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## Medical Applications of Qigong and Emitted Qi on Humans, Animals, Cell Cultures, and Plants: Review of Selected Scientific Research

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**Abstract:** In the past few years, many studies have been conducted to investigate the scientific basis of Chinese Qigong and emitted Qi and to document their medical benefits. Most of this information has been generated in China and published in Chinese. For the benefit of Western scientists and medical practitioners, we discuss selected scientific reports pertaining to the effects of Qigong exercise and emitted Qi that were presented at two international conferences held in 1990. The reports document the medical benefits of Qigong exercise and some of the significant changes produced when Qigong practitioners or "masters" emit Qi to living systems: humans, animals, cell cultures and plants. The research described in these reports appears to have followed satisfactory scientific protocol.

**QIGONG** is one component of Chinese medicine and has a history that extends several thousand years. In general, Qigong promotes health and healing by physical and mental exercises that promote the balancing of Qi, the vital energy of the body. We will discuss two types of Qi used in Qigong: 1) internal, and 2) external.

Internal Qi helps develop good health and self healing by means of individual

practice of Qigong exercises. There are a wide array of personal Qigong practices that are self activated with the objective of self refinement. Most contain the following elements: breath exercises, deep relaxation, meditation, visualization, body postures, movements and certain self-applied massage techniques.

External Qigong refers to emission of Qi by a Qigong "master" (Qigong practitioner with exceptional skill) with the objective of affecting someone or something other than himself; in that way the process it is not unlike a medical procedure or treatment. A patient's condition may be affected (or "healed") when a Qigong master emits his Qi to balance the patient's Qi.

The goal of this review is to provide Western scientists with an overview of the diversity and quality of scientific research on medical Qigong. Information on scientific developments regarding Qigong is primarily published in Chinese journals and conference proceedings that are not readily accessible outside of China. However, the importance of Qigong is indicated by the fact that it was the principal subject of sev-

eral hundred scientific reports presented at seven international conferences during the last four years.<sup>1-7</sup>

In this presentation, we endeavor to provide sufficient information to enable the reader to identify the scientific merits of selected reports. The reports were selected mainly from two recent international Qigong conferences that we attended: 1) The combined First International Congress of Qigong and the Fifth International Congress of Chinese Medicine, held at the University of California, Berkeley, California, June 1990 (sponsored by the Qigong Institute, East West Academy of Healing Arts and the Institute of Oriental Medicine) and 2) the Third International Qigong Symposium, held in Shanghai, P.R.C., September 1990 (sponsored by the Qigong Institute of the Shanghai Academy of Traditional Chinese Medicine).

The following ten reports were selected on the basis that they pertained to research on medical applications of Qigong and of emitted Qi and that the research appeared to have been conducted with acceptable scientific protocol. Our commentary on the reports are based on the oral presentations which we heard, the abstracts printed in the proceedings, and our discussions and correspondence with the researchers. With few exceptions, complete reports were unavailable. Some worthy reports may have been omitted because of space limitations or because we were unable to attend all of the presentations at the conferences, which were organized in two tracks.

The following research reports are grouped according to the effects of Qi on four types of living systems: 1) humans, 2) animals, 3) cell cultures, and 4) plants. Our "Commentary" precedes the specifics of each study. To broaden the scope of understanding of a given topic, we also include occasional reference to reports from other sources, e.g., conferences, published literature, etc. The location of the conference where each report was presented is enclosed in brackets.

## I. Effects of Qigong and Emitted Qi on Humans

*Clinical Observation of 204 Patients with Hypertension Treated with Qigong.* Huang Xianbiao (Xiamen University, Xiamen, Fujian, China): A study of the effects of Qigong exercise on changes in blood chemistry and mortality of patients with hypertension. [Berkeley]

*Commentary:* The researchers concluded that Qigong played a major role in improving the self regulation and relaxation of the multiple cerebro-cardiovascular risk factors. Further, they suggest that this may be a mechanism by which to prevent stroke. The study shows the benefits of Qigong in combination with Western medicinal practice.

