



UW Neurological Surgery Summer Program

Horner Lab
Institute for Stem Cell & Regenerative Medicine

TIARA ADLER

Dr. Horner's Lab

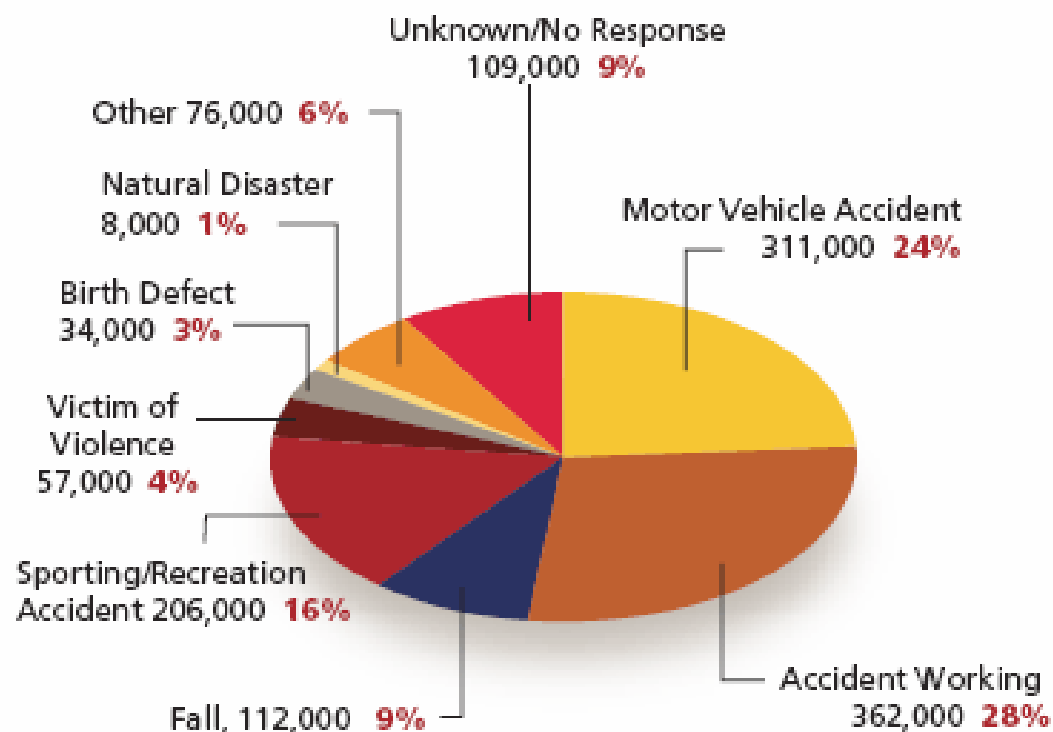
- ▶ Interaction between glial and neural cells following CNS challenge
 - ▶ Mechanisms of adult stem cell-derived lesion remodeling/repair
 - ▶ Gliogenesis and gliosis in neural degeneration
- ▶ Lab uses cellular and molecular techniques on rodent models to induce repair and regeneration after SCI



Spinal Cord Injuries

Causes of Spinal Cord Injuries

N= 1,275,000



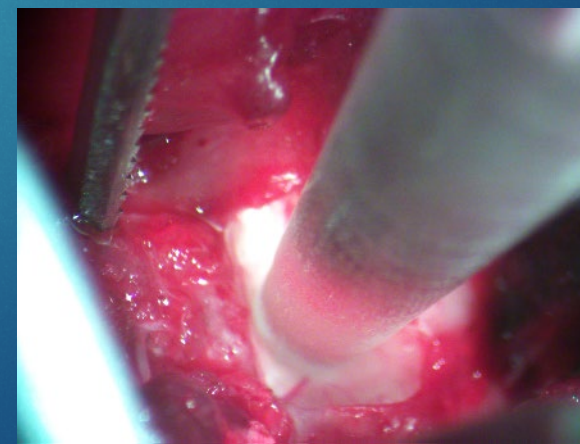
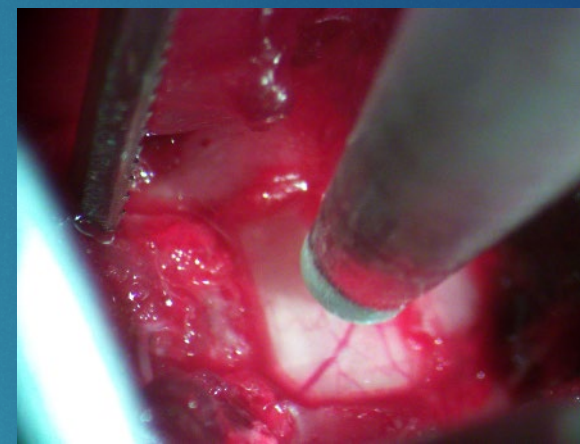
Average Yearly Expenses

| Severity of Injury | First Year | Each Subsequent Year |
|--|------------|----------------------|
| High quadriplegia (C1-C4) | \$775,567 | \$138,923 |
| Low quadriplegia (C5-C8) | \$500,829 | \$56,905 |
| Paraplegia | \$283,388 | \$28,837 |
| Incomplete motor function at any level | \$228,566 | \$16,018 |

