

Introduction to Dr. Langevin's Research

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There has been very little research in the past three decades on the relationships between connective tissue morphology and the central nervous system. Similarly, the role of fascia in musculoskeletal dynamics has been largely overlooked among back-pain scientists. The following article, by Helene Langevin, M.D. is therefore of particular interest, as it offers a model that integrates connective tissue plasticity mechanisms with several well-explored areas of research in chronic back pain such as pain psychology, postural control and central neural sensitization.

Langevin is a French-Canadian internist and acupuncturist and works as research associate professor of neurology and orthopedics at the University of Vermont. Recently featured in the *Boston Globe* Sunday magazine *Profile*, she is a celebrity in the acupuncture field and in fact one of the highest funded acupuncture researchers internationally. Having had the pleasure of spending some personal time with her, during her recent lecture trip to Europe, I was deeply impressed by the unusual combination of a laser-like sharp critical mind, complemented by a very warm and compassionate heart.

Langevin's first acupuncture study, begun in 2000, demonstrated that the Fascia superficialis (subcutaneous tissue) was involved in producing the "tug" (or needle grasp) observed in acupuncture needling. Her team had designed a robotic needling device that showed that when the needles are inserted into the skin and then turned,

the superficial fascia holds onto the needle and wraps around it, much like spaghetti wound around a fork. Langevin's further research has shown that this fascial stretch creates an active response in the connective tissue cells (fibroblasts), which could activate certain cellular pathways and facilitate healing.

Among structural bodyworkers, it was her study "Relationship of acupuncture points and meridians to connective tissue planes" (*Anat Rec* 2002; 269: 257-65) that attracted the most attention. Using ultrasound imaging on cadaver tissue sections, Langevin and her team found an 80% correspondence between the sites of acupuncture points and the location of intermuscular or intramuscular fascial planes. She therefore proposed that the anatomical relationship of acupuncture points and meridians to fascial planes is relevant to acupuncture's mechanism of action and suggestive of a potentially important integrative role of fascial tissues. Langevin's further research of the superficial fascia revealed that the fibroblasts in this tissue form a body-wide interconnected cellular network, suggestive of important integrative functions at the level of the whole body.

In October of last year, Langevin won a major grant from the National Institutes of Health's National Center for Complementary and Alternative Medicine, bringing her grant-funding total over the past seven years to more than \$4.4 million. This most recent award will fund research to compare the acupuncture needling response in the fascia of eighty patients with back pain

and eighty patients without back pain. In a previous pilot study conducted by Langevin and her colleagues, it appeared that needle response was abnormal in people with low back pain.

Langevin is on the Scientific Review Committee of the International Fascia Research Congress (to be held October 4-5, 2007) and has been one of the advisors for this landmark event from the very beginning. The following paper, which readers may enjoy as preparation for the Congress, was recently published in the journal *Medical Hypotheses*. This is an unusual Medline-indexed journal, devoted to serving as a bridge between cutting-edge theory and the mainstream of medical and scientific communication. The respectability of this journal is demonstrated by the outstanding scientists on its seventeen-member editorial board (such as neurologists V.S. Ramachandran and Antonio Damasio or the Nobel laureate Arvid Carlsson). Langevin's article proposes a new explanatory model for chronic low back pain, which for the first time integrates the role of fascial tissue and the nervous system by proposing that these two systems are linked via changes in motor behavior. It is suggested that the described interactions play a key role in the natural history of chronic low back pain, as well as in its treatment. Readers who will attend the Congress look forward to finding out how recent scientific findings from Langevin's team, as well as other presenters, fit the clear and testable predictions made in the concluding section of this article.