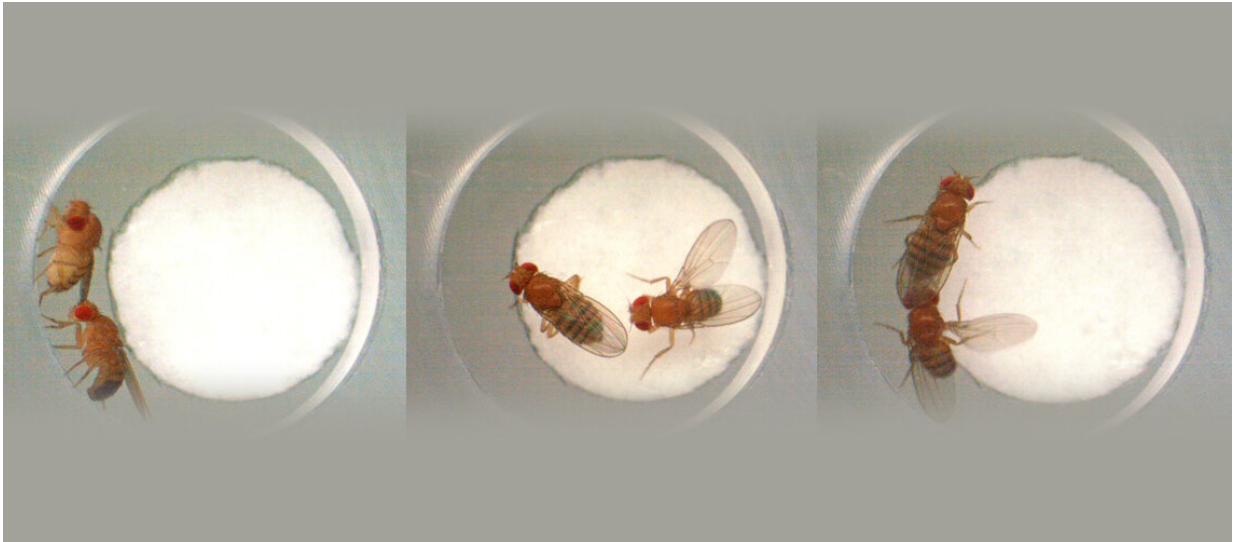


Gut bacteria in fruit flies do not have a major influence on behavior

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Mating behavior of *Drosophila melanogaster*. Credit: Klaus Dreisewerd and Joanne Yew

Microbial communities residing within the gut have been implicated in several aspects of health and disease. The mammalian gut microbiome, for example, not only influences metabolic functions and immune responses, but has also been found to affect mood, cognition, pain and anxiety. However, a recent study by Singaporean scientists has shown this is not the case for flies.

Adam Claridge-Chang, a neurogeneticist at the A*STAR Institute of

Molecular and Cell Biology and the Duke-NUS Medical School in Singapore, uses vinegar flies to study cognitive and emotional behaviors. Curious about the role of the gut [microbiome](#) in [brain development](#) and its contribution to anxiety and autism, he launched a project exploring how the removal of gut bacteria affects a range of fly behaviors.

The project was carried out in collaboration with Joanne Yew at Temasek Life Sciences Laboratory and the National University of Singapore, and Joel Selkrig at Nanyang Technological University.

"I met Joel by chance at a symposium. He said that, in mice, it was hard to get sufficient sample sizes to get a useful estimate of the effects of removing germs from an animal," explains Claridge-Chang.

Realizing that the sample size problem could be overcome by using flies, Selkrig and Yew developed a bleaching method to completely remove gut bacteria from the flies. Using this technique, germ-free offspring could be maintained for two generations.

When Claridge-Chang and colleagues compared anxiety-associated behaviors in these germ-free flies to conventional flies that developed with gut bacteria, they found no significant differences. Furthermore, microbe removal had almost no effect on the flies' sleep. Similarly, the microbiome appeared to have almost no effect on sexual attractiveness: germ-free female bodies were only mildly more attractive to courting males than those of conventional females.

"Although we were surprised by the lack of effect on fly behaviors, this is an important finding in light of reports showing the influence of the microbiome on [brain function](#) in other species," said Yew.

These findings suggest that the microbiota–gut–brain axis is not conserved between mammals and flies. The researchers speculate that to

accommodate the high energy demands of a large brain, mammals may have to be more reliant on gut microbe-derived nutrients and thus, are sensitive to changes in the microbiome.

"It will be interesting to test whether other fly behaviors are affected by the microbiome, as it has a much simpler composition than in mammals and could easily be manipulated genetically to identify bacterial products that impact higher order functions" explains Selkrig.

More information: Joel Selkrig et al. The *Drosophila* microbiome has a limited influence on sleep, activity, and courtship behaviors, *Scientific Reports* (2018). [DOI: 10.1038/s41598-018-28764-5](https://doi.org/10.1038/s41598-018-28764-5)

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