

Standard Evaluation Method of Non-contact Healing Using Biophotons

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Abstract: This study evaluates the effects of non-contact healing such as laying-on-of-hands and prayer using biophotons. Pairs (control and sample) of a cucumber (*Cucumis sativus*) were measured with a highly sensitive detector for 18 h, and the intensity of biophotons from the experimental sample was compared with the control. Measurements were done for three groups, non-treatment, healing treatment, and thermal treatment in which experimental samples were stressed in a heat pool at 40°C. There was no difference in the intensity between the experimental samples and controls in the non-treatment and thermal treatment groups. However, in the healing group, the intensity of biophotons from the experimental samples was significantly greater than the controls ($p = 0.002$, two-tailed paired t -test). In addition, quantitative evaluation for the effect of non-contact healing was possible by using, as an index, a logarithm of the ratio of intensities of biophotons from experimental samples and controls.

Keywords: biophotons, *Cucumis sativus*, healing, laying-on-of-hands, prayer, standard method, evaluation, direct mental interaction with living system, DMILS

1. Introduction

Biophotons are extremely weak light emissions from living organisms. In previous papers, we studied biophotons emitted from the hands of qigong masters and non-trainees, and seeds of plants or the skin of mice¹⁻⁵). However, these studies had many difficulties. The intensity of biophotons from the skin of mice and humans was easily changed by variations in the blood flow. And the measuring time required to make a picture was too long for the humans because the intensity of biophotons from the skin was very weak. In addition, there was no difference in the intensity of biophotons for 10-min measurements even when plant seeds were used.

In the present study, we (1) created a standard method to quantify the effects of non-contact healing, a kind of direct mental interaction with a living system (DMILS), through a changed target: pieces cut from a cucumber (*Cucumis sativus*), which can emit more biophotons than a sweet potato or Japanese radish, (2) measured biophotons after healing and (3) measured biophotons over a long period (18 h).

2. Methods

2-1 Place & Term The study was conducted at the Institute for Living Body Measurements of the International Research Institute from March to June 2006.

2-2 Detecting system for biophotons The detecting system was comprised of a super-sensitive camera (C2400-47, Hamamatsu Photonics) which had an image intensifier (I.I.), a counting system (Argus 20, Hamamatsu Photonics), and a control program (AquaCosmos, Hamamatsu Photonics).

2-3 Targets The targets were paired pieces of cucumber, which is inexpensive and readily available in Japan. The intensity of its biophoton emission is relatively larger than that of other plants. Cucumber was purchased from a vegetable store for each experiment because fresh samples are much brighter.

First, a circular slice (thickness: 2 cm) was cut from a cucumber. Then, the slice was cut and opened at the center. One of the paired pieces was the experimental sample and the other was the control (**Fig. 1**). Four pairs of targets were made from one cucumber. Controls and experimental samples were placed symmetrically in two glass petri dishes.

For non-treatment experiments, measurements of biophotons were done just after preparing the samples. For thermal and healing treatments, the petri dishes were covered by glass.

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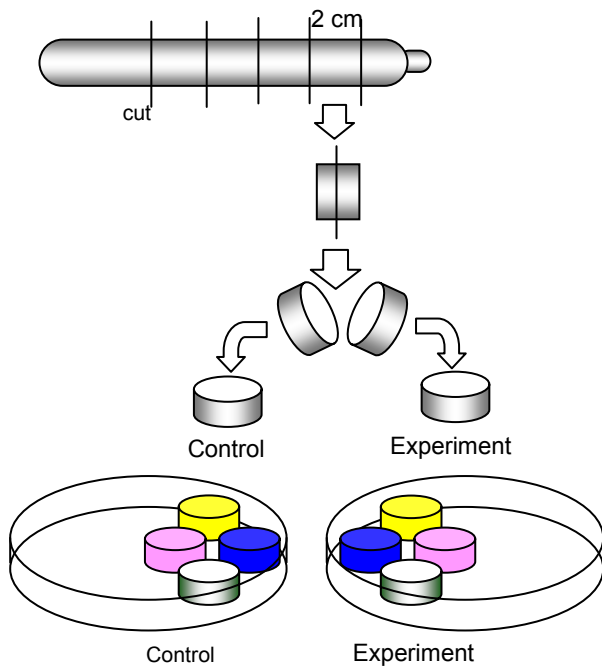


Fig. 1 Making target pairs

2-4 Thermal and Healing Treatments All experiments were conducted at room temperature, 24°C.

