

CHILD DEVELOPMENT

'Refreshing News for Mothers'

While stress hormones may impair babies' cognitive development, loving care may counter the impact.

By Becky Jones

IT'S NOT NEWS TO MOTHERS THAT PREGNANCY can be stressful—and recent studies suggesting that maternal stress can be bad for a baby's cognitive development have given moms-to-be yet one more thing to worry about.

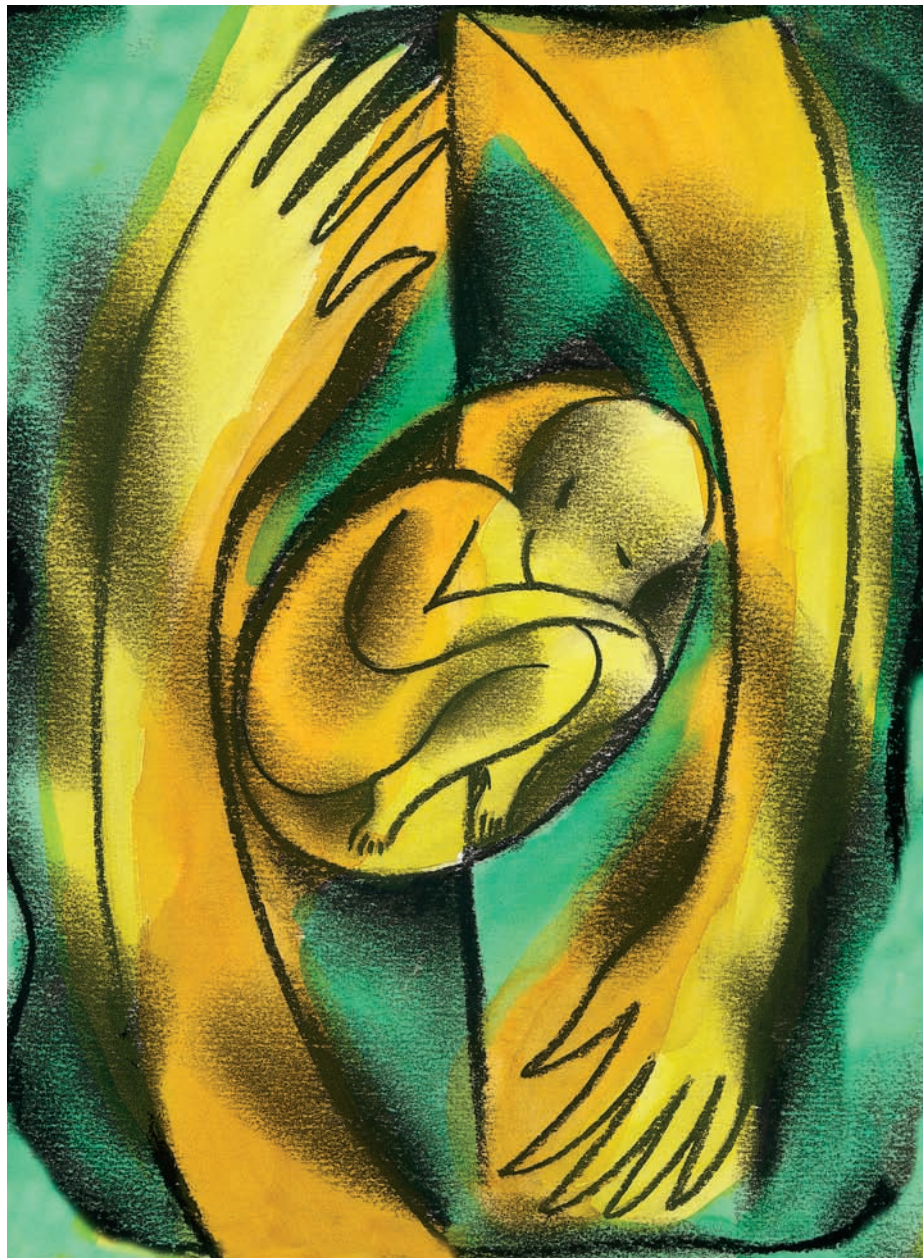
But there's reassurance for parents in a new study led by Thomas O'Connor, a professor of psychiatry and psychology. The research, published in the journal *Biological Psychiatry*, suggests that the negative link between stress and impaired cognition disappears almost entirely if the mother or another caregiver forges a secure connection with the baby.

"This is such refreshing news for mothers," O'Connor says. "There's already so much for mothers to be careful of and concerned about. It's helpful to learn that sensitive care goes some way toward buffering children from the adverse effects of early stress exposure, even in utero."

The study—conducted by O'Connor and his colleagues at the Medical Center and at Imperial College in London—represents the first direct human evidence that elevated levels of the stress hormone cortisol may be a factor in children's later cognitive development.

"Our results shape the argument that fetal exposure to cortisol—which may in part be controlled by the mother's stress level—and early caregiving experience combine to influence a child's neurodevelopment," O'Connor says. "If future studies confirm these findings, we'll need to not only engineer ways to reduce stress in pregnancy, but we'll also need to promote sensitive caregiving by moms and dads."

