

Sulfakinin signalling influences fatty acid levels and composition in *tenebrio molitor* beetle.

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Background: Sulfakinins are arthropod neuropeptides that are structurally and functionally similar to vertebrate gastrin-cholecystokinin. Sulfakinins with sulfated tyrosine (sSK) or nonsulfated tyrosine (nSK) in the C-terminated heptapeptide XY(SO₃H)GHMRFamide display different biological functions, including myotropic activity, inhibition of food intake, stimulation of digestive enzymes and regulation of carbohydrate and lipid content.

Objective: To reveal the mechanisms by which sulfakinin signalling modulates lipid homeostasis, we analysed the changes in the level and composition of fatty acids and organic compounds in the fat body and haemolymph of *Tenebrio molitor* larvae after nSK and sSK treatment.

Methods: Fatty acids in fat body and haemolymph of insects were analysed using Gas Chromatography - Mass Spectrometry (GC-MS).

Results: The direction of the changes observed for major fatty acids, 18:1 and 18:2, and the less abundant fatty acids, 16:0, 18:0, 16:1 and 14:0, was the same for unsaturated (UFAs) and saturated (SFAs) fatty acids, and elevated after nSK application in both analysed tissues. However, the action of sSK in fat body tissue evoked distinct effects and induced either significant decreases in individual fatty acids or UFAs and SFAs. Administration of nSK and sSK significantly increased the level of total organic compounds in the haemolymph, contrary to the effect of sSK in fat body, where the level of total organic compounds decreased, although changes differ between individual chemicals.

Conclusion: Sulfakinins are engaged in the precise modulation of fatty acid levels and composition, but their action depends on the presence of sulfate group on the tyrosyl residue of the peptide what determines the different roles of these peptides in insect physiology.

Słowa kluczowe

Sulfakinin signalling, fatty acids, *T. molitor* beetle, fat body, haemolymph, insect neuropeptides

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