We call attention to another scientific study of treatment by a combination of Chinese and Western medicine. Sun Qiuzhi and Zhao Li (Kuangan Men Hospital, China Academy of Traditional Chinese Medicine, Beijing, China),<sup>3</sup> made a study of the effects of Qigong exercise as a therapeutic aid for advanced cancer patients with pathologically diagnosed malignant cancer. Over a period of six months, 97 patients practiced Qigong exercises and were treated with drugs, and a control group of 30 patients was treated only with drugs. For the Qigong group, 82% regained strength, 63% had improved appetites, 33% were free of diarrhea, 50% had increased body weight by more than 3 kg, whereas the control group's rates were 10%, 10%, 6%, and 13%, respectively. The phagocytic rate increased by 12.3% in the Qigong group while it decreased 7.9% in the control. Out of the 93 patients in the Qigong group, the erythrocyte sedimentation rate of 23 patients and the hepatic function of 20 patients returned to normal, while in the control group there were only 3 and 2 cases, respectively. The results illustrate the potential for Qigong therapy combined with Western medicine.

**Procedures and Results:** 204 hypertensive patients were randomly divided into two groups, a "Qigong group" which prac-

ticed Qigong exercises and received a small dosage of an antihypertensive drug, and a control group which only received a regular dosage of the drug. After 6 months of Qigong practice, plasma dopamin- $\beta$ -hydroxylase (DBH) activity decreased, plasma cholesterol (HDL, high density lipoprotein) increased, and blood viscosity and platelet aggregation abnormalities improved. Also, hyper-response of blood pressure to stress was reduced. A 6-year follow-up showed that the clinical effectiveness of treating hypertension was  $87\pm 3\%$  and  $68\pm 1\%$  for the two groups, respectively. During this period, the total and stroke mortality rates were 17.3% and 11.5% in the Qigong group, and significantly higher at 32.0% and 23.0% in the control group, respectively.

*Relationship Among Erythrocyte Superoxide Dismutase (RBC-SOD) Activity, Plasma Sexual Hormones (T, E<sub>2</sub>), Aging and Qigong Exercise.* Ye Ming, Zhang Ruihua, Wu Xiaohong, Wang Yao and Shen Jiaqi (Shanghai Academy of Traditional Chinese Medicine and Shanghai Qigong Institute, China): A study of the effect of Qigong exercise on the blood chemistry of human subjects. [Shanghai]

*Commentary:* The researchers concluded that Qigong exercise had stimulated increased activity of the enzyme, SOD, which in turn resulted in better control of the aging process by decreasing the estrogen level for men and increasing it for women. For aging people, lower levels of estrogen in men and increased levels for women are considered beneficial for health.

We believe that these results suggest one mechanism by which Qigong exercise can promote health, improve the condition of the aged, and cure disease.

**Procedures and Results:** Two sets of tests were run on the blood samples of 116 human subjects before and after practicing Qigong for two months. The subjects had no previous experience with Qigong. In the first set, the activity of the RBC enzyme, SOD, was found to be  $684.9\pm 7.0$  ng/g Hb

before and  $721.2\pm 8.3$  ng/gHb after the Qigong training ( $p<0.05$ ). The activity of the enzyme was unchanged ( $p>0.05$ ) for a control group of 30 subjects.

In the second set, plasma sex hormone levels, testosterone (T) and estrogen (E<sub>2</sub>), were measured by an enzyme linked immunofluorescence assay. After two months of Qigong practice, the levels of T had not changed significantly. The E<sub>2</sub> levels depended on the sex and age of the subjects. The value of E<sub>2</sub> decreased for 17 males under 45 years of age from  $66\pm 19$  to  $45\pm 21$  pg/ml ( $p<0.01$ ), and for 30 males over 45 years of age from  $38\pm 8$  to  $30\pm 6$  pg/ml ( $p<0.01$ ). The value of E<sub>2</sub> increased for 30 females under 45 years of age from  $74\pm 79$  to  $127\pm 85$  pg/ml ( $p<0.01$ ), and for 13 females over 45 years of age from  $67\pm 49$  to  $80\pm 51$  pg/ml ( $p<0.05$ ). No significant changes occurred in the control group of 27 people.

