The Overall Focus
Both adaptive and innate immunity can play different roles in the development versus the persistence of pain. However, specific mechanisms in the development of various types of pain-states are poorly elucidated. Our lab is focused on immune-interactions in the development and chronicity of pain.

Aging and Nerve Injury - Neuropathic Pain

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Cell-specific action of Toll-like Receptor-4 (TLR4)

Requirement
TLR4 (nociceptor) vs. TLR4 (macrophage)

Sufficiency
Mice lacking TLR4 specifically in DRG nociceptors OR microglia
Mice re-expressing TLR4 specifically in DRG nociceptors OR microglia

Genetic Tools
Non-Nociceptor
Macrophage

Onset of Neurathic Pain
Spared nerve injury

Translational signaling and plasticity
Molecular Biology and Electro Physiology

Development of Chronic Pain
Long-term development

Chemotherapy-induced Peripheral Neuropathy

Pain, burning, and thermal sensitivities in extremities
Reduction of chemotherapy dosage
Poorer survival rate

FIGURE 1. Chemotherapy Induced Neuropathy symptoms. The affect CIPN has on the micro and macro scales of the human body.

FIGURE 2. The working hypothesis and proof-of-concept genetic experiment.

High-Fat Diet-induced Obesity - Diabetic Neuropathic Pain

GTT

ITT

Weight (grams)

Fat Mass

Lean Mass

Glucone (mg/dl)

TLR4

Nav1.8-TLR4

TLR4

Nav1.8-TLR4

REFRENCES


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