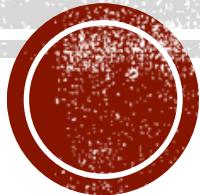


A New Rodent Model of Repeat Mild Traumatic Brain Injury in Adolescents

Katelynn Ondek

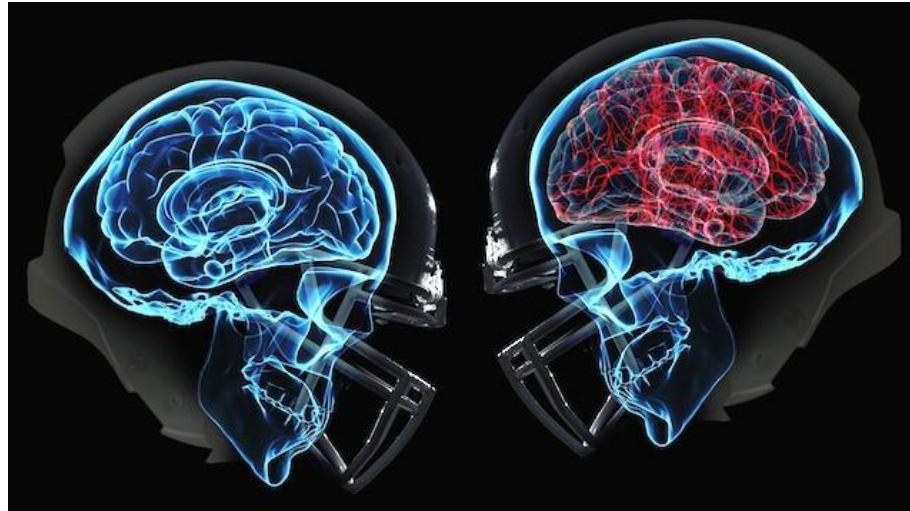
UCD Neurological Surgery Lab

Mentor: Dr. Gene Gurkoff

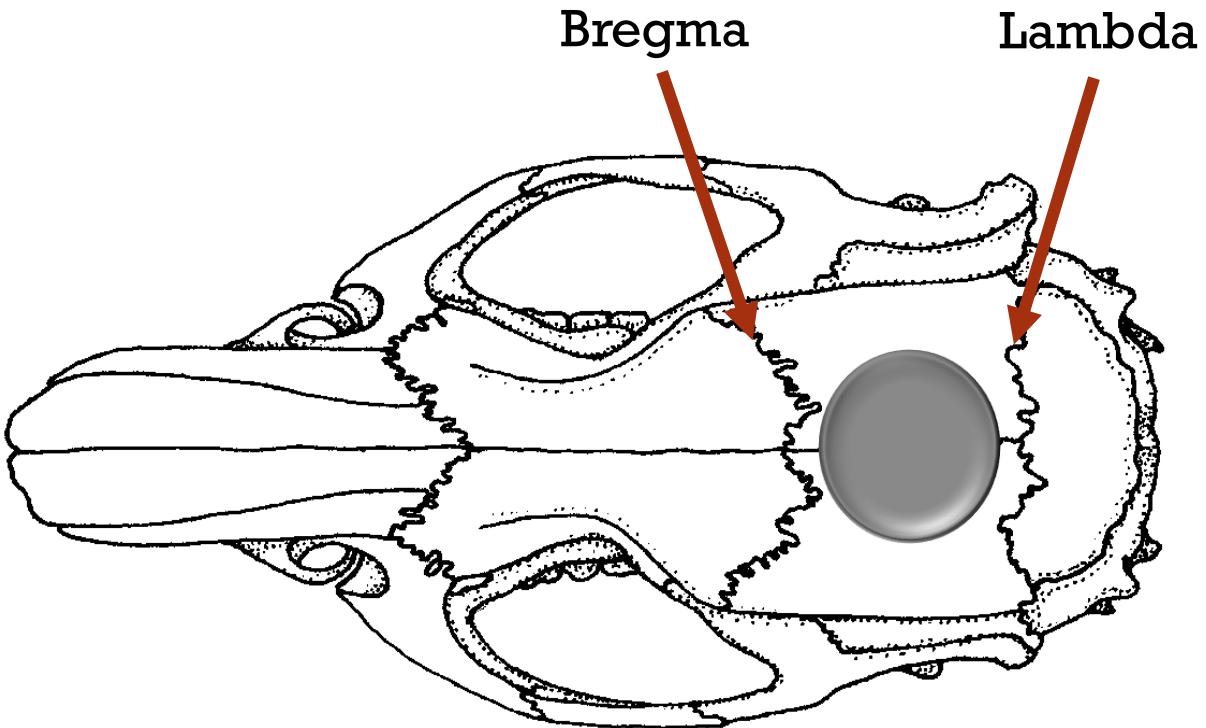
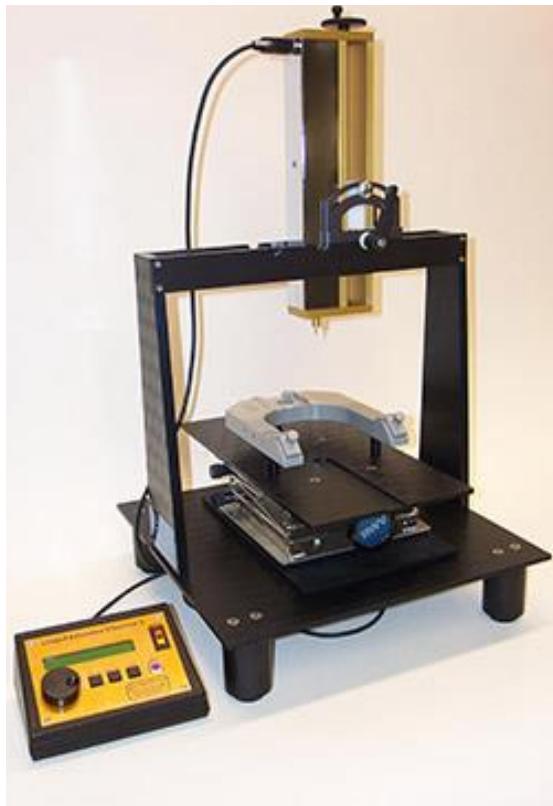


