Development of a Treatment-based Peripheral Nerve Center
Peripheral nerve injuries are frequent and involve many specialties

- Peripheral Neurotrauma
- Compression Neuropathy
- Polyneuropathy
- Causalgia / Complex Regional Pain / Fibromyalgia

Our opportunity: Implement new therapies that enhance treatment outcomes.
A *center* is more than the excellent application of existing treatments.

Our opportunity: Discover and implement new therapies that enhance treatment outcomes. Here!
The challenges of treating peripheral nerve damage

- Diagnosis
- Regeneration of Myelin
- Regeneration of Axons
Erythropoietin enhances recovery from peripheral nerve damage

Erythropoietin Enhanced Recovery After Traumatic Nerve Injury: Myelination and Localized Effects

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Erythropoietin Accelerates Functional Recovery After Peripheral Nerve Injury

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The repurposing of 4-aminopyridine: a novel treatment for diagnosing and treating acute peripheral nerve injury

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Research Article

4-Aminopyridine promotes functional recovery and remyelination in acute peripheral nerve injury

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K⁺ leakage causes impulse conduction failure when myelin is damaged.
4-aminopyrididine (4AP) enables demyelinated axons to conduct impulses
4AP can *identify and diagnose* lesions with axonal continuity

**Crush**

**Transection**
4AP enhances recovery

[Graph showing the enhancement of sciatic function index and nerve conduction velocity over days post-injury.]
4AP promotes remyelination
Our Peripheral Nerve Path

✓ Peripheral Neurotrauma

✓ Compression Neuropathy

○ Polyneuropathy

○ Causalgia / Complex Regional Pain / Fibromyalgia
There are many peripheral nerve centers that focus on the application of currently available treatments.

Currently available treatments have remained unchanged for a very long time.

Our opportunity: Implement our new therapies to enhance treatment outcomes.
UR already has many components needed to cement a center to deliver new peripheral nerve therapies

**Departments**
- Neurology and Pain Management
- Neurosurgery
- Urology - Surgery
- Physical Medicine and Rehabilitation
- Orthopaedics
- Stem Cell Regenerative Medicine Institute
- RNI
- Radiation Oncology and Oncology
- Delmonte Neuroscience Institute
- Pediatrics and Genetics

**Clinicians**
- Eric Logigian
- David Herrmann
- Emma Ciafaloni
- Michael Stanton
- Andrew Wensel
- John Elfar
- Sandy Constine
- Andrew Goodman
- Ed Messing

**Researchers**
- Mark Noble
- Chris Proschel
- Margot Proschel
- Peter Shrager
- Robert Dirksen
- Joe Chakkalakal
Success with 4AP sets the stage for further growth and recruitment WITHIN THE PNS

Our first clinical trial for 4AP in acute nerve damage has been approved by the FDA, for enhancing recovery after radical prostatectomy.

The first DoD grant has been approved, and three other grant applications are submitted.

Candidate treatment trials (near term):
- Cancer neuropathy, Bell’s Palsy, sciatica, central cord Syndrome, Charcot Marie Tooth

Pharmacodiagnostics:
- Saturday night palsy, Foot drop, brachial plexus palsy
Success with 4AP sets the stage for further growth and recruitment ABOVE THE PNS

Effects in traumatic CNS injury are currently under study.

What happens to the CNS in terms of connectivity and function with PNS treatments?

Opportunities for examining changes in CNS connectivity and function changes following treatment.
Define and test relevant animal models

Patient Selection
Inclusion Criteria

Clinical trial design and execution
• Relevant “recovery” readouts
• Diagnostic measures

Timeline is now

1\textsuperscript{st} year

2\textsuperscript{nd} year

3\textsuperscript{rd} year