

Imaging Acupoints and Their Communications Along Channels

Cheryl L Chrisman DVM, MS, EdS, DACVIM-Neurology

I have been fascinated by the anatomy and physiology of acupoints ever since I was first introduced to them in 1974 at a weekend seminar on acupuncture for veterinarians, organized by Drs. Marvin Cain and Richard Yennie. The most interesting parts of that seminar for me were that an ohmmeter could be used to identify acupoints on the body at specific repeatable sites and that these acupoints could be mechanically stimulated and evoke changes in the body, far from their location. Much research to explain the functional anatomy and physiology of acupoints and their effects has been done since that time, but there is so much more to discover. With open minds, further investigation, expanded knowledge of high-energy physics and advancements in imaging techniques, the next 5-10 years of acupoint research will be very exciting. With new information discovered during acupoint research, the current conventional medical paradigm will expand to include many of the aspects of acupoints and Channels observed by the ancient practitioners that are currently mocked by skeptics as “folklore”.

Visualization of acupoints arranged along Channels has helped to deepen our understanding of them. I recently watched an online 2009 Society for Scientific Exploration (SSE) lecture entitled “Imaging Acupuncture Points with fMRI 1/3” that included the results of acupoint studies by Drs. Joie Jones and Young Bae.¹ If you haven’t seen it, I think you might find it quite enlightening and a sign of what lies ahead in acupoint research. Dr. Joie Jones has a PhD in physics and is a Professor of Radiological Sciences at the School of Medicine, University of California, Irvine. Dr. Jones has pioneered many new developments in ultrasonic imaging. Dr. Young Bae, from the Bae Institute of Immune Enhancement, has a PhD in high-energy physics and practices acupuncture in Tustin, California.

Dr. Jones began his lecture by showing his past research from 2001 on functional magnetic resonance imaging (fMRI) of the visual cortex, when BL-67 was stimulated with a needle. He then presented his research on the similar effects of focused ultrasound stimulation of BL-67. He used a 5MHz transducer at 5-8 watts per square centimeter (above the level of ultrasound used for imaging, but below the level known to cause deleterious tissue effects). Ultrasonic stimulation of BL-67 produced

the same fMRI changes in the brain as needle stimulation. The fMRI changes were specific to the acupoint and were not seen with stimulation of a non-acupoint (sham acupoint).

Drs. Jones and Bae then studied ways to image acupoints using ultrasound. They were unable to image acupoints with conventional ultrasound at 3.5, 7.5 and 10 MHz, as acupoints had the same reflectivity as the surrounding tissue. However at 50 MHz, enhanced ultrasound attenuation was consistently found on several different acupoints studied. They then digitized the reflected signals and with special digital reconstructive software, developed in their laboratory, created a 3 dimensional image of BL-67, represented by foci of constant attenuation or elasticity. Through these studies Drs. Jones and Bae demonstrated visually that acupoints move slightly and do not stay in the same place. The slight fluctuations of acupoint positions is known by many acupuncturists, but can be disconcerting to some new acupuncturists in training and used to discredit acupuncture by skeptics.

Dr. Jones and Bae recorded the daily variation of the center of BL-67 over a 12-day period and found that acupoints change slightly, not only in location, but also in size and shape. He summarized his findings with the following points: “1) acupoints correspond to regions of increased ultrasound attenuation, 2) acupoints can change in size, shape and even location over short periods of time, 3) quantitative ultrasound methods can image acupoints and 4) ultrasound at higher intensities can stimulate acupoints”.¹⁻⁴

Dr. Jones then presented preliminary data from ongoing research whose objectives were to 1) obtain ultrasonic attenuation images of acupoints during stimulation, 2) investigate communication between acupoints on the same Channel and 3) investigate various communication pathways between acupoints and the brain and other structures. He has developed a new data acquisition system and showed the resting image of BL-67 created by his system. The acupoint image looked like a multifaceted diamond that then shifted shape and twisted around the needle upon insertion.^{2,3}

Dr. Jones imaged several contiguous acupoints along the BL Channel moving proximal from BL-67 and showed them as multifaceted spheres of different sizes.

Then he stimulated BL-67 with a needle and showed its physical change and then showed, in real time, the distal Bladder Channel acupoint changes that occurred at a transmission time of 5-10 centimeters/sec. Nerves conduct about 60-100 meters/sec, depending on the species and specific nerves, so the ultrasonic stimulation was passing between acupoints along the previously described Bladder Channel, not simply along a peripheral nerve.