Multiple Traumatic Brain Injuries in Adolescence can produce Lasting Deficits

- Contact sports are a leading cause of mild TBI in adolescents
- Brain injury disrupts normal development, potentially causing chronic problems
 - Profound cognitive and behavioral impairment
 - Lack of gross morphological and motor changes
- Mechanisms and timing of precipitating events is poorly understood



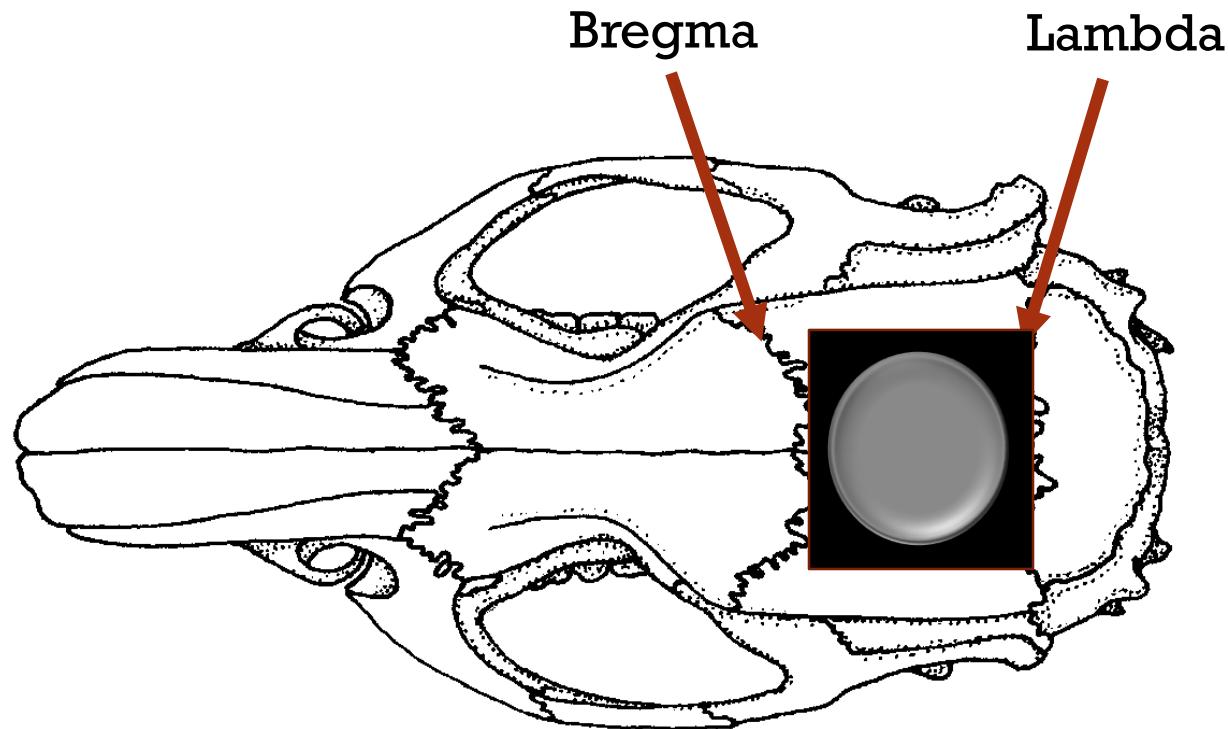
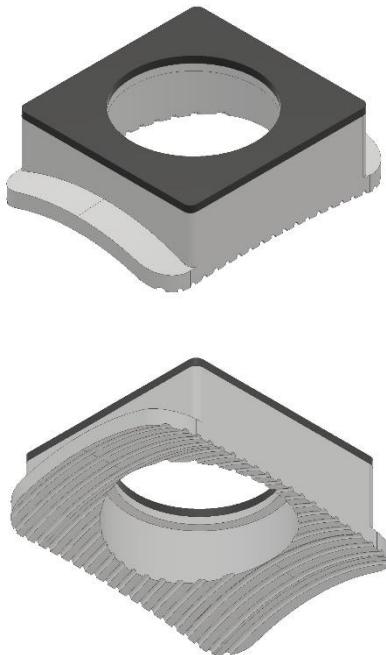
Hypothesis: rat models of repeat TBI can reproduce the cognitive impairment seen in sports-induced concussion



