Weill Cornell Medicine

Non-Invasive Delivery of Oncolytic Viruses Using Focused Ultrasound

Lead Inventor:

Michael G. Kaplitt, M.D., Ph.D.

Professor of Neuroscience, Brain and Mind Research Institute

Professor of Neurological Surgery

Business Development Contact:

Lukasz Kowalik

Senior Licensing and Business Development Officer

(646) 962-7052

kowalik@cornell.edu

Non-Invasive Delivery of Oncolytic Viruses Using Focused Ultrasound

Background & Unmet Need

- Malignant tumors of the brain have an approximate annual incidence of 25 K cases and 33% 5-year survival rate
- Current therapies largely involve surgical resection and adjuvant chemoradiation, which often fail to deliver long-term patient survival
- Oncolytic viruses (OVs) have emerged as a promising new therapeutic platform for selective ablation of tumor cells
- However, development of OVs to treat brain tumors is challenging due to the blood-brain barrier (BBB), and thus typically requires direct surgical injection
- **Unmet Need:** Methods for non-invasive delivery of oncolytic viruses to the brain

Technology Overview

- **The Technology:** Method for delivering oncolytic viruses to the brain using focused ultrasound
- Unlike direct injection, this approach is non-invasive and enables finer control over therapeutic delivery
- **PoC Data:** Rats treated with single or repeat sessions of FUS-mediated OV therapy showed efficient therapy transduction and no evidence of brain injury or systemic illness
- The OVs may be genetically modified to express immunomodulators, such as IL-12, to enhance the therapeutic effect

Inventors:
Michael G. Kaplitt
Mihaela Stavarache
James M. Markert

Patents:
US Application Filed
EP Application Filed

Publications:
N/A

Biz Dev Contact:
Lukasz Kowalik
(646) 962-7052
kowalik@cornell.edu

Cornell Reference:
D-8361

Weill Cornell Medicine

Non-Invasive Delivery of Oncolytic Viruses Using Focused Ultrasound

Technology Applications

- Treatment of primary or metastatic brain tumors such as glioblastoma
- Prevention of disease recurrence via multiple non-invasive therapy sessions

Technology Advantages

- Non-invasive targeted delivery of OV therapy limits damage to the surrounding tissue
- Feasible treatment option following surgical tumor resection
- OVs may be genetically modified to stimulate the immune system to attack tumor cells

Supporting Data / Figures

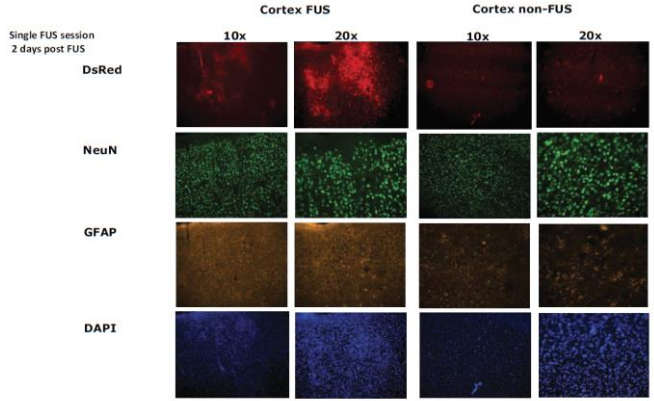

Figure 1: Oncolytic HSV (oHSV) gene transfer into cerebral cortex 2 days following single focused ultrasound (FUS)-mediated blood brain barrier (BBB) disruption. Anti-DsRed antibody demonstrated expression of the transgene from the oHSV vector into the targeted cerebral cortex (top left) with no expression in the contralateral cortex outside of the FUS field. NeuN staining shows no loss of neurons in the treated cortex compared with untreated cortex. GFAP staining shows minimal gliosis in the treated area compared with the untreated side. DAPI staining shows no evidence of neuronal death.

Inventors:
Michael G. Kaplitt
Mihaela Stavarache
James M. Markert

Patents:
US Application Filed
EP Application Filed

Publications:
N/A

Biz Dev Contact:
Lukasz Kowalik
(646) 962-7052
kowalik@cornell.edu

Cornell Reference:
D-8361

Weill Cornell Medicine

Weill Cornell Medicine