Impairment of the immune response after transcuticular introduction of the insect gonadoinhibitory and hemocytotoxic peptide *Neb*-colloostatin : a nanotech approach for pest control.

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Streszczenie

This article shows that nanodiamonds can transmigrate through the insect cuticle easily, and the doses used were not hemocytotoxic and did not cause inhibition of cellular and humoral immune responses in larvae, pupae and adults of *Tenebrio molitor*. The examination of the nanodiamond biodistribution in insect cells demonstrated the presence of nanodiamond aggregates mainly in hemocytes, where nanoparticles were efficiently collected as a result of phagocytosis. To a lesser extent, nanodiamond aggregates were also detected in fat body cells, while they were not observed in Malpighian tubule cells. We functionalized nanodiamonds with *Neb*-colloostatin, an insect hemocytotoxic and gonadoinhibitory peptide, and we showed that this conjugate passed through the insect cuticle into the hemolymph, where the peptide complexed with the nanodiamonds induced apoptosis of hemocytes, significantly decreased the number of hemocytes circulating in the hemolymph and inhibited cellular and humoral immune responses in all developmental stages of insects. The results indicate that it is possible to introduce a peptide that interferes with the immunity and reproduction of insects to the interior of the insect body by means of a nanocarrier. In the future, the results of these studies may contribute to the development of new pest control agents.

Adres publiczny

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