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COMPARISON OF BIOENERGY AND PHYSIOLOGICAL MARKERS IN QIGONG AND ACUPUNCTURE RESEARCH. Shin Lin, Gaetan Chevalier, Timothy Ross, Manhvu Nguyen, Howe Lin, Payton Lin, and Yun Lin. International Alliance for Mind/Body Signaling and Energy Research, Department of Developmental & Cell Biology, Center for Biomedical Engineering, and Susan Samueli Center for Integrative Medicine, University of California, Irvine, CA 92697-2300.

Qigong, a diverse family of many different Chinese styles of mind/body training, is linked to acupuncture by the traditional belief that they both enhance circulation of bioenergy, "Qi", in the body for improvement of health and healing of diseases. Research aimed at understanding the beneficial effects of Qigong practice has been hampered by the lack of scientific methodology to define and to measure Qi. In order to identify surrogate markers for the flow of Qi in the body, we have used several standard biomedical analyses to compare against a number of "non-conventional" technologies for measuring different forms of bioenergy, including the single square voltage pulse (SSVP) method for measuring pre-polarization conductance at jing-well acupoints, gas discharge visualization (GDV, or digital Kirlian photography) for analyzing bioelectromagnetic fields induced by a high-voltage pulse, and single photon counting instrumentation for quantifying biophoton emission. In a study of over 25 Qigong practitioners and 10 control subjects, we found that a period of about 15 minutes of Qigong practice involving regulation of body, mind, and respiration significantly changes the parameters measured by each of the above technologies. Similar changes were detected with the SSVP method following acupuncture treatment, but not physical exercises such as cycling or weight lifting. With the use of laser Doppler flowmetry, we showed that certain Qigong movements significantly increase cutaneous blood flow measured at the Laogong acupoint (PC8) on the palm, and that some movements are more effective than others in producing this effect. Moreover, while performance of Qigong deep breathing cycles also increases blood flow as a result of respiratory sinus arrhythmia indicated by heart rate variability analysis, coupling them with the Qigong movements in the traditional manner produces an even greater effect. By comparison, improper coupling of such breathing cycles with the movements, and vasoconstrictive conditions such as cooling the hand with ice and raising sympathetic tone by performing isometric exercise (i.e., lifting heavy weights) with the other hand counteract this increase in blood flow. In control experiments, we found that artificially increasing blood flow by raising the temperature of the hand by a few degrees (monitored with infra red thermometry) with a heater increases pre-polarization conductance at acupoints and biophoton emission, and changes certain parameters such as "normalized area" and "form coefficient" in the GDV image. From the results of this series of experiments, we suggest that blood flow could be a good surrogate marker for Qi circulation, and that the increase in cutaneous blood flow measured by laser Doppler flowmetry as a result of Qigong practice may directly or indirectly relate to the observed changes in bioenergy detected by the SSVP method, GDV, and single biophoton counting. To what extent these relationships can be applied to research on acupuncture requires further investigation. (Supported by the LSR

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