- ✓ Diffuse but precise model of mild sports injury
- ✗ Multiple injuries = multiple survival surgeries



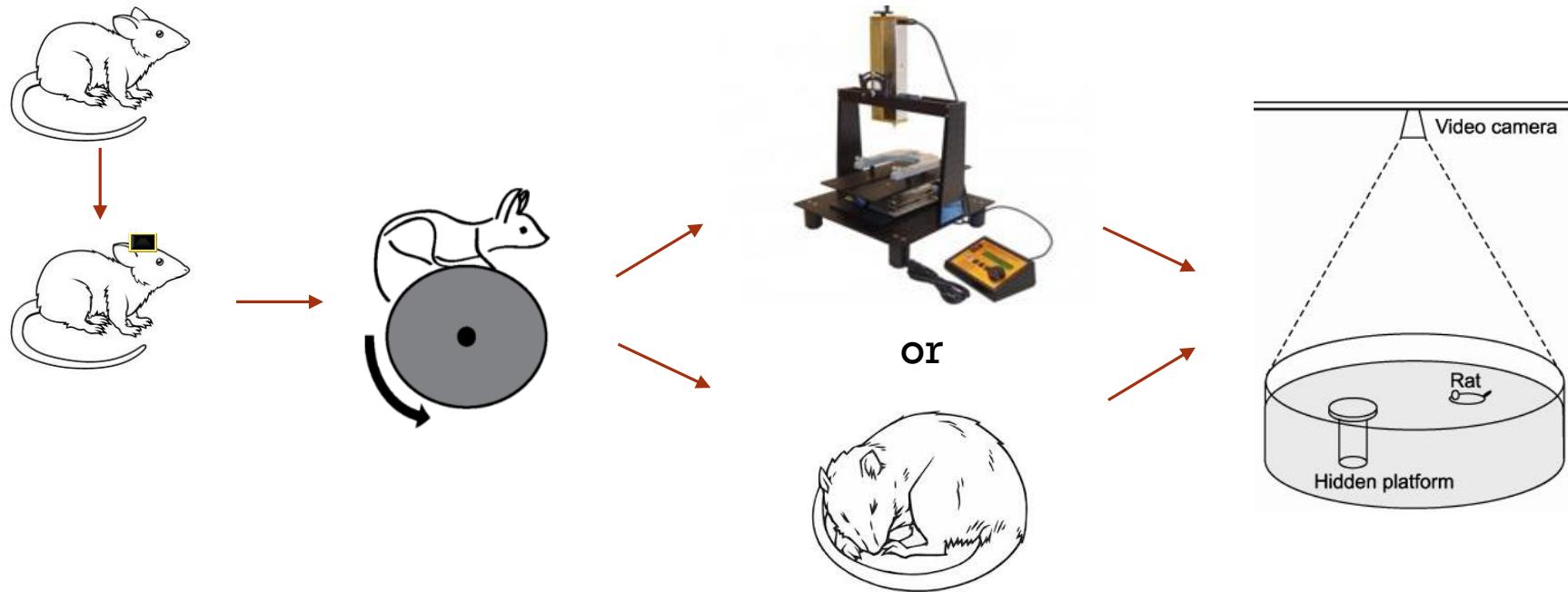
3D-Printed Implants are an Alternative to Performing Multiple Survival Surgeries



