

Factors that cause high blood pressure condition in pregnant women protect against breast cancer

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Preeclampsia is a high blood pressure syndrome in pregnant mothers that is caused when the blood supply in the placenta of the developing baby is restricted. The blood-deprived placenta releases factors that cause the raise in blood pressure in the mother. Doctors have to monitor these women closely and they may be forced to deliver the baby early to protect the mother and the baby. Most women's blood pressure returns to normal levels after they deliver the placenta.

A Risk With Benefits

Women that develop preeclampsia paradoxically seem to have reduced incidence of developing breast cancer. But why this serious condition may have other beneficial effects is unknown.

Anne Gingery of the Department of Physiology and Pharmacology at the University of Minnesota Medical School, Duluth, MN, has investigated how specific factors released from the placenta of women with preeclampsia inhibit the growth of breast cancer cells. Gingery will be presenting her latest findings at the 2010 Experimental Biology meeting in Anaheim, CA from April 24-28. Her presentation is entitled "Soluble Endoglin Inhibits Breast Cancer [Cell Proliferation](#)."

Dr. Gingery's research uses a rat model with preeclampsia, which they induce by restricting the blood flow to the rat's placenta with clips. The [placenta](#) has many blood vessels, so the factors released during preeclampsia end up in the blood stream. The serum - what is left after the cells are filtered out of the blood - of these animals possesses anti-cancer properties. Gingery tested an array of breast cancer cells treated with the serum that resulted in decreased growth of cancer cells.

The Factors Involved

Gingery studies two factors released during preeclampsia: sFlt-1 and soluble endoglin. sFlt-1 is a soluble version of a protein called VEGF (vascular endothelial growth factor), which regulates the growth of cells. The other factor, soluble endoglin, is a co-receptor for TGF- β (transforming growth factor beta). The TGF- β pathway controls growth and Gingery proposes that soluble endoglin inhibits cell growth by reducing the signaling of this pathway. The TGF- β signaling pathway is an important factor in breast cancer development and progression. According to Gingery, at the early stages of cancer this pathway often suppresses tumor growth, but in advanced cancer it can actually promote cancer progression.

Things Are Complicated: The Factors Only Protect the Mothers

Gingery's work expanded to look at the pups born from mother rats with preeclampsia. Surprisingly, the preliminary results reveal that the pups born from the mother's with preeclampsia are more likely to develop breast tumors. The group is examining the time it takes to develop tumors and the characteristics of the tumors. On-going research is evaluating whether the mothers with the preeclampsia will have a reduced incidence of breast tumors.

Gingery speculates that perhaps the factors released during preeclampsia affect the stem cells of the mammary gland in some way that changes how the cells develop, which may affect protection against cancer. But she reiterates that this research is in its early stages and much is still unknown.

By studying the affects of preeclampsia on the protection against [breast cancer](#), Gingery hopes to

identify new targets that can be used in prevention and the development of therapeutics.

"Preeclampsia is not a condition we want any mother to endure," explains Gingery. "We are simply using a unique way to find factors to be used for care and treatment of cancer. Sometimes it just takes looking at a question differently."

Provided by Federation of American Societies for Experimental Biology

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