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Translation of EphB2 in PKCgamma and Calretinin Interneuron Subpopulations After Spinal Cord Injury

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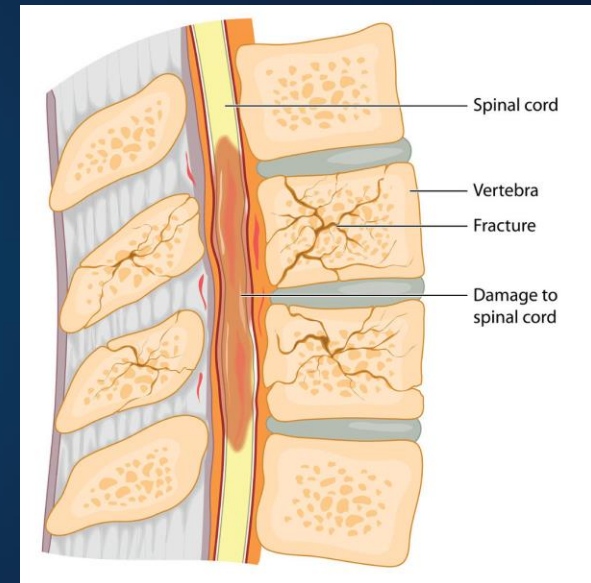


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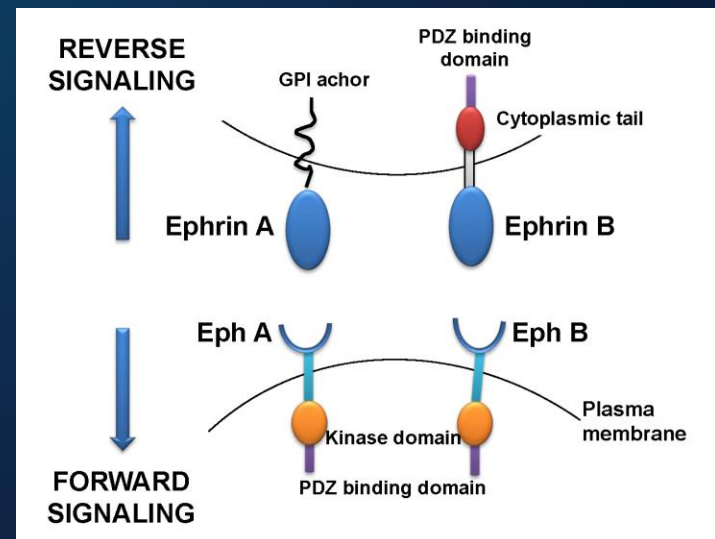
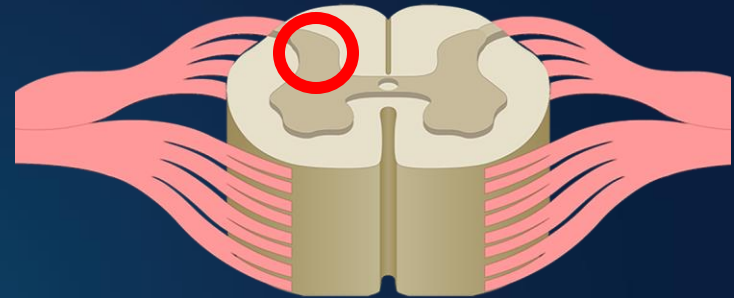
Expression of EphB2 in PKCgamma and Calretinin Interneuron Subpopulations After Spinal Cord Injury.

David Jaffe, Nicolette Heinsinger, Angelo Lepore*

- Neuropathic Pain
 - A majority of patients with spinal cord injury (SCI)
- Debilitating and difficult to treat
 - “Freedom from pain is **often not realistic**”
 - antidepressant, antiepileptic, opioids



- Dorsal horn sensitization
 - Changes in synaptic structure and receptor expression
- Eph-Ephrin signaling
 - NMDAR interactions
 - Linked to neuropathic pain
- Which populations of dorsal horn neurons?

