. Recently, *Drosophila neuropeptide F* (dNPF), which is the homologue of the vertebrate neuropeptide Y, was cloned and the function of dNPF in feeding behaviors was well characterized. However, the function of the structurally related *short neuropeptide F* (sNPF) was unknown. Here, we report the cloning, RNA and peptide localizations, and functional characterizations of the *Drosophila* sNPF gene. The sNPF gene encodes the pre-protein containing putative RLRamide peptides and was expressed in the nervous system of late stage embryos and larvae. The embryonic and larval localization of the sNPF peptide in the nervous systems revealed the larval CNS neural circuit from the neurons in the brain to thoracic axons and to connective axons in the ventral ganglion. In the adult brain, the sNPF peptide was localized in the medulla and the mushroom body. However, the sNPF peptide was not detected in the gut. The sNPF mRNA and the peptide were expressed during all developmental stages from embryo to adult. From the feeding assay, the gain-of-function sNPF mutants expressed in nervous systems promoted food intake, whereas the loss-of-function mutants suppressed food intake. Also, sNPF over-expression in nervous systems produced bigger and heavier flies. These findings indicate that the sNPF is expressed in the nervous systems to control food intake and regulate body size in *Drosophila melanogaster*.