**POSTER #2**

**EFFECT OF FIBRIN MATRICES-CONTAINING HUMAN FETAL NEURAL STEM CELL ENGRAFTMENT IN RAT MODEL OF PENERATING TRAUMATIC BRAIN INJURY (PTBI)**

**Lee Onn Chieng BS**; Markus Spurlock; Shyam Gajavelli; Julia Janecki; Anil Mahavadi; Liz Quesada; Karla Rivera; Ross Bullock

University of Miami Miller School of Medicine, 1600 NW 10th Ave #1140, Miami, FL 33136

**BACKGROUND:** Penetrating traumatic brain injury has been associated with high mortality as well as severe cognitive and motor deficits. Currently, there is no neurorestorative therapy for PTBI. Experimental models of PTBI such as the “penetrating ballistic brain injury” (PBBI) has shown as high as 60% engraftment of human NSC’s, but cell therapy needs to address the toxic microenvironment in the lesion core. The hypothesis of this study is that survival of human neural stem cell (hNSC) in the lesion core will be improved when they are embedded within a fibrin-matrix.

**METHODS:** Athymic Sprague-Dawley rats with unilateral PBBI were randomly assigned to groups:1) hNSC without matrix 2) hNSC with matrix. Stereotactic injection of control or fibrin-matrix embedded hNSCs into lesion core was carried out a week following PBBI. Animals were sacrificed at 2 weeks or 6 weeks endpoint. Immunohistochemistry staining and confocal microscopy was used to analyze survival, distribution, differentiation and potential tumor formation.

**RESULTS:** Histological analysis revealed cell survival and distribution in the group with fibrin scaffold and differentiation was equal to the group without matrix at both time points post transplantation. The transplants survived in the lesion penumbra and extended processes to contralateral hemisphere through corpus callosum. The grafted cells were predominantly stained for immature neuronal but not astrocytic markers. No abnormal aggregation of undifferentiated cells were observed in either groups.

**CONCLUSIONS:** The hypothesis that hNSCs would not survive in the PBBI lesion is not supported by the results , however the proportional survival of cells transplanted intralesional was less than when transplanted perilesional. The fibrin-thrombin matrix had no significant effect on the extent of engraftment or differentiation.

**CONTENT CATEGORY:** basic and transitional science.

**KEYWORDS:** *Penetrating Traumatic Brain Injury, Neural Stem Cell Therapy, Cell Replacement, Neuroprotective, Neurosurgery.*