NEWS

Oxytocin sharpens social response in people with autism

BY **JESSICA WRIGHT**

12 DECEMBER 2013

Sharper image: Oxytocin hones social brain regions to respond more to pictures of faces and less to pictures of cars.

Oxytocin, the infamous 'love hormone,' may attune the brains of people with autism to respond to social information such as facial expressions, researchers reported 2 December in the *Proceedings of the National Academy of Sciences*[1]. The study boosts oxytocin's promise for treating the social deficits seen in autism.

The findings suggest that lack of social interest may not be hardwired into the autism brain, says lead researcher **Kevin Pelphrey**, professor of pychology at the Yale Child Study Center.

"With treatment, you could rescue brain regions that you wouldn't have thought would exist in autism," he says. "It paints a very optimistic picture of autism as a functional disorder that can be treated."

The study also provides preliminary evidence that oxytocin, a hormone and neurotransmitter, may directly affect the brains of people with autism.

Oxytocin has **garnered significant attention** from studies showing that it may hone a range of social behaviors — from **trust** to **empathy** and **monogamy**. This list suggests a connection to autism, despite the fact that people with the disorder have no shortage of the hormone.

But some studies hint that oxytocin's effects on behavior **may not always be beneficial**[2]. In rodents, for example, long-term oxytocin treatment seems to make the brain **less responsive** to the molecule, suggesting that it might be harmful over time[3].

"We're missing a great deal of basic information," says **Sue Carter**, a research scientist at RTI International, a nonprofit institute in Research Triangle Park, North Carolina, who was not involved in the study. "There's a lot of science left to do before we should treat people."

Sniff test:

In the study, the researchers used functional magnetic resonance imaging to scan the brains of 17 children with autism, aged 8 to 16.5 years. The children were asked to look at pictures of eyes and cars and identify the type of emotion or vehicle they saw. About 45 minutes before the imaging session, the children sniffed either oxytocin or a placebo, and the substances were switched on their next visit.

When the children inhaled the placebo, the regions in their brain that process social information responded about equally to the cars and the eyes. But when they sniffed oxytocin, activity in these regions — including the left posterior superior temporal sulcus and the striatum — went up when the children looked at eyes and down when they looked at cars.

"We're seeing reduction in noise and increase in signal in a very specific set of brain regions," says Pelphrey. **"**It looks like what we would expect from a set of typically developing subjects."

The researchers did not investigate typically developing children at the same time, which limits the interpretation of the findings, notes **Karen Bales**, professor of psychology at the University of California, Davis, who was not involved in the study. "We think it's good that we see more activity in these areas, but we don't really know [whether it's beneficial]," she says.

One reason for this uncertainty is that the children don't score higher on the emotion recognition task when taking oxytocin, even though their brain activity increases. This was intentional, says Pelphrey. The aim was to measure brain activity that did not reflect performance on the task, he says. Otherwise, he says, "you couldn't decipher cause and effect."

Pelphrey says researchers could use changes in brain activity as a marker of effectiveness of a drug or behavioral treatment even before they see improvements in behavior. "You could begin to refine the treatment based on what you find in the brain, until you do see an overt behavioral change," he says.

Still, to prove that oxytocin is a good treatment for children with autism, it will be important to show its effect on behavior, says **Betty J. Casey**, director of the Sackler Institute for Developmental Psychobiology in New York, who was not involved with the study. "It's exciting, but more definitive

parallel brain and behavioral changes would really underscore the significance.”

References:

1: Gordon I. *et al. Proc. Natl. Acad. Sci. USA* Epub ahead of print (2013) **PubMed**

2: Shamay-Tsoory S.G. *et al. Biol. Psychiatry* **66**, 864-870 (2009) **PubMed**

3: Huang H. *et al. Neuropsychopharmacology* Epub ahead of print (2013) **PubMed**