- ✓ Less soft tissue trauma and stress
- ✓ Decreased anesthesia time
- ✓ Ability to provide pain medication



Research plan



P31
Implant
surgery

Rotarod
Training and
Baseline test

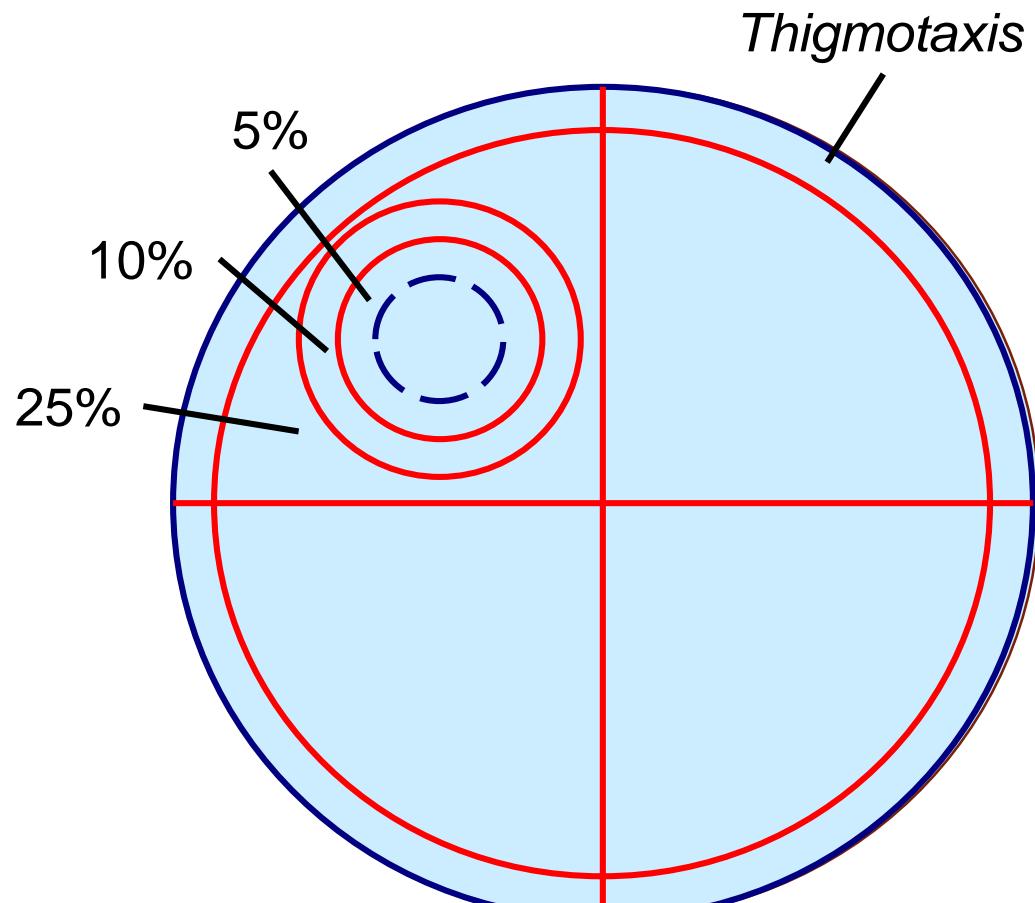
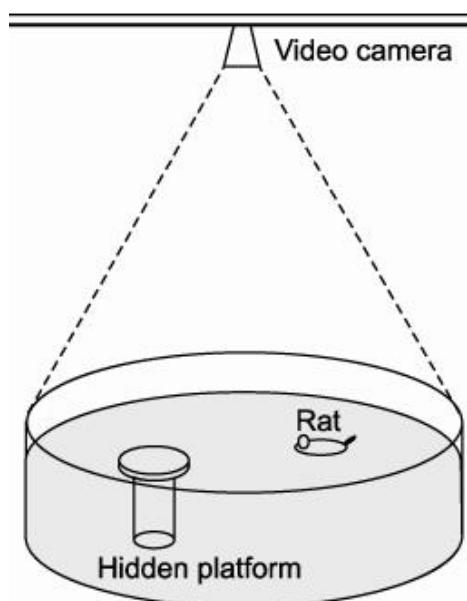
P35, 38, 41
Multiple Injuries
Single Injury
Sham Injury
(n=12)

