Acoustic Transfection with High-Frequency Ultrasound for Research Use

Published date: Nov. 29, 2016

Technology description

Market Opportunity

Transfection of macromolecules to the cytoplasm of cells remains a challenging problem because the lipid bilayer of the cell membrane acts as a barrier to foreign molecules. However, the intracellular delivery of membrane-impermeable molecules with high efficiency and minimum side effects is a crucial process for laboratory and clinical applications. Although transfection with lipids, polymers and viral vectors is usually efficient, deliverable molecules are limited to DNA and RNA. Furthermore, cargo usually cannot be targeted to specific individual cells as desired.

USC Solution

USC inventors have developed an acoustic-transfection tool which uses high frequency ultrasonic pulses to remotely perturb the lipid bilayer of the cell membrane to deliver exogenous molecules into a targeted single-cell. Each ultrasonic pulse was focused into a small confined area, similar in size to a single cell, to achieve single-cell level targeting without microbubbles by an ultrasonic transducer. It is designed to deliver macromolecules with various sizes and structures into designated cells due to single-cell targeting capability. By adjusting input parameters of acoustic pulse, desired molecules for the intracellular delivery can be chosen depending on their size. After acoustic transfection, cells can be monitored by an epi-fluorescence microscope.

Application area

Research tool for delivering and monitoring cell specific exogenous molecules

Advantages

Cargo can be delivered to specific cells
Increases the efficiency of transfection rate
Enables simultaneous monitoring of different molecular events in neighboring cells
Minimizes cytotoxicity

Institution

University of Southern California

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com