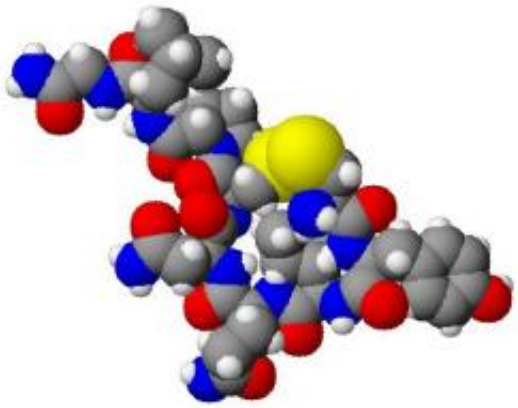
Medical Xpress

The dark side of the 'love hormone'; similarities with the effects of alcohol

May 19 2015



Spacefilling model of oxytocin. Created using ACD/ChemSketch 8.0, ACD/3D Viewer and The GIMP. Credit: Wikipedia.

Researchers at the University of Birmingham have highlighted significant similarities between the behavioural effects of oxytocin and alcohol.

The research, published today in *Neuroscience and Biobehavioral Reviews*, draws on existing studies into the two compounds and details the similarities between the effects of alcohol and the 'love hormone', oxytocin, on our actions. The team warn that the oft-used nickname hides the darker side of oxytocin, and claim that it bears more semblances with the effects of alcohol than previously thought.

Oxytocin is a neuropeptide hormone produced in the hypothalamus and secreted by the posterior pituitary gland. It has long been established as playing a significant role in childbirth and maternal bonding. More recently it has been identified as a brain chemical with a key role in determining our social interactions and our reactions to romantic partners - hence its nickname of 'the love hormone'.

Oxytocin increases prosocial behaviours such as altruism, generosity and empathy; while making us more willing to trust others. The socio-cognitive effects come about by suppressing the action of prefrontal and limbic cortical circuits - removing the brakes on social inhibitors such as fear, anxiety and stress.

Dr Ian Mitchell, from the School of Psychology at the University of Birmingham, explained, "We thought it was an area worth exploring, so we pooled existing research into the effects of both oxytocin and alcohol and were struck by the incredible similarities between the two compounds."

"They appear to target different receptors within the brain, but cause common actions on GABA transmission in the prefrontal cortex and the limbic structures. These neural circuits control how we perceive stress or anxiety, especially in social situations such as interviews, or perhaps even plucking up the courage to ask somebody on a date. Taking compounds such as oxytocin and alcohol can make these situations seem less daunting."

The team acknowledge that the ability to inhibit anxieties could explain the temptation to summon a little 'Dutch courage' - particularly in the context of social situations such a first date. Dr Steven Gillespie said, "The idea of 'Dutch courage' - having a drink to overcome nerves - is used to battle those immediate obstacles of fear and anxiety. Oxytocin appears to mirror these effects in the lab."

When administered nasally, oxytocin appears to closely mirror the well-established effects of alcohol consumption. However the researchers warn against self-medicating with either the hormone or a swift drink to provide a little more confidence in difficult moments.

Alongside the health concerns that accompany frequent alcohol consumption, there are less desirable socio-cognitive effects that both alcohol and oxytocin can facilitate. People can become more aggressive, more boastful, envious of those they consider to be their competitors, and favour their in-group at the expense of others. The compounds can affect our sense of fear which normally acts to protect us from getting into trouble and we often hear of people taking risks that they otherwise wouldn't.

A dose of either compound can further influence how we deal with others by enhancing our perception of trustworthiness, which would further increase the danger of taking unnecessary risks.

Dr Gillespie added, "I don't think we'll see a time when oxytocin is used socially as an alternative to alcohol. But it is a fascinating neurochemical and, away from matters of the heart, has a possible use in treatment of psychological and psychiatric conditions. Understanding exactly how it suppresses certain modes of action and alters our behaviour could provide real benefits for a lot of people. Hopefully this research might shed some new light on it and open up avenues we hadn't yet considered."

Provided by University of Birmingham