

# Tiny brain region better part of valor

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Mice lose their fear of territorial rivals when a tiny piece of their brain is neutralized, a new study reports.

The study adds to evidence that primal [fear](#) responses do not depend on the amygdala - long a favored region of fear researchers - but on an obscure corner of the primeval [brain](#).

A group of neuroscientists led by Larry Swanson of the University of Southern California studied the [brain activity](#) of rats and mice exposed to cats, or to rival rodents defending their territory.

Both experiences activated neurons in the dorsal preammillary nucleus, part of an ancient brain region called the hypothalamus.

Swanson's group then made tiny lesions in the same area. Those rodents behaved far differently.

"These animals are not afraid of a predator," Swanson said. "It's almost like they go up and shake hands with a predator."

Lost fear of cats in rodents with such lesions has been observed before. More important for studies of [social interaction](#), the study replicated the finding for male rats that wandered into another male's territory.

Instead of adopting the usual passive pose, the intruder frequently stood upright and boxed with the resident male, avoided exposing his neck and back, and came back for more even when losing.

"It's amazing that these lesions appear to abolish [innate fear](#) responses," said Swanson, who added: "The same [basic circuitry](#) is found in primates and people that we find in rats and mice."

The study was slated for online publication the week of March 9 in [Proceedings of the National Academy of Sciences](#).

Swanson predicted that his group's findings would shift some research away from the amygdala, a major target of fear studies for the past 30 years.

"This is a new perspective on what part of the brain controls fear," he said.

He explained that most amygdala studies have focused on a different type of fear, which might more accurately be called caution or risk aversion.

In those studies, animals receive an electric shock to their feet. When placed in the same environment a few days later, they display caution and increased activity of the amygdala.

But the emotion experienced in that case may differ from the response to a physical attack.

"We're not just dealing with one system that controls all fear," Swanson said.

Swanson and collaborators have been studying the role of the hypothalamus in the fear response since 1992.

Because of its role in basic survival functions such as feeding, reproduction and the sleep-wake cycle, the hypothalamus seems a

plausible candidate for fear studies.

Yet, said Swanson, "nobody's paid any attention to it."

The *PNAS* study is the most recent of several by Swanson on fear and the hypothalamus. The few other researchers in the area include Newton Canteras of the University of Sao Paulo in Brazil, who collaborated with Swanson on the *PNAS* study, as well as Robert and Caroline Blanchard of the University of Hawaii.

Source: University of Southern California

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