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Survival Science

by Al Ruddy

Joanna Ellington champions fecundity

She began working on endangered species. Now physiologist Joanna Ellington wonders if humans are putting at risk their own capacity to procreate.

One of a relatively small but growing number of scientists concerned with male reproduction problems, Ellington is troubled by the levels of chemicals in the environment and other prescribed compounds that cause infertility, miscarriages, cancer, and other diseases.

After all, she points out, man is a mouse when it comes to producing sperm. Even rats, like those used in most comparative animal studies, produce millions more sperm cells than humans. How we survived at all as a species, considering our level of reproductive prowess, would give Darwin pause.

The body of evidence about male reproductive dysfunction is growing rapidly and has spawned its own scientific organization, the American Society of Andrology, of which Ellington is a member and by which she has been chosen, from a field of international candidates, to receive the prestigious Young Andrologist Award for 2003. The award recognizes the impact on the field of andrology by researchers under 45. Andrology is the science of diseases of males, especially diseases of the male reproductive organs.

With a degree in veterinary medicine from the University of Tennessee, Ellington worked in Germany in the early 1980s on a successful project to protect

Pinzgauers, an endangered cattle breed. Later, she was one of the first woman large-animal practitioners in the Puget Sound area. But her dairy practice declined with the industry. She returned to school, earning a doctorate in reproductive physiology from Cornell University.

Ellington joined the Health Education and Research Center at Washington State University at Spokane in 1995, and later became the director of biomedical development. The appointment, she says, provides a rare opportunity for a research physiologist to work directly with specialists in pharmacology and with WSU's Center for Reproductive Biology.

Her most recent collaboration is with Clarke St. Dennis, a WSU Spokane assistant professor and psychopharmacology specialist at Sacred Heart Medical Center. The two are principal investigators on a \$143,000, two-year research project funded by the National Institute of Child Health and Human Development, exploring the effects of SSRI (selective serotonin reuptake inhibitor) antidepressants on male reproductive success.

The major myth about infertility has now been exploded, says Ellington. Although physicians and reproduction specialists traditionally have approached infertility as primarily a female problem, the reality is that 50 to 60 percent of

infertility issues are traced to the male. One of the root problems is damaged DNA in the sperm. Because sperm cells lack the proteins that do the DNA repair work in all the other cells in the body, sperm DNA, or chromatin, is especially vulnerable to environmentally

toxic compounds. The researchers believe hormonal imbalances also compromise that basic genetic code.

To make the matter even more complex, the brain, which controls all cell functions, cannot distinguish between different sex hormones present in the body. The brain simply shuts down the production of all sex hormones when one rises above its normal level.

Ellington and St. Dennis suspect SSRI antidepressants cause infertility by altering sperm DNA. SSRIs produce an elevated level of the sex hormone prolactin through complicated interactions among serotonin, dopamine, and prolactin.

Antidepressant usage in growing. Four million men nationwide in the reproductive ages 20 to 45 take SSRIs such as Prozac, Paxil, and Zoloft.

Sperm samples from volunteer patients in the Spokane research project are being analyzed by Don Evenson, a South Dakota State University scientist who has pioneered test methods for determining DNA damage in those cells. Volunteers are still being accepted to broaden the project's scope.

Ellington's immediate objective is to help infertile couples conceive. But there are other issues in her global view. What does the worldwide decrease in sperm production mean in the long term? How will environmentally offending chemicals affect future reproduction? Will antidepressants given to children with attention deficit disorders alter their capacity to have healthy children?

Until science can bring some light to these questions, Ellington takes an environmentally cautious tone. To her two young boys she serves a menu high in organic foods, anticipating eventual grandmotherhood. ■

Joanna Ellington takes an environmentally cautious approach to feeding her sons, Rayne and Sage.

Al Ruddy is the former director of WSU News and Information.