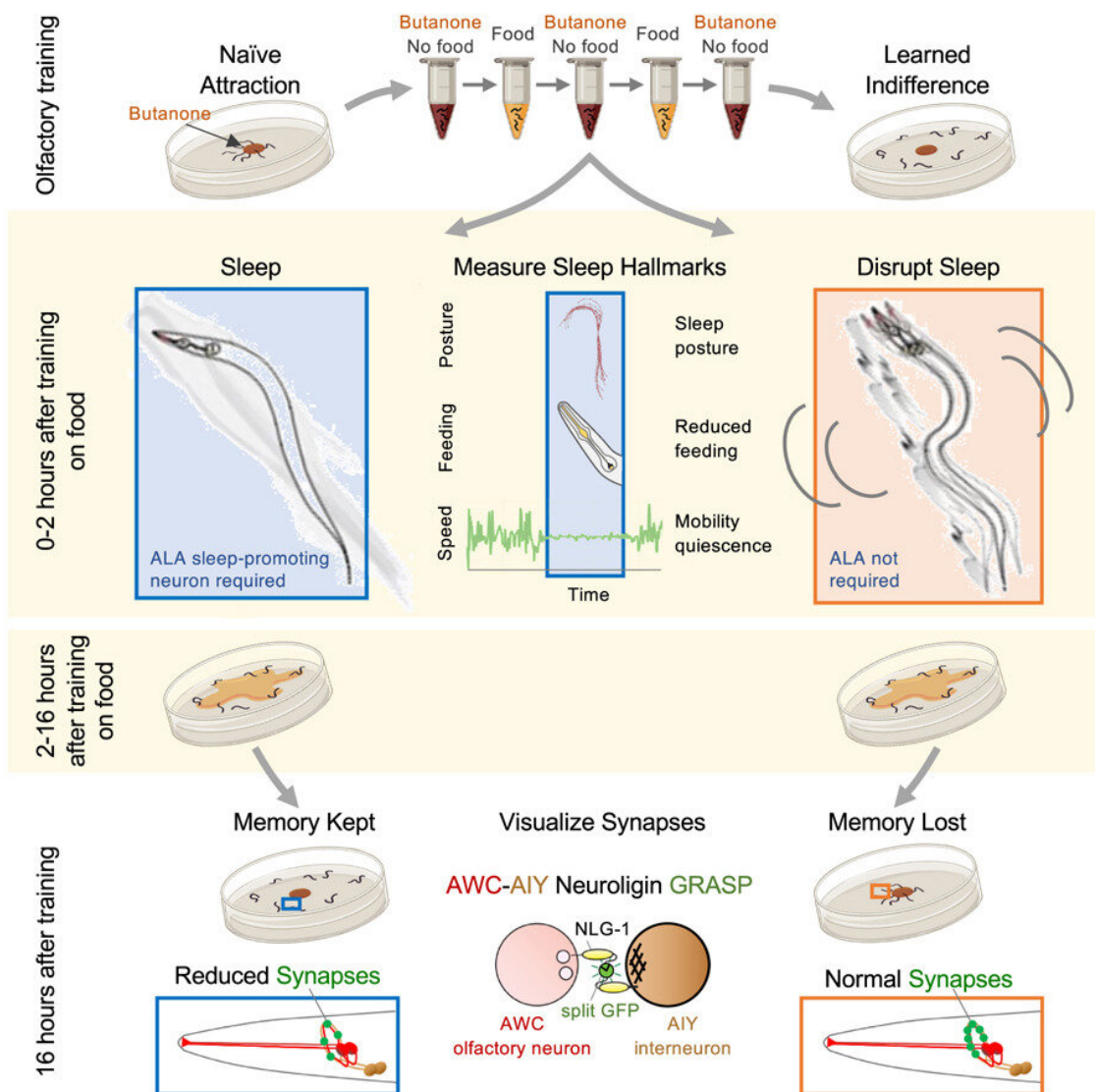


# Experiments with nematodes find they need a nap to consolidate odor memories

June 6 2023, by Bob Yirka



Graphical abstract. Credit: *Cell* (2023). DOI: 10.1016/j.cell.2023.05.006

A team of biomedical researchers from the University of California, San Francisco, San Jose State University and the University of Pennsylvania has found that nematodes need sleep in order to consolidate their odor memories by remapping olfactory synapses. In the study, reported in *Cell*, the group studied nematodes and the behavior of synapses during sleep.

Prior research has shown that one of the reasons animals [sleep](#) is to help the brain consolidate long-term memories. Prior research has also suggested that such memories are stored in synapses in the [brain](#) rather than by neurons. In this new effort, the researchers focused their efforts on nematodes because their [brain structure](#) has already been mapped out—they only have 302 neurons. The team was hoping to observe changes to their synapses during sleep periods. But first, they had to figure out a way to know for sure when the little creatures were sleeping.

Careful study of multiple specimens showed that nematode sleep could be identified by a certain body posture. Once that was established, the team trained several specimens to ignore the smell of butanone, which they normally find quite attractive. They did so by removing food associated with the smell on multiple occasions. The researchers then took a close look at the brains of nematodes, specifically at a neuron called AWC, which is known to communicate with another neuron called AIY.

They found that training the worms to ignore butanone caused reductions in synapses between the AWC and AIY neurons. The team then trained other the worms to avoid the [smell](#) of butanone, but this time did not allow them to take a nap afterward. And this time, they found more

intense synaptic connections between the [nerve cells](#)—they also found that the worms did not remember the training they had received.

The researchers suggest that the short nap allowed for reprogramming of their synapses, which in turn allowed memories to jell.

**More information:** Rashmi Chandra et al, Sleep is required to consolidate odor memory and remodel olfactory synapses, *Cell* (2023). [DOI: 10.1016/j.cell.2023.05.006](https://doi.org/10.1016/j.cell.2023.05.006)

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