

# Maternal protective behaviors run deep

March 24 2022

---



A mother mouse watches over her pups. Neuroscientists at Cold Spring Harbor Laboratory have discovered a set of neurons that activates when mother mice fetch their wandering pups. Credit: Roman Dvorkin/Shea lab/CSHL, 2022

The image of a mouse mom fetching her pup safely home calls to mind a human mother's rapid response when their toddler wanders toward danger. Neuroscientists at Cold Spring Harbor Laboratory (CSHL) now report this resemblance applies in more ways than one.

In a first-of-its-kind study, postdoctoral fellow Roman Dvorkin and CSHL Associate Professor Stephen Shea were able to time this maternal caring action precisely to the firing of cells in a tiny [brain](#) region called the locus coeruleus, or LC, which is a blue cluster of cells found in the brainstem of all vertebrates. Dvorkin says:

"In nature, the pup when it grows, it starts to roll out of the nest, and the mother has to run and bring it back, otherwise it will either die from hypothermia or somebody will just eat it like a snack."

Shea's lab is a leader in studying maternal caring behaviors by observing [female mice](#) in settings that let them behave as they do in nature, as opposed to artificial, "contrived" experiments. "We study pup retrieval because it's very reliable and it's done the same way every time," says Shea.

The team wanted to look at LC's role in pup-retrieval because, "although LC is a very small fraction of the brain, it's the brain's sole source of a chemical called noradrenaline (NA), and it projects it throughout the whole brain," Shea says.

NA is commonly known as the body's fight-or-flight chemical. In the brain, LC is known to affect key functions like sleep and wakefulness, decision-making and memory, and emotional experiences like stress and arousal.

"But," says Shea, "what we didn't know is what activity it has during [social behavior](#)."

Their findings are striking. The recordings show LC neurons spike in activity at the exact moment a mom touches a pup to retrieve it. "This very precise burst activates all of LC at one time. It sends this information across the brain and we think helps coordinate pup

retrieval," Dvorkin says.

Scientists know LC is important in human disorders that impair social functioning, including depression, anxiety, and autism. Studying the structure at this basic level could help reveal causes of such disorders and lead to potential new treatments.

The research was published in the *Journal of Neuroscience*.

**More information:** Roman Dvorkin et al, Precise and pervasive phasic bursting in locus coeruleus during maternal behavior in mice, *Journal of Neuroscience* (2022). [doi.org/10.1523/JNEUROSCI.0938-21.2022](https://doi.org/10.1523/JNEUROSCI.0938-21.2022)

Provided by Cold Spring Harbor Laboratory

Citation: Maternal protective behaviors run deep (2022, March 24) retrieved 11 May 2024 from <https://medicalxpress.com/news/2022-03-maternal-behaviors-deep.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.