*Effect of Qigong State and Emitted Qi on the Human Nervous System.* Liu Guolong (Beijing College of Traditional Chinese Medicine, Beijing, China): A study by EEG and evoked potential on humans and animals of the effects of emitted Qi, Qigong meditation, and infrasound from a Qigong simulator. [Berkeley]

*Commentary:* The researcher suggests that Qigong meditation may bring about excitatory or inhibitory effects of the central nervous system, thereby unmasking or enhancing the functions that are not part of the normal repertoire of the nervous system. He also postulates that the infrasonic component in emitted Qi may cause the neurons in the hypothalamus to resonate and thus alter EEG patterns, but there may be other active components in the Qi. Simultaneous measurements of EEGs of Qigong therapists and their subjects was the subject of a report by Kawano, et al., at the Shanghai Symposium and a recent paper.<sup>8</sup>

**Procedures and Results:** The effects of Qigong meditation and emitted Qi on the nervous system of humans and animals were

measured by electroencephalography (EEG) and evoked potential (EP). Because of limitations of space, we outline only a few results of this multifaceted study. The results for human subjects are summarized in Table 1.

A study of the effects of Qigong meditation was conducted on 14 subjects who had practiced Qigong for 1-3 years. Compared with the control of 27 naive subjects who had never practiced Qigong, Qigong meditation led to a significant enhancement in the EEG frontal power spectrum (A), enhancement of EEG occipital power spectrum (B), and movement of the dominant alpha-wave frequencies from occipital to frontal lobes, i.e., reversal of frontal-occipital (C), enhancement of EEG power spectrum in all channels (D), and enhancement and synchronization of all alpha frequencies (E). The effects of emitted Qi on the EEG and EP of 45 normal subjects produced much the same results as Qigong meditation.

A measurement was made of the intensity of the infrasonic energy emitted by 27 Qigong "masters" who had practiced for 4-32 years. The intensity of this infrasonic intensity ranged from 45db to 76db, with a background noise level of 40db. For six Qigong masters, the infrasonic intensity was over 70db and the dominant peak frequencies were in the range of 8Hz to 12.5Hz, which coincides with the frequencies of EEG alpha waves. In fact, the dominant alpha frequency in the EEG power spectrum of the subjects tended to synchronize with that of the emitted Qi. Imitation of the observable actions of Qigong masters by 28 naive subjects produced effects similar to that of the control experiment.

In another experiment, an infrasonic generator that simulated emitted Qi was found to produce effects on the EEG of 20 subjects similar to that of emitted Qi (Table 1). This result indicates that the effects of the infrasonic generator were not due to electromagnetic interferences from the generator.

**Table 1.**

EEG study of effects of Qigong on human subjects

Experiment		A	B	C	D	E	p <	
							0.05	0.01
Control	%	48	43	13	17	33	8	0
	n = 27	n 11	n 10	n 3	n 4	n 9	n 2	n 0
Meditation	%	93	71	36	50	79	71	14
	n = 14	n 13	n 10	n 5	n 7	n 11	n 10	n 2
Emitted Qi	%	90	58	42	51	69	44	27
	n = 45	n 41	n 21	n 19	n 23	n 31	n 20	n 12
Infrasonic	%	85	55	35	45	70	65	15
	n = 20	n 17	n 11	n 7	n 9	n 14	n 13	n 3
Imitation	%	46	39	4	18	39	11	0
	n = 28	n 13	n 11	n 1	n 5	n 11	n 3	n 0

*Notes:* A = enhancement EEG frontal power spectrum; B = enhancement of EEG occipital power spectrum; C = reversal of "frontal-occipital;" D = enhancement of EEG power spectrum in all channels; E = enhancement and synchronization of all alpha frequencies.

To eliminate psychological influences of emitted Qi, experiments were carried out on anesthetized cats by recording EP and on rabbits by recording EEG. Emitted Qi from a Qigong master changed both EP and EEG. For example in a study of 12 cats, emitted Qi facilitated the Middle Latency Response (MLR) in 6 cases and inhibited it in 6 other cases. The MLR is the primary component of the auditory cortical evoked response and indicates activity of the cerebral cortex.

