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T-Maze Assessment for Learning and Memory Using a Porcine Model

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Traumatic Brain Injuries (TBI), for which there is no present cure, affects an estimated 1.7 million people in the United States each year. Our lab utilizes a porcine behavioral study model to observe the behaviors of normal, affected, and treated subjects. The objective of this study was to assess the learning and memory ability of normal pigs using a spatial T-maze test to serve as a baseline of normal behavior. The spatial T-maze test, used to assess spatial memory, is in the shape of a plus-sign. Two north and south arms serve as possible start arms for the pigs and two east and west arms contain a food reward, where only one side is accessible. The pigs were expected to use specifically placed cues around the arena to identify which arm had the reward. The T-maze test was conducted over a six-day acquisition period followed by a four-day reversal period where the reward arm was switched for each pig. Results showed that the piglet's ability to choose the arm with the reward significantly ($p < 0.05$) increased by Day 4 of the acquisition period, as compared to Day 1. Following reversal, the piglets showed an increase in latency to choice and decrease in proportion of correct choices; however, piglets made significantly ($p < 0.05$) more correct choices by day 4 of reversal as compared to Day 1 of reversal. From these T-maze test results, we have a better understanding of the pigs' learning and memory abilities. These baseline results will enable comparison to be made between normal, affected and treated pigs' learning and memory to further understand TBI's effects and potential treatments.