

Natural anesthetic in honeybee bites

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Honeybee. Credit: Adam Siegel

(Phys.org)—Honeybees never cease to amaze us... their bite contains a natural anesthetic. This discovery was made by a team of Greek and Cypriot researchers, in collaboration with the CNRS Laboratoire Evolution, Génomes et Spéciation. In a study published in the journal *PLoS ONE*, the researchers show that bites from domestic honeybees (*Apis mellifera*) contain a compound, 2-heptanone (2-H), that acts as an efficient natural anesthetic. This finding has been patented, so 2-H can now be commercially produced as a local anesthetic, which offers the additional advantage of low toxicity to humans and animals.

Several hypotheses have been made about the function of 2-heptanone (2-H), a [natural compound](#) present in many foodstuffs and in insects, but

its anesthetic properties were previously unknown.

Results now show that 2-H, secreted by honeybee mandible glands, can paralyze small arthropods bitten by the bees, for up to nine minutes. Like a snake, a honeybee can use its mandibles to bite a foe and secrete the substance into the wound, paralyzing it. The bees can then throw the intruder out of their nest. This approach is particularly efficient against predators and parasites that are too small to be stung and killed with venom. But this anesthetic, which helps [honeybees](#) repel pests that attack their colonies – such as the wax moth *Galleria mellonella* and parasitic mite *Varroa destructor* – also has enormous potential in human medicine.

The researchers compared the anesthetic properties of 2-H with those of lidocaine, one of the most widely used anesthetics in the world. Effects of the two substances on wax moth larvae and on an isolated rat sciatic nerve preparation showed that their properties and mode of action were very similar: both blocked particular [sodium channels](#). Additionally, 2-heptanone appeared to be even less toxic than lidocaine. Because 2-H has low toxicity compared with classic anesthetics, this natural substance is likely to find many applications in both human and veterinary medicine.

More information: Papachristoforou, A. et al., The bite of the honeybee: 2-heptanone secreted from honeybee mandibles during a bite acts as a local anesthetic in insects and mammals, *PLoS ONE* 7(10): e47432. [doi:10.1371/journal.pone.0047432](https://doi.org/10.1371/journal.pone.0047432).

Provided by CNRS

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