

# The Effect of Moderate TBI on Neuronal Degradation in the Spinal Cord

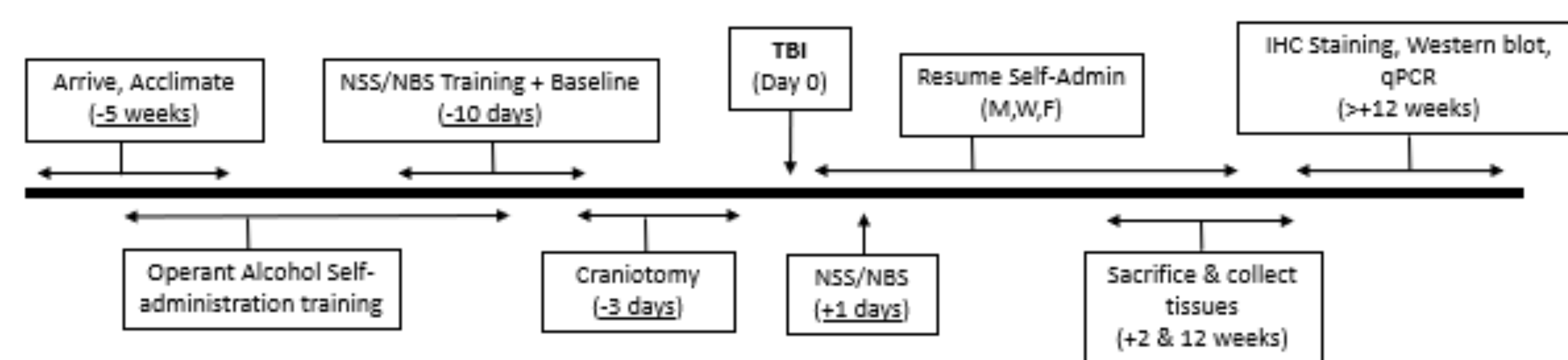
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## Introduction

