Medical Xpress

How neonatal plant estrogen exposure leads to adult infertility

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A paper published today in *Biology of Reproduction*'s *Papers-in-Press* describes the effects of brief prenatal exposure to plant estrogens on the mouse oviduct, modeling the effects of soy-based baby formula on human infants. The results suggest that exposure to estrogenic chemicals in the womb or during childhood has the potential to affect a woman's fertility as an adult, possibly providing the mechanistic basis for some cases of unexplained female infertility.

Earlier research suggested that neonatal exposure to plant estrogens or other environmental estrogens (synthetic substances that function similarly to the estrogen naturally produced in the body) may have long-term effects on adult female reproductive health. Wendy N. Jefferson, a researcher in the lab of Carmen J. Williams at the National Institute of Environmental Health Sciences (NIEHS), part of the National Institutes of Health, previously demonstrated that neonatal exposure to the plant estrogen genistein results in complete infertility in female adult mice. Causes of infertility included failure to ovulate, reduced ability of the oviduct to support embryo development before implantation, and failure of the uterus to support effective implantation of blastocyst-stage embryos.

The team now reports that neonatal exposure to genistein changes the level of immune response in the mouse oviduct, known as mucosal immune response. Some of the immune response genes were altered beginning from the time of genistein treatment, while others were altered much later, when the mouse was in early pregnancy. Together,

those changes led to harmfully altered immune responses and to compromised oviduct support for preimplantation embryo development, both of which would likely contribute to infertility.

These findings raise the possibility that exposure to low levels of environmental or plant estrogens during sensitive developmental windows can alter the balance of the mucosal immune response in the uterus and oviduct.

In the mouse, the window of development during which these changes can occur is found only in the neonatal period; in humans, development of the reproductive tract continues through the onset of puberty. Therefore, estrogenic chemical exposure to the female fetus, infant, child, and adolescent all have potential impacts on mucosal immunity in the reproductive tract and, therefore, on adult fertility. The authors present the view that limiting such exposures, including minimizing use of soy-based baby formula, is a step toward maintaining female reproductive health.

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