

## **Addicted to Mother's Love: It's Biology, Stupid**

**By BENEDICT CAREY**

**The New York Times**

**Published: June 29, 2004**

A mother's love is like a drug, psychologists say, a potent substance that cements the parent-infant bond and has a profound impact on later development.

But scientists have known little about how early mothering affects an infant biologically. If it is like a drug, what kind of drug?

In at least one group of mammals, a team of Italian and French researchers reported last week, it apparently acts like an opiate. Mice that lacked a gene that lets them feel pain relief from opiates have severe difficulty establishing bonds with their mothers, the researchers found.

When briefly separated from their mothers in the first week after birth – a vulnerable period, when the babies can neither walk nor open their eyes - the genetically altered babies did not cry out in distress nearly as often as normal mice suffering the same separation. Cries for help are crucial to cementing mother-child attachment, experts say.

The researchers tested to see whether the altered mice cried out in response to other stresses like cold temperatures. They did. It was just separation anxiety that they did not express strongly.

The cries "are part of an attachment behavior that maintains proximity between infant and mother," said Dr. Francesca R. D'Amato of the CNR Institute of Neuroscience in Rome and an author of the study, published in the June 25 issue of Science. "It's fundamental to survival, but these animals were not displaying it."

The study provides strong evidence that the same brain chemicals that control physical pain also regulate the psychological ache of loss and separation, she said.

It is also one of several recent experiments showing that alterations in a single gene can radically reshape social behavior.

This month, scientists at Emory University in Atlanta reported that injecting another rodent, the meadow vole, with a single gene turned promiscuous males into stay-at-home dads. The gene helps the animals make cellular receptors for a hormone, vasopressin, that is involved in social

bonding. Scientists had previously shown that rodents that were genetically insensitive to another hormone, oxytocin, had difficulty forming pair bonds. The neurobiology of mother-child attachment probably involves all three systems in some way, scientists said.

"This latest study is the largest and best of its kind and provides very strong evidence that maternal support has an opiate component," said Dr. Jaak Panksepp, an emeritus professor of psychology at Bowling Green State University in Ohio, who more than two decades ago was the first to propose that opiate receptors were important in forming mother-child bonds.

Hormone and pain-relief systems work in similar ways in all mammals, including humans.

The circulation of naturally occurring opiates like endorphins in the body helps animals feel relief and comfort. Messenger chemicals in the brain like dopamine then help reinforce the sensation of being rewarded, whether from winning a bet, meeting a potential mate or obtaining support from a parent.

Researchers say subtle variations in the genes that regulate these systems could particularly interfere with the wordless emotion-based interactions between a mother, or a primary caregiver, and child. Physical touch can release opiates that have soothing effects, for example, but a baby with reduced opiate sensitivity might not feel that relief so deeply. That could in turn frustrate the mother or caregiver, who expects to provide comfort.

"What we may find, for instance, is that those individuals born with altered opiate sensitivity will have a particular temperament, an inborn psychological temperament, that would be difficult for a mother to connect with," said Dr. Allan N. Schore, who studies attachment at the School of Medicine at the University of California, Los Angeles. "The ability to feel and express pain, to cry out and then feel comfort - these things tighten the attachment bond. And that bond helps the child regulate their own internal negative states as they grow."

Warm, attentive parenting can in fact help baby animals overcome some genetic differences. In a series of experiments, scientists at McGill University in Montreal have shown that baby rats repeatedly groomed, cuddled and licked by their mothers grow up to be less anxious than those that received less coddling. In a study appearing in the current issue of *Nature Neuroscience*, the McGill researchers report that this physical mothering early in life prompts long-lasting changes in the rats' genes that help the animals manage stress throughout their lives.

Researchers at the National Institutes of Health have demonstrated a similar effect in monkeys: Having parents that are warm and attentive protects young animals from a specific genetic

variation that would - in the absence of such comfort and support - put them at high risk for aggressive, disruptive behavior. These well-nurtured monkeys tend to become attentive parents themselves: Their attachment to their mothers provides a model for the relationships they will form much later with their own children.

"The important part of all this is that we're showing that an attentive caregiver can actually alter the baby's genes, for the better," Dr. Schore said.

A child with a lower genetic sensitivity to sensations of pain or pleasure could thrive under the care of parent especially attuned to the child's more subtle signals, he said, and their physiology might then correct or compensate for the genetic difference.

Although scientists have much to learn about the many brain chemicals involved in this process, some say it makes sense that they would include opiates, a class of chemicals that includes habit-forming drugs like morphine and heroin.

"Think about it: The connection to a parent is such an important one, essential to survival," Dr. Panksepp said. "Wouldn't it make sense that this social dependence is an addiction-type phenomenon?"

=====

The "fair use" doctrine allows limited reproduction of copyrighted works for educational and research purposes. The relevant portion of the copyright statute provides that the "fair use" of a copyrighted work, including reproduction "for purposes such as criticism, news reporting, teaching (including multiple copies for classroom use), scholarship, or research" is not an infringement of copyright. U.S.C. Title 17, Chapter 1, Sec. 107.