

News and Views

Biophoton emission of the human body

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1. Introduction

Roughly twenty years ago a photodetection system for the measurement of ultraweak photon emissions of cells had been developed, showing evidence of "biophoton emission" from all living systems [1]. Various confirmations of these results

by several laboratories showed, without a doubt, that plant [2], animal [3] and human cells [4,5] emit a permanent photon current ranging from a few photons $s^{-1} cm^{-2}$ to hundreds of photons $s^{-1} cm^{-2}$ covering continuously the spectral range of at least 200 to 800 nm [6,7].

Now, for the first time, systematic measurements of the biophoton emission (BP) and the delayed rescattering of

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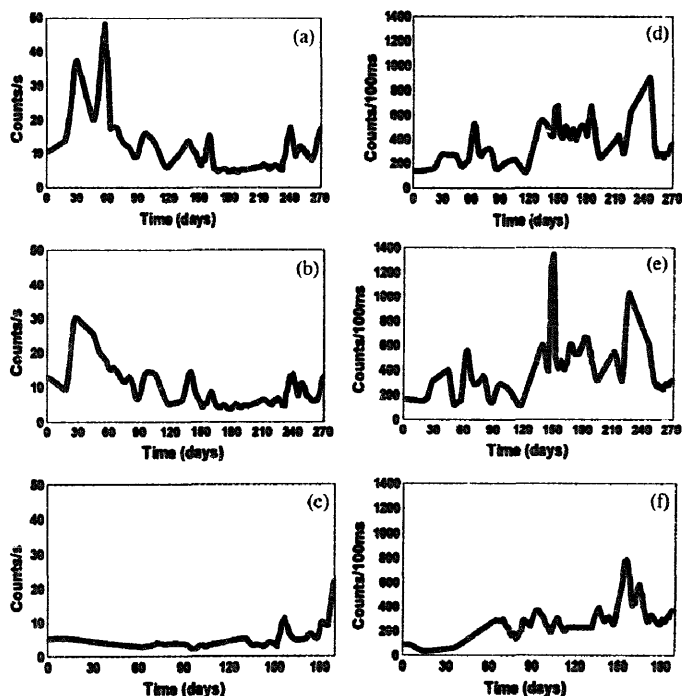


Fig. 1. Biophoton emission ((a)–(c)) and delayed luminescence ((d)–(f)) of the hands ((a), (d) right and (b), (e) left), recorded from 8 June 1995 to 5 March 1996, and the forehead ((c), (f)) recorded from 29 August 1995 to 5 March 1996, of a healthy woman. For all the data the dark count rate is subtracted.

light after illumination (called “delayed luminescence” (DL)) [2] have been performed on the human body every day for a period of over 9 months.

2. Biophoton emission of the human body

A special large dark room of less than 10 photons $\text{s}^{-1} \text{cm}^{-2}$ was constructed, comfortable enough for 5 persons. The method of measuring BP and DL of the human body is based on a single photon counting technique using a photomultiplier (EMI 9558 QA, selected type). It is described in Ref. [1] and elsewhere [7,8].

A healthy woman (27) was measured every day between 8 and 10 a.m. for a period of over 9 months. Due to the limited time period each day, measurements were focused on the hands (from 8 June 1995 to 5 March 1996) and the forehead (from 29 August 1995 to 5 March 1996). The measured circular surface area was about 30 cm^2 . The measurement values were always for BP, the mean value of 256 data points (in counts s^{-1}) and for DL, the first recorded value taken 100 ms after 5 s of white light illumination by a 150 W tungsten lamp (in counts per 100 ms). It is worthwhile to note that these values were significantly stable within the 2 h time interval allowed for investigation per day since their variations never exceeded 5% during this time.

3. Results and discussion

Fig. 1 displays the BP and the DL of the different areas of the test person within this 9 month period. Left-hand and right-hand emissions are significantly correlated, for both BP and DL. However, BP and DL are not correlated to each other, but, rather, display anti-correlation to a significant extent. The BP and DL values of the hands are not correlated to those of the forehead.

The Fourier analysis of these values reveals the same biological rhythms for both, BP and DL, for the hands as well as the forehead (Fig. 2). One can clearly identify periodicities of 7, 14, 21, 27, 80 and 270 days for all the photon emissions of the hands and forehead. This means that the photon emissions from all the skin areas follow the same biological rhythms, but while the photon intensities of the hands are in the same phase, the emissions of the forehead are phase-shifted relative to that of the hands.

The case of a multiple sclerosis patient (Fig. 3) shows that these regularities may be disturbed in the event of disease.

Acknowledgements

This work has been supported by the Ministry of Research (BMBF Project 01 BM 403/3, Biophotonic Communication).

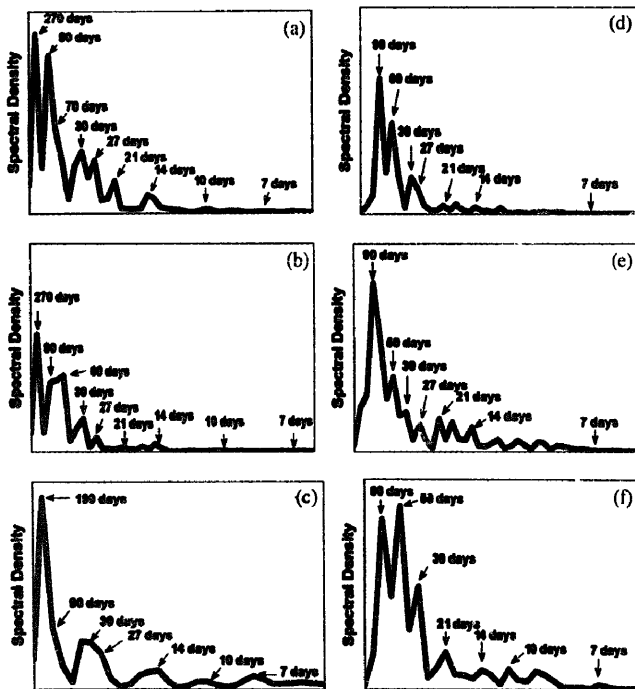


Fig. 2. Fourier analysis (spectral densities) of the measurements values displayed on Fig. 1. (a), (d) right hand; (b), (e) left hand; (c), (f) forehead.

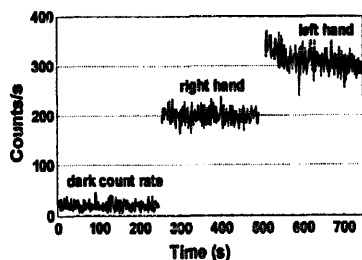


Fig. 3. Biophoton emission of the hands of a multiple sclerosis case.

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