The Fuel of Intimacy

In the media, it's often described as the "cuddle hormone" or the "orgasm hormone". But oxytocin is also attracting a lot of attention among scientists. Biopsychologist Markus Heinrichs talks about the unique qualities and secrets of this hormone – and its possible use in psychotherapy for people with severe social disorders.

Illustration: Paulwip / pixelio.de

The cuddle hormone, the orgasm hormone, the trust hormone – it's been given many names in the tabloids. But the hype isn't just in the media – scientists are equally excited about this hormone, which goes by the unwieldy name of oxytocin. This neurohormone is credited with creating trust, intimacy and empathy and reducing inner stress, fear and anxiety. Is this the hormone that can do everything? Numerous researchers and clinical groups all over the world are studying the "oxytocin system" in animals and humans and its effects on the body and mind.

Freiburg-based biopsychologist and psychotherapist Professor Markus Heinrichs is an internationally respected pioneer of oxytocin research, and his expert knowledge is very much in demand. So what is fact and what is mere speculation when it comes to the "social hormone" and what therapeutic potential does it offer?

Oxytocin

Oxytocin (from the Greek for "quick birth") is a neuropeptide produced in the hypothalamus, which acts as a hormone on numerous organs and as a neurotransmitter between nerve cells. Since the 1950s, scientists have known that it can be used to induce labour and stimulate milk release in the mother. Experiments since the early 2000s have shown that oxytocin strengthens social-emotional perception and bonding between humans, reduces stress and anxiety, and is secreted during sexual activity.

We posed these and other questions during an interview with Heinrichs at his institute in Freiburg, where he combines basic research in the laboratory with therapeutic work in his psychotherapeutic clinic for stress-related illnesses.

german research: Professor Heinrichs, you've been studying oxytocin for almost 20 years – do you ever have dreams or nightmares about it?

Markus Heinrichs: Not yet, far from it, neither in a positive nor a negative way.

How did you first hear about oxytocin?

In an article in the mid-1990s on the subject of prairie voles and their pair bonding behaviour. The article was about a group of American researchers who had discovered a link between pair bonding and the availability of oxytocin in the animals' brains. If there was a lack of the hormone, these monogamous animals were no longer able to maintain a pair bond. My admittedly overconfident question was whether the hormone could have a similar importance in humans. At the time, people just smiled at the idea.

Why was that?

Oxytocin was known in obstetrics as the hormone administered to women in the delivery room to induce labour or as a nasal spray to improve lactation. It was the obstetric hormone.

How did you start your experimental work?

With a group of lactating mothers and a group of non-lactating mothers. We knew that the suckling baby "activated" the secretion of oxytocin in the mother, and we wondered if the oxytocin protected the mother against stress. This was very clearly confirmed. We carried out a second experiment with men, who were given oxytocin as a nasal spray in place of breastfeeding. The effect was observable there too. These two initial studies in humans encouraged us to investigate further.

What brought about the breakthrough?

At the University of Zurich, I came into contact with the economist Ernst Fehr. In a joint experiment, we were able to demonstrate that a high level of oxytocin in the brain significantly increases a person's willingness to take the social risk of investing trust and that the hormone is crucial to social approach behaviour. We were able to publish our findings in *Nature*, which certainly helped to raise the profile of this area of research in my field.

To sum up the story so far – what definite facts do we know thanks to research?

In terms of behaviour the hormone can do at least two things, which is what makes it so interesting. It can help the individual to control fear, stress and alarm systems when a person wants to build or allow social intimacy. At the same time – and this is important – it stimulates the reward areas of the brain, making social intimacy more pleasurable. This combination of factors makes oxytocin a very important hormone in social terms. It has to do with sex, love and trust too, but the buzzword "cuddle hormone" falls far short of the reality.

Do humans have an "oxytocin system"?

Yes, absolutely. First there is the hormone, and then there are the receptors and their sensitivity. This is an area where our knowledge is still very limited. Recent studies with Marco Prinz, a neuropathologist in Freiburg, showed that the highest density of receptors in humans is in the brain's reward area and the amygdala in the limbic system – interestingly, that's exactly where the monogamous prairie voles have the most receptors too.

Personal Profile

Professor Dr. Markus Heinrichs has held the Chair of Biological and Differential Psychology at the University of Freiburg since 2009. Born in 1968, he studied psychology in Würzburg and Bonn. He received his doctorate in 2000 from the University of Trier and subsequently worked as a postdoctoral researcher and associate professor at the Department of Psychology at the University of Zurich, where he held a research professorship funded by the Swiss National Science Foundation between 2007 and 2009. He has investigated the role of oxytocin in social interaction and innovative clinical applications for social disorders in a number of DFG-funded projects.