Also from their studies of acupoint stimulation and brain fMRI studies, Drs. Jones and Bae found that the time between ultrasonic stimulation of an acupoint and change in fMRI brain activity was almost instantaneously “two orders of magnitude faster than any known process”.¹ These findings suggested there were other pathways besides nerves between the superficial acupoint BL-67 and the brain. They indicated that this finding was consistent with the theory of subtle energy fields in the body and went on to theorize that the stimulated BL-67 acupoint was emitting a pulse of electromagnetic energy that was being picked up by an acupoint in the brain.

Drs. Jones and Bae found that stimulation of BL-67 produced three signals that arrived at different times and altered the brain fMRI: 1) a very fast signal, arriving almost instantaneous, whose pathway is currently unknown, 2) a second signal that arrived 180-200 milliseconds later that was clearly from transmission of the nerves in the area of the acupoint and 3) a very slow signal that arrived after 15-25 seconds, whose pathway is also unknown. Dr. Jones predicted that our current understanding of medical science could potentially change fundamentally with the addition of scientific evidence of subtle energy fields and communication pathways throughout the body. Acupuncture and medical practices could also be impacted from his studies as special ultrasonic devices could be developed that precisely locate and image a specific acupoint and then switched to a treatment mode to stimulate that acupoint.^{1,4}

However to change the current scientific paradigm, research findings must be published in conventional scientific journals. Only in this way can the conventional scientific community be informed, so that other laboratories can replicate these studies and bring these controversial concepts into mainstream science. Dr. Jones discussed his experiences trying to get papers published that contain data different than the current scientific paradigm. He first submitted the acupoint imaging studies to the prestigious journal *Science* and was told that they do not even review such papers. Next he sent his paper to another prestigious scientific journal, *Nature*. An editor from *Nature* said they would consider reviewing it, if he could get 5 reliable experts

to review it first and write letters of support. Dr. Jones got 5 Nobel prize winners in the neurosciences, who were all also members of the Academy of Science, to review this research. They all wrote supportive letters about the quality of research and findings, but *Nature* still would not review it. So it appears that some of the most respected journals of science are biased against even reviewing papers with research findings that challenge the current paradigm of science. It is very difficult to expand scientific frontiers in novel directions, when scientific journals censor the type of research they will publish because of these editorial biases. The old adage “I wouldn’t believe it, even if it were true” expresses the mind set of some, even in the scientific community. With patience, persistence and a positive attitude, paradigms of medicine will evolve and change in unconventional ways. It has been very exciting for me to watch the changes in attitude and acceptance of acupuncture into medical practices over the past 38 years and it will be equally exciting to see what happens in the next 5-10 years, as the concepts of energy medicine become science. There is some preliminary clinical evidence of the therapeutic efficacy of ultrasonic stimulation of acupoints.⁵⁻⁷ If any of you are using focused ultrasound stimulation of acupoints to treat patients, please write to me and share your experiences as a “Letter to the Editor” for the next issue of AJTCVM. Send your letter to: chrismanc@ajtcvm.org.

REFERENCES

1. http://www.youtube.com/watch?v=mw_LKKZcgyw
2. Jones JP, Bae YK. Ultrasonic visualization and stimulation of classical oriental acupuncture points. *Journal of Medical Acupuncture* 2004; 15(2):24-27.
3. Jones JP, Bae YK, Wilson CS et al. Ultrasonic imaging and characterization of acupuncture points. *Acoustical imaging* 2004; 27:527-534.
4. Jones JP. Ultrasonic acupuncture and the correlation between acupuncture stimulation and the activation of associated brain cortices using functional magnetic resonance imaging. *Bulletin of Science, Technology and Society* 2002; 22:362-370.
5. Tsuruoka N, Watanabe M, Seki T et al. Acupoint stimulation device using focused ultrasound. *Conf Proc IEEE Eng Med Biol Soc* 2010:1258-61.
6. Wang SH, Chen YT, Weng CS et al. A clinical therapeutic assessment for the administration of different modes of ultrasounds to stimulate the Zusanli acupuncture point of hypertension patients. *Journal of Medical and biological Engineering* 2003; 23(4):221-228.
7. Wang ZJ, Su WZ, Gao HY et al. Clinical observation of acupoint stimulation on acute ischemic stroke. *Hebei Journal of TCM* 2011; 33 (3):404-405. In Chinese