

Biophoton emission of human body

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For the first time systematic measurements of the "ultraweak" photon emission of the human body (biophotons) have been performed by means of a photon detector device set up in darkness. About 200 persons have been investigated. In a particular case one person has been examined daily over several months. It turned out that this biophoton emission reflects, (i) the left-right symmetry of the human body; (ii) biological rhythms such as 14 days, 1 month, 3 months and 9 months; (iii) disease in terms of broken symmetry between left and right side; and (iv) light channels in the body, which regulate energy and information transfer between different parts. The results show that besides a deeper understanding of health, disease and body field, this method provides a new powerful tool of non-invasive medical diagnosis in terms of basic regulatory functions of the body.

Keywords: Biological regulation, Biological rhythms, Biophoton, Human body measurements, Left right symmetry, Psoriasis, Skin disease

In recent years the literature on biophotons has increased drastically, since it is accepted now that biophoton emission is, in contrast to common bioluminescence, a universal phenomenon linked to all living systems and provides a new non-invasive and powerful tool of investigating cellular tissues¹⁻⁴.

Although some theoretical problems are still unsolved, the application of biophoton emission now stretching quickly to new fields such as biosensing and food-quality control⁵.

A completely new area of this development is the analysis of the biophoton emission of the human body.

Materials and Methods

In order to investigate the characteristics of human biophotons, a dark chamber, large and comfortable enough for 2 persons was built and equipped with a movable biophoton detector (photomultiplier: EMI 9558 QA, selected type)⁶. This device provides a count rate lower than 0.1 counts/s.cm² and in the sufficient darkness of the chamber, the skin of a person can be easily examined.

The technique of measurements has been reported elsewhere^{1,2,5,6}.

By the use of a step motor the detector can move under control over the whole body in darkness. The

monitoring and recording of the data by electronic devices is performed outside of the dark chamber. Besides some careful examinations of the biophoton emission of the whole body of healthy and sick people, a systematic long time-monitoring of the biophoton emission of the hands and the forehead of a person (healthy woman, 27) where always round skin areas of 7 cm diameter were examined.

In order to increase the intensities, in addition to the direct biophoton emission (bpe) the so called "delayed luminescence" (dl) of the skin, which is the rescattered light emission after illumination with an external lamp was also measured⁵. The irradiation time of the tungsten lamp was always 5 sec. After 100 msec of switching off the external lamp the first measurement value of dl was recorded (within preset time intervals of 100 msec) and taken as a measure of dl.

As a measure of bpe the mean value of 256 measurement values (within preset time intervals of 1 sec) was taken.

The long time measurements on the single person were performed between 0800-1000 hrs from June 8, 1995 to March 5, 1996 for the hands and from August 29, 1995 to March 5, 1996 for the forehead. Every year some of the measurements were repeated in order to look for systematic changes during longer periods of time.

Results

The biophoton intensity of the human skin can be measured at least in the wavelength range from 400 to

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800 nm, where the photomultiplier is sensitive. The order of magnitude of the count rate is a few up to some 100 photons/sec/cm² surface area (the exact value depends on the individual, on the time of measurement and location on the skin).

The biophoton emission is generally stable. The mean value does not change much during investigation of some minutes of investigation. However, it may vary within a few hours between a few percent of the original value up to ten-times higher or lower values, again depending on the individual situation.

Healthy persons display on an average relatively low biophoton emission (bpe) and relatively high intensities of delayed luminescence (dl). Generally, bpe and dl are anticorrelated and the values on corresponding points of the left and the right side have the same order of magnitude. However, in pathological cases, like multiple sclerosis, one finds rather high values of bpe (and/or) dl as well as distinct asymmetries between left and right side of the body. Two examples are shown in Fig. 1*a* and *b*, where 1*a* refers to a progressed state and 1*b* to an early state of this disease. In the chronic phase the right hand displays about 10-20 times higher spontaneous biophoton emission than the hands of healthy people, the left hand goes up to even 30 times higher values (Fig. 1*a*). In young man in an initial state of multiple sclerosis the biophoton emission and the delayed luminescence have been measured during 3 days. A therapy with interferon was performed after the measurements on the second day. The disease is characterized again by a considerably strong asymmetry between the left and the right hand, in particular of delayed luminescence (Fig. 1*b*). However, the therapy shows only a small influence onto the course of this bias.