Illustration: Project Group Heinrichs

www.psychologie.uni-freiburg.de/Members/heinrichs/

You are involved in three DFG projects investigating the interaction between oxytocin and social cognition …

We are asking the question of how social thinking works. We aren't just looking at hormone availability, but trying to understand the genetic aspect of receptor sensitivity. It's a pharmacogenetic approach that presents a few methodological challenges in the lab.

Everything has its dark side. Does that apply to oxytocin too?

Faces and emotions: The eye movements of a volunteer are recorded in the psychology lab with an eye tracker.

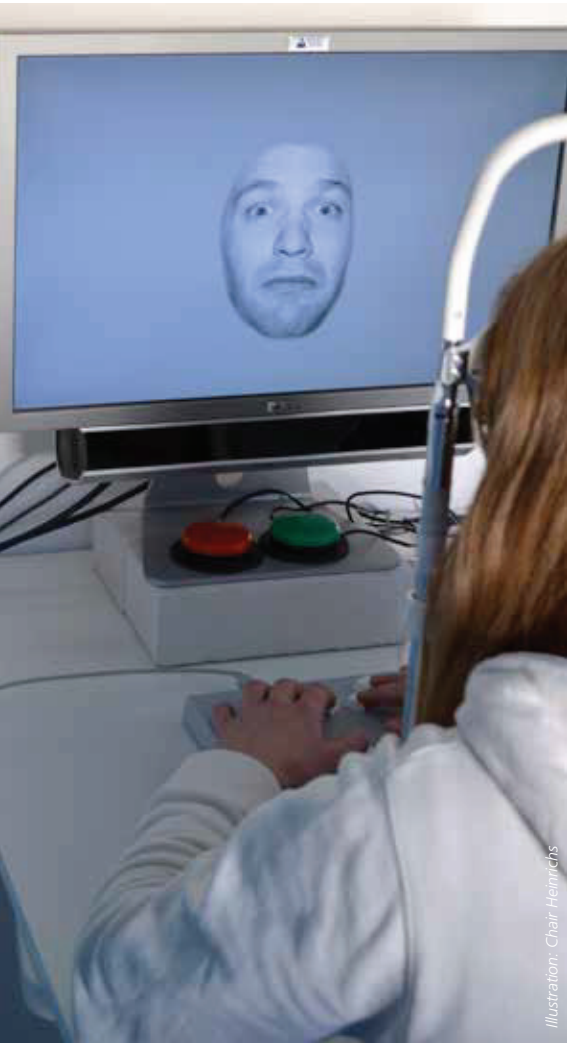

Illustration: Chair Heinrichs

At the doses used in our experiments, where volunteers were given oxytocin in a nasal spray, there were no undesirable side-effects. But oxytocin is not "good" per se. Hormones have a relevance and importance in evolutionary biology, including behaviour. Oxytocin plays a role in the mother-child relationship, pair bonding and group bonding.

And what about therapeutic use? What kind of people could benefit from administered oxytocin?

Primarily, people with severe social disorders. People with autism, a condition for which there is currently no curative treatment. Also people with social anxiety disorders, which are much more difficult to treat than other anxiety disorders, and patients with certain personality disorders such as borderline personality disorder. Here and at other research institutes around the world, scientists are working hard to test oxytocin as a means of treatment.

Test? You can already buy "liquid trust" online.

I would warn people to steer well clear of such things, particularly as you never know what exactly is in them. All of the clinical studies are still ongoing, so as yet there is no clinical evidence of effectiveness. But for me, one thing is certain: a hormone spray by itself will not change an individual's behaviour. Treatment is only successful if the patient learns new behaviours and new cognitions, perhaps having new social experiences after years of avoidance. This can only happen under therapeutical supervision, and is especially effective in a group setting.

Are you in favour of psychotherapy in combination with oxytocin?

We are currently testing this possibility in large-scale clinical studies. Oxytocin may give an individual the extra boost they need to risk new social experiences. The challenge to researchers is to identify those people who could benefit the most. If we could predict genetic sensitivity to administered oxytocin with a simple saliva sample, this would be a huge step towards personalised psychobiological therapy.

In other words, there's a long way to go yet!

In three or four years' time we might be able to give a clear, evidence-based answer. But before that there is still a lot of basic and clinical research to be done.

What do psychiatrists think of your results?

Gratifyingly, they're very interested, open-minded and willing to discuss our approaches. Here in Freiburg we have some excellent partnerships with the University Psychiatric Hospital, which enables us to carry out clinical trials in a hospital setting.

One last question: our society has been described as a stressed, 'exhausted' society. Could oxytocin be a solution?

It's not a lifestyle drug, if that's what you mean. Oxytocin may be a new pharmacological option for a specific group of patients with certain social disorders, but only in combination with the right psychotherapy. Accurately identifying this group and providing optimum care is a huge challenge, one which will keep us busy for some years yet.

Thanks for talking to us, Professor Heinrichs.

Interview by **Dr. Rembert Unterstell**,
Publishing Executive Editor of german research.