

## A happy lab rat? Check the ears!

March 21 2017, by Ada Tong

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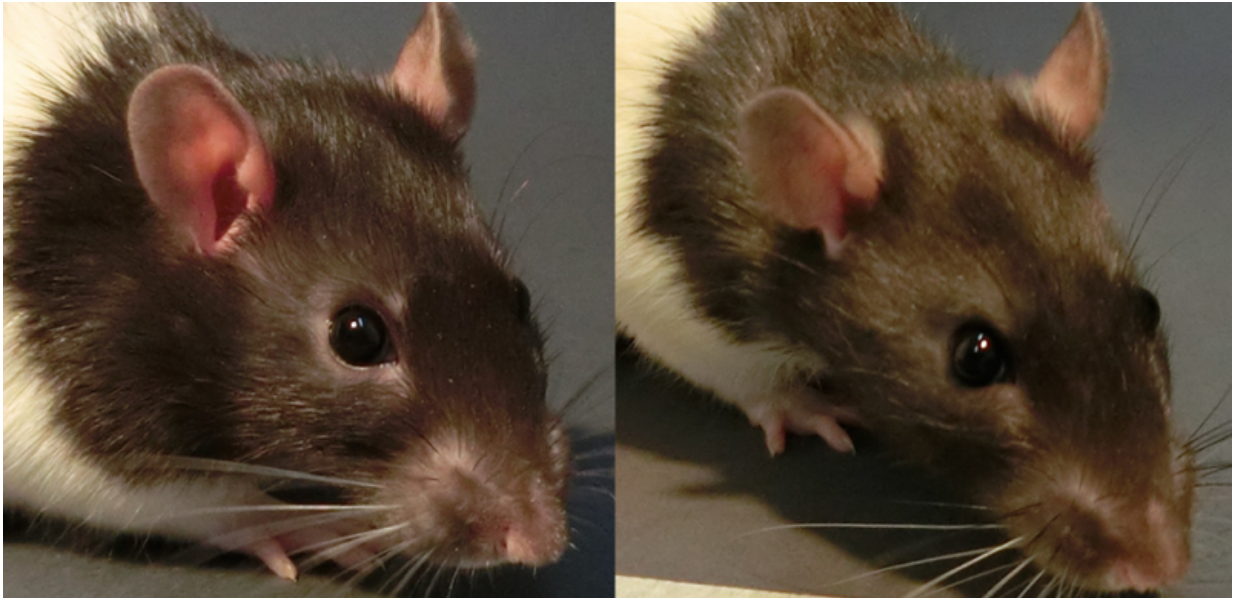


Fig 7b—which rat has the pinker ears?

What do you think of when you hear the term "lab rat"? Chances are, you might not picture an animal happily playing rough-and-tumble with a human handler and then coming back for more. Scientists have traditionally studied negative expressions in rats, as they are more reliable and easier to elicit (imagine a rat freezing still when exposed to sudden loud noise). However, a group of researchers from the Division of Animal Welfare at the University of Bern in Switzerland decided to see if they could get positive facial expressions out of lab rats instead. To do this they developed a novel "two-handed" tickling experiment and

found that rats do indeed exhibit robust positive emotional indicators via pinker and more relaxed ears. Take a look at these images and see if you can identify the happier rat!

To start off, the researchers of this study allowed 75 rats to get used to the test environment, before tickling each one multiple times to determine how eager each rat was to return to the experimenter's hand after a tickling bout. The experimenters then selected the 15 most playful rats for the next part of the experiment—exposure to a Positive Treatment and a Contrast Treatment. The Positive Treatment consisted of alternating one- and two-handed tickling sessions; In the one-handed tickling procedure, the experimenter used one hand to turn the rat on its back and used the other hand to tickle its neck, chest, and stomach. In the novel two-handed tickling procedure, the experimenter cupped the rat in both hands and imitated "rough-and-tumble" play by tickling its neck area. The Contrast Treatment consisted of each rat being exposed to short bursts of stressful white noise.

