

## **Chronic Lumbosacral Radiculopathy: Impact of a Dietary Intervention on Pain and Function**

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Low back pain is a common condition among U.S. adults (26% in the last three months, (NHIS, 2007), and is the second most frequent reason that patients consult a primary care physician. Lumbar radicular pain, a common subgroup of low back pain, is typically more severe than low-back pain without radicular symptoms, and may involve herniation of a lumbar intervertebral disk, spinal stenosis and post-surgical fibrosis. The mechanisms of lumbar radicular pain are uncertain but are presumed to involve both mechanical compression and inflammation of the nerve root. Conventional conservative treatment includes oral medicines, physical therapy, spinal manipulation and lifestyle modifications, and interventional treatments may include epidural steroid injections and surgery. The economic burden of low back pain is estimated as \$100 billion [1]. Although 70% of patients' symptoms eventually resolve, 30% continue for months or years with chronic pain, which lowers quality of life and increases costs to the health care system and society. Preliminary evidence points to the potential for nutritional interventions in pain relief; in particular, there is evidence that Omega-6 (n-6) and omega-3 (n-3) fatty acids regulate multiple pain-related biochemical pathways. In a recent RCT in 67 patients with chronic daily headache, we found that targeted dietary modifications — increased dietary n-3 EPA+DHA with reduced n-6 linoleic acid (LA) intake — altered circulating pro- and anti-nociceptive lipid mediators, while reducing headache frequency and intensity, and improving quality of life. The goal of this proposed research is to assess whether a diet high in n-3 EPA+DHA and low in n-6 LA (H3-L6 Diet) can improve clinical outcomes related to lumbar radicular pain when compared to a control dietary intervention with 'average' U.S. intake of all n-6 and n-3 fatty acids (Control Diet). The proposed randomized, controlled, parallel-group trial with 11-26 subjects in each of two arms is designed: (1) To collect preliminary biochemical and clinical data to support development of a future fully powered RCT testing the clinical efficacy of the H3-L6 diet for treating chronic Lumbar Radicular Pain (LRP); (2) To evaluate the preliminary clinical efficacy of the H3-L6 diet as a complementary treatment for LRP; and (3) To assess the preliminary efficacy of the Analgesic Diet (H3-L6) in inducing the predicted changes in circulating pro- and anti-nociceptive mediators derived from n-3 and n-6 fatty acids. The proposed project will greatly benefit from the infrastructure and interdisciplinary team built for our previous headache trial and expanded for a recently awarded RO1 in Migraine, as well as the LC/MS/MS assay for lipid mediators of pain developed by our colleagues at NIH. These previous efforts will allow us to maximize the scope of the present project at permissible costs (see below), in order to examine of the preliminary clinical efficacy and underlying mechanisms of a promising dietary manipulation with the distinct potential for high impact in terms of ameliorating a chronic, disabling pain disorder.