Complex Changes in the Brain's Vascular System Occur after Menopause

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Many women experience menopausal changes in their body including hot flashes, moodiness and fatigue, but the changes they don't notice can be more dangerous. In a new study, researchers at the University of Missouri have discovered significant changes in the brain's vascular system when the ovaries stop producing estrogen. MU scientists predict that currently used estrogen-based hormone therapies may complicate this process and may do more harm than good in postmenopausal women.

"Before menopause, women are much more protected from certain conditions such as heart disease and stroke, but these vascular changes might explain why women lose this protection after menopause," said Olga Glinskii, research assistant professor of medical pharmacology and physiology in MU's School of Medicine and lead author of the study. "Because the body eventually will naturally adapt to the loss of estrogen, we advise extreme caution when using estrogen-based therapy in postmenopausal women."

In their study, MU researchers removed the ovaries of pigs, which have a reproductive cycle similar to humans, to create postmenopausal conditions. Two months after the ovaries were removed, they observed dramatic differences in the brain's vascular system. There was a huge loss of micro vessels, and blood vessels became "leaky."

"Eventually, however, the body starts to recognize that it needs blood vessels and starts to adapt through natural responses," said Vladislav

Glinskii, assistant professor of pathology and anatomical sciences in MU's School of Medicine, research health scientist at Harry S. Truman Memorial Veterans' Hospital and co-senior author of the study. "If we start adding estrogen to a system that is learning to adapt without it, we upset this transition process. What happens to the vascular system during menopause is complex on many different levels, and we do not know enough to determine the best way to use hormone therapy.

Before menopause, the vascular system depends on estrogen for maintenance. When the body decreases its estrogen production, the body is unable to regulate blood vessels like it did before. After a period of deterioration, the body learns to adapt to the estrogen loss and eventually maintains the system in a different way.

"The vascular system is like a roadmap that is always changing," said Virginia Huxley, director of the National Center for Gender Physiology, professor of medical pharmacology and physiology in MU's School of Medicine, and co-senior author of the study. "The blood vessels are the highways that transport oxygen and other nutrients in our body. After menopause, women are more likely to develop vascular diseases in the 'side streets' or the tiny vessels. In these vessels, the symptoms are more subtle and harder to identify."

The study "PDGF/VEGF System Activation and Angiogenesis Following Initial Post Ovariectomy Meningeal Microvessel Loss," was recently published in Cell Cycle.

Source: University of Missouri

vascular-menopause.html