

Autism : Administration of oxytocin improves the social behavior of patients

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Autism is a disease characterized by difficulties in communicating effectively with other people and developing social relationships. The team led by Angela Sirigu at the Centre de Neuroscience Cognitive (CNRS, France) has shown that the inhalation of oxytocin, a hormone known to promote mother-infant bonds and social relationships, significantly improved the abilities of autistic patients to interact with other individuals. To achieve this, the researchers administered oxytocin to 13 autistic patients and then observed their social behavior during ball games and during visual tests designed to identify ability to recognize faces expressing different feelings. Their findings, published in *PNAS* on 15 February 2010, thus reveal the therapeutic potential of oxytocin to treat the social disorders from which autistic patients suffer.

Oxytocin is a hormone that promotes delivery and lactation. It plays a crucial role in enhancing social and [emotional behavior](#). Previous studies that measured the levels of this hormone in the blood of patients showed that it was deficient in those with [autism](#).

The team led by Angela Sirigu at the Centre de Neuroscience Cognitive in Lyon thus advanced the hypothesis that a deficit in this hormone might be implicated in the social problems experienced by autistic subjects. The team, working in collaboration with Dr Marion Leboyer at Hôpital Chenevier in Créteil, examined whether the administration of oxytocin could improve the [social behavior](#) of 13 individuals with high-functioning autism (HFA) or Asperger syndrome (AS). In both these forms of autism, patients retain normal intellectual and linguistic skills

but are unable to engage spontaneously in social situations. Thus, during a conversation, these patients turn their heads and avoid eye contact with other people.

First of all, the researchers observed the [social behavior](#) of the patients while they were interacting with three other people during a ball tossing game. Three profiles were represented: a player who always returned the ball to the patient, a player who did not return the ball, and finally a player who indiscriminately returned the ball to the patient or to other players. Each time the patient received the ball, he or she won a sum of money. The game was restarted ten times in order to allow the patient to identify the different profiles of his/her partners and act accordingly. Under a placebo, the patients returned the ball indiscriminately to the three partners. However, patients treated with oxytocin were able to discriminate between the different profiles and returned the ball to the most cooperative partner.

The scientists also measured the patients' degree of attentiveness to social signals by asking them to look at series of photographs of faces. Under a placebo, the patients looked at the mouth or away from the photo. But after inhaling oxytocin, the patients displayed a higher level of attentiveness to facial stimuli: they looked at the faces, and indeed it was even possible to see an increase in the number of times they looked specifically at the eyes of the faces in the photographs.

During these tests, the scientists also verified these behavioral effects by measuring physiological plasma oxytocin levels before and after nasal inhalations. Prior to the inhalations, plasma oxytocin levels were very low, but they rose after an intake of the hormone.

The results of these tests thus showed that the administration of oxytocin allowed autistic patients to adjust to their social context by identifying the differing behaviors displayed by those around them and then acted

accordingly, demonstrating more trust in the most socially cooperative individuals. Oxytocin also reduced their fear of others and promoted closer social relations.

This is one of the first studies to have demonstrated a potential therapeutic effect for oxytocin on social deficits in autism. Evidently, variations between individuals were observed in terms of their response to treatment, and the researchers acknowledged the importance and necessity to pursue this work. They will in particular be studying the long-term effects of [oxytocin](#) on improving the everyday living disorders of autistic patients, and its efficacy at an early stage of the disease.

More information: E Andari, J-R Duhamel, T Zalla, E Herbecht, M Leboyer, A Sirigu (2010) Promoting social behavior with oxytocin in high-functioning autism spectrum disorders, PNAS, in press.

Provided by CNRS

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