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Therapeutic target identification by genetically engineered human neural stem cells in a spinal cord glioblastoma model

We recently established a rodent model of intramedullary cervical spinal cord glioblastoma (ISCG). The system for the first time emulated both somatomotosensory disorders and autonomic dysfunctions of this deadly disease. Using genetically engineered human neural stem cells (hNSCs) that were capable to track and migrate towards the cancer cells we have determined a subpopulation of ISCG cells that are crucial for the tumor survival and could be targeted by therapeutic hNSCs that exerted a localized oncolytic effect. Importantly, the data also illuminated host spinal cord cellular and network components that should be preserved to maximize residual neural function in order to benefit extension of survival. Overall, our findings demonstrated a stem cell-based multimodal approach to developing targeted glioblastoma treatment. Such a strategy can be further optimized for its comprehensive efficacy via a simultaneous application of targeted neuroprotection treatment to sustain neurological function.

Biography

YD Teng is Co-Director, Neurotrauma Recovery Research and Director, Laboratory of SCI, Stem Cell Biology and Neurofacilitation Research, Departments of PM&R and Neurosurgery, Harvard Medical School/Spaulding Rehabilitation Hospital Network and Brigham and Women's Hospital. He investigates functional multipotency of stem cells and recovery neurobiology through multimodal approaches that integrate stem cell biology, neural and glial biology, chemical and genetic engineering, molecular pharmacology and neural oncology. Work of his team has received the prestigious Apple award of the American Spinal Injury Association (2011), the ERF New investigator award from the foundation of PM&R (2004) and the Mayfield award and Larson Research award of the CNS/AANS Joint Section on Disorders of the Spine and Peripheral Nerves (2012, 2015 & 2016). Prof. Teng reviews for >50 academic and clinical journals and holds study section membership of the NIH, VA, DoD, European Union academic organizations, research and education institutions and scientific and academic foundations. He was elected President (2013-2014) of the American Society for Neural Therapy and Repair.

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