*Simple Method for Evaluating the Qigong State: Transient Changes in the Qigong Master and Patient and the Effects of Qigong on Blood Circulation, Bacteria, Viruses, and the Release of Neurotransmitters and Hormones at Acupuncture Points.* Yoshiaki Omura (Heart Disease Research Foundation, New York, N.Y.): A study using the Bidigital O-Ring Test imaging technique to evaluate the effects of Qigong in the Qigong master and patient. [Berkeley]

*Commentary: The Bidigital O-Ring Test (BDORT) provides a rapid and sensitive technique for evaluating a Qigong master and his effect on a patient. The BDORT also provides a way of monitoring the healing character of Qi transferred to*

materials, such as paper, cotton or liquids, for which Qigong practitioners have claimed to have healing properties.

**Procedures and Results:** The researcher used the Bidigital O-ring Test to evaluate both the Qigong master and subject being treated.<sup>9</sup> During the Qigong state, certain normal parts of the Qigong master's body showed a minus response to the BDORT. The minus response corresponds to muscle strength weakening and usually appears only when an abnormality exists, with the exception of the thymus gland and strongly excited nerve fibres. Striking changes in the BDORT occurred at certain acupuncture points (CV-5, CV-6, CV-17, CV-22, Yintang, GV-20), meridians (entire Pericardium and Triple Burner), as well as the entire spinal cord, medulla oblongata, and various parts of the cerebral cortex. Similar changes occurred in the Qigong master and patient while the Qigong master was treating the patient.

During the Qigong treatment, the alpha wave in the EEG increased markedly in both the Qigong master and patient. After discontinuing the Qigong treatment, these changes disappeared completely. The researcher was able to reproduce these findings experimentally.

When areas of the body that are positive to the BDORT for bacteria or virus were treated with external Qi, the BDORT response to specific bacteria or viruses often disappeared immediately. Similar changes occurred in *in vitro* experiments with bacterial cultures after approximately 5-15 minutes of Qi treatment. The BDORT's positive response to these pathogens usually reappeared after 3 or 4 hours.

Meridians for specific internal organs and their corresponding acupuncture points were accurately localized using the BDORT, and neurotransmitters and hormones unique to an internal organ were found exactly on the meridians and acupuncture points. When Qi was sent to these acupuncture points, the neurotransmitters and hormones diffused to produce a donut-shaped distribution as imaged by the

BDORT. By contrast, needle insertion at the center of the acupuncture points produced a simple circular distribution of the neurotransmitters and hormones.

The BDORT was also used to evaluate whether a Qigong master is emitting positive or negative Qi.<sup>9,10</sup> This was accomplished by having the Qigong master hold a paper, cloth or metal sheet between his two palms and then sending Qi to his hands. If the Qigong state was reached, the BDORT indicated that the paper developed two opposite polarities (positive or minus Qi) which did not exist before and which lasted for an extended period of time (e.g. one year if it is not exposed to rapidly changing electric or magnetic fields) but disappeared rapidly when a rapidly changing electric or magnetic field was applied. Such positive "Qigongized" paper has therapeutic value by giving relief or reduction of pain, reduction of spastic muscles, or improvement of circulatory disturbances by inducing a vasodilation effect by merely applying the Qi-treated material to the area of circulatory disturbance for 20 or 30 seconds. However, negative Qigongized material, which has the opposite effect of positive Qigongized material, produces vasoconstriction.

Omura stored positive Qi in various materials and drugs which were then used for improving circulation and inducing enhanced drug uptake in the abnormal area where the drug is to be delivered but cannot reach in sufficient therapeutic dosages. In his subsequent research,<sup>10,11</sup> he succeeded in creating pure positive or pure negative Qigongized materials without any opposite polarity. By applying pure, positive Qigongized materials he was able to treat some intractable pain and other intractable medical problems due to bacterial or viral infections, circulatory disturbances, and heavy metal deposits.

