# Heart rate variability and the influence of tapping acupressure on autonomous nervous system regulation in persons with induced distress. A pilot study.

**Peter Schoberegger, Harald Lothaller, Gerhard Lingg**

*Interuniversity College for Health and Development Graz / Castle of Seggau*
*college@inter-uni.net*

## SUMMARY

### Background

The Galvanic Skin Response (GSR) is one of several electro dermal responses. When the organism is exposed to internal or external influences, this electrical property may change within split seconds. In a previous study, the test probe was correctly detected in 77.5% of the cases, with 22.5% false positive results. In reverse, the neuter control was correctly diagnosed in 68.6%, with 31.4% false negative results ($p < 0.01$).

### Objective

To scrutinise the repeatability of such measurements.

### Methods

The aim was to influence the body with information from test substances that were placed via a "biophoton device" into the measuring circuit. Paracetamol was dissolved in water, alcohol as a mixture and distilled water probe were placed into pharmaceutical glass vials. Following a sequence unknown to the measurer and the controllers, the vials were inserted into the input quartz-glass beaker of the device. Changes in skin conductivity were assumed to be measurable at the acupuncture point "TW-1D, left hand-pituitary gland" and "TW-2D, left hand parathyroid gland". Repeated measurements with breaks for recovery were carried out. The study was conducted as a double blind study with 1'380 measurements on 23 volunteers. Data was blindly analysed using the Pearson's chi-square test. The frequency of diagnosed drops (decrease, unbalanced) was compared to the frequency of no drops (increase, balanced) both for the test and the control probe in three show four field tables.

### Results

The effect of paracetamol and water on the results of "drop" or "no drop" is that Paracetamol led to more than 10 percent points more "drops" than water. This difference is attributable to the measurement in each of the acupuncture points. Differences are however not statistically significant. With alcohol mixture the acupuncture point TW-2D-left hand had 30 percent more "drops" than water and the acupuncture point TW-1D-left hand had 30 percent less "drops" than water. With Paracetamol the acupuncture point TW-1D-left hand hat 50 percent more "drops" than alcohol mixture, and the acupuncture point TW-2D-left hand had the similar amount of "drops" as alcohol mixture.

### Conclusion

The results are in line with previous studies on the repeatability of measurements using galvanic skin response with information transfer via the measuring circuit. This does seem to confirm that such information can influence the body and that the measurements of electric skin conductivity, as used for diagnostic purposes, are repeatable under double blind conditions.

## INTRODUCTION

The "biophoton therapy device" scrutinised in this study was designed as a non-invasive diagnostic and therapeutic tool [1].

### Diagnosis

Diagnosis before biophoton therapy does not necessarily follow the lines of western physiology. In contrast, it is closely related to the Chinese system of acupuncture meridians and acupuncture points. These acupuncture points are assumed to show increased electrical conductivity that is influenced by the (stressed or weak) state of related organs and organ systems including the parasympathetic (PSNS) and sympathetic nervous system (SNS). Presumably Richard Croon was the first to discover the different electrical resistance values of the acupuncture points and developed the so-called Electro Neural Diagnosis [2]. In the 1960's, the technique was widely disseminated in Europe by Reinhard Voll and further developed as Electro Acupuncture by Voll [3]. Also in Japan early Electro Acupuncture methods originated (Yoshio Nakatani and Hiroshi Motoyama) [2]. This form of diagnosis is said to be particularly suitable in the case of chronic illness, because among others it is capable of detecting hidden inflammations and toxins / environmental poisons within organ systems which are considered the source of illnesses [3, 4].

