GTR / IGER seminar　アドバンス生命理学特論

Sex and species specific hearing mechanisms in mosquitoes

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For many disease-relevant mosquito species, males locate conspecific females via flight-tone recognition and both sexes then engage in mid-flight acoustic communications. Hearing therefore plays a crucial role in mosquito courtship.

Our understanding of the mechanistic bases of mosquito hearing, and the extent that hearing influences behaviour, is currently limited however. Improving this understanding is essential for developing novel methods of mosquito control.

My research focuses on analysing auditory function in three disease-transmitting species (*Aedes aegypti*, *Anopheles gambiae* and *Culex quinquefasciatus*). Whilst ears of mosquitoes from each species display transduction-dependent power gain, there are significant sex and species specific variations in auditory function.

Efferent innervation of the Johnston's organ is sexually dimorphic, with innervation complexity reduced across females. Furthermore, systemic blocks of neurotransmission result in large-amplitude flagellar oscillations in males only.

Finally, exposing mosquitoes to compounds which ablate chordotonal organ mechanotransduction results in the loss of auditory energy injection.

These findings highlight the importance of investigating sex and species specific differences in mosquito hearing. Further research into acoustic communication-influenced behaviours is necessary in both laboratory and field conditions to guide the development of mosquito control strategies targeting hearing.

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