*Effects of External and Internal Qi as Measured Experimentally by Muscle Testing.*  
Kenneth M. Sancier and Effie P.Y. Chow  
(Qigong Institute, East West Academy of

Healing Arts, San Francisco, California, U.S.A.): A study of the effects of external and internal Qi processes related to healing on body energy of human subjects.<sup>12</sup> [Berkeley, Shanghai]

*Commentary: In Chinese medicine, healing is achieved by balancing the body energy, i.e., by dispersing or tonifying the energy along certain meridians. Such balancing is often achieved by using external or internal Qigong. The present study indicates that the Qigong master's intent, which affects his external Qi, and subject's visualization, which affects his internal Qi, can be potent forces in affecting muscle strength and balance of body energy. The results affirm the often stated belief that visualization and positive thinking are an essential part of the healing process.*

**Procedures and Results:** An arm muscle test was used to indicate changes in a subject's muscle strength that was affected by changes in 1) external Qi emitted by a Qigong master or 2) internal Qi resulting from negative or positive thoughts of a subject. Two measurements were recorded as a function of time: the downward force on the subject's outstretched arms and the arm height. The critical parameter was found to be the time, *t*, that a subject could resist the downward push before his outstretched arms would be moved downward significantly. Force was applied for a maximum of approximately 4 seconds.

External Qi was emitted by the Qigong master in a given sequence of six nonverbal processes, which were known only to the Qigong master, with the intention to either weaken or strengthen each of eight subjects, both men and women. Such processes are analogous to those used in healing to balance the body energy. A muscle test was made after each Qigong maneuver to determine the resistance time.

The results in Table 2 show that the mean values of the resistance times were approximately 2 seconds for the weakened state and approximately 4 seconds for the strong state ( $p < 0.0001$ ).

**Table 2.**

The effect of external Qi on arm muscle strength: the mean time-duration in seconds that 8 subjects resisted the downward force for a given sequence of nonverbal processes of the Qigong master. SD = the standard deviation of data among the 8 subjects.

	1 initial	2 weak	3 weak	4 strong	5 weak	6 strong
Mean	4.2	1.7	1.8	3.6	1.7	4.0
SD	0.4	0.9	0.6	0.9	0.4	0.8

Changes in internal Qi were produced by letting only the subject see a flash card marked "well" or "sick." A muscle test was performed after a subject looked at each of eight random cards. For 12 subjects, there was a significant difference in the value of *t* (*p* in the range of 0.0001 to 0.049), and for three subjects there was no significant difference ( $p > 0.05$ ). The best correlation ( $p < 0.0001$ ) was attained by a subject who reported using strong visualization of what it meant to him to be sick or well.

## II. Effects of Emitted Qi on Animals

*Effects of Outgoing Qi on Transplanted Tumor S180 of Rats.* Xu Hefen, Xing Fengjie, Zhang Chengming, Xue Huining (Jiangsu Provincial Research Institute of Traditional Chinese Medicine), Shao Xiangming, Liu Guanchang and Zhou Qijin (Department of Pathology, Nanjing Naval Medical College) and Wang Yongqiang (Nanjing Second Drug Works, China): A study of the effect of emitted Qi on tumors implanted in rats. [Shanghai]

*Commentary: The researchers suggest that emitted Qi damages tumor cells, inhibits their growth, promotes the regenerative function of the lymph system, and increases anti-tumorigenic function in rats.*

*We call attention to the first in vivo study of the beneficial effects of emitted Qi on the immune functions of mice.<sup>3</sup> Similar benefits of emitted Qi should be expected in clinical treatment of tumors in humans. Therefore, such studies provide support for the numerous claims that emitted Qi and*

*personal Qigong exercise can cure or inhibit cancer growth in humans.*

**Procedures and Results:** Tumor S180 was implanted in 20 rats. One group of 10 rats were treated with Qi emitted from the hand of a Qigong master for 20-30 min., twice a day for 10 days; a control group of 10 rats did not receive Qi. The rats were sacrificed 10 days later, and tumors were removed from their bodies.