### Galvanic Skin Response

The Galvanic Skin Response (GSR) is one of several electro dermal responses. Electro dermal responses are changes in the electrical properties of a person's skin caused by an interaction between environmental events and the individuals' physical and psychological state. Human skin is a good conductor of electricity even if a weak electrical current is applied. Galvanic Skin Response techniques apply a constant voltage. The circuit normally includes a brass electrode to be hold in one hand or a plate to put the hand or bare foot on, and a stylus electrode. The current that flows through the skin, as the voltage is applied, can be detected and displayed [5]. When the organism is exposed to internal or external influences, this conductivity may be chronically prominent in comparison to normal, or it may change within split seconds. Chronical prominence of skin conductivity under exposure to a standard low Voltage current is the basis of clinical biophoton diagnosis. Changes within seconds or split seconds are the basis of testing materials, chemicals or information "balanced" or "unbalanced" to the tested person. By using a special low pressure measuring technique, the stylus electrode of the biophoton therapy device used in the studies reviewed here is reported to be distinct from older measuring electrodes and minimizes the influence of the tester and the type of skin tested [4, 6]. It may be interesting to note that the scale showing the decrease in skin conductivity is broader in the device used here than in devices of Electro Acupuncture according to Voll.

### Information transfer

When the influence of becoming or unbecoming information is tested (on clients in order to find a therapeutic decision or on volunteers in the course of an experiment), the probe may be swallowed, or put directly on the bare skin, or it may be sealed in a (quartz) glass vial that is put on the skin or a mucous membrane [7]. Furthermore, the test probe may (directly or contained in a glass vial) be placed in an input beaker (cup) that is connected to the diagnosis/therapy device. Connection may be via a closed circuit or involve one individual wire only. In the case of the biophoton therapy device scrutinized here, the individual single connection is a glass fibre cable. According to the manufacturer, glass fibre was chosen with regard to the photon nature of the information transfer. Various frequency passes may be applied, from "all pass" ">10000 Hz", ">5000 Hz", ">2000 etc. to ">100 Hz".

*Results of a previous study [8]*

When one volunteer and one tester were involved, an assumedly "disharmonizing" test probe, information from paracetamol, was correctly detected in 70% of the cases, with 30% false positive results. In reverse, control was correctly diagnosed in 73.3%, with 26.7% false negative results. Findings are statistically significant ($p < 0.01$). When 5 volunteers and one tester were involved, the test probe was correctly detected in 70% of the cases and control in 83.3% ($p < 0.01$). When 5 volunteers and 5 testers were involved, the test probe was correctly detected in 76.7% and control in 60% ($p < 0.05$). When the results of all 3 studies were pooled, the test probe was correctly detected in 77.5% of the cases, with 22.5% false positive results. In reverse, the neuter control was correctly diagnosed in 68.6%, with 31.4% false negative results ($p < 0.01$).

Table 1 compares the frequency of diagnosed "non drops" to the frequency of "drops" both for the control and the test probe. Frequencies of diagnoses were also expressed in % of real applications of control and of test substances. In a random distribution, one would expect about 50% in each of the four fields. As can be seen, 73% of control applications led to "no drop" diagnoses, whereas 70% of test probe applications led to "drop" diagnoses. In other words, when one volunteer and one tester were involved, the disharmonizing test probe was correctly detected in 70% of the cases, with 30% false positive results. In reverse, the neutre control was correctly diagnosed in 73%, with 26.7 false negative results. Findings are statistically significant ($p < 0.01$).

| 1V-1R | no drop | drop |
|---|---|---|
| control:    30 (100%) | 22 (73%) | 8   (26.7%) |
| test probe: 20 (100%) | 6   (30%) | 14 (70%) |
| p = 0.006 | | |

*Tab. 1: Four field table on study 1. (1V-1R). For explanation see text.*

When 5 volunteers and one tester were involved (Tab. 4), the disharmonizing test probe was correctly dedected in 70% of the cases, with 30% false positive results. In reverse, the neutre control was correctly diagnosed in 83.3%, with 16.7 false negative results. Findings are statistically significant ($p < 0.01$).

| 5V-1R | no drop | drop |
|---|---|---|
| control:    20 (100%) | 14 (70%) | 6  (30%) |
| test probe: 30 (100%) | 5   (16.7%) | 25 (83.3%) |
| p < 0.001 | | |

