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Title: **IDENTIFICATION OF SIGNALING PATHWAYS OF OCTOPAMINE RECEPTORS IN *APIS MELLIFERA* AND *VARROA DESTRUCTOR***

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**Abstract:** Octopamine receptors (OctoR) are G protein-coupled receptors specific to invertebrate, which are expressed in many neurons in *Apis mellifera*. They control or regulate neuromuscular transmission, learning, memory or responses to odorant by modulating responses of odorant receptors, interneurons or motoneurons. In honeybee, 5 types of OctoR have been identified, with functional homology to  $\alpha$  or  $\beta$  adrenoreceptors, able to activate different intracellular signaling pathways (Gs, Gi/o, Gq), although no precise characterization has been done yet. Amitraz, a synthetic OctoR agonist is used extensively in the hive worldwide to fight against the *Varroa destructor*, a parasite mite partly responsible for the increasing number of colonies collapse disorders recorded last years. The specificity of amitraz for the honeybee or varroa OctoR is however is not really known as well as the precise pharmacology and signaling profiles of the mite OctoRs.

We have cloned the 5 honeybee and 2 varroa OctoR and expressed them in oocytes to (1) analyze their pharmacological profile (octopamine, tyramine, dopamine and amitraz) and (2) identified the signaling pathway they activate.

Our data show that these OctoR can activate multiple G-protein dependent pathways (Gi/o, Gs, Gq) but can also activate directly (G-protein independent) a cation channel that is tentatively identified as TRPC in *Xenopus* oocyte. The presence of these different types of responses is dependent upon the type of receptors expressed and the agonist used.

We now verify the existence of these OctoR-specific signaling pathways in bee neurons from the antennal lobes and mushroom bodies.