Histopathologic and microscopic examinations revealed significant differences between the two groups. For example, the Qi-treated mice 1) were healthier and more active, 2) their tumors could be excised more readily, 3) their tumor volume and mass were less (e.g., 1.32 g compared with 2.2 g for control ( $p < 0.01$ ), 4) the number of tumor cells per unit area of examination were less ( $p < 0.01-0.001$ ), 5) the areas of necrosis and bleeding of the tumors were greater, suggesting that the tumor cells were being killed, 6) their hemoglobin content was much higher ( $p < 0.01$ ), 7) their tumor growth rates and metastasis were slower, 8) their peripheral lymph nodes were larger and more abundant (3 or 4 compared to 2 to 3 for the control), 9) their spleens were more normal and cells in these organs were in a more active regenerative state, 10) infiltration of their lymph cells into the tumors were more obvious, and a number of irregular macrophages were found in the lymph sinus, and 11) visual inspection revealed differences in color.

### III. Effects of Emitted Qi on Cell Cultures

*Effects on the Biochemical Reactions of Normal Cells.* Chien Chihhsiang, Julia Tsuei, and Wei Yauhuei (National Yang Ming Medical College and National Research Institute of Chinese Medicine, Taipei): A study of the effects of a Qigong master's intent on biochemical reactions of cell cultures in vitro. [Shanghai]

*Commentary: The results show that Peaceful Mind Qi increased the growth and*

*respiration of cultured cells, whereas the protein synthesis rate was affected minimally. By contrast, Destroying Mind Qi decreased all of these biochemical reactions. The researchers suggest that Peaceful Mind Qi is accepted by the cells as a signal to stimulate the above cell functions. Destroying Mind Qi decreases the cell function rates by generating a large energy that results in changes of the cytoplasm fluidity, the nuclear matrix or the cell membrane.*

*We believe that this in vitro study provides strong support for the reality of emitted Qi and its potential for changing the metabolism of living cells. The dependence of the outcome on the intent of the Qigong master has profound implications for medical Qigong in clinical applications. Similar studies with tumor cells are in progress in the United States.<sup>13</sup>*

**Procedures and Results:** A Qigong master emitted two different kinds of Qi to cell cultures: "destroying mind" for killing the cells and "peaceful mind" for encouraging cell growth. Measurements were made of the growth rates, respiration rates, and synthesis rates of DNA, protein and actin RNA for fibroblasts and boar sperm. Data were obtained with Qi emitted from the Laogong point [PC-8] of the Qigong master's hand at distances of 10, 20, 30, 40 and 50 cm from the cell cultures. The greatest effects were obtained at a distance of 20 cm, and these data are shown in Table 3, where the changes shown are relative to rates without emitted Qi.

**Table 3.**  
Effect of Qigong master's intention on cell growth factors

System	Type of Qi Emitted	
	Destroying Mind 2 min.	Peaceful Mind 10 min.
Cell growth rate	Decreased	Increased
Respiration rates		
Sperm cells	-53±5%	+28±2%
Fibroblast cells	-20±1%	+10±2%
DNA synthesis	-22±1%	+12±2%
Protein synthesis	-49±1%	+5%
Actin RNA synth.	-30%	not available

***Influence of External Qi of Qigong on the Human Pulmonary Adenocarcinoma Cell (SPC-A-1).*** Chen Yuanfeng (Shanghai Institute of Traditional Chinese Medicine): A study of the effects of emitted Qi on pulmonary cancer cells in a cell culture. [Shanghai]

***Commentary:*** The researchers conclude that Qi-treated lung cancer cells tend to lose their neoplastic character, but they exhibited less of this tendency than liver cancer cells, which they also studied.

We believe that these results provide a strong rationale for further research and clinical studies of the effect of Qigong on lung cancer.

**Procedures and Results:** This study of the effects of emitted Qi on pulmonary cancer cells is an extension of the researcher's earlier research on liver cancer cells. The cell culture was started on day 1. On days 3 and 5, the Qigong master emitted Qi from his Laogong point [PC-8] for 20 minutes, twice a day, and at a distance 2-3 cm from the cell culture. On day 6, the cell cultures were examined.

The results show that Qi-treated lung cancer cells differed from untreated cells several ways. For example, for Qi-treated cells 1) growth inhibition occurred in normal medium and soft agar, 2) vacuoles increased in the cytoplasm, 3) the cell membrane disintegrated so that the vacuoles leaked out, 4) the cell nucleus disappeared, 5) the cells swelled and tended to die, 6) some cell mitochondria exhibited vacuolation and normal morphology, and 7) the cell polarity disappeared and ribosomes dispersed and combined with RNA. The researchers reported that lung cancer cells showed less reversion back to normal than liver cancer cells.

