

Category : **Brain: Head trauma**

**A267 - Neurobehavioral and physiological effects of traumatic brain injury in spontaneously hypertensive rats**

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### **Introduction:**

This study investigates the combined effects of traumatic brain injury (TBI) and hypertension in rats on motor coordination, spatial learning, sustained attention, and anxiety. The hypothesis is that hypertension will worsen TBI-induced deficiencies. Hypertension afflicts nearly half of American adults, thus it is critical to investigate TBI models that take this pre-existing condition into account.

### **Methods:**

A pathophysiological study was conducted on Spontaneously Hypertensive Rats (SHR) compared to normotensive Wistar Kyoto (WKY) rats. Rats were assigned to receive a controlled cortical impact (CCI; 2.8mm cortical deformation depth, 4 m/s) or a sham injury. Both sham and TBI rats underwent the Beam Walking Task (motor) as well as the Morris Water Maze (MWM; spatial learning). Open field testing (OFT) was performed to examine anxiety, while Shock Probe Defensive Burying Task (SPDB) inspected passive/active coping behavior. 3-Choice Serial Reaction Time Task (3-CSRT) was used in a separate cohort of SHR rats to examine sustained attention and distractibility.

### **Results:**

Adult male SHR TBI rats have on average 10% higher heart rate and 30% higher mean arterial pressure versus injured WKY rats. Injured SHR rats demonstrated impaired motor skills as well as diminished spatial learning compared to sham rats. SHR TBI rats also spent less time actively burying the shock probe, and displayed reduced percent accuracy and increased omissions during 3-CSRT, suggesting impaired sustained attention. Results indicate that TBI in rats with a hypertensive phenotype renders neurobehavioral deficits across a variety of behavioral tasks.

### **Conclusion:**

Findings from this array of behavioral paradigms establish neurobehavioral deficits in injured, hypertensive animals, with current work exploring comparisons with normotensive rats. In order to develop new methods of treatment, it is critical to understand the influence that underlying conditions, such as hypertension, have on TBI pre-clinically.