In thermal treatments, a kettle was filled with 2 liters of water at 40°C. The kettle was put on a metal grid pot stand. The kettle was set 1 cm from the surface of the cover of the petri dish holding the experimental samples. A screen was set 1 cm from the surface of the petri dish holding the controls. After 30 min, the water had cooled down to 36°C. The covers of the dishes were removed and biophotons were measured.

Four healing treatments were done: Three by laying-on-of-hands and one by praying. In the former condition, qigong master MS laid on hands by using her right hand for 15–30 min, without touching the experimental sample dish. In the latter condition, YN prayed for 5 min at a distance of 1.2 m from the experimental sample dish. The control dish was set 3 m from the experimental dish in the same room. After healing, the covers of the dishes were removed and biophotons were measured.

2-5 Measurement of Biophotons Four pairs of targets were used for one measurement of biophotons. Measurements were done four times for each condition. Photon counting was done for 18 h (every 1 h) at room temperature (24°C). After May, high humidity was maintained in the dark box during the measurement (Fig. 2).

The counting areas for biophotons were sections

of each sample and control. Accumulation of photons over 18 h was converted to a value of per 10000 pixels (approximately 5 cm², nearly equal to the area of the sample or control). The value minus background noise was defined as the intensity of biophotons from a target.

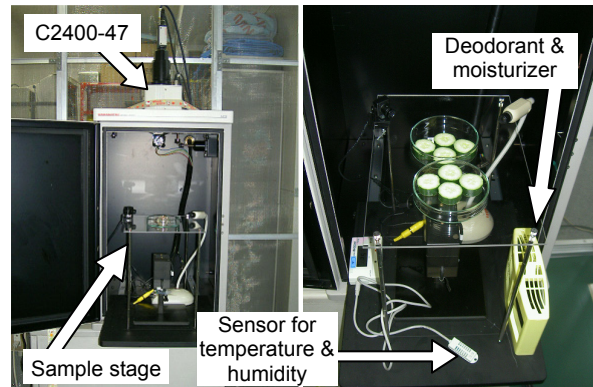


Fig. 2 Measuring biophotons

3. Results

Table 1 summarizes the results. Two data sets were omitted because one sample emitted hardly any photons and in the other the ratio of intensity of the target pair was much higher than that of the other pairs.

Results of paired *t*-tests showed that there was no significant difference between intensities of experimental samples I_E and controls I_C in the non-treatment condition ($p = 0.113$, two-tailed) and thermal condition ($p = 0.383$, two-tailed). In the healing condition, there was a significant difference between I_E and I_C ($p = 0.002$, two-tailed).

