

TOOLBOX

Mechanical tracker measures social activity of multiple mice for days

BY SARAH DEWEERDT

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A new system enables researchers to automatically track the social behavior of up to four mice for days at a time¹.

Standard assessments of mouse social behavior analyze only short interactions and may miss nuances. They also generally require researchers to handle the mice, which can stress the animals. Human analysis of mouse behavior can also be subjective and is prone to error.

So several research groups have **been working** on ways to use **computers to track** mice. The new system, called **Live Mouse Tracker**, is the first that can trace highly specific behaviors over long stretches of time. It is also one of the few methods available to assess social behavior among **more than two mice**.

The system includes an Xbox Kinect camera to record the location, orientation and movements of the animals. Because the camera senses infrared wavelengths, the system can monitor behavior at night, when mice tend to be most active. Sensors embedded in the floor of the cage read radio-frequency identification chips implanted in each animal.

Simple assembly:

Machine-learning algorithms discern the shapes of the mice from bedding, toys and other objects — and from other mice. They identify 35 behaviors, including rearing, crouching and nose-to-nose contact.

The researchers used the Live Mouse Tracker to analyze female mice lacking the autism genes SHANK2 or **SHANK3**. They housed two mutant mice and two controls together in a cage and tracked them for 23 hours.

They found that SHANK2 mice are hyperactive and SHANK3 mice are sluggish relative to controls, which is consistent with previous findings. But the new method confirmed that the altered activity levels are stable traits of the mice rather than just a response to the testing environment. The researchers also identified subtle social differences that only become apparent when more than two mice are housed together; groups of three mice that include both autism models and controls form and break up more often than would be expected by chance.

The researchers created Ikea-style assembly instructions for building the system; at least 20 labs are already using it. The software is open source, enabling users to write scripts for additional behaviors.

The team plans to link multiple systems to track larger groups of mice and to pick up **mouse vocalizations**, among other enhancements. The study appeared in May in *Nature Biomedical Engineering*.

REFERENCES:

1. de Chaumont F. *et al. Nat. Biomed. Eng.* Epub ahead of print (2019) **PubMed**