*Tab. 2: Four field table on study 2. (5V-1R). For explanation see text.*

When 5 volunteers and 5 testers were involved (Tab. 5), the disharmonizing test probe was correctly dedected in 76.7% of the cases, with 23.3% false positive results. In reverse, the neutre control was correctly diagnosed in 60%, with 40% false negative results. Findings are statistically significant ($p < 0.05$).

| 5V-5R | no drop | drop |
|---|---|---|
| control:     20 (100%) | 12 (60%) | 8  (40%) |
| test probe: 30 (100%) | 7   (23.3%) | 23 (76.7%) |
| p = 0.02 | | |

*Tab. 3: Four field table on study 3. (5V-5R). For explanation see text.*

When the results of all studies 1.-3. were pooled (Tab. 4 and Fig. 1), the disharmonizing test probe was correctly detected in 77.5% of the cases, with 22.5% false positive results. In reverse, the neutre control was correctly diagnosed in 68.6%, with 31.4% false negative results. Findings are statistically significant ($p < 0.01$).

| pooled results 1.-3. | no drop | drop |
|---|---|---|
| control:     70 (100%) | 48 (68.6%) | 22 (31.4%) |
| test probe: 80 (100%) | 18 (22.5%) | 62 (77.5%) |
| p < 0.001 | | |

*Tab. 4: Four field table on pooled results from studies 1.-3. For explanation see text.*
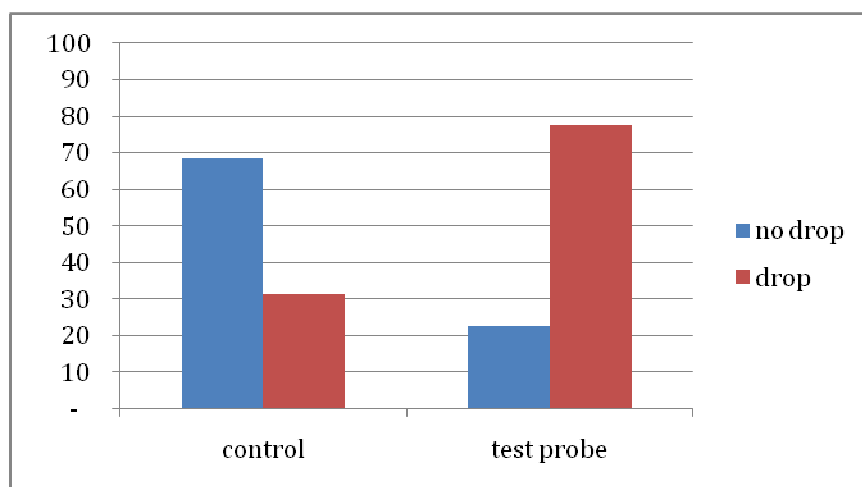


*Fig. 1: pooled results [8] from studies 1.-3. For explanation see text.*

***Treatment***

Treatment is based on the assumption that every biochemical reaction in organisms is preceded by electromagnetic signals, among others in the visible (VIS) or "biophoton" range, and that such photon patterns may be scanned by the device, containing one-way fibre glass cables, filters, amplifiers and elements for phase correction, and may be fed (back) to the biological system [1,7]. Analogously, it is assumed that information from homeopathic remedies, chemicals, etc. may be transferred via the device.

In order to investigate the possible effects of treatment with the biophoton device, the following pilot studies have previously been conducted:

- In a first study with wheat seedlings, germination rate in the group treated with a "harmonizing" biophoton programme was 16.8% *stronger* than (i.e. equal to 116.78% of) the control wheat germination rate (100%) ($p < 0.01$) [9]. However this result could not be repeated in follow up study [10].

- In a study on milk ageing, ssouring of milk in the group treated with the "harmonizing" programme was 16, 7% *less strong* than (i.e. equal to 83.3% of) the souring of control milk (100%) ($p < 0.01$) [11]. No follow up study has as yet been performed.

- In a study on aggregation of erythrocytes, aggregation of red blood cells in the group treated with the "harmonizing" programme was 97,8% *less* marked than (i.e. 2,2% of) aggregation of the control blood cells (100%) ($p < 0.01$) [12]. This result was again reported in a follow up study [13].

