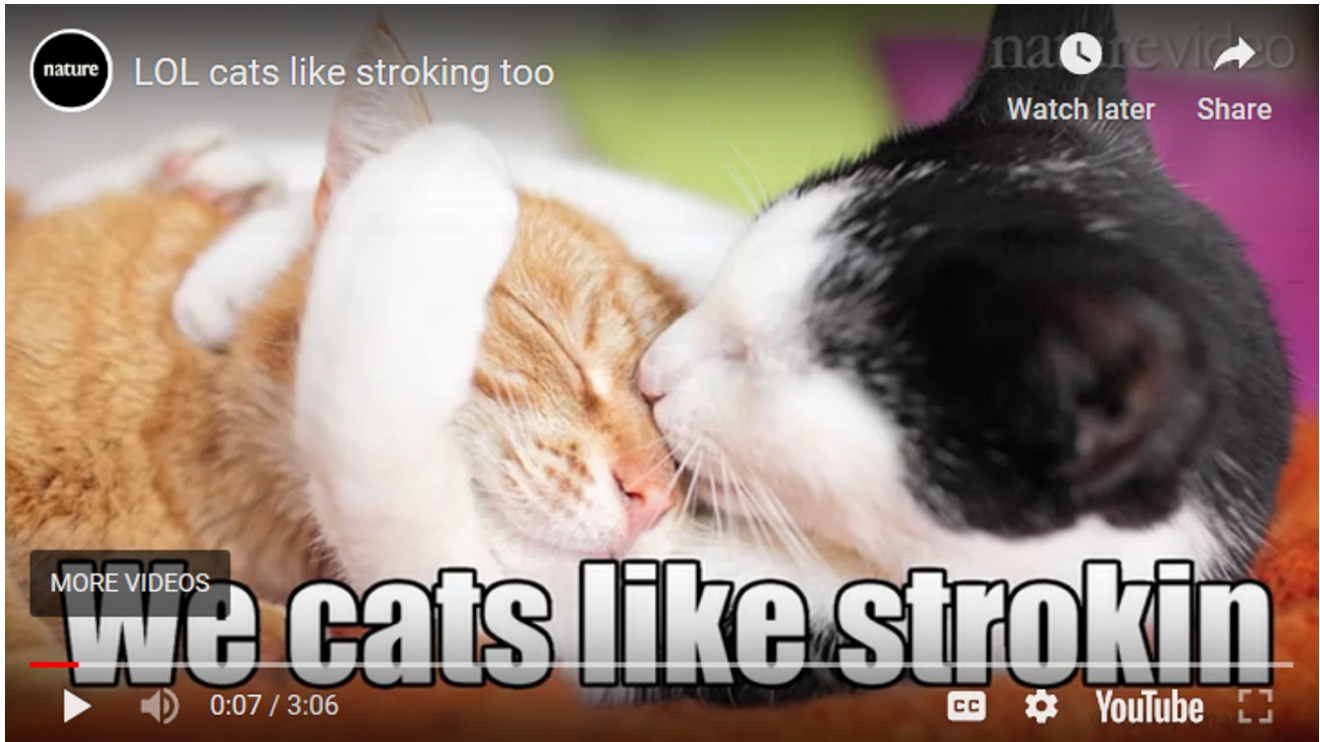


Mice have 'massage neurons'

Nerve cells that detect gentle touch in mice are a hit with cats too.

Thea Cunningham

30 January 2013



Picture the expression on your cat's face when you stroke it. What makes it so happy? The answer lies in a particular type of sensory neuron that responds to pleasant stroking, say scientists at the California Institute of Technology in Pasadena. The neurons, identified in mice, are similar to certain human neurons, which could explain why we enjoy a massage too.

Stroking skin produces a pleasurable sensation in many mammals, including humans, but until now, it was unclear which neurons detected that stimulus. It is easier to measure responses to pain than to pleasure, so neuroscientists have in general focused their attention on noxious stimulation.

The gentle touch

Writing in this week's *Nature*¹, the Caltech team shows that, in mice, a particular type of neuron, identified by molecular markers, responds specifically to stroking. The researchers used a custom-designed brush to pinch, poke or stroke mice on their hind limbs, as seen in the video above, and identified the responding neurons by imaging spots of fluorescence that represent the increase in calcium that occurs when a neuron fires. Another type was identified that was activated by the uncomfortable pinch stimulus but not by stroking.

The team carried out behavioural experiments to confirm that their mice enjoy the sensation produced by a gentle but firm stroke. The animals were genetically engineered in such a way that the 'stroking' neurons could be activated by a drug injection, and in further behavioral tests for 'place preference', the mice showed a preference for the special chamber within their experimental set-up in which the injection had been given.

Activating these neurons also helped to alleviate anxiety symptoms, which might explain why animals enjoy being groomed. Although humans are not as furry as mice, the sensory structures in the stroking neurons in mice resemble those on neurons found in at least parts of our skin (though not on hairless parts, such as the palms of the hands), suggesting that we might respond to stroking using a similar mechanism.

It's too early to tell whether the results have any therapeutic potential but, with more work, a drug to please our pets is not unthinkable, says neuroscientist David Anderson, head of the Caltech team.

“Imagine smearing something on their skin that makes them feel like they're being stroked and petted even when you're away at work! It might make your pets feel better and make you feel less guilty for leaving them home alone,” he says.

Nature | doi:10.1038/nature.2013.12331

References

1. Vrontou, S., Wong, A. M., Rau, K. K., Koerber, R. & Anderson, D. J. *Nature* <http://dx.doi.org/10.1038/nature11810> (2013).