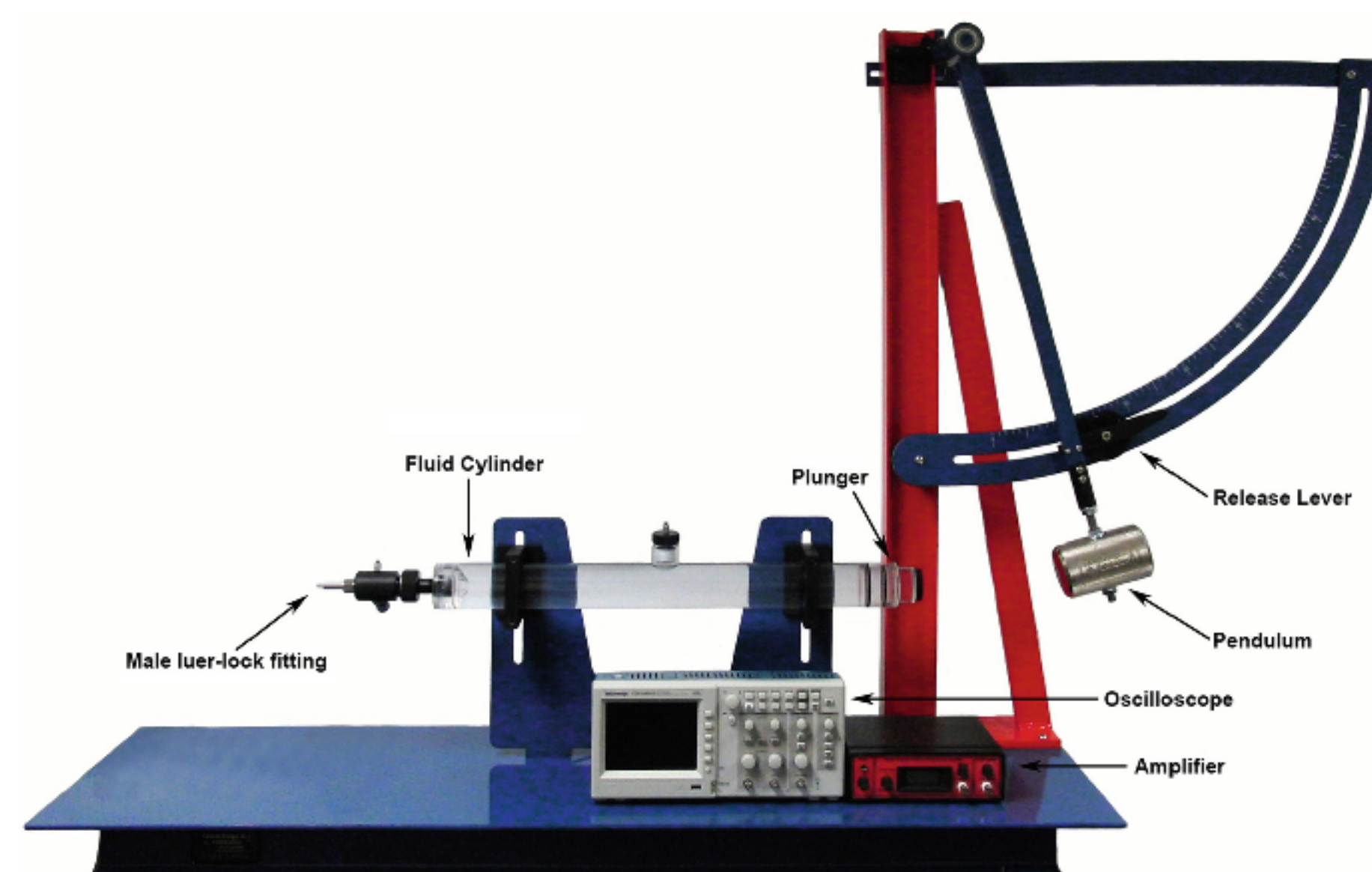
Traumatic brain injury (TBI) is a predominant public health concern, adversely affecting all age ranges. TBI may lead to enhanced neurodegeneration and neuronal loss, with the use of alcohol possibly exacerbating these negative outcomes. TBI may be a risk factor for various neurodegenerative diseases like Amyotrophic Lateral Sclerosis (ALS), with preliminary data from the Desai lab suggesting early evidence of these changes in the spinal cord.

**We hypothesize that following a single moderate TBI, there will be evidence of motor neuron degeneration in the ventral horn of the spinal cord, which will be increased when combined with alcohol use.**

## Methods



- Adult male Wistar rats were trained over 4 weeks to self-administer alcohol using a 2-lever press system, followed by 30m of ethanol access 3x/week
- Animals were anesthetized with isoflurane and a craniotomy was performed over the somatomotor cortex
- Sham animals received craniotomy and matched anesthesia only
- A mild/moderate TBI was produced directly onto the intact dura using the lateral fluid perfusion model