P48-57
Morris Water
Maze

Post-injury Rotarod testing



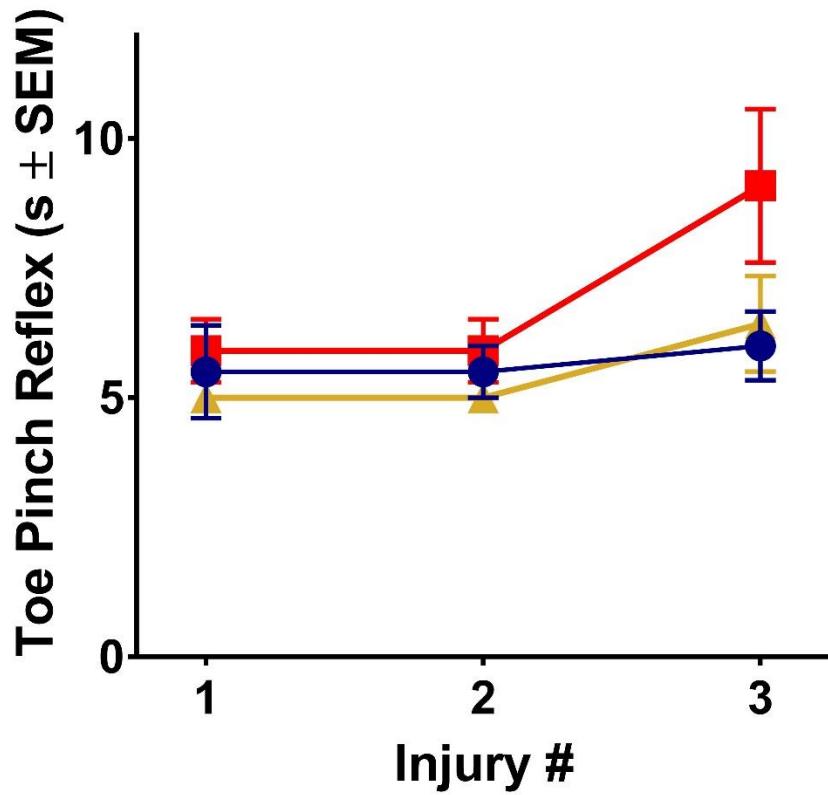
Morris Water Maze



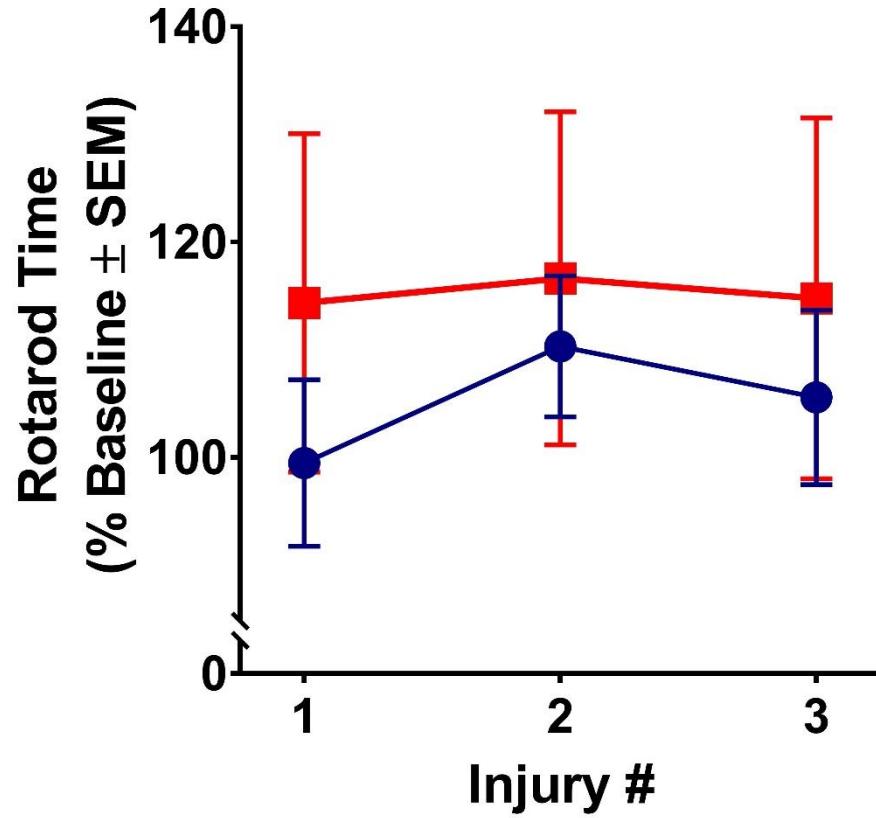
- Acquisition