***Influences of External Qi on the Function of T-Lymphocytes and Natural Killer Cells.*** Ye Ming, Shen Jiaqi, Zhang Min, Wang Yao, Zhang Ruihua and Wu Xiaohong (Shanghai Academy of Traditional Chinese Medicine and Material Medica, Shanghai Qigong Institute, Shanghai, China): An *in vitro* study of the influences of emitted Qi on

human peripheral blood lymphocytes (PBLs) and natural killer cells (NK cells). [Berkeley, Shanghai]

***Commentary:*** The results show that Qi emitted by Qigong masters can increase the cellular immunity in cultured blood cells. While the mechanism is yet to be elucidated, the researchers suggest that external Qi influences the amount, distribution, sequence array and function of the enzymes or receptors on the cell membrane of T-lymphocytes and NK cells. In turn, these changes affect the activity of the cells, the ability to recognize antigens, and DNA synthesis.

We observe that the emitted Qi affected all the functions of cell-mediated immune systems that were measured, not just one part of the system. Thus, the study offers a mechanism by which Qigong helps cure disease and promote health in a holistic way. This study provides scientific support for the popular assertion that emitted Qi can significantly change the biochemistry associated with the immune system of humans and animals.

**Procedures and Results:** Blood samples (1 ml) from human subjects were treated in three different ways: 1) stimulated by external Qi from a Qigong master who emitted Qi to 2 to 8 blood samples in test tubes at a distance of 30 cm for 30 minutes. The Qigong master emitted Qi from his Laogong point [PC-8] or Yintang point (at the forehead) [Ex-HN3]; 2) placebo treatment by non-Qigong exercisers who imitated the observable actions of the Qigong master, and 3) control samples to which Qi was not emitted. Up to 6 Qigong masters participated in different aspects of the experiments. The following cell functions were measured: lymphocyte proliferation, Interleukin-2 (IL-2) production, Concanavalin-A (Con-A) induced T-suppressor function, and NK cell activity.

Blood analyses showed that emitted Qi had caused changes in the PBLs and NK cell functions. For example, the results in Table 4 show that Qi emitted by four different Qigong masters increased the pro-



liferation of T-lymphocytes induced by hemagglutinin D (HLA-D) and phytohemagglutinin (PHA) by approximately 30% as compared to the results of the control group ( $p < 0.05$ ). Emitted Qi also: 1) increased IL-2 production by 51% ( $p < 0.05$ ); 2) increased NK cells function, as measured by release of 3H-TdR from K562 cells, by 20% ( $p < 0.05$ ); and 3) decreased T-lymphocytes induced by Con-A by 20% ( $p < 0.05$ ). The differences between the placebo and control groups were not significant ( $p > 0.05$ ).

**Table 4.**

Effect of emitted Qi from four Qigong masters on the proliferation responses of T-Lymphocytes induced by HLA-D and PHA compared to the control group

Qi Gong master	Induced by	Control group	With emitted Qi	p-value
A	HLA-D#	31,751 ± 8,990	48,050 ± 14,770	<0.05
B	PHA*	24.63 ± 16.26	36.70 ± 27.35	<0.05
C	PHA*	52.13 ± 30.20	72.26 ± 38.76	<0.05
D	PHA*	52.13 ± 30.23	68.37 ± 33.73	<0.05

Note: Proliferation measured as counts per minute (#) or index number (\*).

#### IV. Effects of Emitted Qi on Plants

**Biological Effect of Qigong With the Bio-chronometer.** Fan Yiji and Hu Gang (Laboratory of Photocatalysis, Shanghai Teacher's University, Shanghai 200234, China) Qiu Yuzhen, Chai Jianyu (Shanghai Qigong Institute, Shanghai 200030, China): A study of emitted Qi on the germination rate of rice seeds. [Shanghai]

*Commentary: The researchers conclude that greater propagation rates of rice seeds at certain periods of the day, i.e., during 08:00-08:30 and 16:00-16:30, indicate that a bio-clock plays a role in the quality of the Qi emitted by a Qigong master and/or the receptivity of the seeds. Another possible explanation for the bio-clock effect is that the "universal energy" is time dependent.*