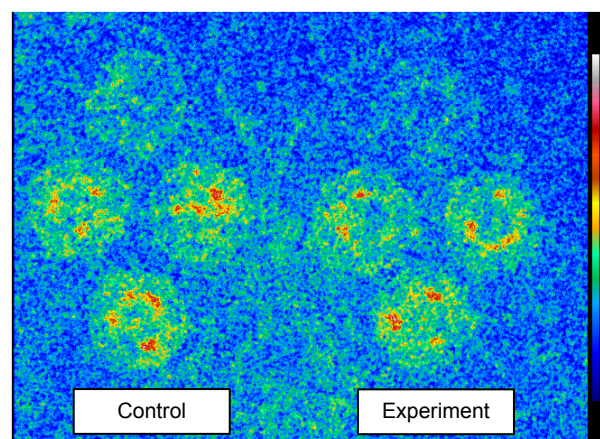


Fig. 3 Example Data of Healing Treatment

Table 1 Intensity of Biophotons

non-treatment	I_E	I_C	$I_E - I_C$	I_E/I_C	$\ln(I_E/I_C)$
June 15	72728	97111	-24383	0.75	-0.289
	110659	78937	31722	1.40	0.338
	62798	81364	-18567	0.77	-0.259
	76295	82419	-6124	0.93	-0.077
June 19	47858	67962	-20103	0.70	-0.351
	53393	42133	11260	1.27	0.237
	54546	48292	6254	1.13	0.122
June 20	91130	109081	-17951	0.84	-0.180
	110487	100511	9976	1.10	0.095
	82648	113059	-30411	0.73	-0.313
	117574	111223	6351	1.06	0.056
June 22	86589	107276	-20688	0.81	-0.214
	55834	69572	-13738	0.80	-0.220
	48188	81235	-33047	0.59	-0.522
	83514	83821	-307	1.00	-0.004
average	76949	84933	-7984	0.92	-0.106
SD	23415	21915	18309	0.23	0.240
p value	0.113				
thermal	I_E	I_C	$I_E - I_C$	I_E/I_C	$\ln(I_E/I_C)$
June 5	48036	80794	-32758	0.59	-0.520
	71446	47723	23723	1.50	0.404
	23922	27923	-4000	0.86	-0.155
	25053	29211	-4158	0.86	-0.154
June 26	79655	87181	-7526	0.91	-0.090
	82224	87231	-5007	0.94	-0.059
	68614	77148	-8534	0.89	-0.117
June 27	100317	81502	18815	1.23	0.208
	81915	56512	25403	1.45	0.371
	65880	47554	18326	1.39	0.326
	59282	53416	5866	1.11	0.104
June 29	74955	47597	27358	1.57	0.454
	82943	75443	7500	1.10	0.095
	85694	71127	14567	1.20	0.186
	24474	42449	-17975	0.58	-0.551
93235	89009	4226	1.05	0.046	
average	66728	62614	4114	1.08	0.034
SD	24420	20918	16893	0.30	0.299
p value	0.383				
healing	I_E	I_C	$I_E - I_C$	I_E/I_C	$\ln(I_E/I_C)$
March 22 laying on of hand	53099	29953	23146	1.77	0.573
	59931	45980	13951	1.30	0.265
	55057	43995	11062	1.25	0.224
	65202	64407	795	1.01	0.012
March 23 laying on of hand	173565	179134	-5569	0.97	-0.032
	116936	84258	32678	1.39	0.328
	80664	80180	484	1.01	0.006
	92833	67095	25738	1.38	0.325
March 29 laying on of hand	44413	44908	-495	0.99	-0.011
	60669	33172	27496	1.83	0.604
	34766	30698	4069	1.13	0.124
	47495	21508	25987	2.21	0.792
June 3 prayer	66756	52760	13995	1.27	0.235
	39546	25268	14278	1.57	0.448
	24462	26061	-1599	0.94	-0.063
average	67693	55292	12401	1.33	0.255
SD	37434	39623	12417	0.37	0.261
p value	0.002				

Generally, the intensities are very different depending on individual differences, such as cutting positions, days of harvest, or growing conditions. Therefore, we introduced an index value, J as follows:

$$J = \ln(I_E/I_C).$$

The results of the t -test showed that there was no significant difference between non-treatment and thermal conditions ($p = 0.164$, two-tailed). However, there were significant differences between healing and thermal conditions ($p = 0.037$, two-tailed), and between healing and non-treatment conditions ($p = 0.0005$, two-tailed). **Fig. 4** shows average values of J and their 95% confidence intervals.

