

Sex-Dependent Cerebrovascular Dysfunction in the 5xFAD Mouse Model of Alzheimer's Disease, Revealed by Functional Ultrasound Power Doppler Imaging

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KEY TAKEAWAY Functional ultrasound reveals a strong female-specific cerebrovascular deficit in 5xFAD mice, with up to ~45% reductions in cerebral blood volume, and not comparable impairment in males. These deficits are further unmasked and amplified during N₂O challenge, indicating impaired cerebrovascular reactivity and reduced vascular reserve. Vascular changes track with earlier and more severe memory impairment, supporting a link between sex-dependent neurovascular dysfunction and cognition in AD. fUS provides a sensitive, translatable platform for longitudinal, sex-stratified vascular phenotyping and for testing vasoactive compounds to probe vascular reserve and therapeutic response in Alzheimer's disease.

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