- In a study on rat cortical neuron synaptic development, synaptic size in the group treated with the "harmonizing" programme was 19% greater (i.e. equal to 119% of) than the control group (100%) ($p < 0.01$) [14]. This result was again reported in a follow up study [15].

- In an observational study on children and adolescents with chronic complaints, before treatment, 133 chronic complaints were reported, i.e. an average of 6.7 complaints per individual. After the treatment, only 10 (7.5%) were reported, i.e. 0.5 per patient, and 92.5% of the chronic complaints had disappeared. Differences before and after treatment were statistically significant ($p < 0.01$). There were no differences as to gender or age. In other words, chronic complaints among children and adolescents, being defined as having had a previous duration of 3 months minimum, diminished significantly within the 3 months course of the study. The authors could at present not attribute exactly the contribution of the personalized therapeutic interaction and the influence of the biophoton device on the treatment success [16].

### *Research Questions*

Based on the above mentioned assumptions, it should be possible to measure the influence of information on being "balanced (no drops)" or "unbalanced (drops)" with measurements on GSR, skin conductivity. This study was organized as a double blind experiment, with three step by step research questions.

*1. ("P-W"):* Is there a repeated measurable impact of two specific probes (paracetamol and distilled water), tested on several volunteers, and measured on two different measuring points, the parathyroid ("TW-1D") and pituitary gland ("TW-2D")?

*2) ("A-W"):* Is there a repeated measurable impact of the two specific probes (alcohol mixture and distilled water), tested, on several volunteers, measured on two different measuring points, the parathyroid ("TW-1D") and pituitary gland ("TW-2D")?

*3) ("P-A"):* Is there a repeated measurable impact of the two specific probes (paracetamol and alcohol mixture), tested on several volunteers, and measured on two different measuring points, the parathyroid ("TW-1D") and pituitary gland ("TW-2D")?

## METHODS

### Test probe and device

The study design requires a substance that, in Galvanic Skin Response (GSR) measurement, is known to lead to a decrease of GSR. Here, the drug paracetamol (N-acetyl-p-aminophenol. N-acetyl-p-aminophenol) was used, alcohol mixture (propanol 35%, ethanol 25%, water 40%) and distilled water were used positive and neutre control.

In humans the substance paracetamol has an analgesic and fever-reducing effect [17, 18]. This pharmacological effect is probably caused by inhibition of an enzyme hormone synthesizing system (prostaglandin syntheses) in the brain (hypothalamus). Thus here, paracetamol is considered as an agent that, although useful in conventional medicine. Use tends to have influence in the GSR.

Ethanol in alcoholic beverages has been consumed by humans since prehistoric times for a variety of reasons. The alcohol mixture used is a toxin which is often used as a disinfection agent privately and by professionals. It can cause intoxication, nauseas and vomiting when inhaled and consumed.

500 mg paracetamol was dissolved in 1 ml of distilled water, used as intoxication I, 5 ml alcohol mixture was mixed with 15ml of distilled water, used as intoxication II and 20 ml of distilled water was used as the control probe (dummy). Both the test probes I, II and the control probe were placed into separate pharmaceutical glass vials with insulated rubber holding tips. The vials were kept in separate insulated containers; a minimum distance of 80 cm was maintained between the insulated containers.

Following a sequence unknown to the tester, the vials with test and control probes were inserted into the "input" quartz-glass beaker of the "Biophoton Therapy Device J. Boswinkel" (Health Angel International AS, type Chiren 4746, Germany).

