Combination approach may boost social interactions in autism

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The hormone oxytocin, the so-called hug hormone or cuddle chemical, has more nicknames than proven medical uses. However, oxytocin may benefit children with autism spectrum disorders if receptors for opioids—brain chemicals activated by drugs such as heroin that tend to disconnect people socially—are also blocked, Yale researchers report the week of May 1 in the journal *Proceedings of the National Academy of Sciences*.

Oxytocin plays a key role in sealing social bonds during activities such as sex and nursing, but its use in spurring greater social connections among people with autism has had limited success. However, Yale researchers were able to significantly increase social interaction among monkeys—as measured by extent of eye contact—when oxytocin delivery was paired with the drug naloxone, which blocks opioid receptors and is widely used to combat heroin overdoses.

It has long been noted that use of the opioid morphine disrupts lactation in nursing mothers, but naloxone reverses those symptoms in part by spurring increased production of oxytocin. The authors suggest the two neurochemical systems appear to be evolutionarily linked in human behavior: oxytocin spurring creation of strong social bonds and opioids—as tragically illustrated in cases of addiction—triggering greater social isolation.

Coupling an increase in oxytocin and the inhibition of opioid receptors "really boosts social interactions in a robust way we do not see when using either approach individually," said Steve Chang, assistant professor of psychology and neurobiology and senior author of the paper.

Yale's Olga Dal Monte and Matthew Piva are co-lead authors of the study. Chang's team also collaborated with Yale's Kevin Anderson and Avram Holmes to obtain gene expression evidence supporting the observed social boost in the human brain.

More information: Olga Dal Monte et al. Oxytocin under opioid antagonism leads to supralinear enhancement of social attention, *Proceedings of the National Academy of Sciences* (2017). DOI: 10.1073/pnas.1702725114

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