Unexpected plant odor responses in a moth pheromone system

Male moths rely on olfactory cues to find females for reproduction. Males also use volatile plant compounds (VPCs) to find food sources and might use host-plant odor cues to identify the habitat of calling females. Both the sex pheromone released by conspecific females and VPCs trigger well-described oriented flight behavior toward the odor source. Whereas detection and central processing of pheromones and VPCs have been thought for a long time to be highly separated from each other, recent studies have shown that interactions of both types of odors occur already early at the periphery of the olfactory pathway. Here we show that detection and early processing of VPCs and pheromone can overlap between the two sub-systems. Using complementary approaches, i.e., single-sensillum recording of olfactory receptor neurons, in vivo calcium imaging in the antennal lobe, intracellular recordings of neurons in the macrogglomerular complex (MGC) and flight tracking in a wind tunnel, we show that some plant odorants alone, such as heptanal, activate the pheromone-specific pathway in male Agrotis ipsilon at peripheral and central levels. To our knowledge, this is the first report of a plant odorant with no chemical similarity to the molecular structure of the pheromone, acting as a partial agonist of a moth sex pheromone.
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[15] http://okina.univ-angers.fr/publications/ua12565
[16] http://dx.doi.org/10.3389/fphys.2015.00148

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