

Short neuropeptide F signaling regulates functioning of male reproductive system in *Tenebrio molitor* beetle.

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Streszczenie

Neuropeptides of short neuropeptides F family (sNPF) have been identified in various arthropods. They are pleiotropic neuromolecules which so far have been mainly associated with regulation of feeding and metabolism, as well as growth and development, locomotion, circadian rhythm or learning and memory. Here, we describe the effects of Tenebrionid sNPF peptide (SGRSPSLRLRFa) on various aspects of the male reproductive physiology in the *Tenebrio molitor* beetle. We identified in silico the putative sNPF receptor Tenmo-sNPF_R. Based on RT-PCR technique, it was shown that the receptor might be present in the male reproductive tissues of this beetle. The analysis of receptor amino acid sequence showed that it is similar to other beetle sNPF_Rs, as well as other insect species, and belongs rhodopsin-like G-protein-coupled receptors (GPCRs). Injections of Trica-sNPF and its shorter form Trica-sNPF₍₄₋₁₁₎ caused differentiated effects in *T. molitor* male reproductive tissues. After 24 h post injections, the peptides decreased the concentration of the soluble protein fraction in testes of 4- and 8-day-old beetles as well as the dry mass of these organs but only in 8-day-old individuals. The same effects were shown with regard to accessory glands. Both peptides decrease the concentration of the soluble protein fraction but do not affect the dry mass of this organ. Furthermore, injections of Trica-sNPF at the 10^{-7} M concentration decrease the total sperm number in the reproductive system. Surprisingly, the same concentration of the shorter form, Trica-sNPF₍₄₋₁₁₎ increased the sperm number. It was also shown that both peptides in different manner influence contractions of ejaculatory duct. The data presented in this article give new evidence that sNPFs are involved in the regulation of reproductive events in beetles, which might be the part of a larger neuropeptide network combining feeding, growth and development with the physiology of reproduction.

Typ publikacji

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Short neuropeptide F, Reproduction, Testes, GPCR, Beetle, *Tenebrio molitor*

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