The impact of menopause stage on age-related changes in the brain

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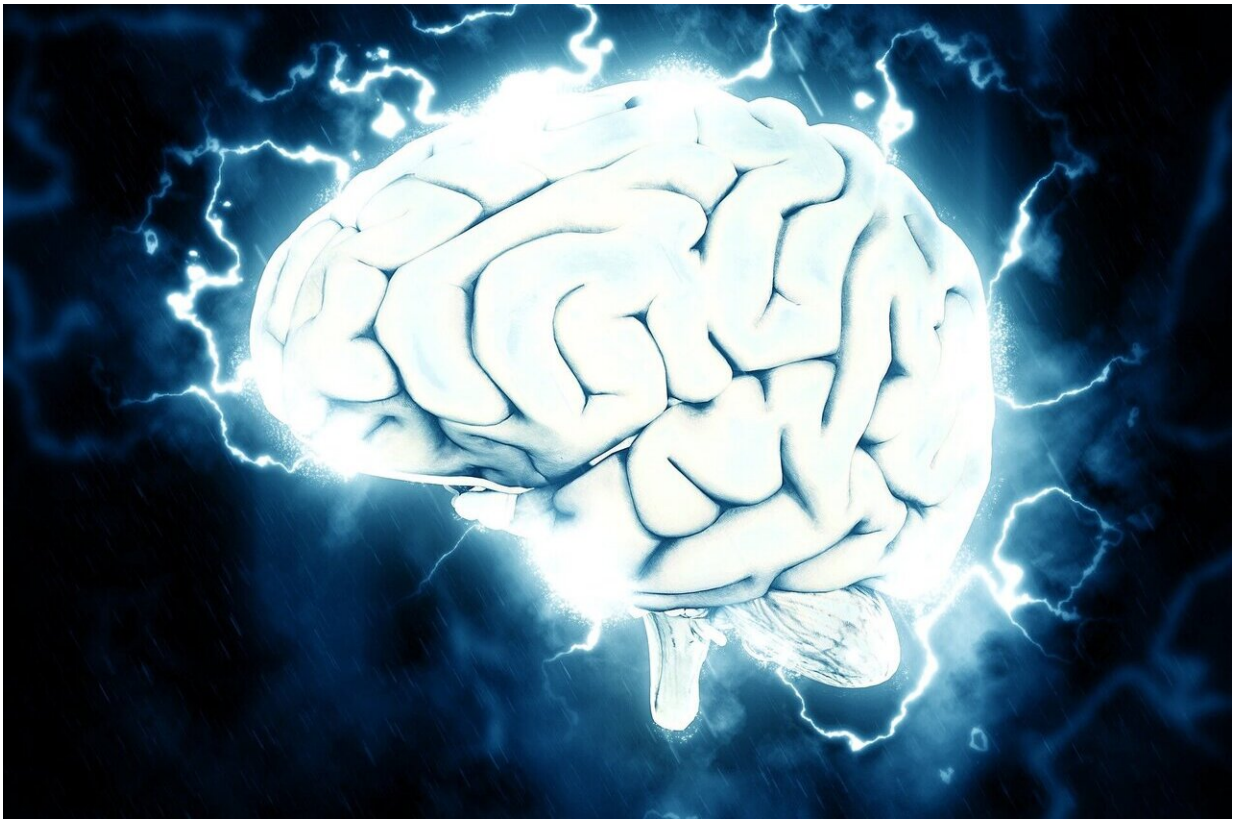

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Driven by changing estrogen levels, the menopause transition has a major influence on physiology during aging. Estrogen receptors populate numerous brain regions which explains why cerebral glucose metabolism

is affected during the perimenopause stage.

A new study investigated the association between the menopause stage and cerebral hemodynamics during typical aging. The study results presented during the 2023 Annual Meeting of The Menopause Society in Philadelphia September 27–30, are part of a presentation entitled "Effect of menopause stage on cerebral hemodynamics during typical aging."

It has been suggested that changes in cerebral physiology during aging may precede the appearance of structural biomarkers of neurodegeneration. The characterization of such age-related changes is crucial for improving our understanding of typical, vs. atypical, aging. However, little is known about the relationship between the menopause transition and age-related changes in cerebral physiology.

In this new study that compared differences in mean cerebral blood flow (the perfusion rate of blood to brain tissue) and arterial transit time (the time taken for blood that is magnetically labeled at the level of neck to travel to brain tissue) between women at each menopause stage and age-matched men, researchers investigated the role of menopause stage on how the brain ages.

The cross-sectional study included 131 women and 125 men between the ages of 40 and 60 years. Widespread significant differences in mean cerebral blood flow and arterial transit time were confirmed between women at each menopause stage and age-matched men. Distinct spatial distributions were also observed.

In contrast to prior work suggesting that menopause stage has a profound effect on cerebral hemodynamics, no statistically significant differences were observed between menopause stages. Nevertheless, men and women showed differences in both mean cerebral blood flow and

arterial transit time.

Compared to men, women in the premenopausal stage showed significant differences in the middle temporal cortex for arterial transit time and inferior parietal cortex for cerebral blood flow.

When comparing men and perimenopausal women, significant differences were identified within the superior parietal and frontal cortices for both arterial transit time and cerebral blood flow. And, significant differences between men and postmenopausal women were found in the prefrontal and inferior parietal cortices. These sex differences therefore were more evident than any effect of menopause stage.

Based on the results, the researchers surmised that physiological neuroprotective mechanisms may exist during the menopause transition in typically aging individuals. Validation of these findings requires additional analysis that, among other things, will investigate the impact of lifestyle, medical history and cardiometabolic risk.

"We hope that our findings highlight the importance of understanding the relationship between this significant life transition and cerebral physiology," says Dr. Nikou Louise Damestani, lead author from the Department of Radiology at Massachusetts General Hospital in Boston.

"The impact of menopause stage on age-related changes in the brain is definitely of interest to those involved in midlife women's health," says Dr. Stephanie Faubion, medical director for The Menopause Society. "We look forward to the additional analysis that will investigate the impact of lifestyle, medical history, and cardiometabolic risk."

Provided by The North American Menopause Society