# Immunohistochemical Characterization of the Mouse Subcutaneous Perimuscular Fascial Plexus

Sarah Corey[1], Nicole Bouffard[1], Helene Langevin[1,2]
Departments of Neurology[1] and Department of Orthopedics and Rehabilitation[2]
The University of Vermont, Burlington, VT 05405
Ph: (802) 656-0969 Fax: (802) 656-8704 email: scorey@uvm.edu

PURPOSE The innervartion of the deep fascia has not been fully described but may play an important role in musculoskeletal chronic pain. The pathophysiology of chronic musculoskeletal pain is poorly understood and may be related to nociceptive and/or mechanoreceptive sensory input originating from the perimuscular fascia . The goal of this study is to characterize the type and structure of the nerves and nerve terminals located within the subcutaneous perimuscular fascia of mouse tissue.

METHODS Post-mortem mouse subcutaneous tissue including the subcutaneous (panicular) muscle was excised from the backs of C57BL/6 mice and fixed in 3% paraformaldehyde. The perimuscular fascia was dissected from the panicular muscle and placed on slides as whole mounts. Immunohistochemistry and immunofluroescence was carried out with protein gene product 9.5 (PGP 9.5; marker of all neurons) and alpha-bungarotoxin (labels motor end plates). Imaging techniques included florescent and confocal microscopy.

RESULTS Within the perimuscular fascia, we observed an extensive plexus of nerve fibers. Immunofluorescent labeling of tissue whole mounts with PGP 9.5 demonstrated an extensive and diverse network of nerve fibers in the perimuscular fascia. To gain a better understanding of the types of nerves present in this tissue we used alpha-bungarotoxin to identify motor end plates. Double label immunohistochemistry showed that fibers from the same bundle of nerves would terminate in varying fashion. Some groups of fibers terminated at motor end plates. Other groups of fibers appeared to terminate at free nerve endings. Further study to characterize the composition and function of the free endings is ongoing.

CONCLUSIONS An extensive plexus of nerve fibers was observed within the mouse perimuscular fascia associated with the subcutaneous (panicular) muscle. Preliminary data using alpha-bungarotoxin suggests that a large number of these fibers are sensory. Currently we are working to identify characteristics of these sensory nerves that may play an important role in conveying the sensation originating from deep fascial tissue.