

## PSYCHOLOGY

# The Prickly Side of Oxytocin

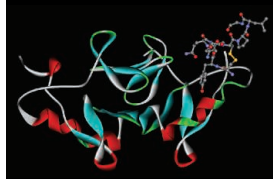
Oxytocin has a touchy-feely reputation, thanks to research showing that it promotes social bonding in a wide range of animals, including humans. Sold on the Internet in a formulation called “Liquid Trust,” the peptide hormone is marketed as a romance enhancer and sure ticket to business success. Australian therapists are trying it alongside counseling for couples with ailing marriages. And police and military forces reportedly are interested in its potential to elicit cooperation from crime suspects or enemy agents.

But a study published on page 1408 hints that the hormone has a prickly side as well. In experiments with groups of people playing an economic game, those who received a dose of oxytocin behaved more altruistically toward members of their own group. Yet they also displayed more “defensive aggression” toward outsiders, preemptively punishing members of a competing group when their own group was in danger of suffering a heavy financial loss. “The important message here is that oxytocin is not just promoting generosity and benevolence and trust,” says lead author Carsten De Dreu, a psychologist at the University of Amsterdam in the Netherlands. “It’s a double-edged sword.”

De Dreu and colleagues recruited dozens of undergraduate men to play a version of the prisoner’s dilemma game that’s often used in behavioral economics research. Half an hour before the game, all participants inhaled three puffs from a bottle of nasal spray containing either oxytocin or a placebo. (Neither they nor the researchers guiding them through the experiment knew which.) When the game began, participants were assigned to groups of three and told that another group of three would be playing at the same time. Each individual received €10 (about \$13) and had to pick from several options for distributing his money. Compared with men who got the placebo, those who’d taken oxytocin behaved more altruistically, keeping less money for themselves and donating about twice as much to a

pool that benefited all members of their own group.

However, a more complicated version of the game revealed oxytocin’s darker side. De Dreu’s team tested 75 men in a game in which groups of three sometimes faced the possibility of a substantial financial loss to their group if the other group decided not to cooperate with their group by giving them money. This threat didn’t faze men who’d taken the placebo, but the oxytocin-sniffers tended to get defensive, selecting an option that took money from the outsiders and minimized their group’s potential losses instead of playing nice and hoping the others did the same. Oxytocin had this effect only when



**Not so cuddly?** Oxytocin (below) may help mothers bond with their young—and defend them in times of danger.

men faced a significant financial threat to their group; otherwise, those who took the hormone behaved no differently toward outsiders.

The findings hint at a biological basis for thinking that altruism and aggression are more closely related than is usually acknowledged, says Holly Arrow of the University of Oregon, Eugene, who studies group dynamics and the psychology of war. “It’s morally simple to say that altruism is good and aggression is bad,” Arrow says. But in the context of war, for example, harming others to protect one’s own group can be considered heroic. “Oxytocin is perhaps an important pathway that bonds men together and makes them ready to defend the group.” Arrow would like to see the work repeated in

women to see if they respond the same way.

Oxytocin regulates mother-infant bonding in sheep and rodents, pair bonding in voles, and flock size in zebra finches (*Science*, 14 August 2009, p. 862), and Larry Young, a neurobiologist at Emory University in Atlanta, says De Dreu’s study suggests that the molecule plays a similarly important role in maintaining the more complex social groups formed by humans. “It probably does have a big role in our everyday relationships and how we fit into groups and contribute to the success of our own group,” Young concludes.

—GREG MILLER

## Science Insider

### From the *Science* Policy Blog



Italian researchers are worried that their successful protests against **budget cuts** proposed by Prime Minister Silvio Berlusconi may be only a temporary victory. <http://bit.ly/italyfun>s

A scientific meeting last week in Washington, D.C., is the latest sign that the National Football League has reversed its longtime resistance to acknowledging a link between the sport and **brain injuries**. <http://bit.ly/concussions>

As part of our team coverage of the **Gulf of Mexico oil spill** (see <http://news.sciencemag.org/oilspill>), we reported:

- A story on how scientists are stunned by a rush analysis of a **hand-drawn engineering plan**;
- How scientists with the National Oceanic and Atmospheric Administration’s toxics lab in Seattle, Washington, are **looking for oil in seafood samples and also shifting their strategy** to begin sampling in oiled areas as well as clean areas;
- The recent discovery of pancake batfish 400 meters below the surface illustrates how little scientists know about species abundance on the sea floor—and just what might be at **risk from the oil**.
- NOAA Administrator Jane Lubchenco is calling for a halt to **missions to find oil plumes** in the gulf until coordinated research can be planned in a “careful, thoughtful, and quantifiable manner”;
- One oceanographer who uses undersea robots to study jellyfish and other sea life says that the **moratorium on deep-sea drilling** in the gulf has cut off his flow of data. He collects images from undersea cameras connected to the robots that work below the drill platforms;
- And new modeling supports previous predictions that the oil will likely move around Florida and **enter the Gulf Stream**.

See the full postings and more at [news.sciencemag.org/scienceinsider](http://news.sciencemag.org/scienceinsider).