

NEWS

# Neurons in the amygdala have specialized functions

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Emotional response: Monkeys react to facial expressions seen in videos, looking primarily at the eyes and mouth (red).

The amygdala, an almond-shaped nub of brain tissue that processes emotions, has specialized neurons that respond to facial expressions and eye contact, according to unpublished work presented Monday at the **2012 Society for Neuroscience annual meeting** in New Orleans.

People with autism tend to **avoid eye contact** and have trouble recognizing faces and emotions, so the amygdala has been the focus of some autism research. However, **Ralph Adolphs**'s lab at the California Institute of Technology has found that a woman who has lesions disrupting her amygdala avoids eye contact **but does not have autism**.

In the new work, **Katalin Gothard**'s team at the University of Arizona is recording the activity of individual neurons in the amygdala of rhesus macaques.

The researchers looked at the activity of seven amygdala neurons at a time in a female macaque while she watched videos of other monkeys. Videos elicit a **greater emotional response** from monkeys than still images do. The researchers also followed her gaze using eye-tracking technology.

Of a total of 104 recorded neurons, 13 burst into action the moment the macaque looked at the

eyes of a monkey on the screen. And those same neurons shut down the moment she looked away.

These bursts of activity correspond to the moments when the movie monkey looks directly at the camera, meaning that these cells may be tuned to detect eye contact, says Gothard.

"This type of basic research is essential for understanding translation," says **Andrew Mitz**, a staff scientist at the National Institute of Mental Health, Laboratory of Neuropsychology, who was not involved in the work. "Autism researchers need to have a clearer understanding of how the basic emotional processing circuitry works."

## Playing favorites:

**Gaze finders:** A subset of neurons in the amygdala (green) fire only when monkeys make eye contact.

Some monkeys elicited stronger reactions than others from the female macaque's neurons. This is probably natural, as some monkeys tend to be more attractive than others, says Gothard. For example, she notes that all the monkeys in the colony love the macaque in the study. "Probably she is the cutest, hottest thing on the block. We don't know why."

What's more, among the 13 neurons, some fire more in response to neutral facial expressions than to emotional ones, whereas others do the opposite.

In another poster presented Monday, Adolphs's lab recorded activity in the amygdala of nine people with epilepsy undergoing surgery.

These individuals looked at photographs of people making happy or fearful facial expressions. Of the 185 neurons the researchers analyzed in total, 24 respond only to fearful faces, and 17 only to happy ones.

This type of selectivity probably also extends to eye contact, says Shuo Wang, a graduate student in Adolphs's laboratory, who presented the poster. But researchers have yet to coordinate the epilepsy surgery with eye tracking, which can take hours to set up.

The amygdala is probably not responsible for directing one's gaze to the eyes, says Gothard. She has recorded activity from 340 neurons, none of which are active when monkeys switch their gaze

to a face.

Instead, the amygdala may be required for relaying important social information the moment that individuals make eye contact. This is the type of deficit that could underlie autism, she notes.

*For more reports from the 2012 Society for Neuroscience annual meeting, please [click here](#).*