



Low doses of a neonicotinoid insecticide modify pheromone response thresholds of central but not peripheral olfactory neurons in a pest insect

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Résumé en anglais	<p>Insect pest management relies mainly on neurotoxic insecticides, including neonicotinoids, leaving residues in the environment. There is now evidence that low doses of insecticides can have positive effects on pest insects by enhancing various life traits. Because pest insects often rely on sex pheromones for reproduction, and olfactory synaptic transmission is cholinergic, neonicotinoid residues could modify chemical communication. We recently showed that treatments with different sublethal doses of clothianidin could either enhance or decrease behavioural sex pheromone responses in the male moth, <i>Agrotis ipsilon</i>. We investigated now effects of the behaviourally active clothianidin doses on the sensitivity of the peripheral and central olfactory system. We show with extracellular recordings that both tested clothianidin doses do not influence pheromone responses in olfactory receptor neurons. Similarly, <i>in vivo</i> optical imaging does not reveal any changes in glomerular response intensities to the sex pheromone after clothianidin treatments. The sensitivity of intracellularly recorded antennal lobe output neurons, however, is upregulated by a lethal dose 20 times and downregulated by a dose 10 times lower than the lethal dose 0. This correlates with the changes of behavioural responses after clothianidin treatment and suggests the antennal lobe as neural substrate involved in clothianidin-induced behavioural changes.</p>

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