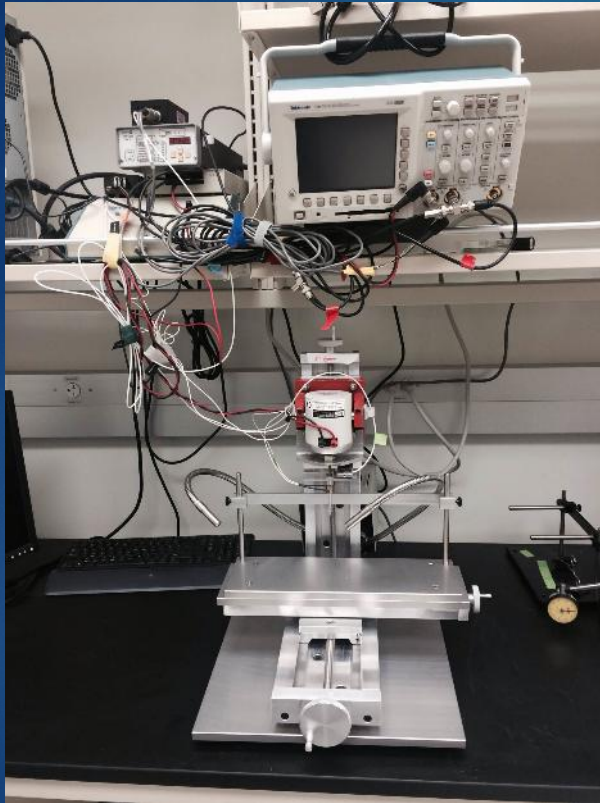


Injury Characterization and Effect on Mobility

- ▶ Purpose: to compare different size injuries effects on animals without any treatment and to describe the injury itself
- ▶ 4 groups of animals
 - ▶ Group 1: 0.8mm SCI
 - ▶ Group 2: 0.7mm SCI
 - ▶ Group 3: Surgery but no injury
 - ▶ Group 4: No surgery, no injury
- ▶ Post-op behavioral tasks included: Catwalk, IBB and cylinder



