Investigating neuroplasticity associated with psilocybin-assisted and mindfulness-based relapse prevention group therapy in alcohol use disorder

Summary

Background and rationale
Alcohol use disorder (AUD) is a chronic and relapsing disorder with a major impact on psychological, physiological and social functioning. Pharmacological and psychotherapeutic treatments only show limited efficacy with relapse rates up to 60% after residential treatment highlighting the urgent need for novel treatment approaches. Recent trials showed that psychedelics applied in adjunction to psychotherapy produced robust decreases in percentage of heavy drinking days in patients with AUD. There is also evidence that psychedelic therapy improves mindfulness on a psychological level. Translational research in animals suggests that psychedelics induce long-lasting changes in neuroplasticity. However, to date there is no study in humans that investigates if psychedelics induce structural neuroplasticity.

Aims of the study
The aim of the present study is to investigate if psilocybin-assisted group psychotherapy (PAP-G) induces long-lasting neuroplasticity on cortical midline structures (anterior and posterior cingulate cortex (ACC, PCC)) and their communication within the thalamocortical system using advanced neuroimaging. Structural and functional changes of PAP-Gs' will be compared with an active AUD-patient control group receiving mindfulness-based relapse prevention group psychotherapy (MBRP-G). We hypothesize that PAP-G will increase thalamic nuclei volumes, cortical thickness in the ACC and PCC, and their cortico-thalamic functional connectivity. We expect similar but less pronounced changes in MBRP-G.

Methods
We will recruit two groups of abstinent outpatients with AUD in the Clinic Südhang (Kirchlindach) participating in the both standardized and 4-week PAP-G (n = 20) or 8-week MPRP-G (n = 20) therapy. Additionally, we will recruit healthy controls (n = 20). All subjects will be measured before treatment, after one month and after two months using clinical questionnaires (including mindfulness) and with 7-Tesla MRI before and after therapy (two months). After completion of the PAP-G/MBRP-G a three-month follow-up takes place to assess alcohol-related outcome measures (mean of percent heavy drinking days) in patients with AUD.

Impact for the field
This is the first study that investigates PAP-G and MPRP-G induced structural and functional neuroplasticity of cortical midline structure and their associated large-scale networks in AUD. It is also the first study to use high-resolution 7-Tesla MRI to investigate neuroplasticity associated with PAP-G. Thus, our findings will contribute to understand the neurobiological underpinnings of PAP-G and MBRP-G in AUD. Results
will further provide data on potential biological factors, which are associated with changes of mindfulness after
PAP-G and MBRP-G, which seem to play a key role for treatment outcome in AUD. Finally, our results of psychedelic-induced neuroplasticity will be of broad interest for a wide range of neuropsychiatric disorders.