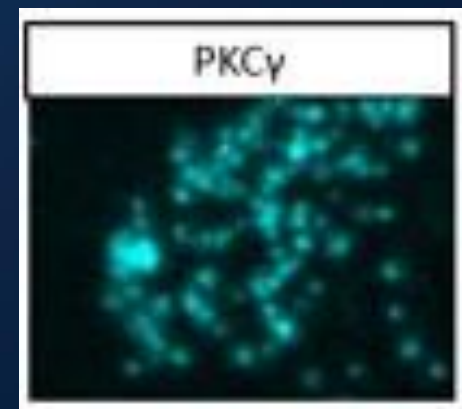
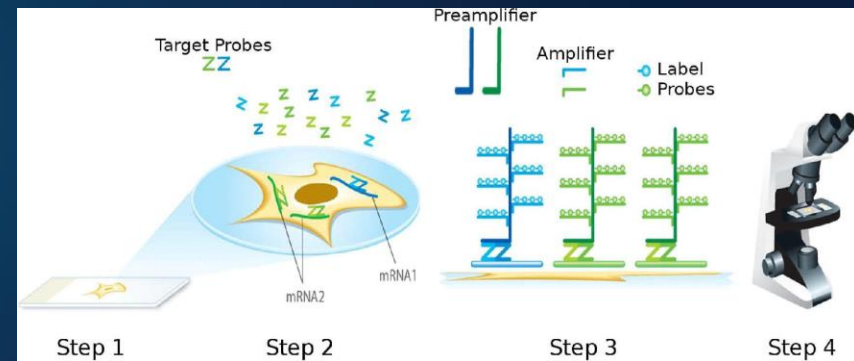
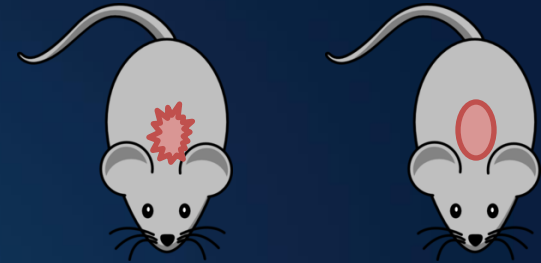


Objectives & Hypothesis

- Research Question
 - Does EphB2 mRNA increase in PKC γ or calretinin expressing dorsal horn neurons in mice with SCI compared to laminectomy-only controls?
- Hypothesis
 - Mice with SCI will have increased EphB2 mRNA in PKC γ or calretinin expressing dorsal horn neurons compared to their laminectomy-only controls.

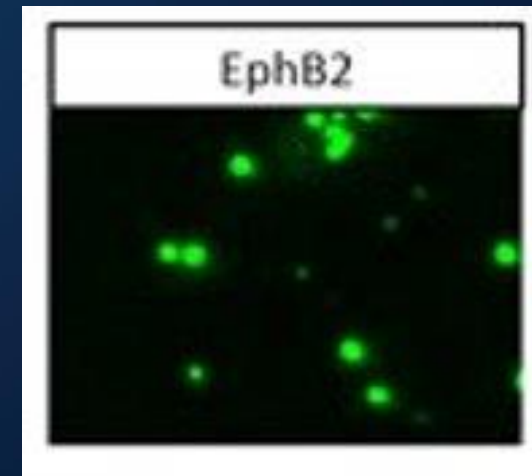
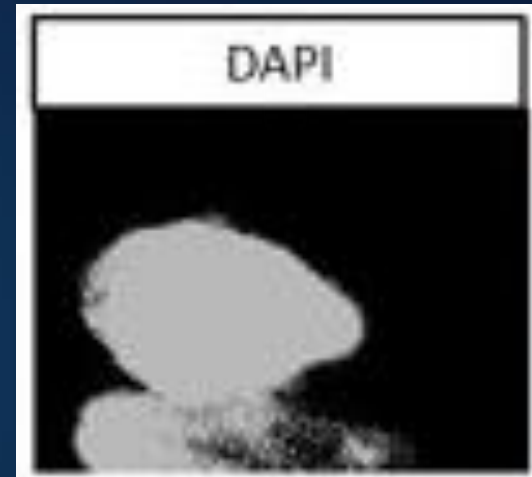
Approach & Results

- Animal Study: mice
- Design
 - C5/C6 spinal cord contusion injury vs. Laminectomy-only controls
 - mRNA labelled in sliced cords using RNAscope
 - Targets: PKC γ , calretinin and EphB2 mRNA



Approach & Results

- Data collection
 - Semi-automated system that counted mRNA transcripts per cell after user outlining
- Rationale for Approach
 - Previously uninvestigated
 - Immunohistochemistry consolidates in the dendrites

