Results: There was a trend toward increased tau accumulations in patients with late-life depression compared to healthy controls, while levels of Aβ depositions were equally low in patients and controls. Notably, patients with psychotic symptoms exhibited greater tau loads (p < 0.01) than those without psychotic symptoms. However, tau depositions were not significantly correlated with any of the clinical symptoms examined here.

Conclusions: The current findings implicate tau pathologies in the pathophysiology of late-life depression with psychotic symptoms, indicating a potential therapeutic approach to this disease based on PET-visible pathologies.

Keywords: TAU PROTEIN, Depression, PET, Late Life Depression, Neuroimaging

951. Changes in Resting-State Global Brain Connectivity in LSD-Induced Altered States of Consciousness are Attributable to the 5-HT2A Receptor

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Background: Lysergic acid diethylamide (LSD) is a prototypical psychedelic drug with agonist activity at various serotonin (5-HT) and dopamine receptors. Despite the therapeutic and scientific interest in LSD, the specific receptor contributions in particular to changes in brain connectivity have not been studied yet.

Methods: In a double-blind, randomized, counterbalanced, cross-over study 24 healthy participants received either 1) placebo + placebo, 2) placebo + LSD (100 µg po), or 3) ketanserin - a selective 5-HT2A receptor antagonist (40 mg po) + LSD (100 µg po) in three different sessions. Resting-state fMRI scans were acquired 75 and 300 minutes after the second substance administration. We analyzed resting-state functional connectivity with a data-driven global brain connectivity (GBC) method to facilitate discovery.

Results: LSD administration caused widespread alterations of GBC across cortical and subcortical regions. LSD decreased GBC in the thalamo-cortical structure, connectivity, and function compared to placebo light exposure (p < .05). Structural magnetic resonance imaging (MRI) showed that active blue-light treatment was associated with increased volume of the pulvinar nucleus bilaterally (p < .05). Changes in functional and structural connectivity correlated with improved neurocognitive performance.

Conclusions: Daily morning exposure to blue-wavelength light for 6-weeks led to improved sleep and associated alterations in thalamo-cortical structure, connectivity, and function compared to amber placebo light exposure. These preliminary findings raise the possibility that blue-light treatment may provide a novel method for improving recovery from some aspects of mTBI.

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Keywords: Light Therapy, Traumatic Brain Injury, MRI, DTI, Functional Connectivity

952. Light Therapy Facilitates Thalamo-Cortical Brain Recovery from Mild Traumatic Brain Injury

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Background: Mild traumatic brain injury (mTBI) or “concussion” is often associated with persistent problems with sleep for up to 50% of patients. We hypothesized that regular morning blue light exposure therapy may re-entrain the circadian rhythm and improve sleep, potentially enhancing brain repair and neuropsychological recovery.

Methods: Twenty-eight individuals (15 female; 18-48 years) with a documented mTBI during the preceding 18 months underwent a comprehensive neuropsychological assessment and multidimensional PET-visible pathology assessment. Participants completed 6-weeks of daily morning light exposure (30 min/day) with a light device fitted with blue (n=14) or amber wavelength (placebo; n=14) diodes, and returned for follow-up assessment and imaging.

Results: Blue light exposure led to an earlier bedtime and rise time, lower daytime sleepiness, and improved balance compared to placebo light (p < .05). Structural magnetic resonance imaging (MRI) showed that active blue-light treatment was associated with increased volume of the pulvinar nucleus bilaterally (p < .05). Changes in functional and structural connectivity correlated with improved neurocognitive performance.

Conclusions: Daily morning exposure to blue-wavelength light for 6-weeks led to improved sleep and associated alterations in thalamo-cortical structure, connectivity, and function compared to amber placebo light exposure. These preliminary findings raise the possibility that blue-light treatment may provide a novel method for improving recovery from some aspects of mTBI.

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Keywords: Light Therapy, Traumatic Brain Injury, MRI, DTI, Functional Connectivity

953. Reciprocal Disruptions in Cortico-thalamic and Hippocampal Connectivity in Youth at Genetic High Risk for Psychosis

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