Ultra-weak photon emission and EEG in a study on color perception in the dark

Results:

A new photomultiplier device (single photon counting mode) allowing for simultaneous recording of ultra-weak photon emission (UPE) and EEG was used for studying the effect of 20 s exposure to a color filter and to study the correlation between UPE of the right hand dorsum and alpha activity. Human UPE (4 00-600 nm) was recorded continuously with 50 ms dwell times. EEG was recorded with a sample rate of 125 Hz per channel (filtering 1 Hz HP; 30 Hz LP) and of each 5 s a FFT frequency spectrum was computed.

Post-exposure UPE ranged between 96.9 % and 106.9 % (mean 101.4 %) compared to pre-UPE (=100 %) values ($p=0.017$). EEG 7-13 Hz activity ranged between 90.5 % and 120.9 % (mean 102.3 %) compared to pre-EEG (=100 %) values ($p=0.007$). UPE increased during filter exposure and faded away after removal of the filter. EEG alpha decreased during exposure and showed a rebound followed by a decrease after removal. Pre-post differences were relatively small, permitting the combination of both (720 data sets/ experiment) for utilization in correlation analysis.

Significant correlations were found between the EEG range 7-13 Hz and the mean UPE in subjects with a relatively high photon emission ($r=0.7525$; $p=0.000$). Correlation was not dependent on 7-13 Hz activity ($r=0.0797$; $p=0.753$). Correlation was observed in 1 Hz sub-bands immediately next to major alpha activity. Correlation was commonly observed in left and right bands. Dual-type regulation (negative in 3 subjects; positive in 1 subject) may be related to dual type correlations of other physiological factors and of activity in other EEG frequency ranges and scalp locations with 7-13 Hz activity.

Published work resulting from the project supported with the present grant:

Van Wijk R, Bosman S, Ackerman J, Van Wijk EPA. (2008) Human ultra-weak photon emission and EEG alpha rhythm Correlation Between Fluctuations in Human Ultra-weak Photon Emission and EEG Alpha Rhythm. NeuroQuantology. Vol 6, Issue 4, 452-463.

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