- 2 and 12 weeks after TBI, rats were euthanized and tissues collected

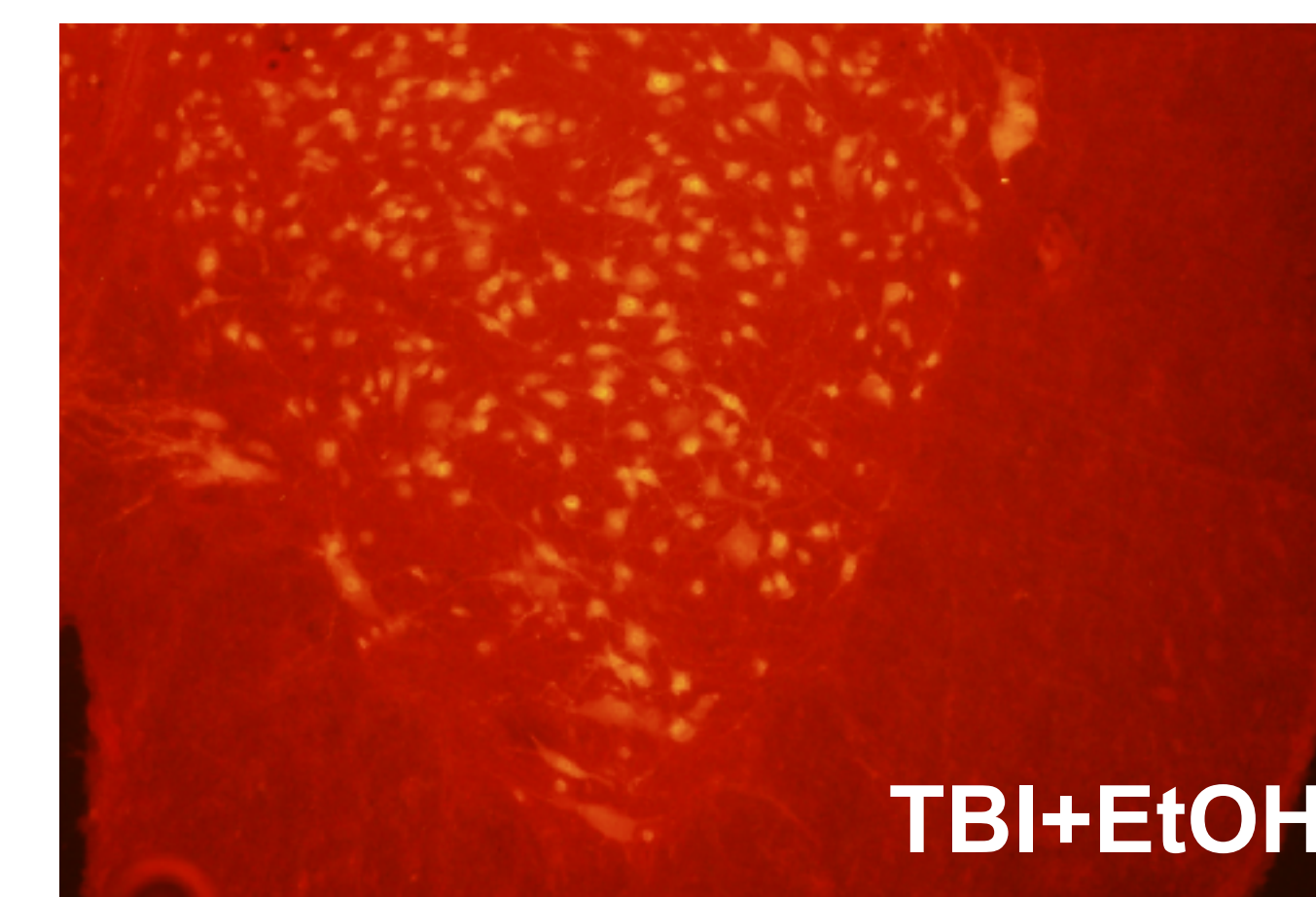
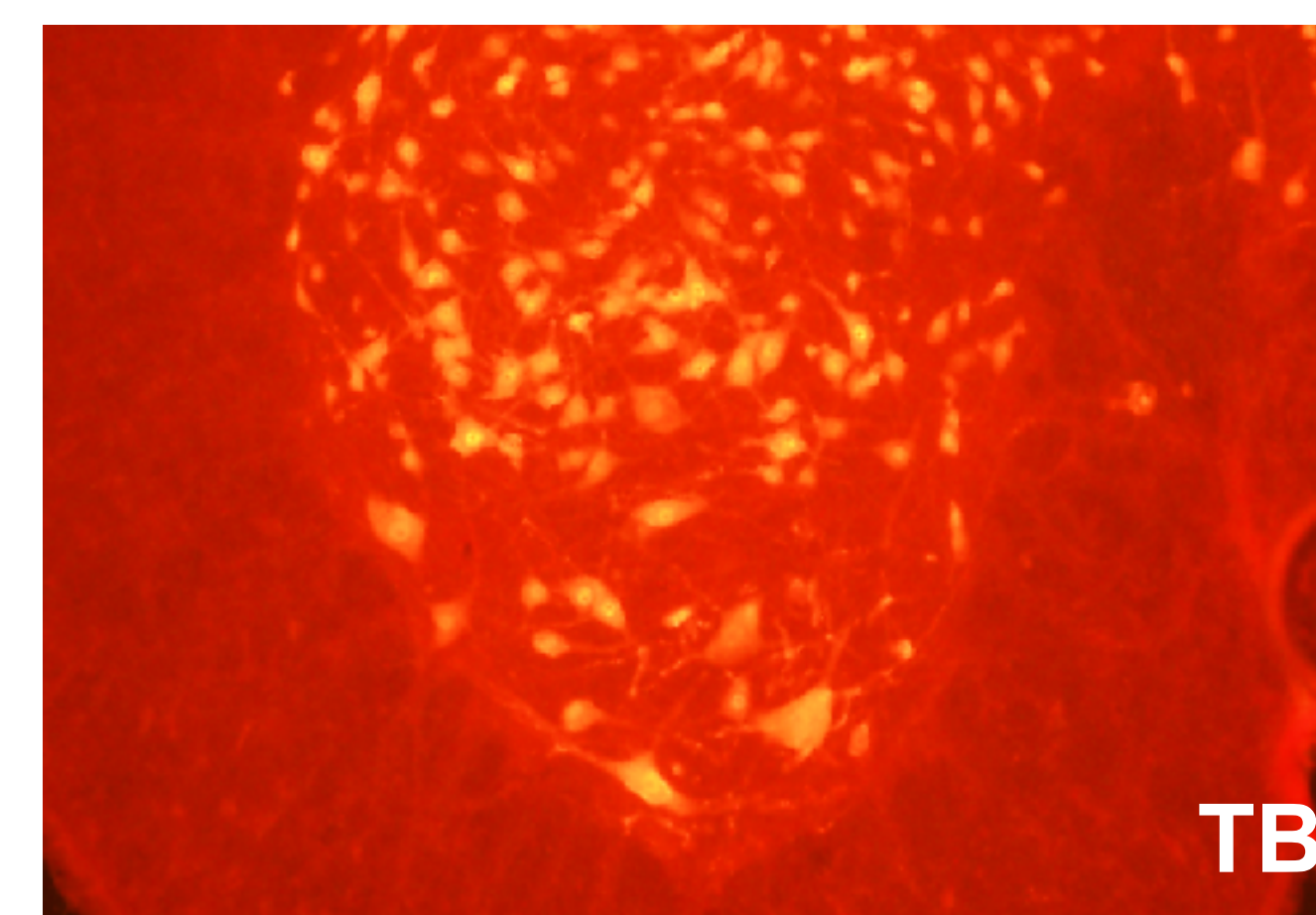
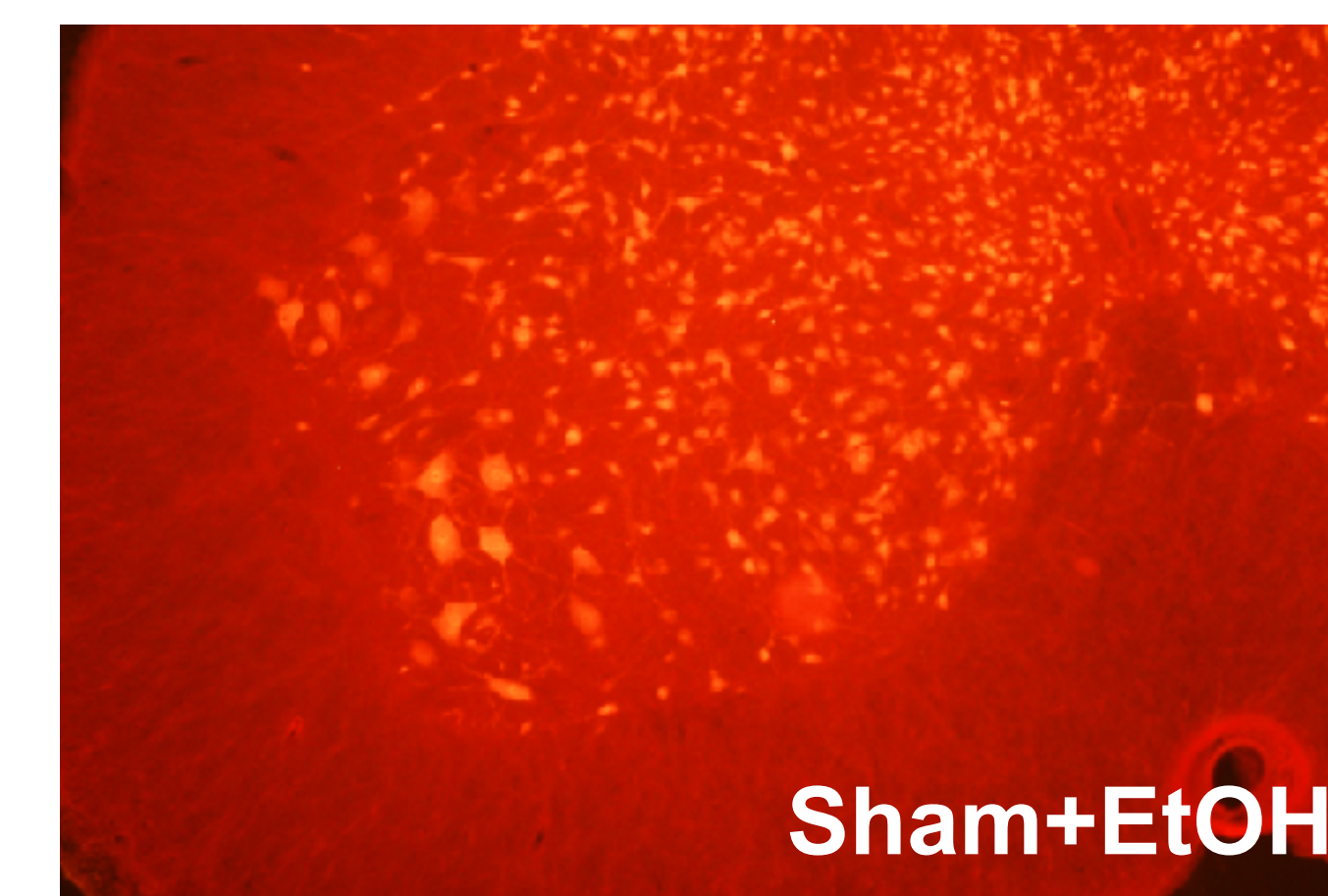
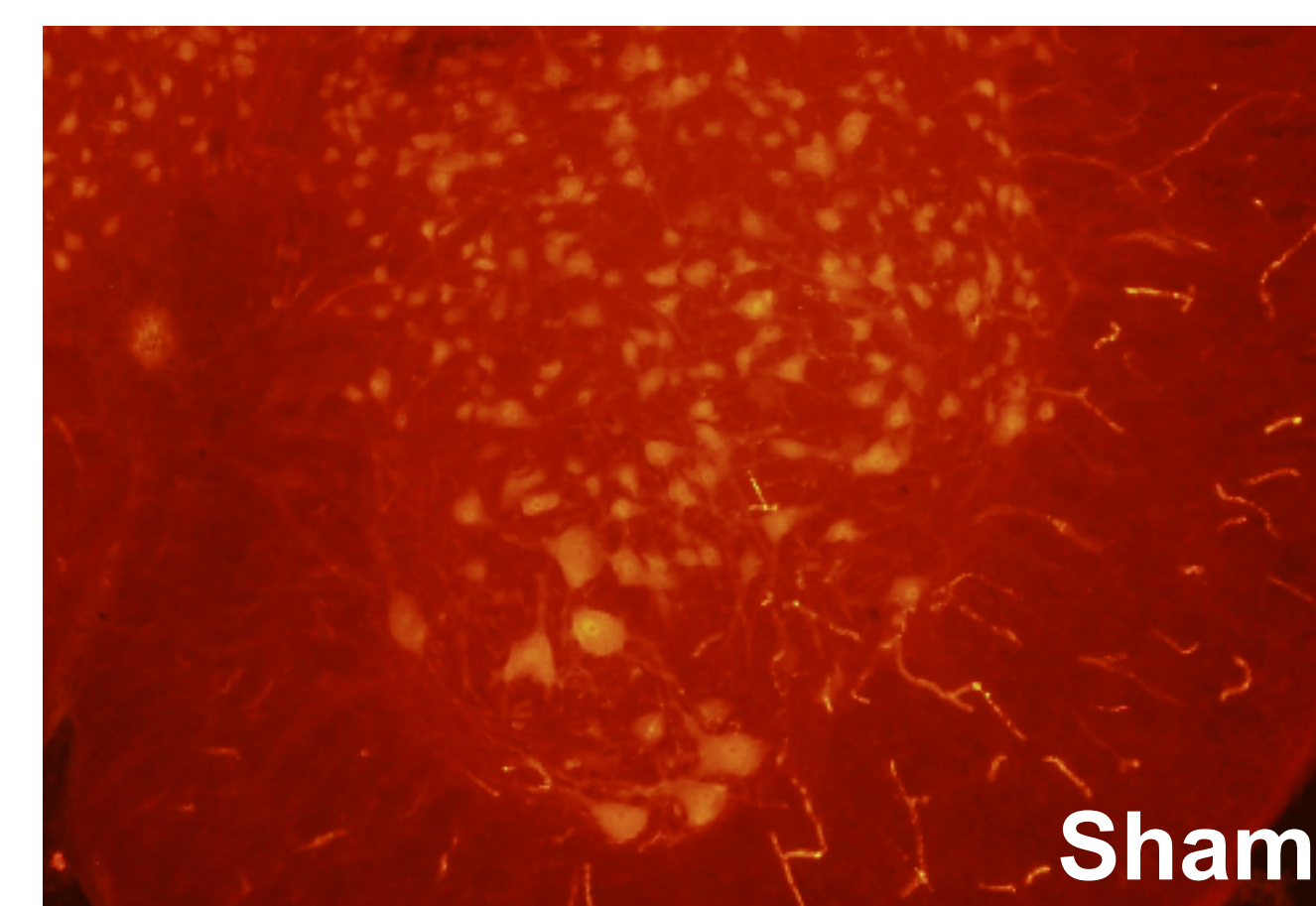
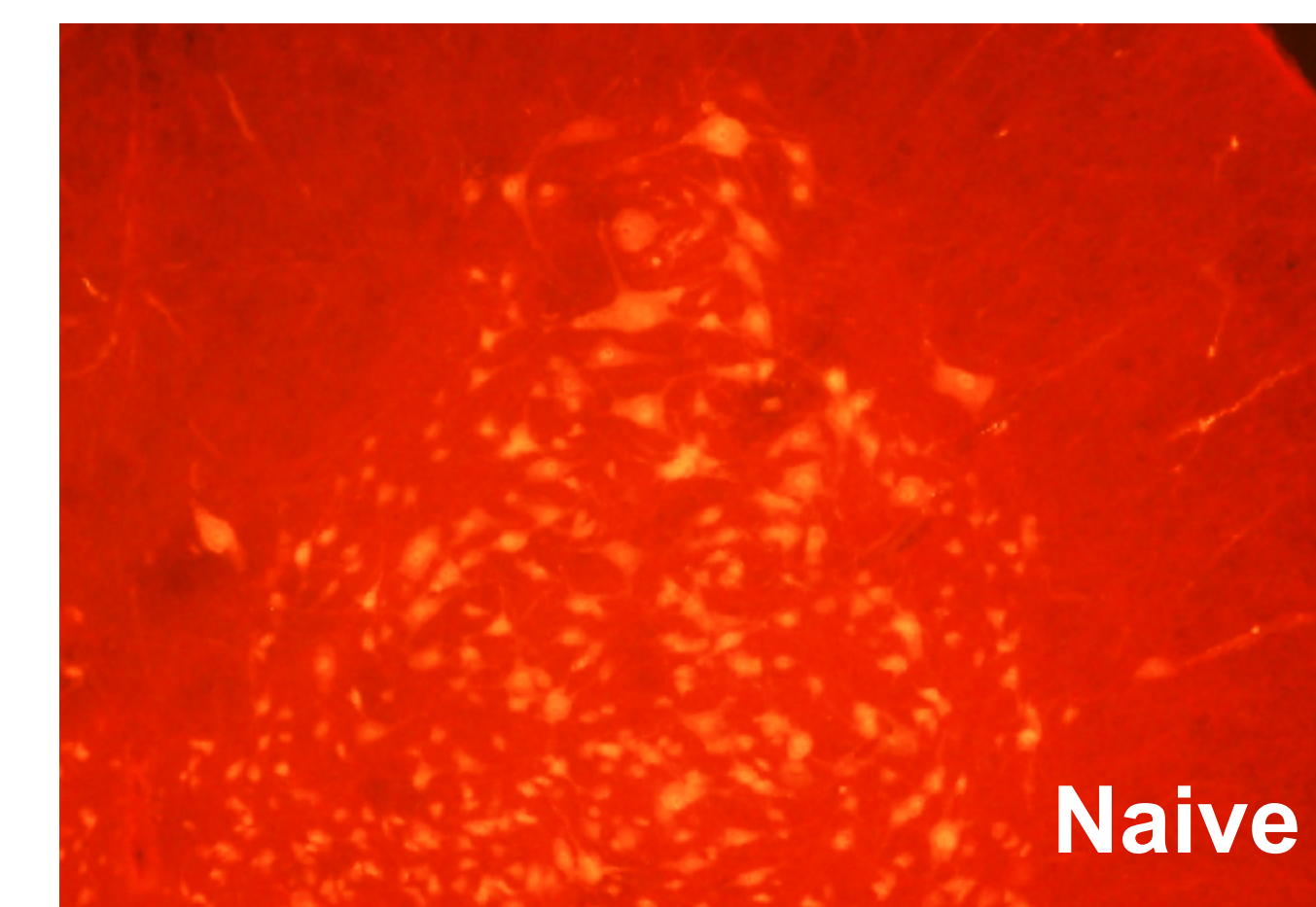
