# SURGICAL DECOMPRESSION AS A TREATMENT FOLLOWING TRAUMATIC SPINAL INJURY

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NIH NINDS R25NS095377 - Summer Research Experience in Translational Neuroscience and Neurological Surgery

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# **SPINAL CORD INJURY**

- 11,000 new cases per year in the US
- 250,000 Americans with spinal cord deficits costing \$19 billion in medical expenses annually <sup>2.</sup>
- Most are incomplete injuries caused by low energy trauma
- Contusions occurs during hyperflexion or hyperextension

**Causes of SCI** Since 2010 5% 4% Vehicular 9% Falls 38% 13.5% Violence 30.5% Sports Medical/surgical Other

3.

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## **CURRENT CLINICAL MODEL OF TREATMENT**

- Neurons in the spinal cord fail to regenerate after traumatic injury
- Surgical Treatment:
  - Removal of impinging bone fragments or foreign bodies within 24 hours of injury
- Pharmacological Treatment:
  - Administration of methylprednisolone within 8 hours of injury
  - Currently out of favor limited clinical benefit
- Currently there are no clinically effective neuroprotective treatment mechanisms for spinal cord injury (SCI)





# **RESEARCH OVERVIEW**

We hypothesized that surgical decompression following acute spinal cord injury could play a neuroprotective role, limiting permanent secondary neuronal death

### **Background:**

Dural and pial linings both play a role in elevated ISP

**Experimental Groups**:

Sham, SCI, SCI + decompression

Functional and Histological Assessment:

Open field locomotor test/ ladder walk/ cat walk Motor neuron counting



## **EXPERIMENTAL DETAILS**

- 23 animals total
- CV + Myelin Staining
- Sampled 0.5 mm apart







# **HISTOLOGICAL ASSESSMENT**

SCI

Sham



## Individual Motor Neuron



## **VENTRAL HORN MOTOR NEURONS**



Row 1: Slice #, Row 2: Slide #



## **FUTURE DIRECTIONS**

### Ultrasound imaging with contrast

### Water channels in the spinal cord









## **THANK YOU!**

 To the Neurological Surgery Summer Program especially Dr. Ellenbogen and Mrs. Ellenbogen, Dontay Smith, and Jim Pridgeon

To everyone who works in the Hofstetter Lab:
Dr. Christoph Hofstetter, Dr. Zin Khaing,
Lindsay Cates, Anna Marie Yanny, Brian Kim, Jeff Hyde,
Zeinab Birjandian, Ashley Gaing, Michael Cruz

