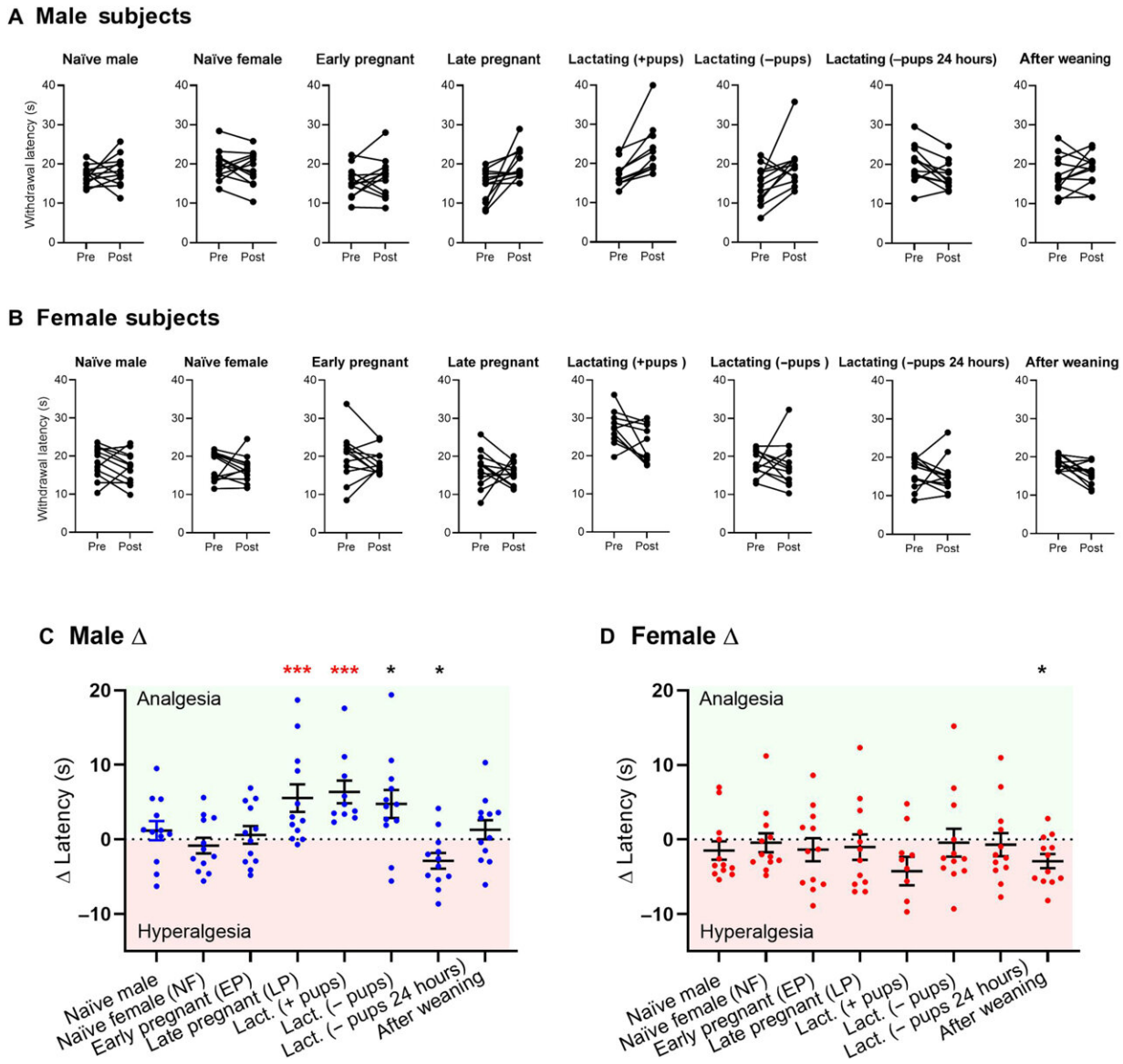
Why are male mice afraid of bananas?

May 24 2022



Olfactory exposure to late-pregnant and lactating mice produces analgesia in male but not female mice in the radiant heat paw-withdrawal test. (A and B) Latency to hind paw-withdrawal (s) from radiant heat of male (A) and female

(B) mice before (Pre) and during (Post) exposure to stimulus mice of various reproductive conditions: naïve male, naïve female (NF), early pregnant (EP), late pregnant (LP), lactating (Lact.) [with pups present (+ pups), without pups present (− pups), and with pups removed 24 hours before (− pups 24 hours)], and after weaning. (C and D) Change (Δ) in hind paw-withdrawal latency (Post-Pre) in all stimulus conditions shown in graphs (A) and (B) in male (C) and female (D) mice. Positive values (green) represent analgesia; negative values (pink) represent hyperalgesia. In all graphs, individual data are shown (n = 10 to 12 mice per sex per condition); black bars represent means ± SEM. *P Science Advances (2022). DOI: 10.1126/sciadv.abi9366

Researchers from McGill University have identified a form of chemical signaling in mice to defend their offspring. The researchers found that proximity to pregnant and lactating female mice increased stress hormones in males and even decreased their sensitivity to pain.

"The findings have important implications for improving the reliability and reproducibility of experiments involving mice. This is yet another example of a previously unknown factor in the lab environment that can affect the results of scientific studies," says Jeffrey Mogil, a Professor in the Department of Psychology at McGill University and E. P. Taylor Chair in Pain Studies.

According to co-author Sarah Rosen, "what is likely happening is that female mice are signaling to males who might be considering attacking their babies that they will defend them vigorously. It's the threat of the possible upcoming fight that causes the stress."

"Mice have richer communication with one another than we think; it's just that a lot of it's through smell," says Mogil. The researchers started looking for the olfactory chemical responsible. Several odorants were identified, but one, n-pentyl acetate, which is released in the urine of

pregnant and lactating female mice, was especially effective at producing stress in male mice.

"Curiously, n-pentyl acetate is also responsible for the unique smell of bananas. After a quick trip to the supermarket for some banana oil, we were able to confirm that the smell of banana extract stressed the male mice just as much as the pregnant females," says co-author Lucas Lima.

The finding represents a breakthrough in the science of mammalian social signaling. "There are a number of examples of male-to-female olfactory signaling in rodents, but far fewer examples of female-to-male signaling, especially outside of the realm of sexual behavior," says Mogil.

"Olfactory exposure to late-pregnant and lactating mice causes stress-induced analgesia in male mice" by Sarah Rosen et al. was published in *Science Advances*.

More information: Sarah F. Rosen et al, Olfactory exposure to late-pregnant and lactating mice causes stress-induced analgesia in male mice, *Science Advances* (2022). DOI: 10.1126/sciadv.abi9366

Provided by McGill University