Konstancia Sonina

Saratov State University
Russia

Limitations of effectiveness of phototherapy of alzheimer's disease

Abstract:

The number of people with Alzheimer's disease (AD) continues to rise among individuals aged over 65. Photobiomodulation (PBM) is recognized as promising therapeutic approach for AD. However, the age-specific sensitivity to PBM remains unclear, highlighting the need to study the efficacy of the therapeutic effects of PBM across different age groups. In this study on mice, we demonstrate that PBM enhances brain lymphatic functions following meningeal lymphatic vessels (MLV) injury. Furthermore, we show that PBM during sleep provides more effective Aβ clearance from the brain compared to PBM at the waking state. Results of our research shed light on the mechanism underlying PBM's effects, demonstrating its ability to stimulate lymphatic drainage and promote Aβ removal via the lymphatic pathway. The superior impact of PBM on brain lymphatics during sleep opens a new niche in the study of restorative functions of sleep and provides a foundation for developing innovative "smart sleep" technologies for AD therapy. Given the limited efficacy and safety concerns of pharmacological AD treatments, PBM as a non-invasive and safe approach holds high potential for implementation in clinical practice in the treatment of brain diseases associated with lymphatic disorders, including AD, Parkinson's diseases, glioma, traumatic brain injury, and intracranial hemorrhages. This study was supported by the RSF project No. 23-75-30001

Biography

Konstancia Sonina, student of the Faculty of Biology, Department of Human and Animal Physiology of the Saratov State University. Research interests lie in the development of breakthrough non-invasive technologies for stimulating the functions of meningeal lymphatic vessels and brain drainage.