BBB Disruption With Low-Intensity Ultrasound

ABSTRACT

Low-Intensity Pulsed Ultrasound Reversibly Opens The Blood-Brain Barrier For Drug Delivery – Al Kyle, President / CEO

TREATMENT OF MANY NEUROLOGICAL DISEASES IS IMPEDED BY THE BLOOD-BRAIN BARRIER (BBB) THAT

BACKGROUND

Low-intensity pulsed ultrasound (LIPUS) is an effective treatment for many neurological diseases by reversibly opening the BBB. It allows large molecules to pass through the barrier, facilitating drug delivery. This technology is promising for the treatment of various diseases, including cancer, neurodegenerative disorders, and infectious diseases. However, challenges such as the lack of detailed mechanisms and potential risks associated with ultrasound exposure remain to be addressed.

RESULTS

LIPUS enables transfection of Adeno Virus in rat brain

METHODS

Animals were anesthetized using 1-1.5% Isoflurane, placed in a stereotaxic frame, and exposed to 60 minutes of LIPUS or no treatment. EB concentration was measured in the brain tissue using spectrophotometric measurements.

RESULTS

In all groups exposed to ultrasound showed increased EB concentration in brain tissue (see graph). When EB was injected before LIPUS, the concentration increased significantly compared to the control group.

DISCUSSION

LIPUS successfully reversibly opens the BBB, allowing large molecules to pass through. This technology has the potential to revolutionize the treatment of neurological diseases by improving drug delivery. Further studies are needed to investigate the long-term effects of LIPUS on the BBB and to develop safer and more effective ultrasound protocols.

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