

## Environmental effects on the gut microbiota of the *Anopheles gambiae* complex (Diptera: Culicidae)

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The *Anopheles gambiae* complex is a group of morphologically indistinguishable mosquitoes that differ in their behaviours and capacity to transmit malaria. There are a variety of genetic factors that underlie this capacity, and an understanding of the basis of vector competence by investigation of the underlying biology could inform vector control efforts. A factor that is increasingly being shown to mediate life history in mosquitoes is their gut microbiota, which has been implicated in a range of traits, including insecticide resistance and vector competence. In this study, the dynamic gut microbiota of four laboratory strains of *An. gambiae* complex mosquitoes was characterised by 16S rRNA profiling using Next Generation Sequencing on an Illumina Platform. SENN and SENN-DDT are insecticide susceptible and resistant strains respectively of the vector species *An. arabiensis*. MAFUS (*An. merus*) is a colony of the secondary vector species *An. merus* and SANGWE is a colony of the non-vector species *An. quadriannulatus*. Furthermore, the effect of larval metal exposure on the gut microbiota of SENN, SENN-DDT and F1 *An. arabiensis* was characterised. The 16S rRNA gut microbial community profile revealed a conserved core of microbiota between species that varied during the course of life. Insecticide resistance affected bacterial species richness, but not  $\beta$ -diversity or differential abundance. There was a marked difference in  $\beta$ -diversity between major and minor/non-vectors, with bacterial species associated with defence against the *Plasmodium* parasite less prevalent in *An. arabiensis*. Finally, metal pollution resulted in a marked shift in the composition of the gut microbiota, and the shifts differed in insecticide susceptible and resistant *An. arabiensis*.

Keywords: vector competence, bacterial diversity, life history, *Anopheles gambiae* complex