

Study explores multiple roles of oxytocin

July 23, 2012 | Author: Summer Allen, Graduate and Postdoc, Brown University



Oxytocin (or the ‘love hormone’ as it’s often called) is an important regulator of sexual arousal, pair bonding, and maternal behavior. Oxytocin also regulates non-reproductive social behaviors, which can be artificially manipulated by changing oxytocin levels. When people playing investment games in a research setting [inhaled oxytocin](#), they became both more trusting and more empathetic towards other players. But can too much oxytocin be a bad thing?

A [study](#) by Li Dai, Julie Korenberg, and colleagues published last month in PLoS ONE highlights the role that oxytocin (as well as a related hormone called vasopressin) may play in the excessive sociability displayed by people with the rare genetic developmental disorder Williams Syndrome.

Williams Syndrome, which affects roughly one in 7,500 people, is caused by the deletion of approximately 28 genes on chromosome 7. Symptoms of Williams Syndrome often include intellectual disability, heart defects, and particular facial features such as a wide mouth and sunken nose bridge. Additionally, people with the syndrome are often very gregarious and outgoing, and one of the disorder’s hallmark features is an overly strong trust of strangers that is difficult to break (for a vivid example, check out this NPR [story](#)). People with Williams Syndrome often exhibit another interesting feature: they have a strong affinity for and deep emotional responses to music.

In their study Dai, Korenberg, and colleagues found that abnormal regulation of oxytocin levels in people with Williams Syndrome is likely a factor in both their extreme sociability and their emotional responses to music. In this study, subjects with Williams Syndrome had increased baseline levels of both oxytocin and vasopressin compared to control subjects, and higher oxytocin levels in Williams Syndrome subjects were correlated with an increased tendency to approach strangers and decreased adaptive social behaviors. After listening to music, the Williams Syndrome group as a whole had a striking increase in both oxytocin and vasopressin hormones compared to the control group, although the levels of these hormones varied widely across subjects with Williams Syndrome. Do these results suggest that control subjects could be brought to tears by [Brahms’s lullaby](#) if they were given an extra dose of oxytocin?

The results from this study are the first to show that oxytocin and vasopressin release is abnormal in people with Williams Syndrome and that increased oxytocin may underlie their often problematic social behaviors and strong emotional responses to music. In contrast, there is evidence that oxytocin levels may be lower in people with [autism spectrum disorder](#) (ASD). In fact, [Kevin Pelphrey’s group at Yale](#) has shown that giving children with ASD a nasal spray containing oxytocin improved their performance on a number of cognitive tasks—including those that required processing social information. Since people with ASD often have reverse social behavior symptoms from those with Williams Syndrome (decreased eye contact and interest in people, for example), these studies highlight

the two sides of the hormone and suggest that many of the unconscious social behaviors that make for 'normal' interactions between people might depend on a tight regulation of oxytocin release.

These results also highlight the need for further research: which of the 28 genes that are deleted in Williams Syndrome are involved in regulating oxytocin and vasopressin? What are the neural circuits responsible for social behavior and emotional responses to music? Are they the same or different? Are these circuits accessible outside of the blood-brain barrier (and thus reachable via a nasal inhaler)? Could inhaled oxytocin be used in an entertainment setting to increase the emotional responses that people feel toward a song or a movie (or a first date)? More importantly: Is there a way to regulate oxytocin in people with Williams Syndrome? And could oxytocin be used to treat behavioral symptoms of anxiety disorders or schizophrenia? This may be unlikely as studies have shown that oxytocin actually reduces feelings of trust in people who already experience social anxiety (see more about oxytocin's dark side in this [piece](#) by Ed Yong). The diversity and subtleties of behaviors controlled by this 'love' hormone should make it a fascinating field to follow.