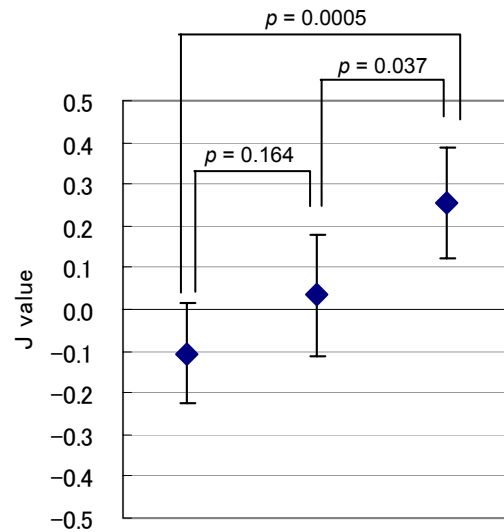


Fig. 4 Average of J and 95% confidence interval

4. Discussions

4-1 Transition The intensity of biophotons after cutting the samples was very small. Later, the intensity increased and reached its maximum for 5 to 8 h. **Fig. 5** shows transitions of intensities for the non-treatment condition. These transitions were considered to result from reactions to cutting and drying. Intensities of experimental and control samples were the same every time in non-treatment and thermal conditions. However, differences between I_E and I_C occurred 7 h after the start of measurements for the healing condition (**Fig. 7**). This was considered similar to the butterfly effect of chaos or the phenomenon reported by Kataoka et al.^(6,7) that effects of healing remain in samples even after several hours of treatment.

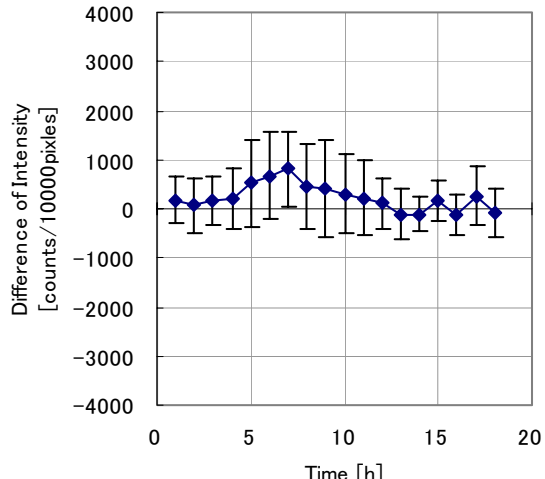
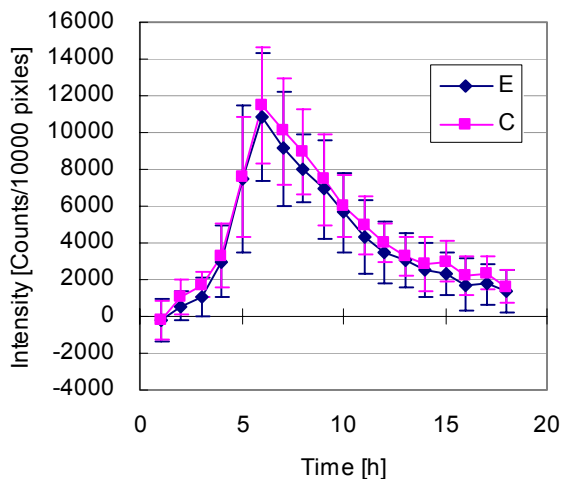


Fig. 5 Non-treatment (n = 15)

Left: Intensity and SD Right: Difference between I_E and I_C and 95% confidence interval

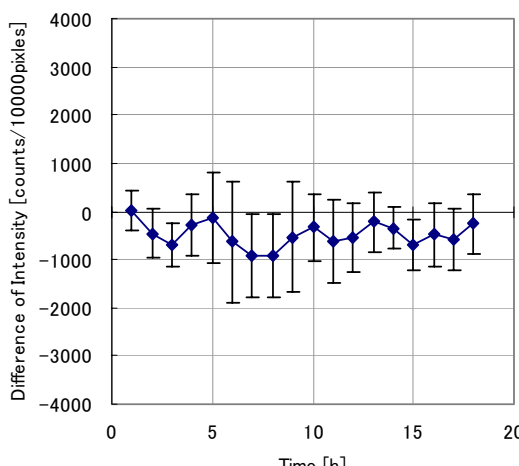
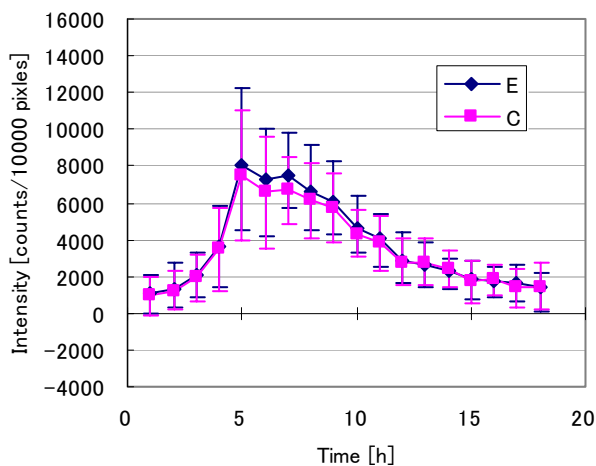