### Measurement point, timing, observed parameters

Changes in GSR due to alcohol, paracetamol and distilled water are assumed to be measurable at the acupuncture point "TW-1D-left hand-pituitary gland" (Fig. 1). Measurements were given after waiting 30 sec (the device requires 30 sec. to read the input beaker), and GSR values were expected to recover within 5 min after the application of the test probe.
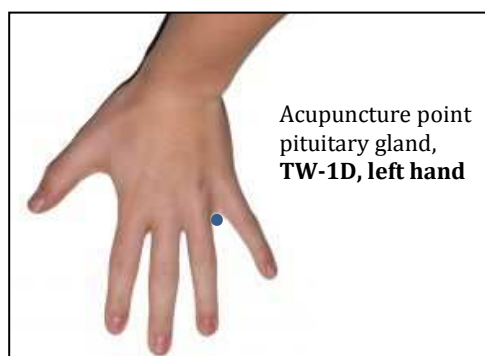


Acupuncture point pituitary gland, **TW-1D, left hand**

*Fig. 2: Measurement point for the GSR effect of the probe. For explanation, see text.*

Changes in GSR due to ethanol, paracetamol and distilled water are assumed to be measurable at the acupuncture point "TW-2D-left hand-parathyroid gland" (Fig. 2). Measurements were made after waiting 30 sec (the device requires 30 sec. to read the input beaker), and GSR values were expected to recover within 5 min after the application of the test probe.
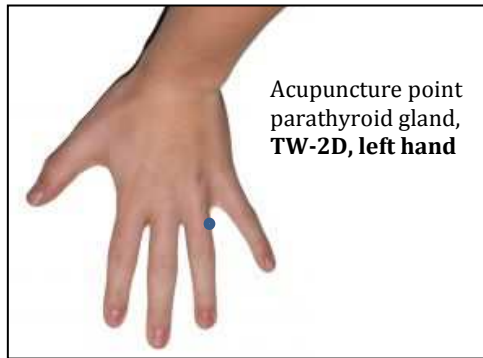
Acupuncture point parathyroid gland, **TW-2D, left hand**

*Fig. 3: Measurement point for the GSR effect of the probe. For explanation, see text.*

A brass electrode moistened with water was held in the volunteer's right hand. This hand electrode was connected to the device by an electric cable. The researcher (measurer), a trained biophoton therapist, pressed the pin of the measuring stylus (electrode) gently onto the above mentioned acupuncture point. The observed parameter was the decrease (drops) or non-decrease (no drops) of GSR, expressed by an indicator drop (red) on the analogue display of the device (arbitrary units), with no acoustic signal. Controller I randomly placed the probes into the input beaker. Controller II noted the drops (red) into the protocol.

### Design and participants

All volunteers had a measurement check on the two acupuncture points shortly before the experiment, the check was done by a biophoton therapist, (not the measurer in the experiment), to be sure that the volunteers did not have any drops on those acupuncture points. The volunteers entered the research room separately and singularly. This was done so, because previous experiments (NL, June 2012) have shown that when an experiment is done in a crowded room there seems to be an influence on the measurements. The first measurement on acupuncture point TW-1D was done after waiting 30 seconds (for the device to read the input beaker) after the controller I had placed a random probe into the input beaker, which was connected to the biophoton therapy device. The second measurement on acupuncture point TW-2D was done after waiting 30 seconds (for the device to read the input beaker) after the controller I had again placed a random probe into the input beaker.

The volunteers left the research room without having contact with the other volunteers or controllers, washed his / her hands to reset the value of GSR at the acupuncture points. The volunteer came back after a five minute break, which included a short walk outdoors, for the next measurements, as seen on the attached diagram Fig 4. This was repeated for a total of 23 volunteers, each volunteer was measured on each point 30 times. During the 5 minutes break that the volunteers had, research continued with the remaining volunteers. The study was done in a double blind manner.

Controller I placed the three different (without knowing what they were) substances into the input beaker according to a randomized list.

Controller II read and recorded in writing the results (drops, red or no drops, green).

Both controllers and the measurer worked on a double blind system. The controllers did not know who or what substance was being measured and what the other controller's results were. The measurer did not know what substance was being measured and or what the results were.

