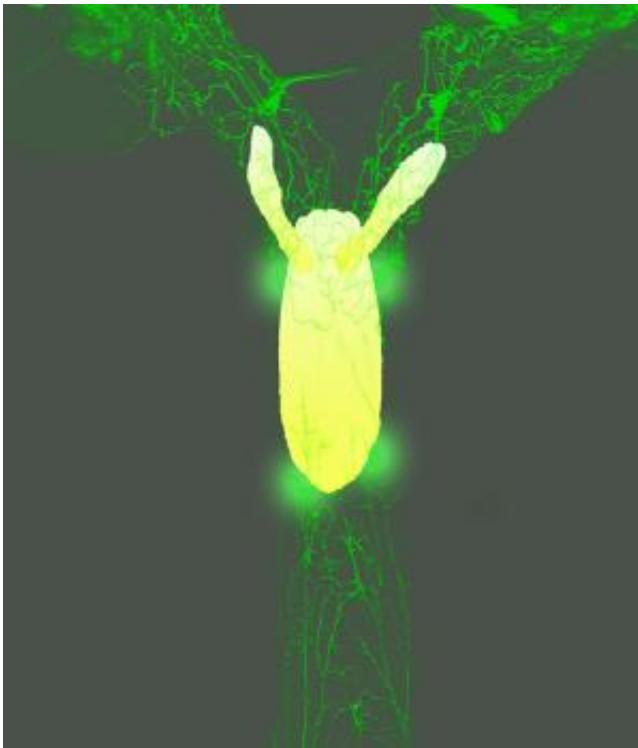


# That pregnant feeling makes a fly start nesting

October 16 2014

---



The female fly's reproductive tract is lined with neurons (green) that detect stretching. When they sense the passage of an egg (yellow), they signal the fly to start searching for a good place to lay eggs. Credit: Bin Gou, Duke University

Across the animal kingdom, it's not uncommon for pregnancy to change an expectant mom's behavior. Even female flies have their own rudimentary way of "nesting," which appears to be brought on by the stretch of their egg-filled abdomens rather than the act of mating,

according to a Duke study published online October 16 in *Cell Reports*.

After mating, the female fruit fly *Drosophila melanogaster* dramatically shifts priorities as she prepares to lay eggs.

"For example, the virgin flies are interested in sex. Once they're mated, it's very striking—they vigorously reject male courtship," said lead author Rebecca Yang, an assistant professor of neurobiology in the Duke University School of Medicine.

As their egg production ramps up after mating, female flies also seek out a "nest" of acetic acid, or vinegar, a chemical found in fermenting fruit on which they prefer to deposit their eggs.

The fly's eggs are normally made in the ovaries and move down a long, narrow tract into the uterus, where they are fertilized by sperm that are already stored there. After fertilization, the fly lays her eggs: where and when depends on how good the environment is for the offspring, Yang said.

Previous studies have alluded to the effects of mating on the fly's nesting behavior, but Yang and her team wondered whether pregnancy alone (that is, the pressing need to lay eggs) could cause these changes.

Fortunately, their earlier work uncovered a set of [motor neurons](#) that squeeze the reproductive tract to push out eggs when the time is right.

In the new study, the scientists genetically inhibited those motor neurons to cause an "egg jam" in the flies' reproductive tracts.

Using custom-built nesting chambers with one side containing vinegar-infused gel and the other without, the team found that the egg-jammed flies sought out and preferred vinegar compared with mated flies that

were not carrying eggs.

The pregnant females seemed to sense the [eggs](#), but how? The scientists had a hunch that [sensory neurons](#) for detecting stretch innervate the long narrow part of the fly's reproductive tract. One type of cell already known to line the tract, the ppk1 neuron, was an obvious candidate.

So Yang's group stimulated the motor neurons of the tract to make it contract and the ppk1 neurons responded. When they blocked these sensory neurons, the females' interest in vinegar seemed to diminish.

"Before our work, I thought that this behavior was driven by hormones. Now I think that it's sensory neurons that can initiate the change," said co-author Bin Gou, a postdoctoral researcher in Yang's lab who just became a parent with his wife and co-author, postdoc Ying Liu.

The flies join dogs, sheep and rats that have been found to have similar ways of detecting stretch in their reproductive organs. But these new findings don't rule out the possibility that hormones also contribute to behavior change, Yang said.

"The sensory neuron innervates the reproductive tract and projects to the fly equivalent of the spinal cord," Yang said. "In the end, the decision to move toward or away from the [vinegar] probably takes place in the brain."

As for what occurs between the neurons of the [reproductive tract](#) and the brain, Yang and her team are working to find out. "It's a black box," she added.

Provided by Duke University

Citation: That pregnant feeling makes a fly start nesting (2014, October 16) retrieved 4 May 2024 from <https://phys.org/news/2014-10-pregnant.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.