Fig. 6 Thermal treatment (n = 16)

Left: Intensity and SD Right: Difference between I_E and I_C and 95% confidence interval

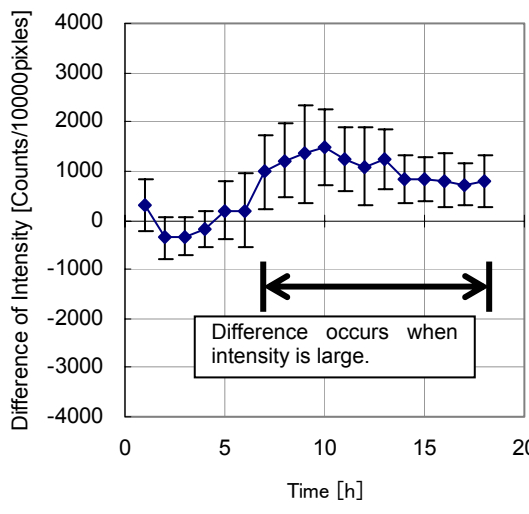
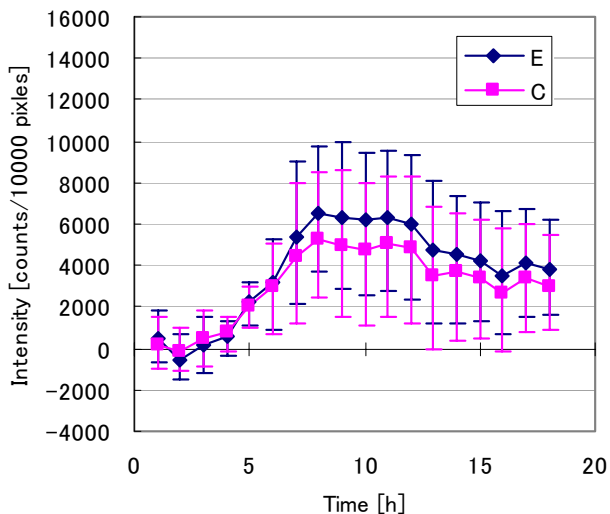


Fig. 7 Healing treatment (n = 15)

Left: Intensity and SD Right: Difference between I_E and I_C and 95% confidence interval

Additionally, the difference of the characteristic transition of intensity is considered to be caused by harvest seasons of samples (spring and early summer).

4-2 Non-thermal Effects & Bio-sensor The heat of the hands is often discussed as a source of effects by healing in the laying-on-of-hands. In the present study, there was no significant difference in the intensity of biophotons for the thermal condition. Therefore, the difference for the healing condition is considered to be caused by non-thermal factors, although these factors are unknown at present. In the samples, change in some chemical reactions caused a change in the intensity of biophotons. It is difficult to identify the reactions because of the complexity of biochemical systems *in vivo*. However, from the viewpoint of detecting an anomalous phenomenon, a living body as a sample is more useful than a device that is specialized to detect a certain factor.

4-3 Quantitative Evaluation We have attempted to quantify effects of non-contact healing using a simple sample, which can be obtained easily. The J value suggests a possible quantitative estimation of healing or abilities of healers. Although the presumed accuracy is approximate $J = 0.2$, a rough classification is possible, for example, class N is $J < 0.2$; class A is $J = 0.2-0.4$; class S is $J > 0.4$. We consider that the reliability of this method can be improved by increasing the sample size for the measurements.

5. Conclusions

The healers conducted non-contact healing (laying-on-of-hands or prayer) for 5–30 min against pieces of cucumbers (*C. sativus*). The result showed that the intensity of biophotons from experimental samples was significantly larger than that from controls. Thus, we concluded that this phenomenon was not caused by thermal effects of hands because there were no effects for the thermal condition in which the experimental samples were stressed by heat at 40°C.

Furthermore, a quantitative estimation for healing is possible if we use, as an index, the logarithm of the ratio of intensities of biophotons.

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