Photostimulation of lymphatic clearance of β-amyloid: A new strategy for Alzheimer's disease therapy

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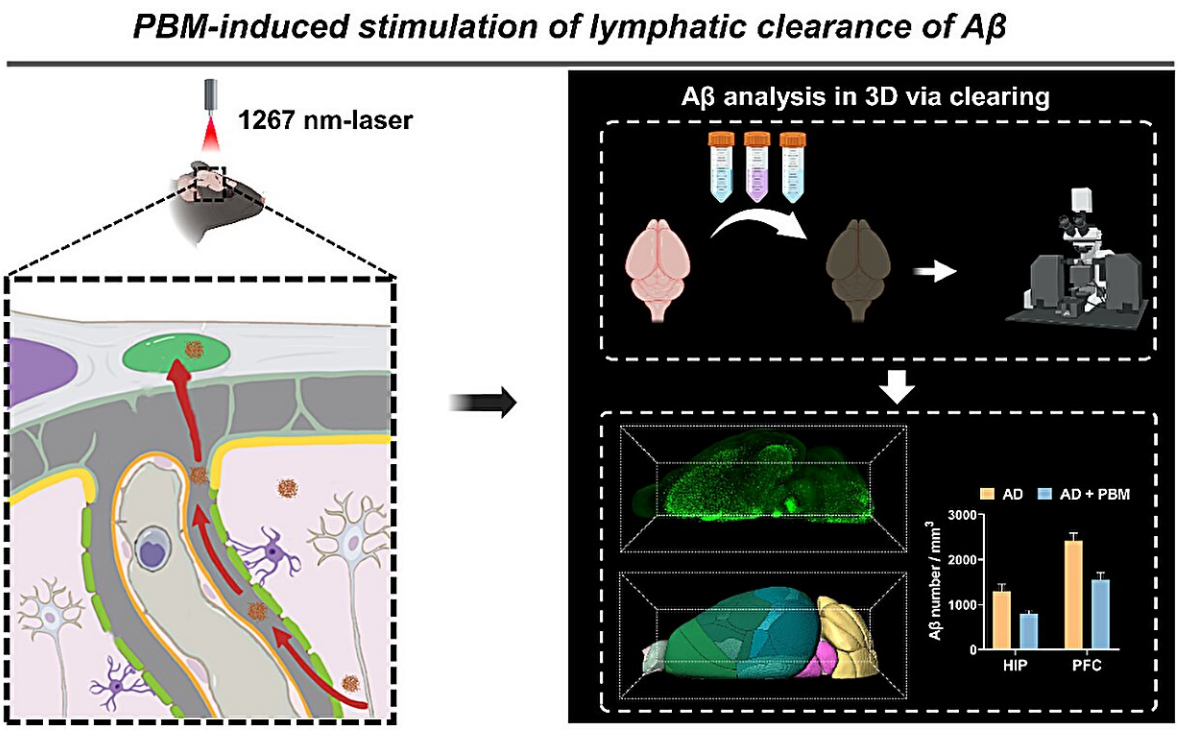

Photostimulation-induced stimulation of lymphatic clearance of Aβ from the brain in 5xFAD mice. Credit: Dongyu Li, Hao Lin, Silin Sun, Shaojun Liu, Zhang Liu, Yuening He, Jingtan Zhu, Jianyi Xu, Oxana Semyachkina-Glushkovskaya, Tingting Yu, Dan Zhu

Alzheimer's disease (AD) is an age-related neurodegenerative disorder. β-

amyloid (Aβ) deposition in the brain is a crucial contributor to the pathogenesis of AD, mitigating excessive cerebral Aβ burden has been considered as a possible therapeutic strategy for AD.

Meningeal lymphatic vessels (MLVs) are recently-discovered structures responsible for exchanging soluble components between the cerebrospinal fluid and interstitial fluid, and have been proved to be a potential pathway of Aβ drainage.

Researchers at Huazhong University of Science and Technology (HUST), China, collaborated with researchers at Saratov State University, Russia, demonstrate that 1267-nm photobiomodulation (PBM) significantly alleviates Aβ deposition and cognitive decline in 5xFAD mice, and is safe as it does not induce a significant increase in cortical temperature.

The work, titled "Photostimulation of lymphatic clearance of β-amyloid from mouse brain: a new strategy for the therapy of Alzheimer's disease," was published in *Frontiers of Optoelectronics*.

With the combination of 3D tissue optical clearing imaging and automatic brain region segmentation, they show that PBM can reduce Aβ plaques in the prefrontal cortex and the hippocampus, but to varying degrees in different subregions.

PBM-mediated stimulation of Aβ elimination from the brain via the MLVs system may be a key mechanism in its therapeutic effects for AD in mice.

More information: Dongyu Li et al, Photostimulation of lymphatic clearance of β-amyloid from mouse brain: a new strategy for the therapy of Alzheimer's disease, *Frontiers of Optoelectronics* (2023). DOI: 10.1007/s12200-023-00099-8