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New approach uses magnetic beads to treat preeclampsia

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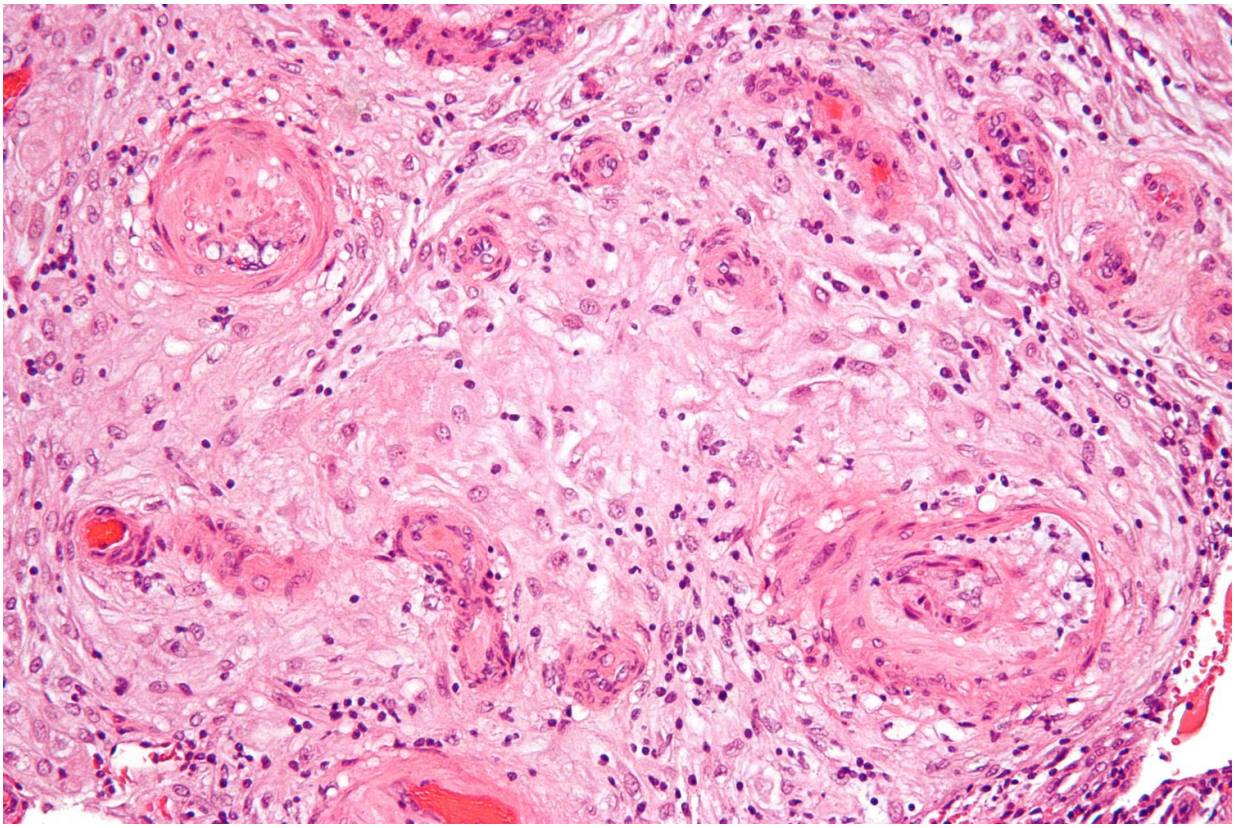

High magnification micrograph of hypertrophic decidual vasculopathy, as seen in pregnancy-induced hypertension. Credit: Wikipedia

Preliminary laboratory tests show that functionalized magnetic beads successfully reduced blood levels of a harmful molecule that is elevated

during preeclampsia, according to new research in the American Heart Association's journal *Hypertension*.

Preeclampsia is a complication of pregnancy characterized by hypertension and kidney dysfunction that affects an estimated 6% - 8% of women in the U.S. who give birth each year. Preeclampsia is responsible of severe complications for the mother (seizures, stroke, renal failure, liver dysfunction) and the infant (low birth weight, preterm delivery, stillbirth). The condition also increases a woman's risk for cardiovascular disease later in life (stroke and high blood pressure). Currently, there's no cure for preeclampsia, and only childbirth can alleviate symptoms.

Researchers focused on a molecule, called sFlt-1, which is released by the placenta into the woman's bloodstream and rises to high levels during preeclampsia. High levels of sFlt-1 are responsible for blood vessel wall dysfunction, contributing to high blood pressure and for trapping two other important molecules that enhance blood vessel wall function called VEGF and PIGF.

Using blood from women with preeclampsia, researchers conducted laboratory tests to see if magnetic beads could essentially drag sFlt-1 out of circulation, therefore freeing up levels of VEGF and PIGF. They found that magnetic beads reduced sFlt-1 by 40% and freed up to two times more PIGF, reducing the sFlt-1/PlGF ratio by 63 percent.

"This was a proof of concept study and our approach aims to restore physiologic levels of angiogenic factors," said lead study author Vassilis Tsatsaris, M.D., Ph.D., a professor of obstetrics and gynecology at Cochin Hospital in Paris. "The reduction of sFlt-1 and the release of angiogenic factors is very significant and promising."

Angiogenic factors is any of a group of substances present in the

circulation—most of which are polypeptides (i.e., angiogenin, fibroblast growth factor, transforming growth factors and some lipids) which help form blood vessels.

Based on the success of these early findings, Tsatsaris and his colleagues would like to expand their study and repeat these experiments to see if this approach can control preeclampsia and prolong pregnancy while reducing the risks of prematurity for the baby.

More information: *Hypertension* (2019). DOI: 10.1161/HYPERTENSIONAHA.118.12380

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