

# Transcranial Brain Targeted Light Treatment via Ear Canals in Seasonal Affective Disorder (SAD) – a Pilot Study

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**Background:** Bright light therapy (BLT) is widely accepted as first line treatment in seasonal affective disorder (SAD). However, we have challenged the existing conceptual framework that BLT would only be mediated through the eyes.

**Aim:** We run a pilot study to test whether transcranially brain-targeted light therapy reduced symptoms of SAD.

**Methods:** The light was produced by using a novel invention, which is a medical-device approved in the European Union. The amount of photic energy was 6.0-8.0 lumens in both ear canals, and the length of treatment was 8 or 12 minutes five times a week during a four-week study period. The final patient series consisted of 13 physically healthy indoor workers suffering from winter SAD according to DSM-IV criteria. The severity of depressive symptoms was assessed using the 17-item Hamilton Depression Rating Scale (HAMD-17) and Beck Depression Inventory (BDI-21). Furthermore, severity of anxiety symptoms was measured by the 14-item Hamilton Anxiety Rating Scale (HAMA).

**Results:** The HAMD-17 mean sum score at screening was  $23.1 \pm 1.6$ . Ten out of 13 patients (76.9%) achieved full remission (i.e., HAMD-17 sum score  $\leq 7$ ), and 92.3% (12/13) at least 50% reduction in HAMD-17 sum scores during the study period. By using a mixed regression model of repeated measures (AR-1) controlling for age, gender, and HAMD-17 mean sum score at screening, significant differences were found comparing the HAMD-17 mean sum scores of “week 0” with the corresponding scores at “week 3” ( $t = -2.05$ ,  $p = 0.045$ ) and “week 4” visit ( $t = -2.77$ ,  $p = 0.008$ ). Corresponding significant differences were found comparing the BDI-21 mean sum scores ( $15.2 \pm 6.7$ ) of “week 0” with the corresponding scores at “week 3” ( $t = -2.37$ ,  $p = 0.021$ ) and “week 4” visit ( $t = -3.65$ ,  $p = 0.001$ ). The HAMA mean sum score at screening was  $20.5 \pm 5.4$ . During the study period, 12 out of 13 (92.3%) patients achieved at least 50% reduction in their HAMA sum scores, and in 10 out of 13 patients (76.9%), the HAMA sum score was  $\leq 7$ .

**Conclusion:** Based on the results, the psychogenic effects of light may be mediated to the brain even without eyes. The basic assumptions underlying extraocular photoreception in humans deserve to be reconsidered.

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