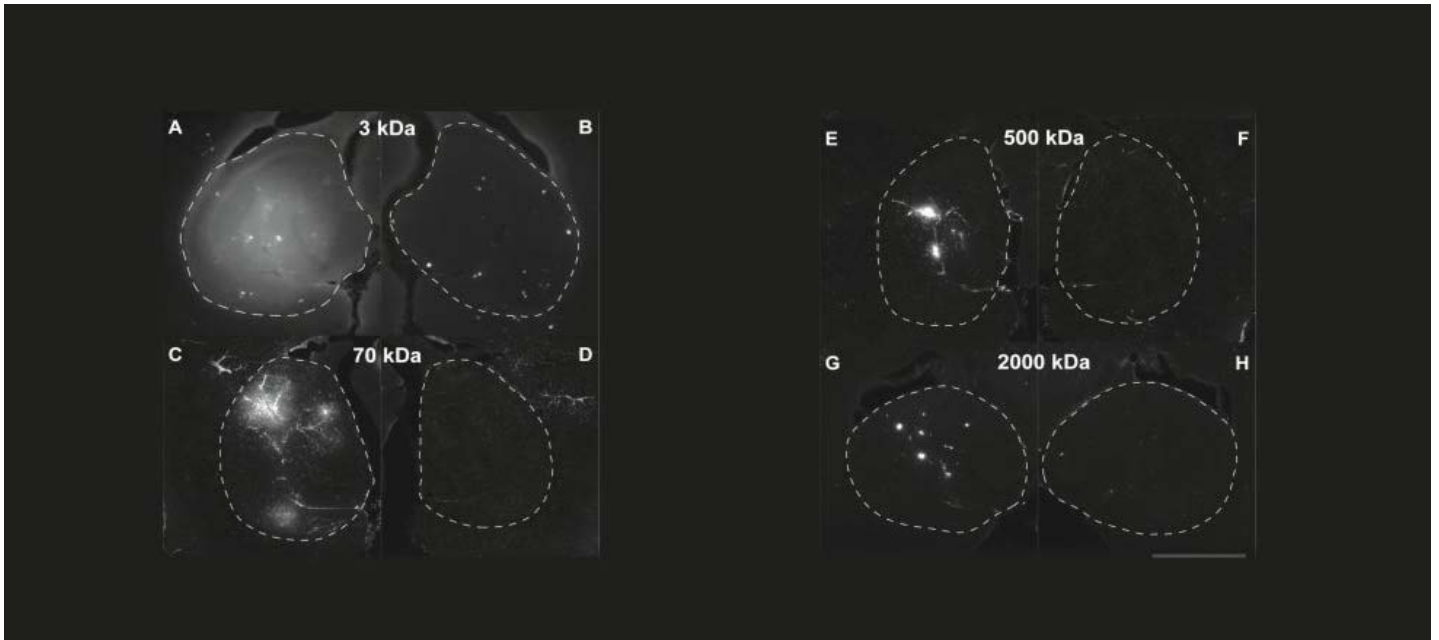


Transfer of drugs



TRANSFER OF DRUGS

The figure - a fluorescent image of the mouse hippocampus after diffusion through the BBB dextrans of various sizes.

Molecules that penetrate the blood-brain barrier can be controlled by the acoustic pressure - the pressure of the ultrasonic beam. This innovative method can improve the transportation of drugs to the brain.

Protection of the brain in the form of the blood-brain barrier (BBB) includes endothelial cells, capillaries and neuroglia, thus filter unit. Vascular endothelium of most tissues contains open spaces diameter of about 50 nm and intercellular gap from 100 to 1000 nm. Through these gaps water and substances dissolved therein are circulated between the blood and intercellular spaces. A distinctive feature of vessels of the central nervous system is the absence of both the fenestrations and intercellular gaps between endothelial cells.

BBB acts as a highly selective filter unit, through which from the bloodstream into the brain receives nutrients and reverse derived metabolic products of nervous tissue.

However, the presence of the BBB impedes the treatment of many diseases, holding a number of drugs. For example, only four hundred antibiotic penetrate into the brain.

The study was performed on the basis of Columbia University School of Engineering and Applied Science, at the Department of Biomedical Engineering and Radiology.

This is an important breakthrough in the treatment of Parkinson's disease, because the method allows to deliver powerful drugs to specific areas of the brain - specifically, non-invasive and safe.

Focused ultrasound microbubbles in combination with - gas-filled bubbles protein coated or in lipid envelope - continues to be the only safe and noninvasive way of penetration.

According to the researchers, there was also received important information about the physical mechanisms of BBB permeability. The communication system between the leading universities allowed to hold consultations related to accelerate the process.

WestMedGroup cover the whole range of products for hospitals: clean rooms, gas distribution consoles, terminals, medical monitors and valve systems, chemical and biological protection systems, anesthesia machines, ventilators and filter unit.

Hong Chen, Elisa E Konofagou. The size of blood-brain barrier opening induced by focused ultrasound is dictated by the acoustic pressure. *Journal of Cerebral Blood Flow & Metabolism*, 2014; 34 (7): 1197 DOI:10.1038/jcbfm.2014.71