"The Relationship of Acupuncture Points and Meridians to Connective Tissue Planes" by Helen M. Langevin, Ph.D., and Jason A. Yandow, Ph.D.

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In a recent compendium of her own research and existing literaturea, Dr. Helen Langevin hypothesizes that acupuncture needling transmits information primarily via the connective-tissue matrix. Acupuncture meridians run along connective-tissue planes; and acupuncture points are embedded in connective tissue, tending to be located on fascial septi. Continuous throughout the body and responsive to mechanical stimulation, connective tissue integrates all structures and cells, as well as the physiologic systems such as the sensorineural, circulatory and immune. It appears that acupuncture produces cellular changes that propagate along connective-tissue planes; and that the efficacy of acupuncture depends in part on the adaptive and communicative qualities of the connective-tissue medium.

Chinese medicine considers acupuncture meridians to be channels through which the life force, *qi*, flows. The meridians form a continuous network that includes all body systems. Acupuncture points are places of entry into the meridians. The Chinese character for acupuncture point also means hole, which suggests that an acupuncture point might be a spot that allows access to deeper layers of tissue. Ancient acupuncture texts make reference to "fat greasy membranes, fasciae and systems of connecting membranes" through which qi flows. Research also suggests continuity between meridians and connective tissue, as meridians lie along fascial planes.

Connective-tissue response to needling is quantitatively different at acupuncture points than at control points. "Needle grasp" refers to the fact that at acupuncture points, the connective tissue winds around the needle and seems to tug on it. Ancient texts describe this phenomenon as a fish biting on a line. Until recently, needle grasp was perceived as a function of muscle contraction, but Langevin's research shows that it is a connective-tissue response. According to Langevin, the tissue's grasp of the needle gives the acupuncturist leverage to send a mechanical signal to distant points in the connective-tissue matrix.

With connective tissue as their medium, the mechanical signals imparted by acupuncture might ultimately mediate information at the cellular level: cells share the global environment of the connective-tissue matrix, and changes in the local extra-cellular matrix influence fibroblasts, sensory afferents, immune system cells and vascular cells. Langevin also postulates that fibroblasts themselves contract in response to needling, causing further and more remote deformation of collagen fibers that spreads through the connective-tissue matrix like a wave. Moreover, mechanical signals are transduced into bioelectrical and biochemical signals. These signals, in turn, affect gene expression and protein synthesis, as well as producing semi-permanent tissue deformation.

In her article, Langevin sets forth many specific findings concerning acupuncture and the connective-tissue matrix. She also describes relationships between the connective-tissue matrix and physiological function. Langevin's work advances our understanding of the still-mysterious paths of communication within the organism, as well as the mechanisms at work in both acupuncture and manual connective-tissue therapies. Her ideas suggest new avenues of exploration regarding the properties of connective tissue. What's more, she has given a systematic account of the possible foundations of the anecdotal experiences of acupuncturists and manual therapists. ❑

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