After each session (positive or contrast) the rats had a close-up photography session to record any changes in facial features associated with a positive or contrast treatment. From the photos the authors looked at a number of facial indicators including the eyes, cheeks, nose, ears and whiskers and found that a pinker ear color and a wider, more relaxed, ear angle were reliable indicators of positive emotion. However, other indicators, such as eyebrow height and eye width, were not.

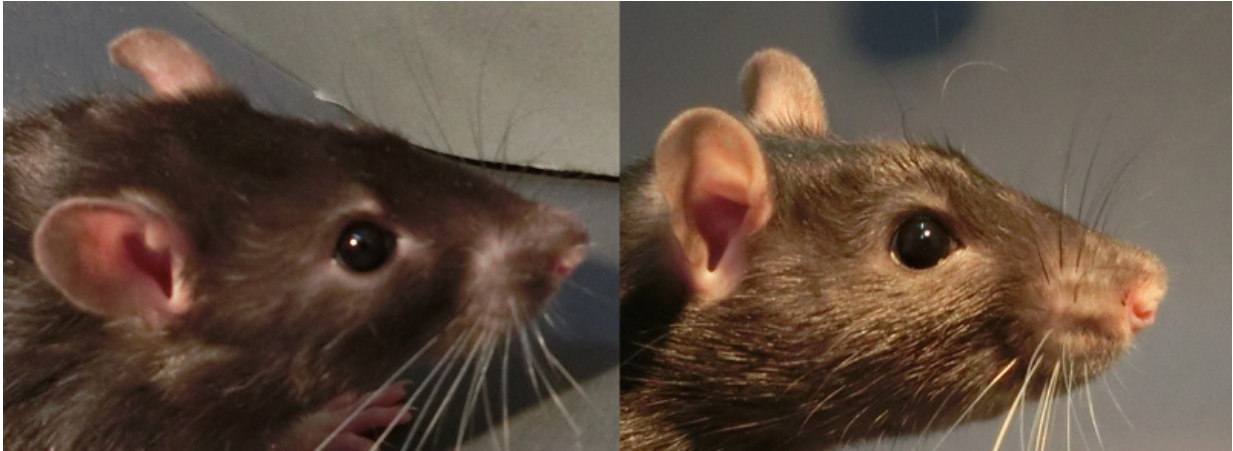


Fig 8b—which rat has the more relaxed ears?

In addition to looking at photos the researchers also recorded each rat's ultrasonic vocalizations (USVs) to determine whether the rats actually enjoyed the Positive Treatment. In each [treatment](#), they looked for frequency modulated (FM) 50 kHz USVs ("rat laughter"), which is associated with positive experiences like play, sex, and receiving rewards for desirable behaviors. In the Positive Treatment, the experimenters found that their novel two-handed tickling procedure elicited even stronger USVs than the previously established one-handed tickling procedure. This frequency was not found during the Contrast Treatment.

Identifying these facial features is a good start for exploring positive emotions, but future work is needed to understand the reasons for pinker ear color. In the meantime, you can start checking your pet rat's ears as an indicator of its pleasure at any particular moment; and, if you're wondering what the [lab rats' ears](#) look like right now, you might be happy to hear that some of the [rats](#) were adopted as pets at the end of this study and are hopefully getting a lot of tickles from their new owners!