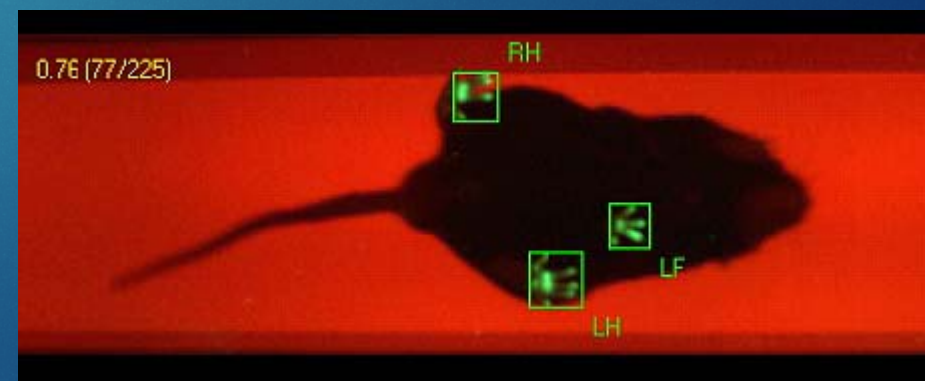
Injury Device



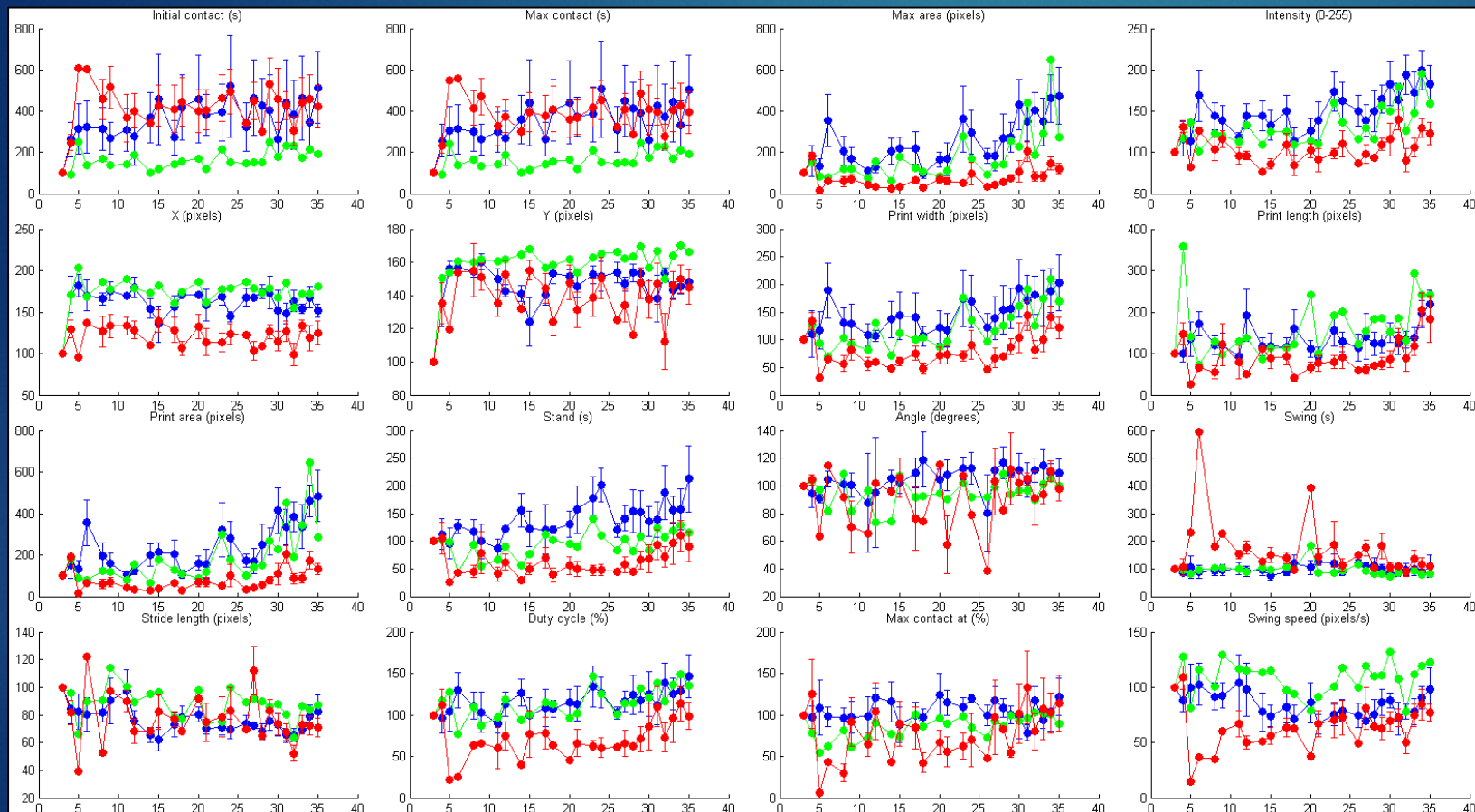
- ▶ Touches surface of cord with known force
- ▶ Highly reproducible
- ▶ High velocity injury... 20 milliseconds
- ▶ Major improvement since 1911 Allen Rod + Weight Model

Catwalk

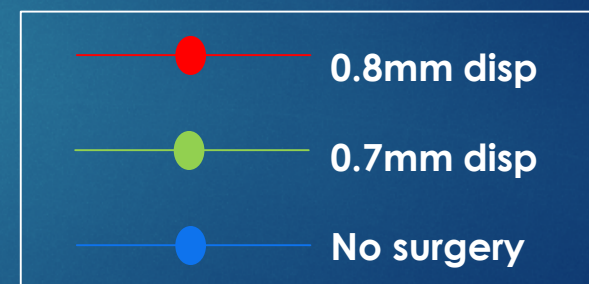
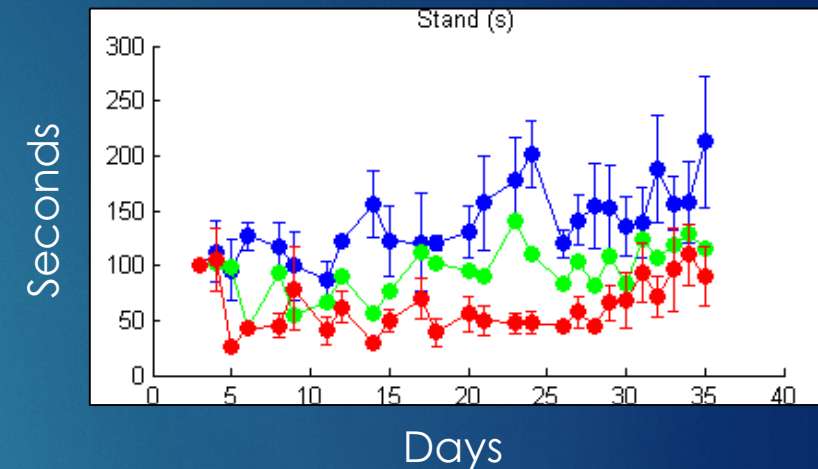
- ▶ Automated gait system
- ▶ Developed for analysis of locomotor function in SCI models
- ▶ Subjects walk across an illuminated glass platform while recorded from underneath
 - ▶ Stride pattern, paw swing speed, stance duration, and pressure



