

Worker ants that can shrink their brains and then grow them back when needed

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A team of researchers from the New York University School of Medicine and Arizona State University has found that a certain ant species is unique in that worker ants can increase and shrink their brain

size when needed. In their paper published in *Proceedings of the Royal Society B*, the group describes their study of Indian jumping ants and what they learned about the plasticity of their brains and ovaries.

In most species of [ants](#), the males and the queen are the only members of a colony that can reproduce. When a queen dies, the colony generally follows suit. In this new effort, the researchers have found that with Indian jumping ants, things are quite different. Female workers can compete for the job of queen if the queen dies—and if they win, they can decrease their [brain size](#) and increase the size of their ovaries, allowing them to take on the duties of a queen.

In their study, the researchers spent several years watching and dissecting Indian jumping ants to learn more about their unique behavior. They found that when the queen of a colony dies, many of the female workers begin competing for the job. Competitions consisted mostly of jabbing other females with their antennae. At some point, a consensus is reached and one of the contestants is declared the winner—it is still not clear how the decision comes about, however. Notably, all of the females competing for the job of queen continued on with their [worker](#) duties while the competition was being held. The researchers used the term "gamergate" to describe the ant who would be queen.

Once a new queen was established, she would begin to change. Her ovaries would grow larger, allowing her to populate the colony. And her brain would shrink—up to 25%. She would also cease producing venom and her behavior would change. She would begin hiding from intruders instead of fighting and she would never hunt.

To learn more about the body changes, the researchers removed some of the [female workers](#) from their colony and allowed them to compete for a new [queen](#). Then, once a winner was declared and her body changed, the

researchers put her back in with the original colony. They found that the other ants held her in place, preventing her from doing anything for a period of time. During that time, the gamergate reverted physically back to a worker ant—a degree of plasticity never before seen in an insect.

More information: Clint A. Penick et al. Reversible plasticity in brain size, behavior and physiology characterizes caste transitions in a socially flexible ant (*Harpegnathos saltator*), *Proceedings of the Royal Society B: Biological Sciences* (2021). [DOI: 10.1098/rspb.2021.0141](https://doi.org/10.1098/rspb.2021.0141)

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