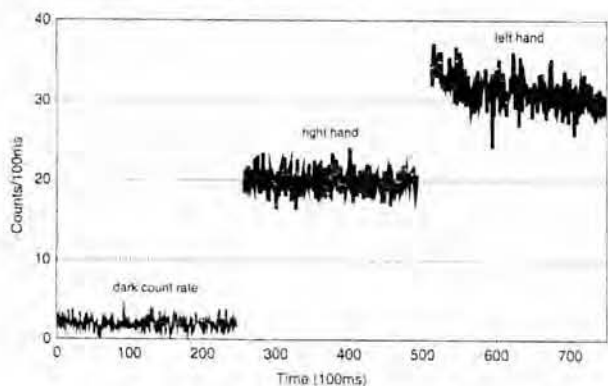


Fig. 1*a*—Biophoton emission of a progressed state of multiple sclerosis.

A psoriasis patient when treated only on the skin of his right arm by a 5 min exposure to an UV-A therapy lamp, displayed a strong increase of spontaneous biophoton emission and at the same time a considerably sharper decrease of delayed luminescence. The unhealthy and irradiated region of the arm reacted at the beginning stronger than the healthy part (Fig. 2*c* and 2*d*, respectively) at the beginning but after 30 min the bpe started decreasing and approached the original value after about one hour. The behaviour of dl was slightly different. The dl of the unhealthy part approached again at the initial values, but the dl of the healthy part attained values much higher than the original ones. Surprisingly, also on the left arm that has not been treated, the bpe and the dl followed the same change but not so strongly than on the treated right arm (Fig. 2*a* and *b* in comparison to Fig. 2*c* and *d*). This demonstrates for the first time that psoriasis is not a local disease but displays a communication between left and right side of the body.

The same principal result can be obtained by many other influences on the body, i.e. in case of simple treatment with cream (Fig. 3). Immediately after rubbing a conventional ointment onto the skin of the right arm, the bpe increased drastically, while at the same time the dl dropped down at this area. (Fig. 3*c* and *d*). This effect is reversible, and after some hours there is a relaxation back to the initial values. However, the surprising result is again that the untreated arm reacts undoubtedly onto this treatment without that it has been influenced locally at all. The effects depend on the nature of the cream and the individual properties of the test person under examination.

Only in a few cases of cancer patients it is possible to determine the location of the tumor. Usually, cancer

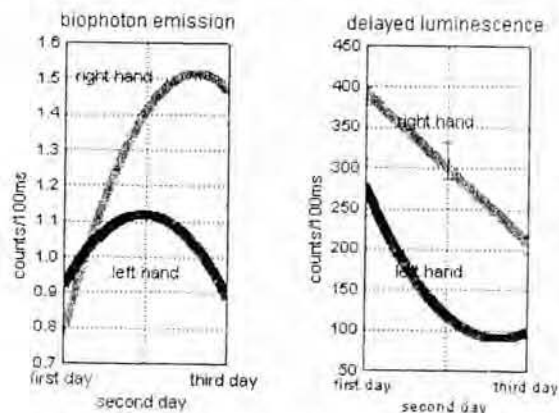


Fig. 1*b*—Biophoton emission and delayed luminescence along three days of an early state of multiple sclerosis.