We refer to two other reports at the Shanghai symposium concerned with the effects of Qi on plants. In one, He Qingnian, et. al., reported that Qi sent to seedlings of *Amaranthus Candatus L.* in the dark resulted in the synthesis of amaranthin, which gave a red color to 27% of the leaves of the seedlings. Without Qi and in the dark, the leaves of the seedlings did not develop red leaves; without Qi and in the light, 50% of the leaves developed a red color. Therefore in the dark, Qi appears to simulate the effects of light. In another study, Inosuke reported that emitted Qi increased the rate of seedling growth by a factor of 3 compared to that of the controls without Qi.

These studies provide evidence that emitted Qi can affect plant growth. We believe that an understanding of the mechanism by which Qi stimulates seed germination and plant growth may lead to information on the mechanism by which Qigong and emitted Qi affects humans.

**Procedures and Results:** The effects of Qi on the germination rates of rice seeds (Japanese indica) were determined by having a Qigong master hold a batch of dry rice seeds (100 seeds/batch) in the palm of his hand and emit Qi from his Laogong point [PC-8]. Two Qigong masters separately emitted Qi for 30 minutes to different batches of seeds for each of five periods during the day (08:00-08:30, 10:00-10:30, 12:00-12:30, 14:00-14:30, and 16:00-16:30). Each procedure was repeated with three different batches of seeds. The treated seeds were germinated on a wet paper surface in the dark. After 36, 40 and 44 hours, the germination rates were determined by counting the number of sprouts. For controls, the germination rates were determined for 1) batches of seeds that were treated by individuals without Qigong experience who mimicked the Qigong masters' actions and 2) seeds that did not receive Qi.

The results of germination rates for three batches of seeds treated by a given Qigong master in a given 30-minute period

of time were averaged. For example, the percentages of seeds that germinated after 40 hours for the above five time periods were 56, 43, 43, 41 and 52, respectively, compared with the control value of 30. Similar results were obtained by the other Qigong master. An average reproducibility of  $\pm 4\%$  was obtained from the germination rates of seeds in the two types of controls. The results show that 1) the percentages of seeds that germinated were generally greater for the Qi-treated seeds than for those of the controls, and 2) significantly greater germination rates occurred when the seeds had been Qi-treated in the time periods of 08:00-08:30 and 16:00-16:30.

### General Conclusions

We have selected the above experimental research studies because most of them seem to have been done in accordance with acceptable scientific protocol. As a whole, the research studies provide compelling evidence that Qigong exercise can benefit health and that emitted Qi can produce significant changes in different kinds of living systems. Hopefully, enough information has been presented to stimulate American scientists to perform their own studies to verify the therapeutic effect of Qigong practice and emitted Qi.

We suggest that this collection of information, which was developed primarily by Chinese scientists, is the beginning of a Medical Qigong Science. During the past four years, activity in Qigong research has been impressive, judging from the many contributions to recent international conferences on Qigong. Although these efforts have produced valuable information, there should be a much greater effort to realize the medical potential that Qigong has to offer in combination with Western medicine. Future efforts should be directed to clinical work, applied and basic medical research, and education of practitioners and the public. Of course, such efforts require the political support of the medical community and financial support of gov-

ernment agencies and corporations who are most likely to benefit.

Many Chinese scientists have expressed a strong interest in cooperating with Western scientists. With such cooperation, it will be possible for health practitioners in the United States to learn the skills needed to develop and promote Qigong as an alternative form of health maintenance and healing therapy. Such cooperation will certainly inspire the development of an integrated East/West medical system in the United States and other countries.

Just as Chinese acupuncture gradually became accepted as an alternative therapy in this country since the 1970s, we predict that Qigong will gradually be accepted by American health practitioners as another alternative form of health maintenance and healing therapy. Qigong can complement Western medicine in many ways. For example, Qigong emphasizes preventive medicine, and patients are encouraged to take responsibility for their own health by practicing Qigong. Another important feature of Chinese Qigong is its claims to improve the medical conditions of some patients who had not received help from Western medicine.

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