Study finds Viagra increases release of key reproductive hormone

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The little blue pill may do more than get the blood pumping. Sildenafil — the generic name for Viagra — also increases release of a reproductive hormone in rats, according to a new study.

Researchers at the University of Wisconsin-Madison report this month that sildenafil increases the amount of oxytocin released by stimulation of the posterior pituitary gland, a small structure directly underneath the brain that regulates hormone levels in response to neural signals.

The finding is the first indication of a chemical mechanism through which erectile dysfunction drugs like Viagra may have physical effects besides increasing blood flow to sexual organs, says study author Meyer Jackson, a physiology professor at the UW-Madison School of Medicine and Public Health.

Sometimes called the "love hormone" or "cuddle chemical," oxytocin plays several important roles in social interactions and reproduction, including triggering uterine contractions and lactation. It is also released during orgasm and has been linked to sexual arousal.

Oxytocin release is regulated by an enzyme that acts like a braking system, limiting hormone release by dampening neural excitation of the cells. This same enzyme, phosphodiesterase type 5, also limits blood flow by contracting the muscles around blood vessels.

In both places, sildenafil works by blocking this enzyme, essentially

releasing the brakes, explains Jackson. In blood vessels, relaxing smooth muscle increases blood flow, which corrects erectile dysfunction, and in the posterior pituitary, the cells become more responsive. "The same stimulation will produce more [oxytocin] release."

He says, "I think this is a missing link in terms of trying to sort out the issues around whether there are additional effects of phosphodiesterase type 5 inhibitors," which include Viagra, Levitra and Cialis.

The new report was published online Aug. 9 and appears in an upcoming issue of the *Journal of Physiology*.

In the study, the scientists measured oxytocin released from rat pituitaries in response to neural stimulation. When the pituitaries were treated with sildenafil, they responded to the stimulation by releasing three times as much oxytocin as they did without the drug.

Importantly, the drug had little if any effect on hormone release in the absence of stimulation, Jackson says.

"Erectile dysfunction drugs do not induce erections spontaneously, they enhance the response to sexual stimulation," he says. "The same thing is happening in the posterior pituitary - Viagra will not induce the release of oxytocin on its own, but it will enhance the amount of release you get in response to electrical stimulation."

Though he doesn't think his findings raise any significant safety issues related to Viagra use, he does think it provides strong rationale for studies of additional effects and new potential uses.

"A big question raised by our study is, will sildenafil do the same thing to the nerve terminals that release oxytocin [in the brain]?" he says. The cells that supply oxytocin to the pituitary come from a brain structure

called the hypothalamus, which also sends hormones throughout the brain.

Though sildenafil's effects on these pathways are still unknown, work by other researchers has shown that oxytocin-sensitive cells in the brain play a role in the neural control of erectile responses, suggesting that Viagra and its kin may work through multiple channels.

The famous blue pills could have other uses as well. Oxytocin has been linked to the ability to make strong social bonds, while sildenafil was recently shown to improve hamsters' abilities to adjust the timing of their internal clocks to overcome simulated jet lag.

"This is one piece in a puzzle in which many pieces are still not available," Jackson says. "But it raises the possibility that erectile dysfunction drugs could be doing more than just affecting erectile dysfunction."

Source: University of Wisconsin