The role of oxytocin on trust

Introduction

The hormone oxytocin is a hormone that acts primarily as a neurotransmitter in the brain. Oxytocin is known to be involved in child birth. It has long been known that the hormone is released during labour and facilitates birth, breastfeeding and initiation of maternal behaviour. Researchers have also investigated the role of oxytocin in pair bonding, orgasm and social behaviour such as trust. The hormone is sometimes called the "cuddle hormone" because it is related to sexual arousal and bonding in couples. Animal research with prairie voles (Vacek et al. 2002) has found that prairie voles are monogamous. This has been linked to the fact that oxytocin is released into the brain of the female during sexual activity. For the male it seems that the hormone vasopressin has a similar effect. If secretion of the hormones is blocked during sexual activity the couple will not exhibit the normal behaviour of being monogamous.

Trust is an important social tool that allows humans to form productive and meaningful relationships at a personal and a professional level. However, bonds of trust are fragile and can be disrupted by a single act of betrayal such as an extramarital affair or telling secrets to a third part. It is hard to trust someone and be betrayed and sometimes this experience is so hard that people begin to avoid social company. They may develop a social phobia.

Trust is also important in professional relationships or in business. Researchers have been interested in how trust may influence behaviour in economics.

Procedure

Baumgartner et al. (2008) did a study within the field of neuroeconomics where they used neuroimaging (fMRI) to study the role of oxytocin in creating trust between participants during a social game called the "trust game." This game is used by economists and neuroscientists to study social interaction. In a typical trust game, an investor (player 1) must decide whether he or she will keep a sum of money (for example 10 dollars) or share it with a trustee (player 2). If the sum is shared, the investment is tripled (30 dollars). Player 2 (the trustee) now has to decide whether he or she will repay the trust by sharing the gain with player 1 so that each gets 15 dollars or violate the trust by keeping the money. This game is thus built upon the dilemma of either trusting or not trusting. Trusting is profitable but there is also a risk in trusting.

The hormone oxytocin has among other things been associated with social bonding and facilitation of social interactions. This has also been seen in trust games where it has been found that investors who are given a sniff of oxytocin before the game are more likely to trust the other player and engage in risk. Baumgartner et al. (2008) studied what happens in the brain when trust breaks down.

Aim: The aim of the study was to investigate the role of oxytocin following breaches of trust.

This was an experimental study where the researchers used neuroimaging.

49 participants were placed in an fMRI scanner. They received either oxytocin or a placebo via a nasal spray. Participants were then told to act as investors in several rounds of a trust game with different trustees. They were also told that they were to engage in a risk game, which is the same as a trust game in terms of financial risk but it is played against a computer instead of a human partner.

The participants received feedback from the experimenters. The procedure was divided into a pre-feedback phase and a post-feedback phase and the feedback was given in between the two. The feedback given indicated that about 50% of their decisions (in both kinds of games) resulted in poor investment because their trust was broken.

Results

The researchers saw that the feedback had different results. Participants who had received a placebo before they started playing were more likely to decrease their rate of trust after they had been briefed that their trust had been broken. Participants who had received oxytocin in the nasal spray continued to invest at similar rates. Apparently it did not matter to them that their partner had broken their trust. The researchers could also see that different brain areas were active in the two groups. Participants in the oxytocin group showed decreases in responses in the amygdala and caudate nucleus. The amygdala is a structure in the brain involved in emotional processing and fear learning. It has many oxytocin receptors. The caudate nucleus is associated with learning and memory; it plays a role in reward-related responses and learning to trust.

Discussion

The researchers hypothesized that oxytocin may have a role in decreasing fear reactions (via the amygdala) that may arise as a consequence of betrayal and our reliance on positive feedback that can influence future decisions (via caudate nucleus). It seems that oxytocin may facilitate the expression of trust even after trust has been violated by potentially lowering defense mechanisms associated with social risk. This seems to happen by ignoring the negative feedback, which is important for adapting behaviour in the future. An interesting finding was that the researchers could only observe these behavioural and neural results when participants played the trust game but not when they played the risk game against a computer. According to the researchers this suggests that oxytocin's effect on trust only comes into play in interactions with real people.

Trust is an important adaptive mechanism, which helps humans to find out how to navigate among other humans. Humans need to be with other human beings, as there is a "need to belong"; but they also need to be careful in terms of trust. Lover levels of oxytocin are certainly adaptive in some situations in order to protect against potential harm but it is also important to be able to forgive and forget if long-term relationships and mental well-being should be preserved.

The results of this study can help us understand how mental disorders such as social phobia may develop. It could be due to an excessive fear of betrayal. However, longterm lack of social interaction can result in psychological and physiological disorders. Results like these could indicate that levels of oxytocin play an important role in the consequences of betrayals that we all have to deal with during life. A further step in research could be to examine how levels of oxytocin influence real life betrayals. Another field to explore could be gender differences in responses to betrayal after oxytocin administration.