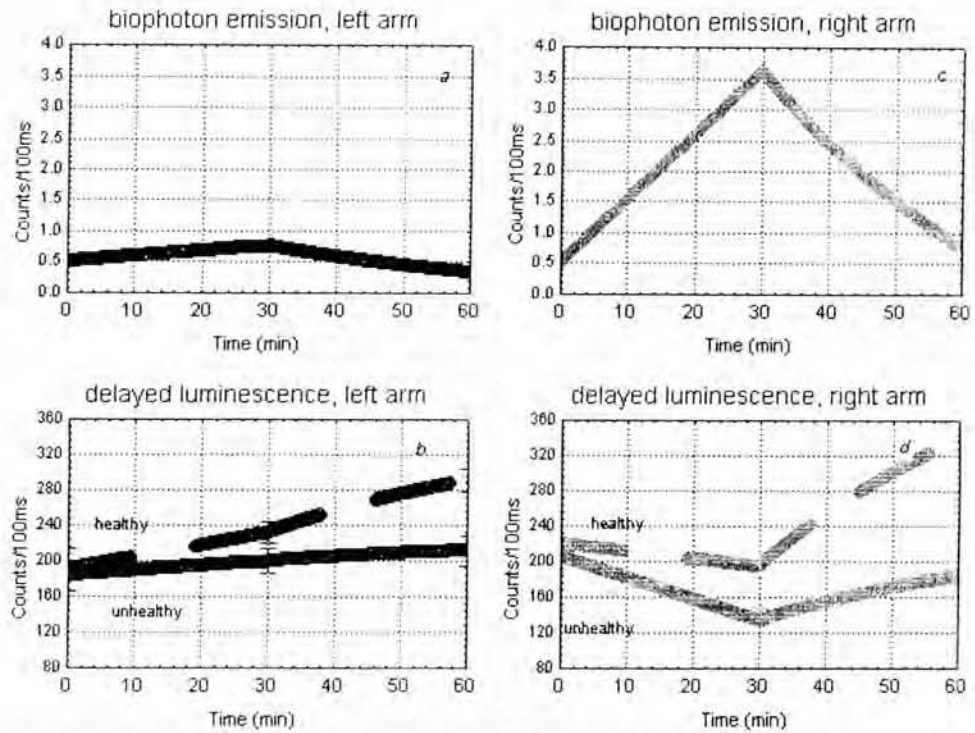


Fig. 2— Variations of biophoton emission and delayed luminescence of left arm (Fig.2a, 2b) and right arm (Fig.2c, 2d) of a psoriasis patient after 5 min exposure to a UV-A lamp on right arm.