- Probe
- Video Analysis



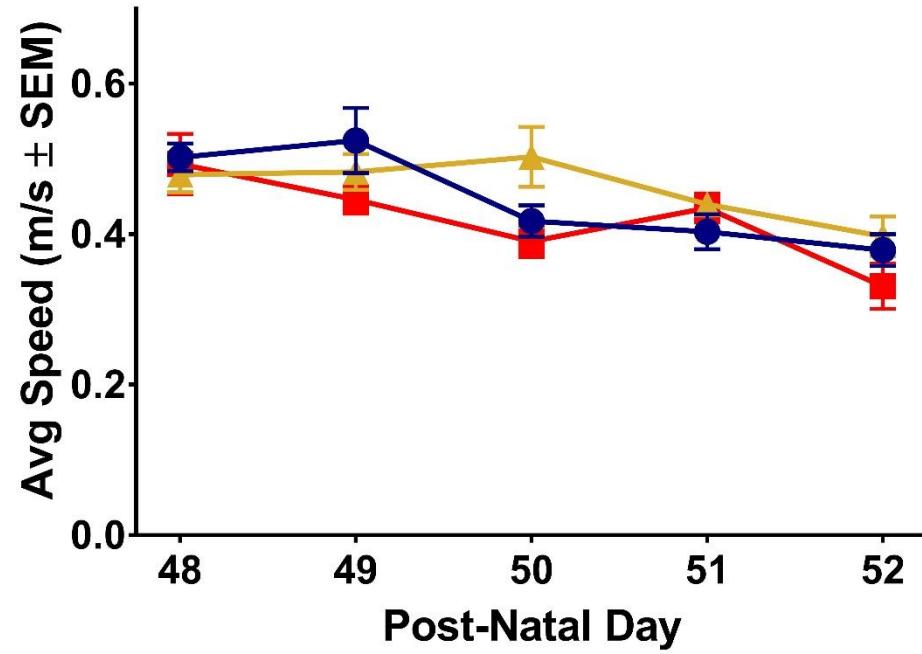
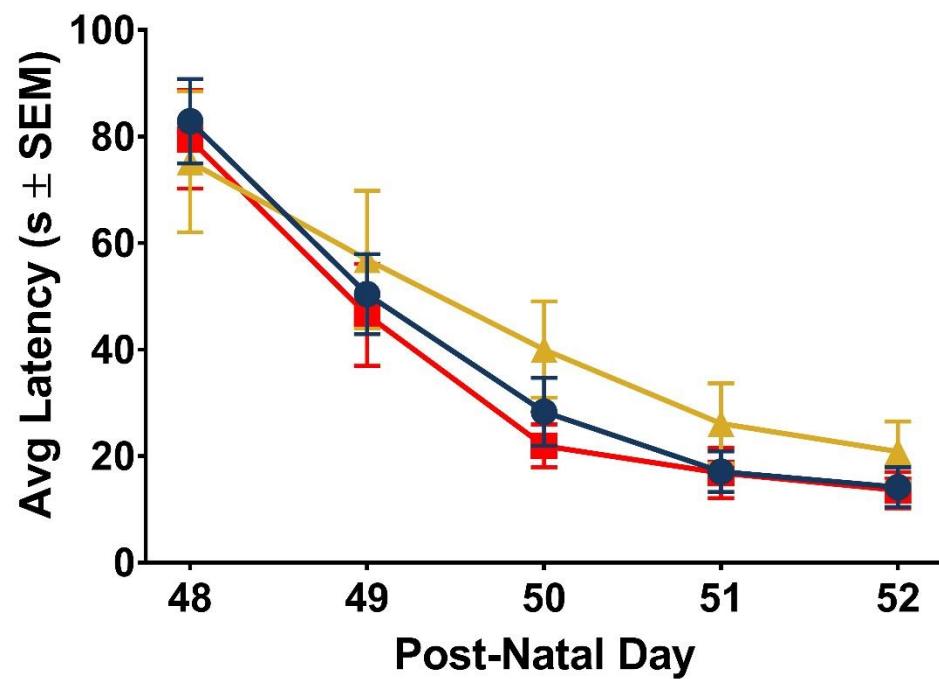
Repeat TBI did Not affect Biological Response or Motor Performance



