

## BEHAVIORAL TESTING FOR COGNITIVE DEFICITS IN TBI PIGLETS

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### **ABSTRACT**

According to the CDC, traumatic brain injuries (TBI) are a contributing factor to over 30% of injury-related deaths in the United States every year, with children aged 0-4 at the highest risk. Currently, there are limited therapy options available for the treatment of TBI and the resulting cognitive and neurobehavioral deficits, but human induced pluripotent stem cell-derived neural stem cells (iNSCs) have recently become an option for injury treatment. Due to similarities in brain structure and early development, we are using a piglet model to 1) develop quantifiable and repeatable behavioral tests, 2) determine cognitive deficits following a TBI and 3) explore the effects of subsequent iNSC treatment on these deficits. Two behavioral tests that we will develop for use in the study are the open-field test and the social recognition test. In the open-field test, piglets will be placed in a 12' x 14' arena and observed to determine their exploratory interest, motor behaviors, and normal/abnormal behaviors. We expect that normal piglets will have high exploratory interest and will not exhibit any motor deficits or abnormal behaviors. The social recognition test will measure sociability and the ability to recognize familiar pigs from unfamiliar pigs, or social memory. We expect that normal pigs will be highly social and will be able to distinguish familiar pigs from unfamiliar pigs, demonstrating a high level of social memory. By developing these tests, we hope to satisfy the first objective of the study by creating quantifiable, reliable behavioral measures of cognitive abilities in piglets.