Brief exposure to sensory cues elicits stimulus-nonspecific general sensitization in an insect

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Résumé en anglais	The effect of repeated exposure to sensory stimuli, with or without reward is well known to induce stimulus-specific modifications of behaviour, described as different forms of learning. In recent studies we showed that a brief single pre-exposure to the female-produced sex pheromone or even a predator sound can increase the behavioural and central nervous responses to this pheromone in males of the noctuid moth Spodoptera littoralis. To investigate if this increase in sensitivity might be restricted to the pheromone system or is a form of general sensitization, we studied here if a brief pre-exposure to stimuli of different modalities can reciprocally change behavioural and physiological responses to olfactory and gustatory stimuli. Olfactory and gustatory pre-exposure and subsequent behavioural tests were carried out to reveal possible intra- and cross-modal effects. Attraction to pheromone, monitored with a locomotion compensator, increased after exposure to olfactory and gustatory stimuli. Behavioural responses to sucrose, investigated using the proboscis extension reflex, increased equally after pre-exposure to olfactory and gustatory cues. Pheromone-specific neurons in the brain and antennal gustatory neurons did, however, not change their sensitivity after sucrose exposure. The observed intra- and reciprocal cross-modal effects of pre-exposure may represent a new form of stimulus-nonspecific general sensitization originating from modifications at higher sensory processing levels.
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