- Sham Injury
- ▲ Single Injury
- Repeat Injury



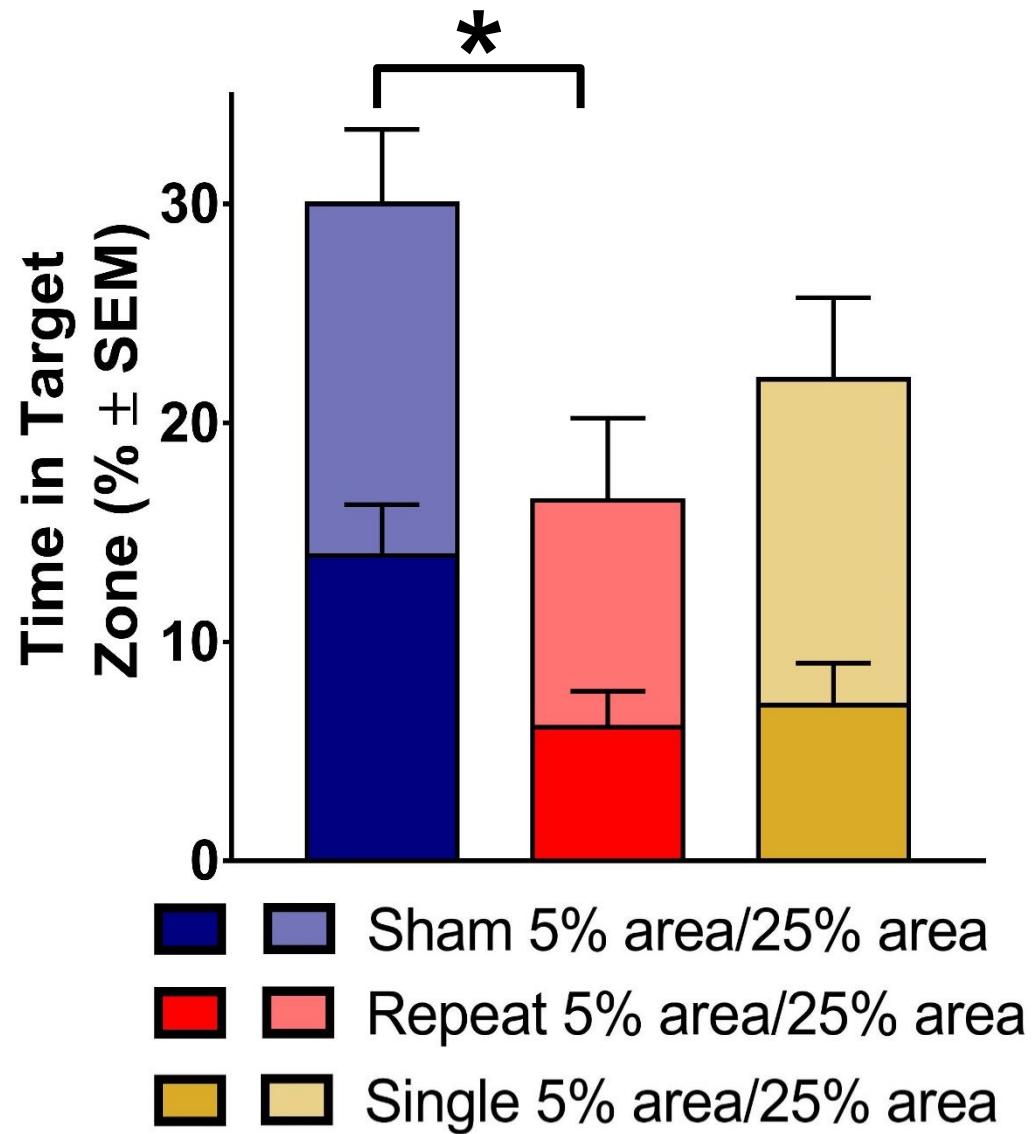
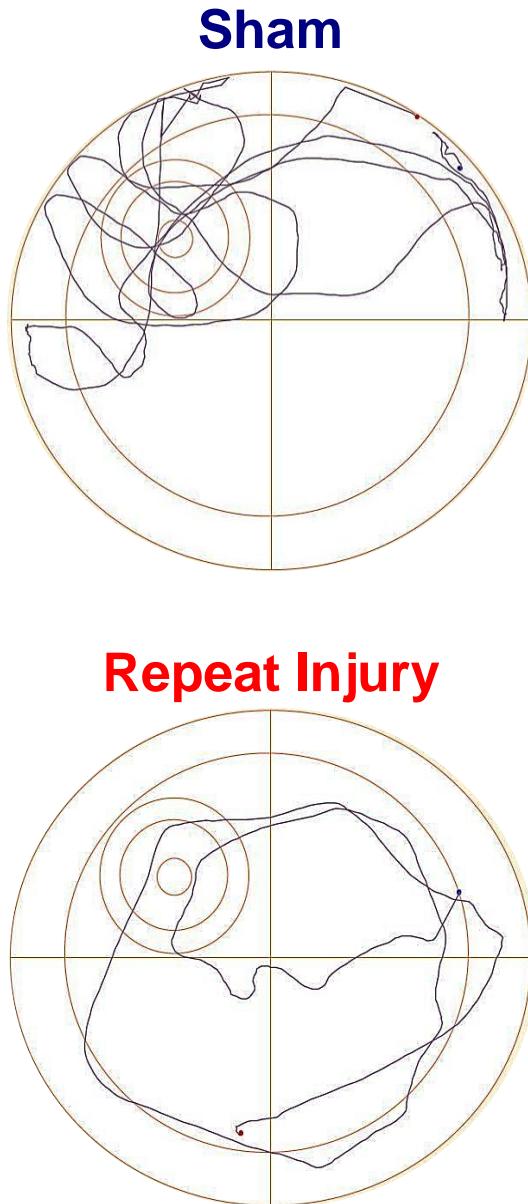
Repeat Injury did Not Impair Acquisition Week Performance