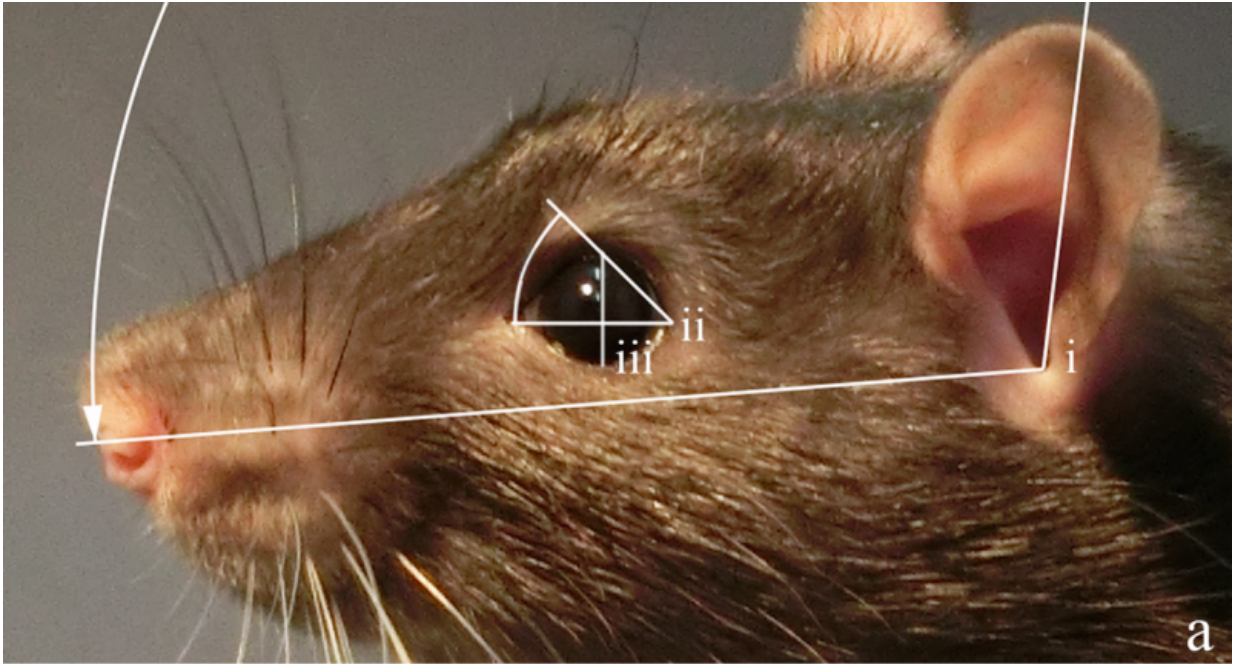


Fig 5a—ear angle is among the many indicators the authors measured

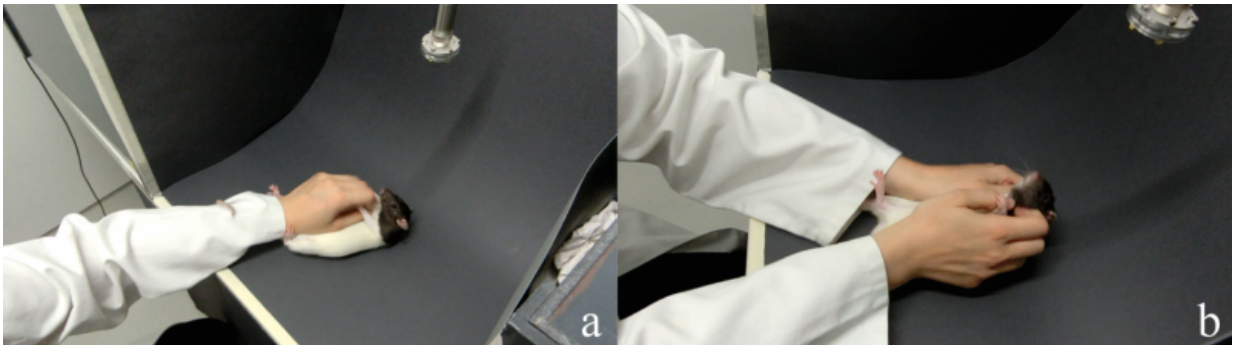


Fig 2—when it comes to being tickled, rats seem to prefer “the more the merrier”

**More information:** Finlayson K, Lampe JF, Hintze S, Würbel H, Melotti L (2016) Facial Indicators of Positive Emotions in Rats. *PLoS ONE* 11(11): e0166446.. [DOI: 10.1371/journal.pone.0166446](https://doi.org/10.1371/journal.pone.0166446)

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