For the study, O'Connor and study co-author Vivette Glover of Imperial College followed 125 women at an amniocentesis clinic in an urban maternity hospital, measuring the stress hormones in the mothers' amniotic fluid. The mothers were at 17 weeks gestation on average; only mothers



with normal, healthy pregnancies and subsequent deliveries were followed.

When the children were about 17 months old, researchers administered a test—called a Bayley Scales of Infant Development—that uses puzzles, pretend play, and memory challenges to gauge the youngsters' cognitive development. They also evaluated the security of the attachment between the mothers and their babies. Secure attachment, O'Connor says, results when a caregiver reliably and predictably soothes the baby's stress. Such reliable comforting

allows the child to see the caregiver as "a secure base for exploration."

With cortisol levels, relationship-quality results, and cognition scores in hand, researchers analyzed how the first two measures might influence the third. For children showing signs of an insecure attachment to their mothers, a high prenatal cortisol level was linked with shorter attention spans and weaker language and problem-solving skills.

But for babies who showed signs of secure attachment, there was no link between

elevated prenatal cortisol levels and cognitive development.

O'Connor notes that there are a couple of important nuances of the study. For example, the source of the in-utero cortisol is hard to pinpoint. It might be passed along the placenta from an anxious mother to her unborn baby—or it could be created and excreted directly by a stressed fetus.


“While many large-scale studies have observed that prenatal stress may influence child development, our particular study sheds some light on ‘how;’” O'Connor says. “Still, much more research is needed to better pinpoint the exact mechanisms behind a mother ‘transferring’ her stress to her unborn baby.”

This study plays into the much larger theory of fetal programming, which suggests that exposure in the womb may prime the developing child for long-term health and developmental outcomes. Past studies have found a pregnant mother's diet can sway a child's long-term risk for heart disease, diabetes, and obesity. Along with diet, prenatal stress has emerged as a factor looming large in such programming.

“Our results support this emerging theory,” says coauthor Glover. “In neurology, the idea emerging is that unborn children sense their mothers' stress hormone levels, programming them for greater watchfulness. We're trying to determine whether or not that sensitivity comes with greater anxiety during childhood, and if so, what we can do about it.”

The team will revisit the children in the study when they turn six. At that point, researchers hope to give the group a battery of tests to see how the interplay between in-utero cortisol levels and sensitive parenting pans out in the long term. Those tests would include imaging studies of the children's brains, looking to see if the higher cortisol levels may be linked to anatomical changes.

The findings are of broad public health significance, O'Connor says. “Stress in pregnancy is really something we need to attend to seriously.

“This is a helpful lesson for neuroscience and neuroscientists. We don't want to leave behind a focus on family relationships while we investigate what happens under the skin and between cells.” 

Becky Jones is a writer for Medical Center Public Relations and Communications. Additional reporting by Kathleen McGarvey.

EXCERPTS

Celebrating Books

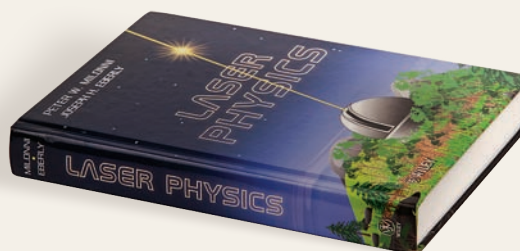
You can't judge a book by its cover, but it can be a nice way to get acquainted. As part of an effort to showcase scholarly research, performance, and creativity, University authors and artists were honored this spring at the third annual Celebration of the Book. Featured were more than 60 publications released this year. Here's a taste of just a few. To see the full list, visit www.rochester.edu/pr/Review.



MICHAEL JARVIS, ASSOCIATE PROFESSOR OF HISTORY

In the Eye of All Trade: Bermuda, Bermudians, and the Maritime Atlantic World, 1680-1783 (University of North Carolina Press)

“If we discard Europeans' predilection for placing north at the top of maps and approach British America from a mariner's point of view, a more authentic geography encompassing the full scope of British America emerges. Jamaica and the quasi settlements of Belize and the Mosquito Coast in the Caribbean and Hudson Bay excepted, nearly all of British America was arrayed along a continuous curving arc of islands and coastline stretching from Newfoundland to Tobago. Bermuda lay at the center of this vast British American crescent, roughly equidistant from all points on its rim.”



PETER MILONNI, PROFESSOR OF PHYSICS

JOSEPH EBERLY, THE ANDREW CARNEGIE PROFESSOR OF PHYSICS

Laser Physics (John Wiley & Sons)

“The word laser is an acronym for the most significant feature of laser action: light amplification by stimulated emission of radiation. There are many different kinds of laser, but they all share a crucial element: Each contains material capable of amplifying radiation.”



BARRY GOLDSTEIN '81M (MD), '82M (PHD),

ASSOCIATE PROFESSOR OF BIOCHEMISTRY AND BIOPHYSICS

Gray Land: Soldiers on War (W. W. Norton & Company)

“I have no political agenda: no one indicts war more powerfully than an experienced soldier, and no one enumerates more eloquently the reasons for serving. Collectively, their stories convey the many, often conflicting, emotions that any soldier deals with in a war zone and returning home.”