- Sham Injury
- ▲ Single Injury
- Repeat Injury

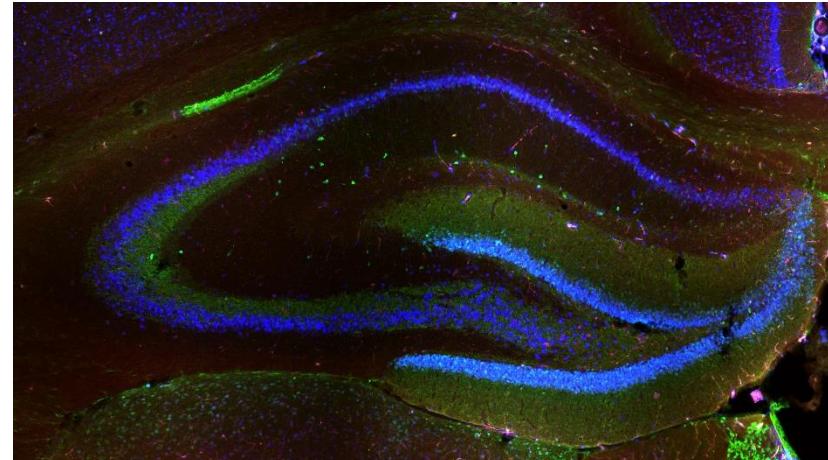


Multiple Injuries Altered Search Strategies on Probe



Conclusions

- Implant has several advantages
- Promising model of sports-related repeat TBI
 - No biological effects, motor deficits, or gross damage
 - No effect of injury on acquisition
 - Repeat injury altered search strategy on probe trials
- Future directions
 - Histology
 - Additional tasks and materials
 - Assess injury prevention and therapy methods



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Questions?

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