doubleX beta

HEALTH & SCIENCE

Taking Care of Babies May Change Your Brain

A new study suggests that your brain can become "motherly" without giving birth.

Posted: Thursday, January 7, 2010 8:08am
By Sarah Elizabeth Richards

Photo by Getty Creative Images.

If you've ever worried about not being naturally maternal—as you awkwardly pat cranky babies that other women seem to cradle and soothe effortlessly—a new study might provide some reassurance. Researchers found that virgin female rats that took care of foster pups grew new brain cells that are believed to be associated with nurturing. Pregnant or lactating rats normally experience such cellular changes, but this study suggests that simply *acting* motherly can make your brain motherly. In other words, our willingness to mother—rather than an innate ability—may be what matters most. And even the rats that were slow to warm up to the pups developed mom brains eventually.

In the study published this month in the journal *Brain Research Bulletin,* researchers from Tufts University's Cummings School of Veterinary Medicine introduced 14 rats that had never been around mothers or babies to unknown pups for two hours a day. It took about a week on average for seven of the rats to exhibit rodent caretaking behavior, such as crouching over the pups, grouping them, or returning them to the nest. Brain analyses showed that these maternal rats developed new neurons, which migrate to the olfactory region and are thought to be involved in the odor recognition of offspring. The brains of rats that were isolated from pups as a control group, as well as the rats that were exposed to the pups but ignored them, did not change.

However, the maternal rats did not begin to act motherly at the same rate. Some responded within five days, and others took as long as 11 days to show the pups some love. Previous studies have shown that most of the rats would have eventually acted maternal if the pups were left with them long enough, says neurobiologist and study co-author Robert Bridges—their maternal behaviors developed along a spectrum. At least in the rat world, there was no "normal" way to come around to the idea of parenting.

The study is a reminder that the development of motherly feelings and the concomitant desire to have children can vary widely, too. Some women might be so in touch with their baby longings that they carry around the list of baby names they compiled in college or are willing to be single moms, says Samantha Meltzer-Brody, a perinatal psychiatrist at the University of North Carolina-Chapel Hill. However, others—she offers the stock example of a freedom-loving 35-year-old urban careerist—might theoretically want children but are detached from their desires, especially if they don't have partners or aren't emotionally or financially ready. They shouldn't worry, she says, explaining that the notion that all women who are meant to be mothers experience a sudden, overwhelming urge to reproduce is a myth. A woman often discovers her yearnings when she falls in love with someone with whom she wants to share the parenting experience. Or some women might never feel maternal, explains Meltzer-Brody. The same goes for rats: Previous research shows that one or two rats in any given group never showed interest in the pups.

For women who *are* bent on procreating but need a neuronal nudge, the rat study (if it proves to be an accurate model for humans) implies that hanging out with your niece or nephew might help provide it. Scientists have long observed that exposing many species of animals to youngsters generates nurturing impulses. (That also applies for cute cross-species photos of dogs taking care of ducklings). Think of it as an internship in mothering. Among some primates, young females are often eager to babysit infants in order to learn how to take care of them, explains Sarah Blaffer Hrdy, professor emeritus of anthropology at the University of California-Davis, who has studied the practice among the langur monkeys in India. This readiness to bond with nonbiological offspring explains why human adoption works so well.

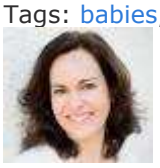
Journal Reference:

Furuta et al. Effects of maternal behavior induction and pup exposure on neurogenesis in adult, virgin female rats. Brain Research Bulletin, 2009; 80 (6): 408 DOI: 10.1016/j.brainresbull.2009.08.011

Abstract :

The states of pregnancy and lactation bring about a range of physiological and behavioral changes in the adult mammal that prepare the mother to care for her young. Cell proliferation increases in the subventricular zone (SVZ) of the female rodent brain during both pregnancy and lactation when compared to that in cycling, diestrous females. In the present study, the effects of maternal behavior induction and pup exposure on neurogenesis in nulliparous rats were examined in order to determine whether maternal behavior itself, independent of pregnancy and lactation, might affect neurogenesis. Adult, nulliparous, Sprague-Dawley, female rats were exposed daily to foster young in order to induce maternal behavior. Following the induction of maternal behavior each maternal subject plus females that were exposed to pups for a comparable number of test days, but did not display maternal behavior, and subjects that had received no pup exposure were injected with bromodeoxyuridine (BrdU, 90 mg/kg, i.v.). Brain sections were double-labeled for BrdU and the neural marker, NeuN, to examine the proliferating cell population. Increases in the number of double-labeled cells were found in the maternal virgin brain when compared with the number of double-labeled cells present in non-maternal, pup-exposed nulliparous rats and in females not exposed to young. No changes were evident in the dentate gyrus of the hippocampus as a function of maternal behavior. These data indicate that in nulliparous female rats maternal behavior itself is associated with the stimulation of neurogenesis in the SVZ.

Tags: babies, brain research bulletin, pregnancy, studies



Sarah Elizabeth Richards is the author of *Motherhood Rescheduled: Five Women, Five Quests to Stop the Biological Clock* about the personal and social impact of egg freezing, to be published in summer 2010. www.motherhoodrescheduled.com