**Project Title:** Molecular and functional characterization of olfaction genes in tsetse flies

**Institute**  
Biotechnology Research Institute

**Center(s)**  
KALRO BioRI-Muguga

**Principal Investigator**  
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**Other investigators**  
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**Problem Statement**  
Human sleeping sickness transmitted by tsetse is a fatal disease in sub-Sahara. In the absence of good vaccines and drugs, vector control can be an effective disease control strategy. Studies proposed here will investigate the molecular aspects of tsetse's olfactory biology from three species resident in Kenya and have the potential to improve the efficacy of existing traps/targets or generate new methods

**Objective(s)**

1. Determine differences in olfactory responsive genes in sympatric Glossina pallidipes and Glossina austeni in Shimba hills and Glossina fuscipes fuscipes in Mbita in Kenya

2. Determine functional roles of olfactory responsive genes in sympatric G. pallidipes and G. austeni in Shimba hills and G. f. fuscipes in Mbita districts in Kenya

**Planned Activities**  
Field evaluation of new repellents and attractants

**Outputs**  
New potent attractant and repellent compounds were identified and validated in the wind tunnel against Glossina pallidipes and G. morsitans morsitans at BioRI labs. The structural variants of δ-octalactone an important component of tsetse refractory waterbuck repellent odour blend were evaluated in wind tunnel and in the Shimba Hills to determine how the modification affects the olfactory responses of G. pallidipes and G morsitans. Increasing the chain length enhanced repellency to Gpd and G mm while ring size changed activity from repellency to attraction. The results show that subtle structural changes of olfactory signals can significantly change their interactions with olfactory receptor neurons, and either shift their potency, or change their activity from repellence to attraction

**Outcomes**  
Provide information on molecular processes in tsetse vectors that mediate their olfactory processes, enabling them to locate their hosts and other critical resources for their survival and reproduction

**Budget**  
3,056,300.00

**Start date**  
2013-03-20

**End date**  
2017-02-28

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**Collaborators**  
Serap Aksoy; Yale School of Public Health;