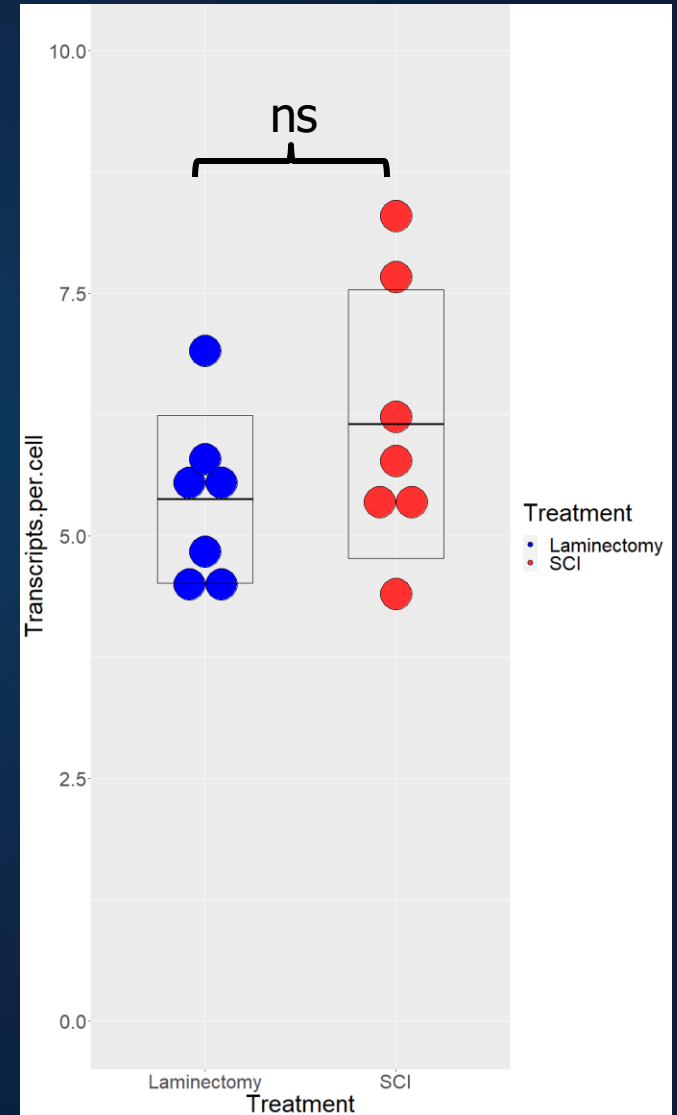
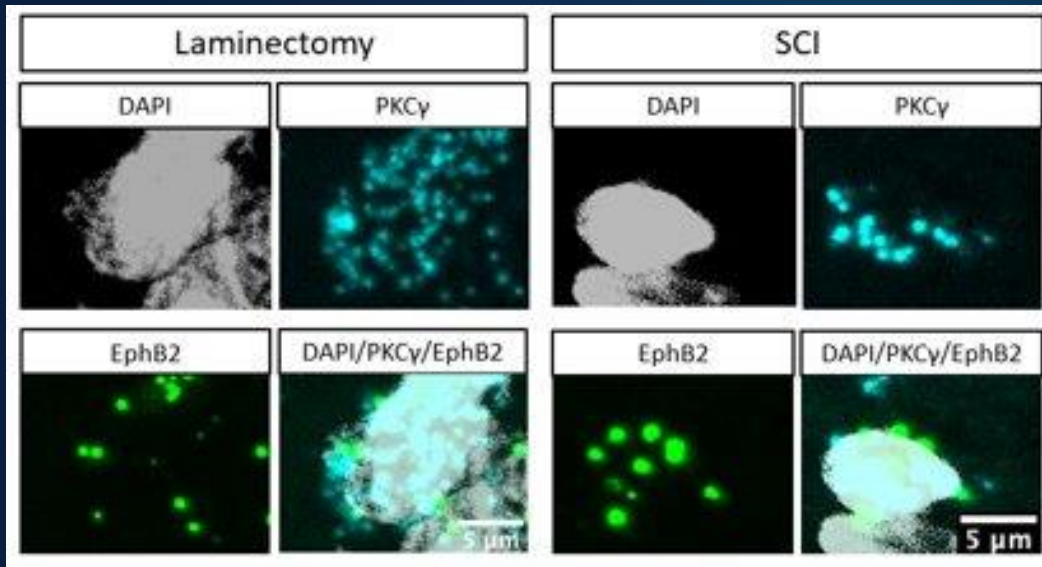


Approach & Results

- Analysis
 - 2 independent means T-test
 - Each interneuron population was quantified and compared separately (PKC γ and Calretinin)

