New physiological activities of myosuppressin, sulfakinin and NVP-like peptide in *Zophobas atratus* beetle.

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Rok wydania

2011

Czasopismo

Journal of Comparative Physiology B-Biochemical Systemic and Environmental Physiology

Numer woluminu

181

Strony

721-730

DOI

10.1007/s00360-011-0563-5

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Three neuropeptides Zopat-MS-2 (pEDVDHVFLRFa), Zopat-SK-1 (pETSDDYGHLRFa) and Zopat-NVPL-4trunc. (GRWGGFA), recently isolated from the neuroendocrine system of the Zophobas atratus beetle, were tested for their myotropic and hyperglycaemic activities in this species. These peptides exerted differentiated dose-dependent and tissue specific physiological effects. Zopat-MS-2 inhibited contractions of the isolated heart, ejaculatory duct, oviduct and hindgut of adult beetles and induced bimodal effects in the heart contractile activity of pupae in vivo. It also increased the haemolymph free sugar level in larvae of this species, apart from myotropic activity. Zopat-SK-1 showed myostimulatory action on the isolated hindgut of the adult beetles, but it decreased contractions of the heart, ejaculatory duct and oviduct. Injections of this peptide at a dose of 2 µg also caused delayed cardioinhibitory effects on the heartbeat of the pupae. Together with the ability to increase free sugar level in the haemolymph of larvae these were new physiological activities of sulfakinins in insects. Zopat-NVPL-4trunc. inhibited the muscle contractions of the two organs: hindgut and ejaculatory duct but it was inactive on the oviduct and the heart of the adult beetles. This peptide also increased free sugar level concentration in the haemolymph of Z. atratus larvae. These physiological actions are the first biological activities discovered for this group of the insect peptides. The present work showed pleiotropic activity of three neuropeptides and indicates that the visceral muscle contractions and the haemolymph sugar homeostasis in Z. atratus are regulated by complex mechanisms.

Słowa kluczowe

insect neuropeptides, Zophobas atratus beetle, Myotropic activity