

Abstract

The biogenic amines tyramine (TA) and octopamine (OA) are neurochemicals essential in invertebrates that act as adrenaline and noradrenaline substitutes. They exert their effects by binding specific receptor proteins that belong to the superfamily of G-protein coupled receptors. Tyramine (TAR) and octopamine (OAR) receptors play important roles in modulating the biology, physiology and behavior of insect. This PhD thesis describes the characterization of the type 1 tyramine receptor (TAR1) in two insect pests, *Drosophila suzukii* and *Halyomorpha halys*, to dissect the receptor role in controlling physiological and behavioral traits as well as to examine TAR1 as possible target for biopesticides. *D. suzukii* TAR1 proved to be an interesting target for biopesticides, such as monoterpenes. These compounds were in fact able to modulate directly TAR1-controlled physiology and behavior. In *H. halys*, RNAi-mediated *TAR1* downregulation suggested that the receptor involvement in pheromone perception. Together, the data described emphasize TAR1 as crucial in controlling and defining physiological and behavioral aspects in insects. Furthermore, this receptor appears an interesting target for innovative and environmental friendly in pest control.