2) *Experiments with Liquid Crystal*

In the aforementioned experiment for the meridian test, in which electrodes were placed on the various acupuncture points and stimuli were applied to elicit electrical reaction of the points, it was difficult to apprehend the path of the meridian visually. Therefore it was thought that if there were changes in the skin temperature in a line or band along the meridian, temperature-sensitive liquid crystals would possibly show the path of the meridian. For this purpose, experiments were undertaken on each of the six meridians of the hand (Pictures 1 ~ 6).

(1) Experimental Method

① The temperature of the lower arm was measured with a thermistor. Since 29°C was the temperature actually measured, a liquid crystal that changes color at 29° ~ 31°C was selected.

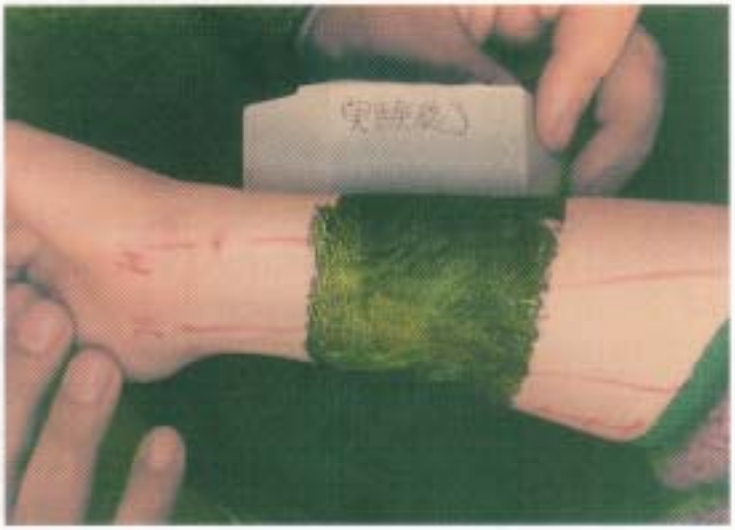
② Approximately 25cm of the lower arm (from 5cm above the wrist almost up to the elbow) was covered with black carbon ink, and after this had dried, the above-mentioned liquid crystal was applied thoroughly (Picture 1).

③ Heat stimulus was then applied to the Gen point of the large intestine meridian for 5–10 minutes (Picture 2).[7]

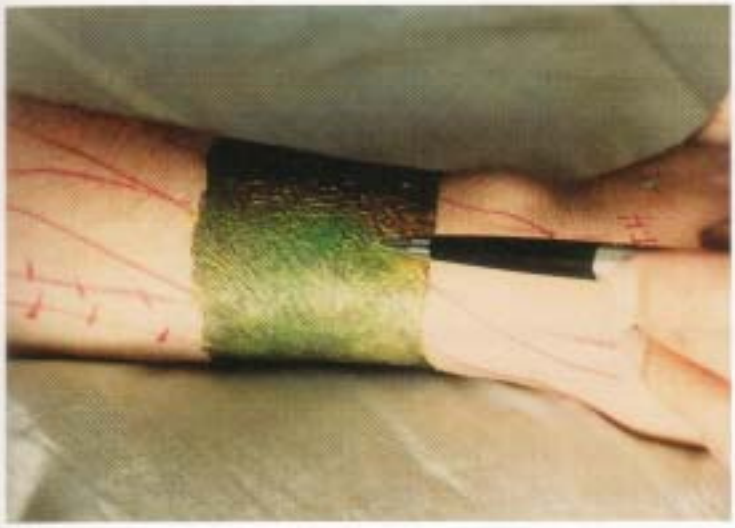
Picture 1: Before Stimulation

Picture 4: Color change continued along the meridian for 2 or 3 minutes

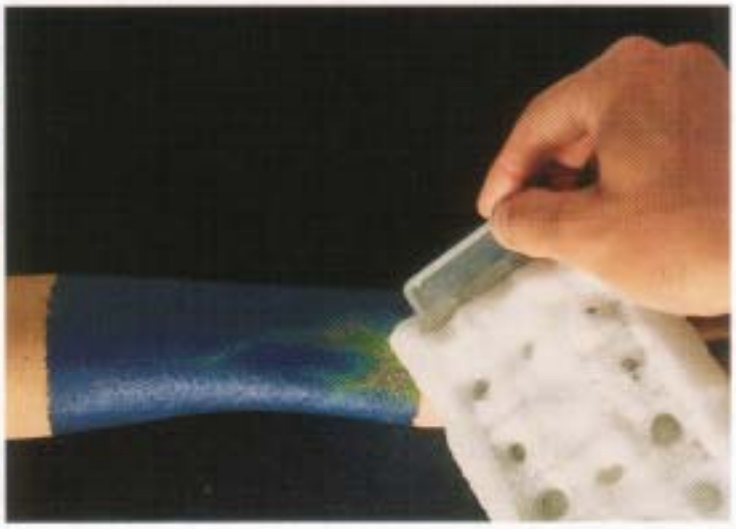
Picture 2: Thermal stimulation on the Gen Point of the large intestine meridian



Picture 5: Five Minutes after the Completion of This Experiment



Picture 3: Color Change Was Noticed in a Band along the LI Meridian



Picture 6: A Different Subject Having a Higher Arm Temperature

(2) Results and Observations

In 2 ~ 5 minutes the liquid crystal changed color (turned green) in a band along the large intestine meridian (Picture 3). This indicated that by thermal stimulation of the Gen point of the large intestine meridian, the flow of body fluids along this meridian underwent a temperature increase of 1 ~ 2°C. Since the course of a meridian does not always correspond with that of blood vessels, this increase of the skin temperature along the meridian can be hypothesized to be the increase in the temperature of the body fluids hypothesized to flow as the meridian.

(3) Conclusion

By this experiment with liquid crystals, the path of a meridian was visually demonstrated. From these experimental results, the meridians are thought to be flows of body fluid.

Supplement:

This experiment with liquid crystal did not succeed for all the persons tested. One subject, for example, as shown in the last colored photograph (Picture 6), displayed no apparent temperature change along an acupuncture meridian. This subject had a higher than normal arm temperature, so the wrist (ulnar part) was cooled with ice. Along the arm, the temperature decrease caused the liquid crystal coating to change color only along the pathway of the major blood vessels (veins). Even though the sites of the temperature changes partly corresponded to the heart meridian, the pattern observed was not the band-type characteristic of the meridians. Instead they correspond to the size of the blood vessels. Also in some other cases it was noticed that the temperature of the veins was higher than that of neighboring areas regardless of whether a stimulus was applied or not.

Even for the same individuals, results were not always repeatable between successive determinations. The results were clearer, it seems, after exposure to the sun's rays; and on cloudy days, variations in the skin temperature could not be observed. This perhaps indicates that there is some kind of relationship between sunlight and the meridians.