

Playing Fertility in a Different Key

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(PhysOrg.com) -- Sometimes a couple can't get pregnant although anatomically everything seems normal. Emory reproductive endocrinologist Sarah Berga may be able to explain why: Stress.

Specifically, gonadotrophic releasing hormone (GnRH) released from the [hypothalamus](#) in the brain sends signals to the pituitary, which then sends signals to the ovaries, affecting ovulation and menstrual cycles. [Chronic stress](#) causes these brain messages to slow down, and if the ovaries receive too few signals, ovulation and menses may cease.

Berga likens what happens to a musician playing a piano. The hands play

a melody, interpreting the music and affecting the mood of the score. While the musician's hands don't change the piano—a solid, fixed instrument—the way they play the piano affects the way the music sounds. The same with genes, which are static, until played by stress, changing the spatio temporal patterns and affecting every hormone involved in reproduction.

“We think we can fix infertility with assisted reproductive technology, so we don't as a society invest in really understanding the role of stress,” says Berga, chair of OB/GYN at Emory. “But what if we could fix infertility by de-stressing people, both women and men, by working to play the piano keys differently?”

In animal studies with colleagues at the University of Pittsburgh and the Oregon Health and Sciences University, Berga has found that 10% of rhesus monkeys stopped ovulating when subjected to [social stress](#). When their [food intake](#) and exercise was manipulated, again 10% of the monkeys stopped menstruating. However, when nutrition and social stressors were combined, more than 70% of the monkeys were affected by amenorrhea. In further studies with colleagues at the Yerkes National Primate Research Center, Berga has found that the social status of premenopausal monkeys influences their risk of atherosclerosis and other [chronic conditions](#).

In research in people, Berga has found parallel results. She took the “garden-variety woman” who was missing menstrual periods and studied possible anatomical causes, brain messages to the ovaries, levels of cortisol (a stress hormone), and thyroid function. Stress will always reduce thyroid function, she says.

Then she tried cognitive behavior therapy in some of the women to see if it could influence their menstrual cycles. This talk therapy covered elements of good nutrition and appropriate amounts of exercise, problem-

solving strategies and coping mechanisms, realistic attitudes and expectations, and ways to deal with common stressors.

It worked. Ovulation was restored in seven of eight women who underwent cognitive behavioral therapy, compared with only two of the eight women who did not get the therapy.

The way the hormone keys are played, i.e. the effects of stress, also has implications that extend well beyond pregnancy. “Maternal health is critical for fetal health,” says Berga. “Health begins in utero, not at birth, and there are long-term health consequences for women after pregnancy and for the child, continuing into adulthood.” Maternal health can affect a baby’s eventual risk of cardiovascular disease, obesity and diabetes, neuro-developmental disorders such as autism, and psychiatric disease.

Berga is passionate about exploring these connections, but recently she’s cut back on research to spend more time in the clinic with patients. “We need to translate these insights into the clinical arena,” she says. While Emory’s infertility clinics offer high-tech treatments such as in vitro fertilization, they also give women the opportunity to participate in cognitive behavior therapy programs—a low-cost approach to infertility. And once pregnant, women can enroll in centering pregnancy programs to reduce stress.

Despite advances in reproductive technology, maternal mortality is worsening in the United States, says Berga. In 1980, the country experienced the nadir of maternal mortality, with 8 in 100,000 women dying during childbirth. But since then, the number has been rising. Although the United States spends more than any other country on health care, it currently ranks only 33 in maternal mortality. Georgia has highest [maternal mortality](#) in the United States.

Berga believes that stronger support for women’s health offers an

opportunity to improve the general health of the state and the nation. “To reduce disease burden, we must invest in maternal and paternal health before, during, and after conception,” she says.

Provided by Emory University

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