The study was conducted in a school for Natural Medicines in Zurich, Switzerland.
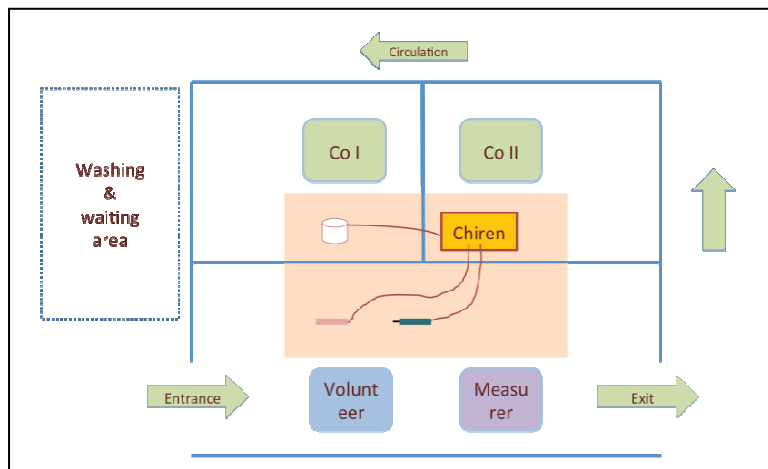


*Figure 4.  CO = controller; Chiren = biophoton device. For explanation see text above.*

Volunteers (8 male, 15 female) were between 11 and 65 years old. The volunteers had an average weight of 63 kilos, an average age of 40 years and an average height of 1.70 meters. All volunteers reported to be of good health. A check measurement was done before the experiment on the two acupuncture points ("TW-1D", "TW-2D"), the points showed no drops. The volunteers declared their consent to take part in the experiment. The authors did not use any biophoton therapist as a volunteer.

*Analysis of data*
The protocol forms were analysed blind by the authors under supervision from the statistical department of the Interuniversity College Graz, Austria, using Pearson's chi-squared test. The frequency of diagnosed "drops" (unbalanced, red) was compared to the frequency of "no drops" (balanced, green). The frequency of the measured "drops" / "no drops" was also expressed in percent to one another.

**RESULTS**
Tables 1, 2 and 3 compare the frequency of diagnosed "no drops" to the frequency of "drops" for each substance as measured on the two acupuncture points TW-1D-left hand and TW-2D-left hand. Frequencies of measurements were also expressed in percent.

As can be seen in all three tables below there is a repeatability of measurements on both acupuncture points (TW-1D-left hand, TW-2D-left hand) with all substances used in this experiment.

The effect of Paracetamol and water on the results of "drop" or "no drop" is that paracetamol led to more than 10 percent points more "drops" than water. This difference is attributable to the measurement in each of the acupuncture points. Differences are however not statistically significant, see table 5.

The effect of water and alcohol mixture on the results of "drop" or "no drop" is on average the same. When The authors took into account the two different acupuncture points there was a difference in results. With alcohol mixture the acupuncture point TW-2D-left hand had 30 percent more "drops"

than water. With alcohol mixture the acupuncture point TW-1D-left hand had 30 percent less "drops" than water, see table 6.

The effect of paracetamol and alcohol mixture on the results of "drop" or "no drop" is that paracetamol led to more than 10 percent points more "drops" than alcohol mixture. When The authors took into account the two different acupuncture points there was also a difference in results. With Paracetamol the acupuncture point TW-1D-left hand hat 50 percent more "drops" than alcohol mixture. With paracetamol the acupuncture point TW-2D-left hand had the similar amount of "drops" as alcohol mixture, see table 7.

| 1. P-W | no drop | Drop |
|---|---|---|
| Paracetamol:  460  (100%) | 300  (65%) | 160  (35%) |
| - TW-1D-left hand: 230 (100%) | 140  (60,9%) | 90  (39,1%) |
| - TW-2D-left hand: 230 (100%) | 160  (69,6%) | 70  (30,4%) |
| Water:  460  (100%) | 352  (76.5%) | 108  (23.5%) |
| - TW-1D-left hand: 230 (100%) | 167  (72,6%) | 63  (27,4%) |
| - TW-2D-left hand: 230 (100%) | 185  (80,4%) | 45  (19,6%) |
| p = 0.065 | | |