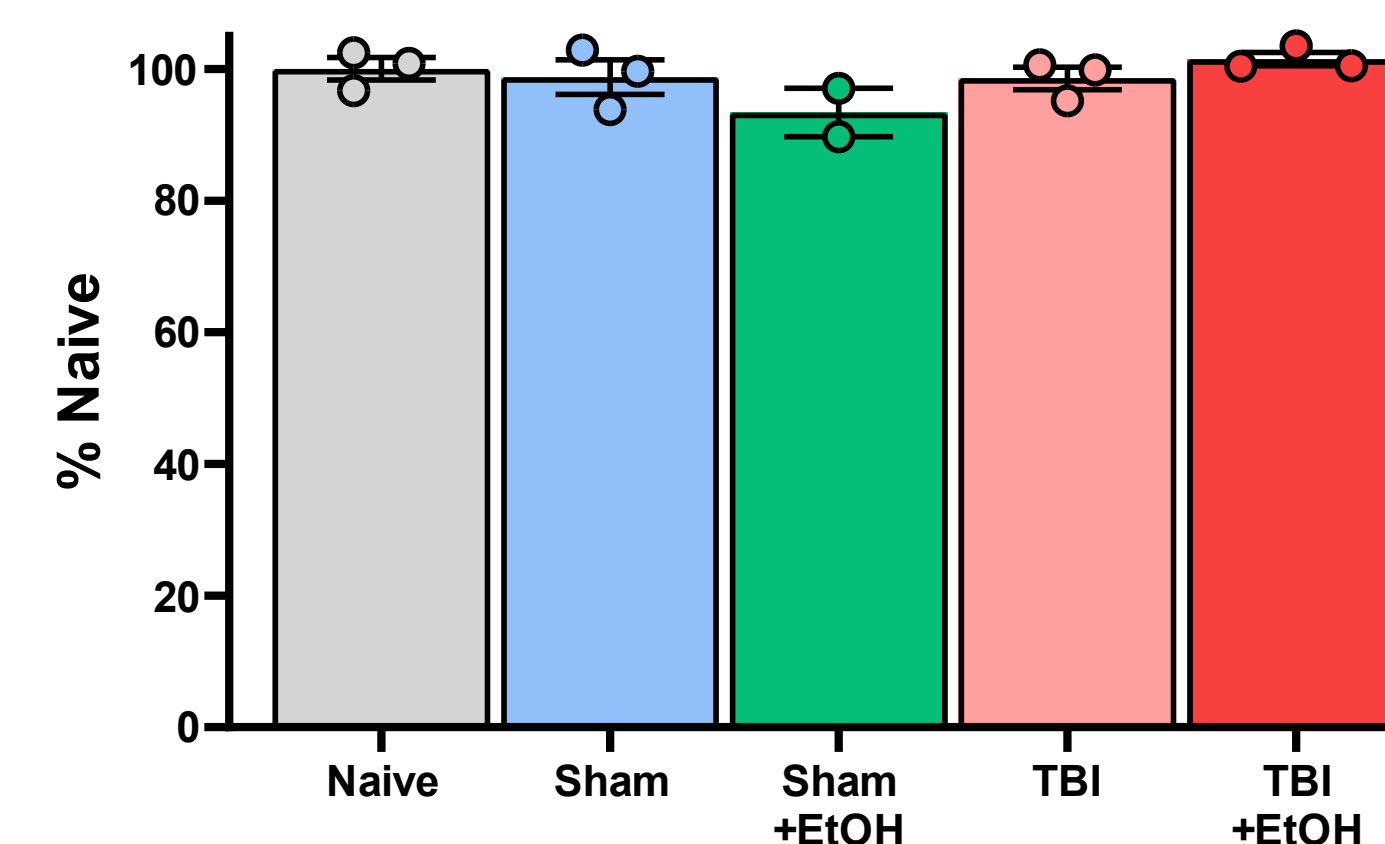
## NeuN labeling in the ventral horn

### Methods

- The lumbar spine was cryosectioned coronally at 40µm for immunohistochemical processing
- Free-floating sections of naïve (n=3), sham (n=3), Sham+EtOH (n=2), TBI (n=3), or TBI+EtOH (n=3) were incubated overnight in NeuN and visualized using Alexafluor 568
- The ventral horn was imaged at 10x
- Results are qualitative, not quantitative

### Results

- No difference could be detected between groups



## Conclusion

No difference could be detected amongst the density of motor neurons in the spinal cord between any of our groups. Though this data is preliminary, our results suggest that there may not be an effect on motor neurons in the spinal cord from a single moderate TBI, with or without alcohol use.

The addition of Fluoro-Jade C, which stains degenerating neurons, was intended for this experiment, but was unsuccessful.

Further experiments may wish to look at neurodegeneration in different areas of the brain like the motor cortex or hippocampus. Additionally, investigating the role of inclusion bodies and their relation to neurodegeneration within the brain and spinal cord may be necessary.

## Acknowledgements

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