

A discovery on the mechanism of Gut microbiome homeostasis in mosquitoes

With the support by the National Natural Science Foundation of China, the research team led by Prof. Cheng Gong (程功) from the School of Medical at Tsinghua University revealed the mechanism by which the insect symbiotic microbiome offsets gut immunity to achieve homeostasis. This study has been published online in *Nature Microbiology* (16023, DOI: 10.1038/nmicrobiol.2016.23).

The long-term evolution between the host immune system and symbiotic bacteria determines their cooperative rather than antagonistic relationship. It is known that commensal bacteria have evolved a number of mechanisms to manipulate the mammalian host immune system and maintain homeostasis. Such intricate insect host-microbiome relationships in disease vector mosquitoes have lately received great attention due to their potential exploitation for disease transmission control. However, the strategies employed by the microbiome to overcome host immune responses in mosquito still remain to be understood.

In this study, Prof. Cheng Gong's team reported that the gut microbiome in mosquitoes utilizes C-type lectins (mosGCTLs) to evade the bactericidal capacity of antimicrobial peptides (AMPs). Maintenance of the gut microbial flora relies on the expression of mosGCTLs in *A. aegypti*. Silencing the orthologs of *mosGCTL* in another major mosquito vector (*Culex pipiens pallens*) also impairs the survival of gut commensal bacteria. The gut microbiome stimulates the expression of mosGCTLs which coats the bacterial surface and counteracts AMP activity. This research revealed a mechanism by which the commensal microbiome conquered constitutive immune activation, and furthermore might offer intervention targets for the control of vector-borne diseases in nature.