*Tab. 5. (P-W). For explanation see the text above.*

| 2. A-W | no drop | Drop |
|---|---|---|
| Alcohol mixture:  460 (100%) | 350  (76,1%) | 110  (23.9%) |
| - TW-1D-left hand: 230 (100%) | 184  (80%) | 46  (20%) |
| - TW-2D-left hand: 230 (100%) | 166  (72,2%) | 64  (27,8%) |
| Water:  460  (100%) | 352  (76.5%) | 108  (23.5%) |
| - TW-1D-left hand: 230 (100%) | 167  (72,6%) | 63  (27,4%) |
| - TW-2D-left hand: 230 (100%) | 185  (80,4%) | 45  (19,6%) |
| p < 1.000 | | |

*Tab. 6: (A-W). For explanation see the text above.*

| 3. P-A | no drop | Drop |
|---|---|---|
| Paracetamol:    460  (100%) | 300  (65%) | 160  (35%) |
| -    TW-1D-left hand: 230 (100%) | 140 (60,9%) | 90 (39,1%) |
| -    TW-2D-left hand: 230 (100%) | 160 (69,6%) | 70 (30,4%) |
| Alcohol mixuture:  460 (100%) | 350  (76.1%) | 110  (23.9%) |
| -    TW-1D-left hand: 230 (100%) | 184 (80%) | 46 (20%) |
| -    TW-2D-left hand: 230 (100%) | 166 (72,2%) | 64 (27,8%) |
| p = 0.087 | | |

*Tab. 7: (P-A). For explanation see the text above.*

**Discussion**

The effect of paracetamol and water on the results of "drop" or "no drop" is that paracetamol led to more than 10 percent points more "drops" than water. This difference is attributable to the measurement in each of the acupuncture points. Differences are however not statistically significant, see table 5.

The effect of water and alcohol mixture on the results of "drop" or "no drop" is on average the same. When The authors took into account the two different acupuncture points there was a difference in results. With alcohol mixture the acupuncture point TW-2D-left hand had 30 percent more "drops" than water and the acupuncture point TW-1D-left hand had 30 percent less "drops" than water, see table 6.

Paracetamol led to more than 10 percent points more "drops" than alcohol mixture. When The authors took into account the two different acupuncture points there was also a difference in results. With Paracetamol the acupuncture point TW-1D-left hand hat 50 percent more "drops" than alcohol mixture and the acupuncture point TW-2D-left hand had the similar amount of "drops" as alcohol mixture, see table 7.

The basis of the study was a previous study [8]. The authors decided to perform this study in a different manner. The main differences were, the authors used more volunteers, no skilled biophoton therapists as volunteers, they performed a larger amount of measurements, they used two different accupuncture points and three different probes. The volunteers were not in one room, the contact to each other was kept at an absolute minimum. The authors did not pre treat the volunteers with a harmonising program (just a short pre check on the accupuncture points).

*Conclusion and recommendations:*

Our results are in line both with previous studies on the changes in electric skin conductivity as well as on the studies on information transfer of substances via electric circuits. This seems to confirm that such information can influence biological systems and that measurement of electric skin conductivity, as used for diagnostic purposes, are repeatable under double blind conditions.

Further research on the model presented here should involve greater numbers of participants (testers and tested volunteers), possibly with fewer subsequent measurements per participant, with different test substances. It may look for differences according to status of training of the testers, to age, gender, physical and psychological well-being etc. Furthermore, independent methods (such as heart rate variability) should be used to monitor effects of information transferred via the biophoton device and thus validate diagnosis via skin conductivity.

Information transfer from a drug sealed in a glass vial via an electronic circuit was also described in immunological [19, 20] and zoological experiments [21, 22]. Recent biochemical assumptions may shed new light on the issue of information transfer from molecules [23].

For an experiment repetition it could be of some help to have smaller volunteer groups. The volunteers could be grouped by age, sex, weight and high. There should not be so many measurements done on each volunteer as the acupuncture points seem to "tire out" (measurements loses their reliability). There should be no contact between the volunteers during the experiment, as that could cause an influence on the measurements. The volunteers should be checked, measured in advance to be sure that they are healthy i.e. that all acupuncture measuring points are not showing drops, specially on the acupuncture measuring points that will be used in the experiment. The measurer and controllers should take more breaks between measurements, which would help to keep their concentration at a steady level.

