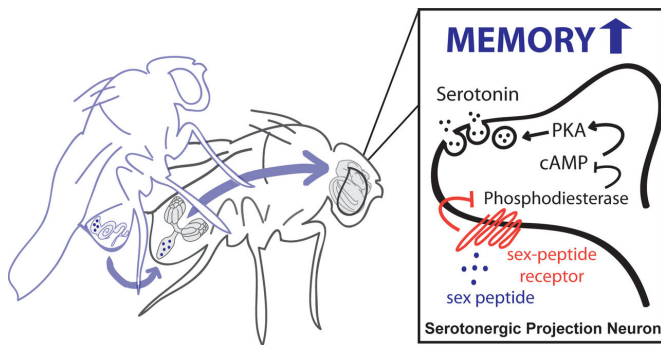


# Peptide in male fruit fly semen found to enhance memory in females after mating

21 November 2019, by Bob Yirka



*Drosophila virgin* females cannot form long-term memory. Upon fecundation, the sex peptide is transferred from the male testis to the female ovary. From there, the sex peptide reaches the brain and activates a pair of neurons that controls long-term memory formation. Credit: Lisa Scheunemann

A quartet of researchers with PSL Research University, CNRS, has found that a peptide in male fruit fly semen somehow makes its way to the female fruit fly brain after copulation, resulting in improvements in long-term memory. In their paper published in the journal *Science Advances*, L. Scheunemann, A. Lampin-Saint-Amaux, J. Schor and T. Preat describe their study of memory in fruit flies and what they learned.

Prior studies have shown that a peptide called the [sex peptide](#) in *Drosophila* male semen makes its way through the female's body and plays a subsequent role in changing her [eating habits](#) and rejection of advances by other males. In this new effort, the researchers have found that it can also alter [long-term memory](#) capabilities in the female.

The work by the team involved training several female [fruit flies](#) to avoid certain foods by administering a small electric shock. They then tested the females up to four days later to find out if they remembered the lesson. The researchers

found that if the female had mated during the interim, she was able to remember the lesson and thus avoid more shocks. Virgin females, on the other hand, tended to forget the lesson and wound up getting shocked again. Suspecting that the sex peptide was behind the differences in memory ability, the researchers removed the peptide from the semen of several males and then allowed them to mate with some of the females. This time, the females did not remember the lesson and wound up getting shocked. To further prove that the sex peptide was behind the changes in long-term memory, the researchers injected some virgin flies with the peptide, which made all the difference—this time, they remembered the lesson and avoided getting shocked.

The researchers report that their experiments show that the sex peptide is responsible for the changes in long-term memory, though they acknowledge that they have no idea how it makes its way from the sex organs all the way to the brains of females—they note that this process would involve not only quite a bit of travel, but crossing the [blood-brain barrier](#).

**More information:** L. Scheunemann et al. A sperm peptide enhances long-term memory in female *Drosophila*, *Science Advances* (2019). [DOI: 10.1126/sciadv.aax3432](https://doi.org/10.1126/sciadv.aax3432)

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