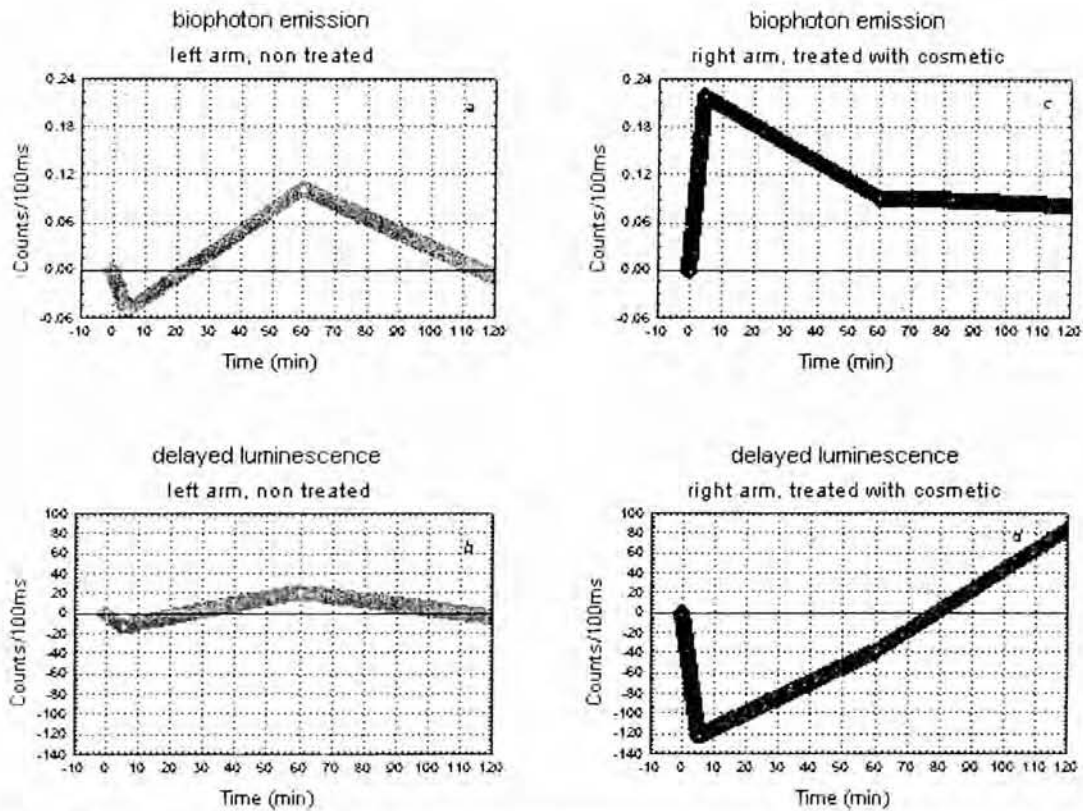


Fig. 3— Variations of the biophoton emission and the delayed luminescence of left arm (Fig.3a, 3b) and right arm (Fig.3c, 3d) after application of a cosmetic on the right arm.

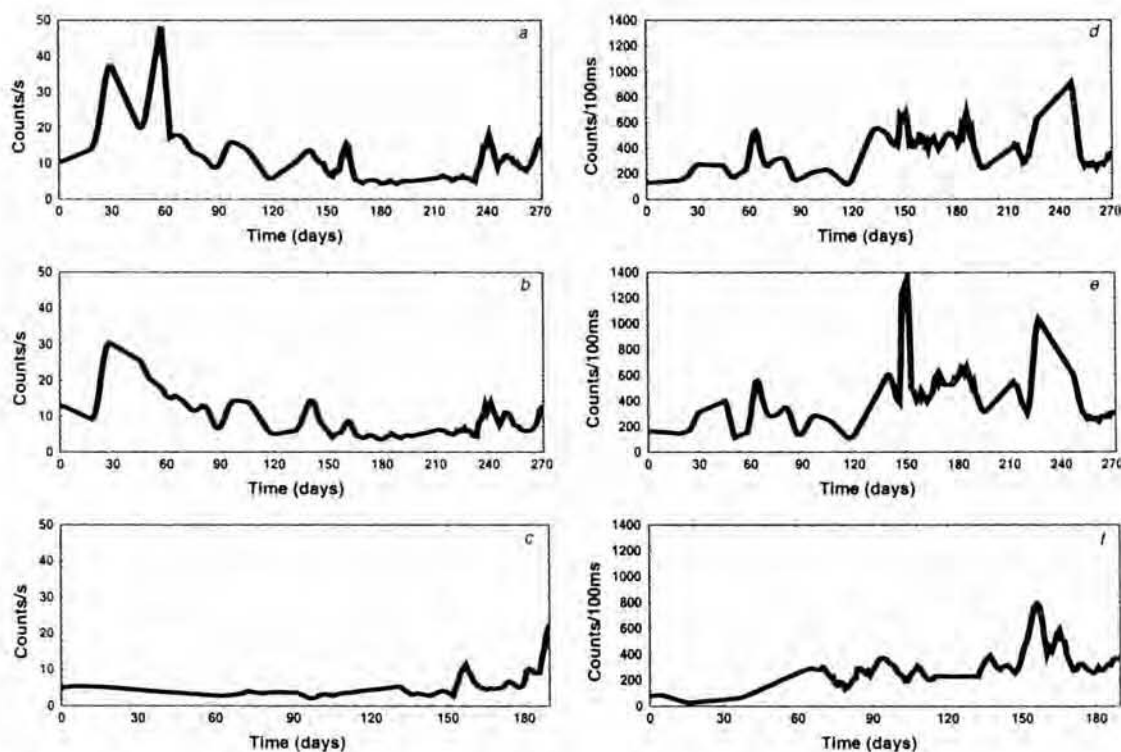


Fig. 4—Biophoton emission and delayed luminescence variations. *a/b/c*: Biophoton emission variations of *a*, right hand, *b*, left hand, from June 8, 1995 to March 5, 1996 (271 days). *c*, forehead from August 29, 1995 to March 5, 1996 (190 days). *d/e/f*: Delayed luminescence variations of *d*, right hand, *e*, left hand over 271 days, *f*, forehead over 190 days.

patients display as low bpe values as healthy ones, with the exception that (1) one finds asymmetric values on some parts of the body which may be far away from the location of the tumor, i.e. on the ears in case of a liver tumor, and (2) the bpe and dl values are rather rigid and do not change slowly in time as they do in case of healthy people.