**REFERENCES**

1 Boswinkel J. Energetic Anatomy, Physiology and Pathology. Edition Health Angel Academy, Drammen 2008

2 Bischof M. Das Licht in unseren Zellen, Zweitausendeins Verlag, Frankfurt 2002

3 Voll R., The phenomenon of medicine testing in electro acupuncture according to Voll. A, J Acupuncture 1980; 8(2), 97-104

4 Kramer F. Lehrbuch der Elektroakupunktur. Haug-Verlag, Heidelberg 1976

5 Fuller G.D., Biofeedback Methods & Procedures in Clinical Practice, Biofeedback Press, San Francisco 1977

6 Boswinkel J., Kramer F. Manual Chiren Biontology. Edition Health Angel Academy, Drammen 2007

7 van Wijk R., Wiegant F.A.C. Homeopathic remedies and pressure-induced changes in the galvanic resistance of the skin. VSM Geneesmiddelen, Alkmaar 1989

8 Muller J., Pet W., Pet-Reatsch E., Servaas R. Ansems F., Schwander D., Firer G., Endler P.C. Repeatability of Measurements of Galvanic Skin Response – A Pilot Study. Open Complement Med J 2013; 5, 11-17

9 Boswinkel W., Muller J., Baars W., Lely B., Mikx B., Wassenberg G.E.M., Reich C. Wheat germination and information from a plant hormone and a herbicide, transferred via a „biophoton device" – a pilote study. Explore! 2011, 20; 4, 17-26

10 Efinger-Siegwart M., Prenosil A., Bovri S., Burgers L., Pet S. Wheat germination and information transferred via a "biophoton device" – a follow-up study. Res Proceedings IUC 2013; E, 1-8

11 Mak P., Vastenburg D., Reich C. Milk aging and information from a „biophoton device" – a pilot study. Explore! 2011, 20; 4, 4–13

12 Pet S, Pet  M, Vastenburg D. Biophoton therapy and its perceptible effect on human blood - a pilote study. Expore! 2012; 20(3), 4-6.

13 Pet S. Biophoton therapy and its perceptible effect on human blood - a follow up study. Accepted by Res Proceedings IUC 2013

14 Vastenburg D., Pet S. Morphology of isolated rat cortical neurons and information transferred via a "biophoton device" – a pilot study. Explore! 2012; 21 (1), 7-12

15 Vastenburg D., Pet S. A follow-up study on the morphology of isolated rat cortical neurons and information transferred via a "biophoton device". J Altern Med Res 2012; 4(2): online

16 Pet-Reatsch E., Pet W. Chronic health complaints in children and adolescents and "biophoton therapy" – a pilot study. Explore! 2011; 20 (6), 29-34

17 Bohn - Stafleu - van Loghum. Merck Manual Medisch Handboek, 2. ed., Springer, Berlin 2005

18 Wolffers I., Medicijnen 2008-2009. Uitgeverij Contact, Amsterdam/Antwerpen 2007

19 Aissa J., Litime M.H., Attis E., Benveniste J. Molecular signalling at high dilution or by means of electronic circuitry. J. Immunolog. 1993; 150, A146

20 Benveniste J., Aissa J., Litime M.H., Tsaegaca G.T., Thomas Y. Transfer of the molecular signal by electronic amplification. FASEB J. 1994; 8, A398.

21 Citro M., Endler P.C., Pongratz W., Vinattieri C., Smith C.W., Schulte J. Hormone effects by electronic transmission. FASEB J. 1995; 9, A12025.

22 Endler P.C., Citro M., Pongratz W., Smith C.W., Vinattieri C., Senekowitsch F. Übertragung von Molekül-Information mittels Bioresonanz-Gerät im Amphibienversuch. Erfahrungsheilkunde 1995; 3, 186-192.

23 Enserink M. Newsmaker Interview: Luc Montagnier. Science 2010; 330, 1732.