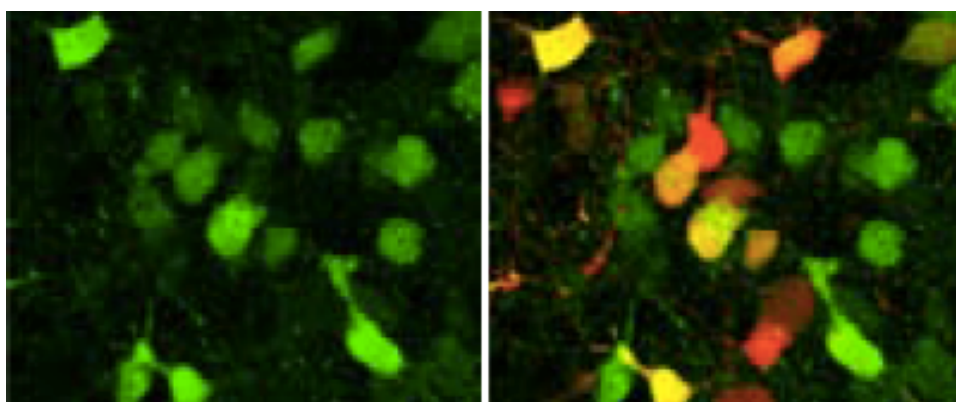
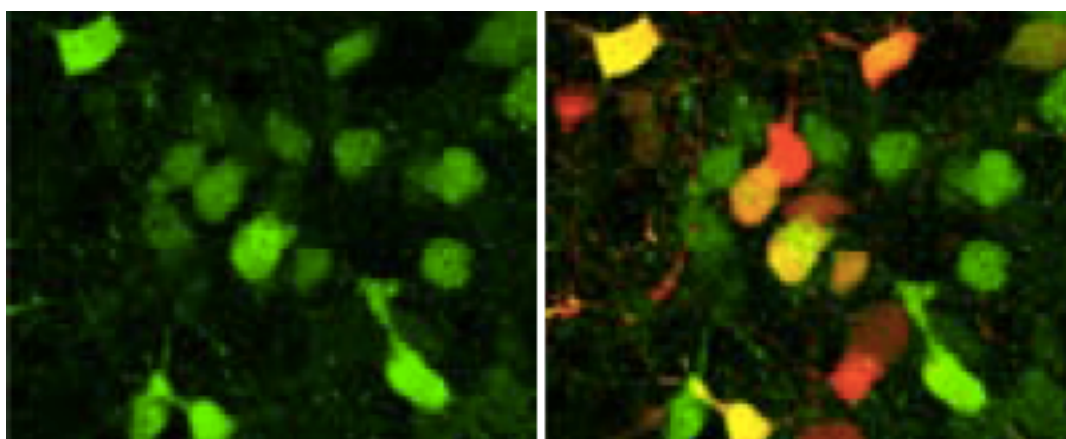


NEWS

Molecular mechanisms: Oxytocin mediates social reward

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Rewarding messenger: Neurons that express a receptor for oxytocin (green) reach into the nucleus accumbens (red) from other brain regions, and form connections in some cells (yellow).

Oxytocin may make social interactions more rewarding for mice by stimulating the release of serotonin, a chemical messenger involved in mood, according to a study published 12 September in *Nature*¹.

Oxytocin is a chemical messenger and hormone that studies have linked to a wealth of social behaviors — from **monogamy** to trust — in both people and rodents.

Some people with autism may **carry a common genetic variant** in the oxytocin receptor that has been linked to empathy. This, along with the preliminary evidence that **oxytocin boosts sociability**, has led researchers to **suggest it as a treatment for autism**.

The new study implicates oxytocin in the brain circuitry that produces a sense of reward in response to social interaction. It is possible that a **deficit in this pathway** underlies the social deficits seen in autism, the researchers say.

The researchers placed a mouse in a cage with its littermates and one type of bedding — such as paper or corn chips. They then moved the mouse to an empty cage with a different bedding in order to create an association between a certain kind of bedding and social interactions.

They later placed the same mouse into a cage with two chambers, each containing one of the two types of bedding. Overall, the mouse spent more time in the room with the bedding associated with social interactions.

However, if the researchers injected a mouse with a drug that blocks oxytocin as it interacted with its littermates, the mouse showed no preference for the ‘social’ bedding. The inhibitor had the same effect when injected directly into the nucleus accumbens, a brain region involved in reward and drug addiction.

The mice also formed positive associations with bedding from a room in which they were given cocaine, but the oxytocin inhibitor had no effect on this preference. This suggests that oxytocin specifically reinforces social reward, the researchers say.

The role of the nucleus accumbens in social behavior is surprising, as other mouse studies have not found any receptors for oxytocin in this brain region. In the new study, the researchers found that oxytocin enters the nucleus accumbens via neurons projecting from different brain regions. The receptors for oxytocin are on serotonin-producing neurons, which also originate from a different brain region, the dorsal raphe nucleus.

Blocking serotonin receptors prevents the mice from forming a positive association with the ‘social’ bedding, the study found. This suggests that serotonin released into nucleus accumbens

activates the neurons that ultimately lead to social reward.

The results elaborate the complex pathway by which oxytocin mediates social reward in the brain, which may go awry in individuals with autism.

References:

1: Dölen G. *et al. Nature* **501**, 179-184 (2013) **PubMed**