

Expression Levels of Odorant Receptor Genes in the Savanna Tsetse Fly, *Glossina morsitans morsitans*

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Abstract

Tsetse flies (*Glossina*) are vectors of African trypanosomiasis. Olfaction plays a critical role in *Glossina* behavior, including larviposition, feeding, and reproduction. Odorant receptors (ORs) are important in insect chemoreception as they bind volatile odorants and transport them to olfactory receptor neurons to elicit behavioral response. To better understand *Glossina* chemoreception, we used quantitative polymerase chain reaction to examine the expression levels of ORs in female and male *Glossina morsitans morsitans* Wiedemann, 1850 (Diptera: Glossinidae) antennae and legs. Results showed that *G. m. morsitans* ORs code for a transmembrane domain and are involved in odorant binding. The ORs had homologs in *Drosophila*, mosquitoes, other *Glossina* species, and the reduced number of tsetse ORs could be linked to its restricted blood-feeding diet. The OR genes were more highly expressed in antennae than the legs with GmmOR33 and GmmOR45 transcript levels being high in the female and male antennae, respectively, whereas GmmOR26 and GmmOR34 levels were high in female and male *G. m. morsitans* legs, respectively. These findings identified sex- and tissue-specific *G. m. morsitans* ORs. The expression levels of OR genes in female and male *G. m. morsitans* could be conserved in function with the antenna being the main olfactory organ. Thus, this study provides a blueprint to explore the functional roles of tsetse ORs with the potential to identify molecular targets that can be used to control the vector based on disruption of its chemosensory system.

Keywords: tsetse fly, odorant receptor, expression profile

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