

Why so fly: Scientists discover some fruit flies learn better than others

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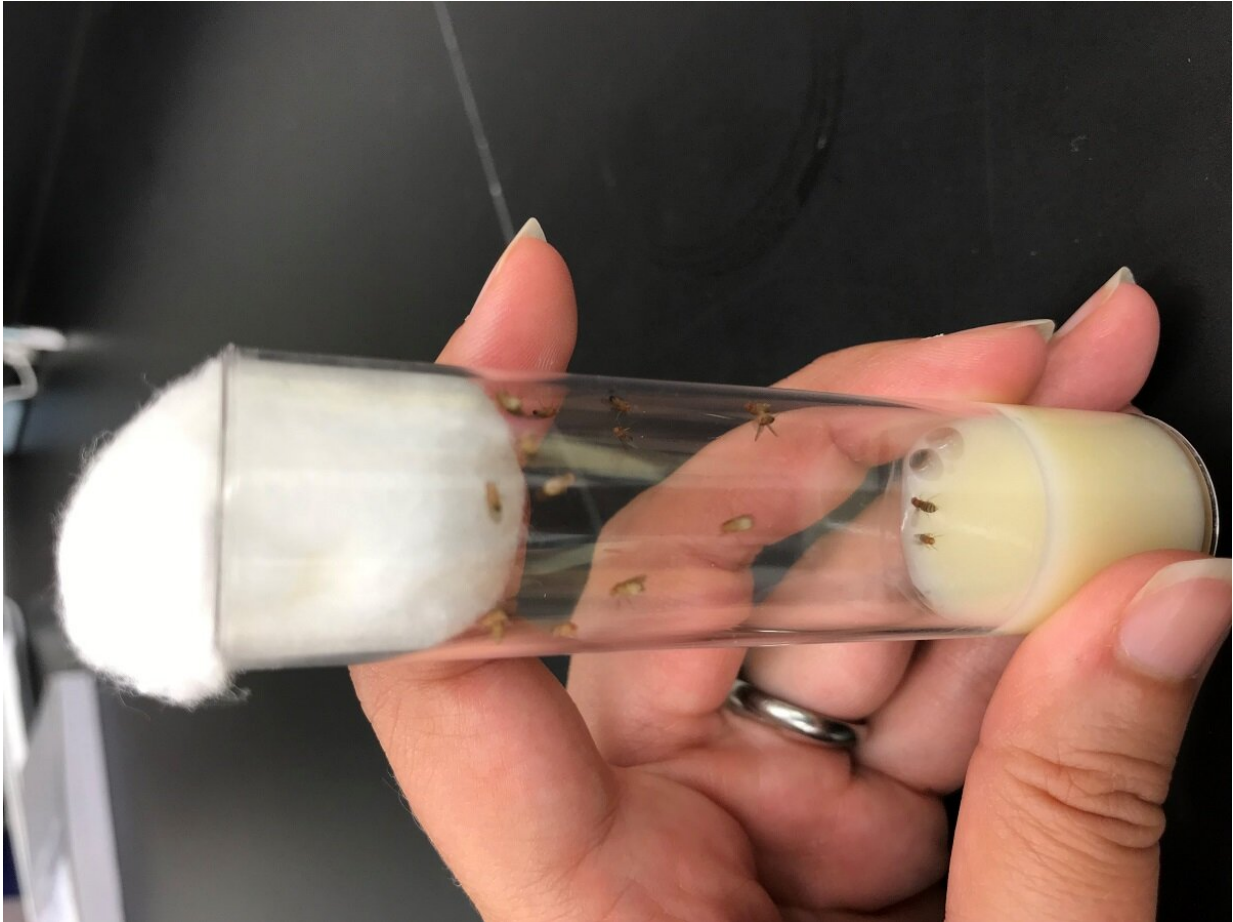
Patricka Williams-Simon, a doctoral fellow in biological sciences at MU who led the study, places fruit flies into a box to study how well they learn and remember. Credit: MU

Fruit flies could one day provide new avenues to discover additional genes that contribute to a person's ability to learn and remember. Scientists at the University of Missouri are studying genes of fruit flies to explore why an individual fly can be a better learner than another. Many of those genes in fruit flies are similar to those found in people.

Past experiments studying how [fruit flies'](#) ability to learn and remember have involved "turning off" a [single gene](#) and watching the response. In this study, the scientists took a different approach by placing fruit flies in a box equipped with heating elements. When the heat was turned on, the flies—uncomfortable in heat—moved to the far side of the box where it was cooler. A fly's ability to avoid the heat measured how well it learned, and a fly's ability to avoid the hotter side of the box, even when the heat was off, measured its capacity to remember.

"Some flies learn fast and remember to stay away from the heat whereas some flies take longer to figure it out," said Patricka Williams-Simon, a doctoral fellow in biological sciences who led the study. "We repeated the experiment with over 40,000 individual fruit flies from over 700 different genes to establish variation in performance. Then, we focused on the high and the low learning and memory performers."

The scientists then took these results and applied genetic sequencing technology to determine if [specific genes](#) were responsible for these observed changes in a fly's behavior. They found nine genes that show a change between high and low performing flies when it comes to learning and memory.



Scientists at the University of Missouri are studying genes of fruit flies to explore why an individual fly can be a better learner than another. Credit: MU

"All of these [genes](#) are previously known to affect the [nervous system](#) or the brain in some way, but none of them had previously been implicated in learning and memory," said Elizabeth King, an assistant professor of [biological sciences](#) in the MU College of Arts and Science. "Therefore, they represent novel areas to further investigate these behavioral traits."

While the study is considered basic research, Williams-Simon said their findings are important.

"The better we can understand these traits in fruit flies, the more we can develop targeted studies in humans," Williams-Simon said.

More information: Patrick A. Williams-Simon et al, Multiple genetic loci affect place learning and memory performance in *Drosophila melanogaster*, *Genes, Brain and Behavior* (2019). [DOI: 10.1111/gbb.12581](https://doi.org/10.1111/gbb.12581)

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