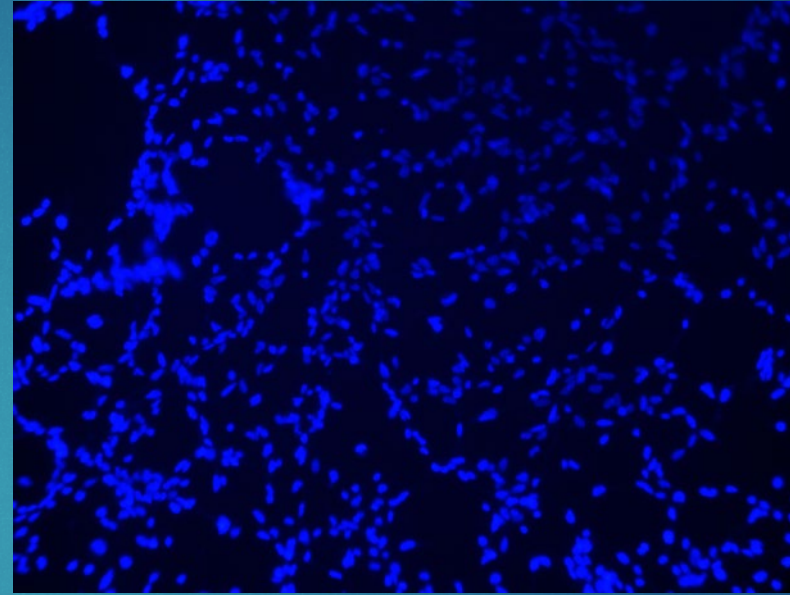
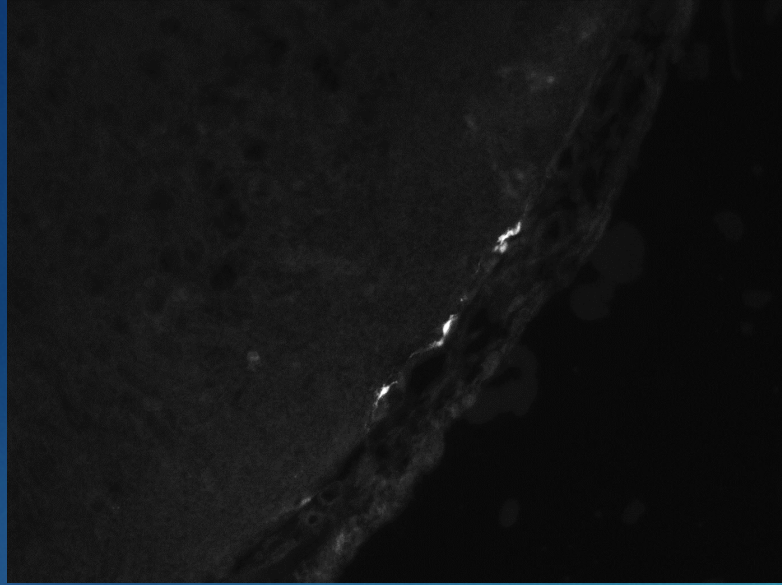
C4 Injury Data



Left front paw



Tissue Processing + DAPI Staining



- ▶ Study of two essential enzymes in oligodendrocyte development
- ▶ Injection of virus at 5 days
 - ▶ Prevents expression of Ehmt2 and Suv39h1 histones
 - ▶ Proven to work in vitro
- ▶ Perfused 5~ days post-injection
- ▶ DAPI is a nuclear stain that recognizes cells rather than artifacts



Thank you!

Dr. Richard Ellenbogen

Jim Pridgeon

Christina Buckman

Dr. Phillip Horner

Don Maris

Amanda Fishedick

Dr. Sarah Mondello