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

Steven Ger Nyanjom¹, Cyrus Tare¹, Fred Wamunyokoli¹ and George Fredrick Obiero²*
¹Jomo Kenyatta University of Agriculture and Technology
²*Department of Biochemistry and Biotechnology. Technical University of Kenya

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

See more at: https://academic.oup.com/jme/articleabstract/55/4/855/4911424?redirectedFrom=PDF