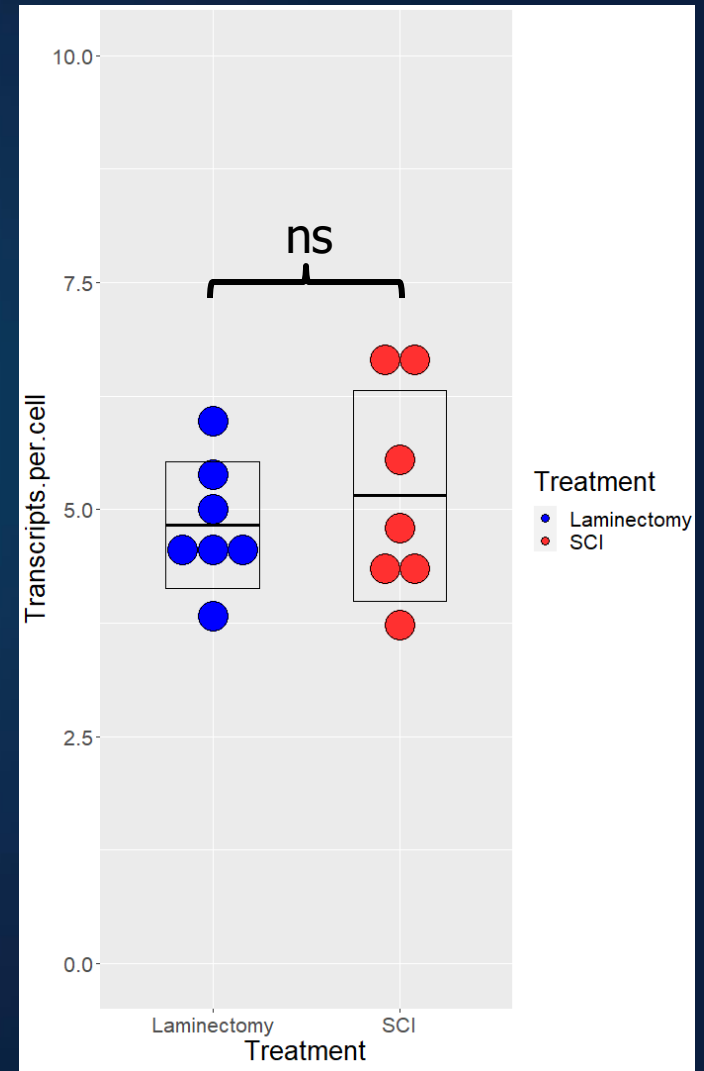
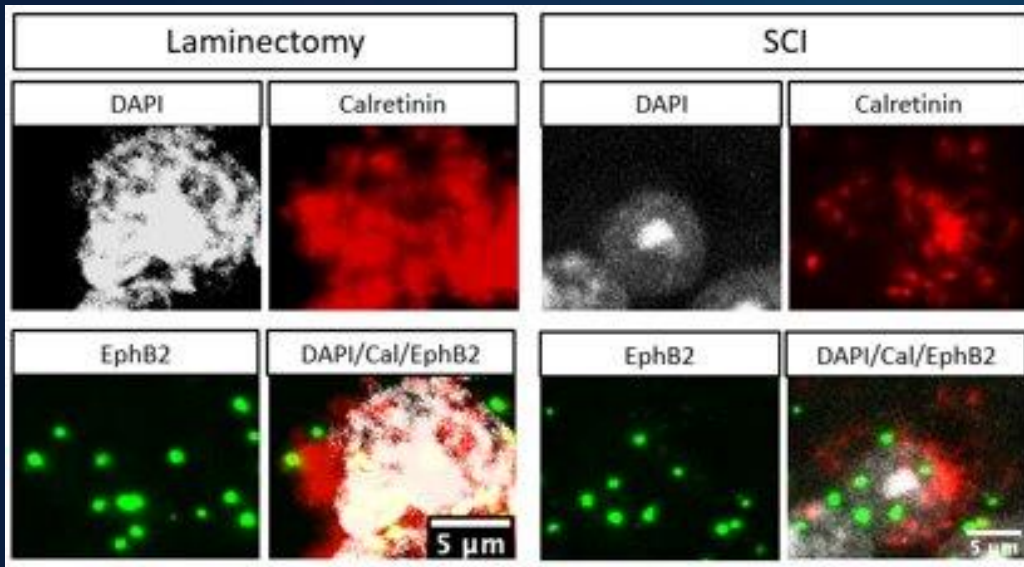
Approach & Results

- PKCgamma expressing interneurons
 - 5.38 vs. 6.15 Transcripts
 - P-value = 0.23



Approach & Results

- Calretinin expressing interneurons
 - 4.83 vs. 5.15 Transcripts
 - P-value = 0.54



- Conclusion
 - No significant difference between EphB2 mRNA levels in subpopulations of dorsal horn neurons in SCI vs. laminectomy-only mice
 - Targeting EphB2 in these interneuron populations may not be therapeutic
- Context
 - While previous studies have demonstrated an increase in EphB2 expression after SCI in spinal cord neurons, these two subpopulations are likely not responsible

Future Directions

- Next steps
 - Look at actual protein expression instead of mRNA
 - Look for EphB2 expression after spinal cord injury in different populations of dorsal horn interneurons
 - Look at different members of the Eph/Ephrin family of proteins

Acknowledgements

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