A possible tool of finding helpful remedies for tumor tissue is the measurement of bpe and dl of operated tissues, after application of non-toxic remedies. In case if bpe and dl decrease under the influence of the remedy there is a chance of anti-tumor efficacy of the treatment with this agent.

In order to examine the long time behavior of bpe and dl of the human body, the biophoton emission of a single person was observed for many months.

Figure 4 shows bpe (left column) and dl (right column) of the hands and the forehead. The values display some patterns (Fig. 4, Table 1).

The cross-correlations analysis of these temporal bpe-and dl-variations reveal the following characteristics:

—Left hand and right hand emissions are strongly correlated, as well for bpe as for dl (Fig. 5*a,b* respectively).

—Bpe and dl are not correlated, but to a significant extent anti-correlated (Fig. 5*c*).

—The bpe-values of the forehead are not correlated with those of the hands (Fig. 6*a*), but there is a significant correlation of the dl-values of the forehead and the hands (Fig. 6*b*).

The Fourier analysis of the temporal bpe-and dl-values of Fig. 1 is shown in Fig. 7, where the spectral densities of the different measurements of Fig. 4 are displayed always on the corresponding positions of Fig. 7.

It is obvious that all these spectral densities show a similar pattern of rhythms, including 7 days, 14, 21, 27, 90 and 270 days.

Discussion

At this stage a complete interpretation of the results is not possible. Nevertheless, the following conclusion can be drawn:

There is a clear preference of right-and left hand-correlation, indicating a regulatory role of this bpe-and dl-phenomenon. This becomes evident also with the Fourier pattern revealing well-known biological rhythms.

The results can be understood in terms of an oscillating electromagnetic body-photon field which

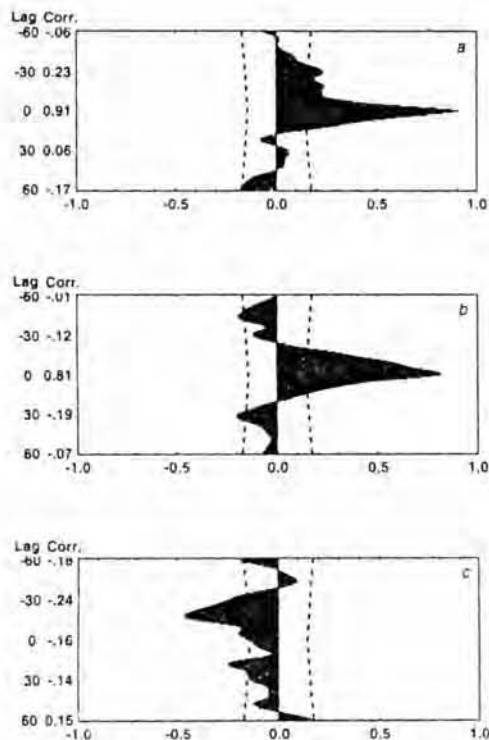


Fig. 5—Cross-correlations of the hands measurements from August 29, 1995 to March 5, 1996. *a*, of the biophoton emission variations of left hand (first) and right hand (lagged), *b*, of the delayed luminescence variations of left hand (first) and right hand (lagged), *c*, of the biophoton emission (first) and delayed luminescence (lagged) variations of left hand. The correlations (Corr.) are calculated for a lag of 0 though 60 days.

follows definite rhythms and where the oscillators become stronger with decreasing oscillation frequency. However, the phases of the oscillations depend on the location within the body.

While corresponding points like ears, hands, feet have the same phases (unpublished data), non-corresponding points display phase-shifts to such an extent that their bpe becomes different.

