

## Microbial influences on insect physiology: Lessons learned from Tsetse Fly

Insects provide excellent systems to study the dynamic interplay between beneficial microbial symbionts and their hosts, especially in relation to insect nutritional physiology and immune function. We use the tsetse fly, *Glossina morsitans*, and its obligate bacterial symbiont, *Wigglesworthia glossinidia*, to investigate the co-evolutionary adaptations that influence host physiological processes. *Wigglesworthia* is maternally transmitted to larvae in the uterus of the tsetse fly mother, and we can produce flies that lack this symbiont by interfering with this process. Such offspring give rise to adults that exhibit a largely normal phenotype, with the exception that they are reproductively sterile. Our results indicate that when reared under normal environmental conditions adults that lack *Wigglesworthia* have a highly compromised immune system and can be easily parasitized with trypanosome infections. Our results demonstrate that *Wigglesworthia* in particular is required during the development of immature progeny in order for tsetse's immune system to function properly during adulthood. This phenomenon provides evidence of yet another important physiological adaptation that further anchors the obligate symbiosis between tsetse and *Wigglesworthia*.