

Hormone in birth control shot linked to memory loss

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The birth control shot Depo Provera offers a convenient alternative for women who don't want to remember to take a daily pill. Ironically, research from Arizona State University has shown the shot actually may impair a person's memory.

The ASU study connects [medroxyprogesterone](#) acetate (MPA), the [hormone](#) active in Depo Provera and many widely used menopausal hormone therapies, to impaired [memory](#) in rodents. The study is currently in press in the journal *Psychopharmacology*.

The study was led by Blair Braden, an ASU psychology doctoral student, and Heather Bimonte-Nelson, an ASU associate professor of psychology and director of the Bimonte-Nelson Memory and Aging Lab. The work was done in collaboration with Laszlo Prokai from the University of North Texas Health Sciences Center, Fort Worth, Tex., and Alain Simard from Barrow Neurological Institute, Phoenix.

The Bimonte-Nelson lab first linked MPA to [memory loss](#) in rats while studying it as a component of hormone therapy for menopause. This earlier study showed that MPA impaired memory in menopausal-aged rats, and results were published in the November 2010 issue of *Neurobiology of Learning and Memory*. The current study specifically looks at the drug in relation to the birth control shot.

Bimonte-Nelson said she and Braden began asking questions about the effects of the drug because Braden was concerned about friends taking

MPA as a contraceptive.

"This is an important question, because what we are going to have in our future are women who are menopausal that also have a history of taking MPA as birth control when they were younger," said Bimonte-Nelson.

The U.S. [Food and Drug Administration](#) originally approved Depo Provera for use in October 1992. It requires an injection every 12 weeks. Its 99 percent effectiveness and the infrequency of doses make the shot an attractive alternative for women seeking to avoid pregnancy.

While other studies have examined Depo Provera's effects on [bone density](#), Bimonte-Nelson's lab is the first to explore its effects on cognition. The researchers note that other forms of hormonal contraception, such as the pill, do not use MPA.

The study lasted approximately one year, using three groups of rats (which received doses at varying ages), plus a control group that did not receive the hormone. To test their memory, rats were placed in water-based mazes to swim and seek out hidden platforms in the water.

"What we found was pretty shocking – animals that had been given the drug at any point in their life were memory impaired at middle age compared to animals that never had the drug," said Braden. "We also confirmed that in the subjects that only received the drug when young, the hormone was no longer circulating during memory testing when older, showing it had cleared from the system yet still had effects on brain function."

The researchers also measured a marker of the gamma-aminobutyric acid (GABA) neurotransmitter system in the hippocampus of the rats' brains to determine MPA's physiological effects.

"What GABA does is slow the brain down," Braden said. "So if there is too much of it, it can make it more difficult to produce memories. But then if there's too little of it and there's too much excitement, same thing – it makes you not able to produce memories correctly."

The group plans to follow the animal studies with human trials, and the work is leading to results that could have profound implications for women of all ages.

"This research shows that even after this hormone is no longer on board, months and months later, resulting effects are impacting the brain and its function," Bimonte-Nelson said. "This work is an important step forward in our understanding of the potentially long-lasting effects of clinically used hormones on brain function. However, more research is needed to determine whether these effects also occur in women that take this hormone as [birth control](#) or part of hormone therapy."

More information: An early online version of the article is available at <http://www.springerlink.com/content/53357212117581w6/>.

Provided by Arizona State University

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