Various measurements have to be performed in future in order to uncover these presumably

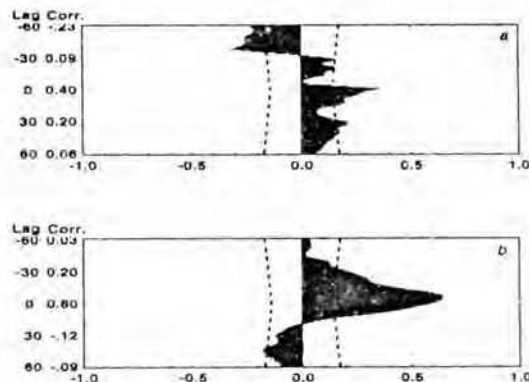


Fig. 6—Cross-correlations of the left hand and forehead measurements from August 29, 1995 to March 5, 1996. *a*, of the biophoton emission variations of left hand (first) and forehead (lagged), *b*, of the delayed luminescence variations of left hand (first) and forehead (lagged). The correlations (Corr.) are calculated for a lag of 0 though 60 days.

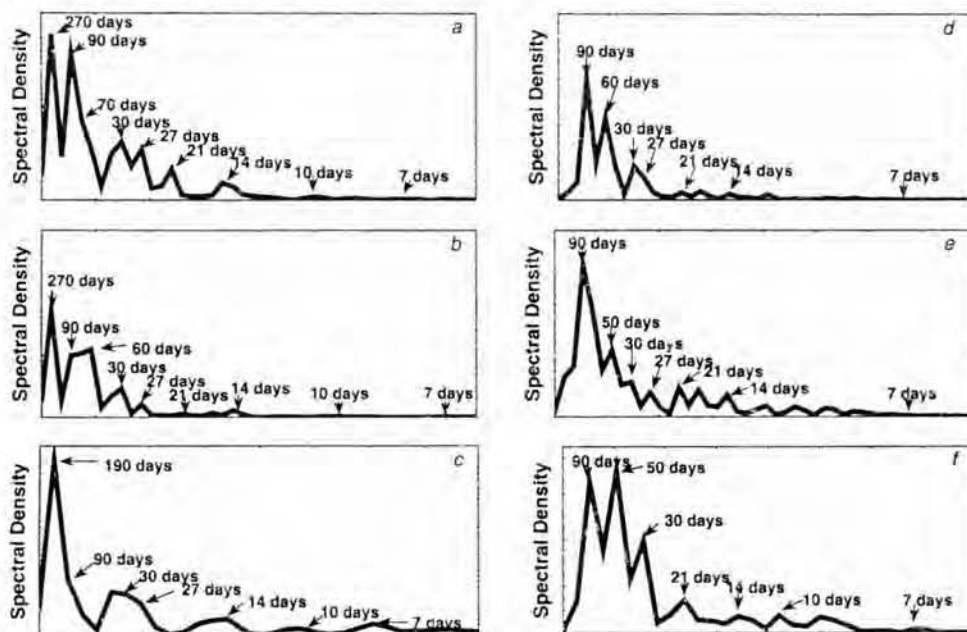


Fig. 7—Fourier analysis (spectral densities). *a/b/c*: Spectral densities of the biophoton emission values of *a*, right hand, *b*, left hand, from June 8, 1995 to March 5, 1996 (271 days), *c*, forehead from August 29, 1995 to March 5, 1996 (190 days). *d/e/f*: Spectral densities of the delayed luminescence values of *d*, right hand, *e*, left hand over 271 days, *f*, forehead over 190 days. Dark count rate (background noise), right hand and left hand were successively measured.

Table 1 — Biophoton emission and delayed luminescence over the whole measurement period
[Values are mean \pm SD]

Position	bpe (counts/s)	dle (counts/100ms)
Right hand	12.9 \pm 8.7	359 \pm 183
Left hand	10.7 \pm 6.6	400 \pm 230
Forehead	4.7 \pm 2.6	245 \pm 147

complicated regulation principles. It seems however that disease, according to these new insights into whole body radiation, can be assigned to definite perturbations of the regulatory pattern, that is loss of left-right symmetry. It is worthwhile to note that these results are in accordance with similar observations on cell-cultures and daphnia, where non-linear variations of bpe or dl with the density of the radiating subjects have been demonstrated^{5,7}. The reported investigations are a first step in understanding living systems, health and disease in terms of regulatory principles.

Acknowledgment

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