Methods: Twenty-two right-handed patients with schizophrenia (12 males and 10 females, mean age = 45.9 years) and 20 right-handed healthy control subjects (13 males and 7 females, mean age = 42.8 years) consented to participate in this study. We measured musical ability, cognitive functions, and clinical assessments using the Montreal Battery for Evaluation of Amusia (MBEA), Brief Assessment of Cognition in Schizophrenia (BACS), and Positive and Negative Syndrome Scale (PANSS), respectively. We employed automatic probabilistic tractography DTI analysis using TRActs Constrained by UnderLying Anatomy (TRACULA) available in the Freesurfer software for the reconstruction of major tract bundles.
Results: Whole-tract diffusion characteristics in patients with schizophrenia and controls were significantly different. Fractional anisotropy (FA) was lower for patients with schizophrenia compared to controls in the left superior longitudinal fasciculus - parietal endings (slfp) ($p < 0.001$), left cingulum - angular bundle (cab) ($p < 0.001$), and corpus callosum - forceps minor (fminor) ($p < 0.001$). We found significant correlation between musical abilities and FA alterations in slfp in both controls and patients with schizophrenia. While lower musical ability corresponds to lower FA in slfp of controls ($r = -0.572$, $p = 0.013$), it is associated with higher FA in the slfp of patients with schizophrenia ($r = 0.515$, $p = 0.021$).
Discussion: This study shows that TRACULA can be used for the detection of decrements in several DTI tracts including the left slfp, left cab, and fminor in patients with schizophrenia. It revealed that while lower musical ability correlates with lower FA values in the left slfp in controls, it is associated with higher FA values in the same region in patients with schizophrenia. This contradictory finding in controls and patients with schizophrenia with regard to white matter pathology may reflect left supramarginal region malfunction resulting in cortical pathology in patients with schizophrenia. The data suggest that patients with schizophrenia may be more susceptible to changes in cortical thickness in the supramarginal region, and white matter alteration in the left slfp. Further study is needed to confirm the results. The characteristics of grey and white matter in the left parietal region which are relevant to musical ability may provide insight into pathological progression in patients with schizophrenia.

F180. CANNABINOID 1 RECEPTOR AVAILABILITY & MEMORY FUNCTION IN FIRST EPISODE PSYCHOSIS: A MULTI-MODAL PET-FMRI STUDY

Faith Borgan*[,1], Mattia Veronese[2], Owen O'Daly[1], Tiago Reis Marques[2], Maria Rogdaki[2], Oliver Howes[2]
[1]King's College London; [2]Psychiatric Imaging Group, MRC Clinical Sciences Centre, Institute of Clinical Science, Imperial College London

Background: Although memory deficits are a core stable feature of schizophrenia, the neurobiology of these deficits remain poorly understood and unaddressed by current treatments. Converging lines of evidence show that the cannabinoid 1 receptor modulates memory function by altering mitochondrial function as well as synaptic transmission and plasticity. We aimed to investigate the association between memory function and cannabinoid 1 receptor availability, for the first time as far as we're aware in vivo. We also aimed to investigate the cannabinoid 1 receptor, for the first time as far as we're aware in first episode psychosis in order to identify if memory function is linked to a cannabinoid 1 receptor dysregulation.
Methods: Sixty-seven volunteers including 32 first episode psychosis patients (28 un-medicated, 4 medicated) and 35 matched healthy volunteers completed the Sternberg working memory paradigm during a functional magnetic resonance imaging (fMRI) scan. A subset of these volunteers including 20 healthy volunteers and 20 first episode psychosis patients (17 un-medicated, 3 medicated) also underwent a dynamic positron emission tomography (PET) scan using a cannabinoid 1 receptor selective radiotracer [11C]MePPEP with arterial blood sampling.
Results: Relative to healthy volunteers, first episode psychosis patients showed a significantly lower availability of cannabinoid 1 receptors in the hippocampus (Hedge's $g=0.6$) but showed greater bilateral hippocampal (left: pFWE=0.001; right: pFWE=0.002) and parahippocampal (left: pFWE=0.005; right: pFWE=0.014). functional activation during memory encoding. Healthy volunteers showed an association between CB1R availability in the hippocampus and mean functional activation in the parahippocampal gyrus during memory encoding ($R=.567$, $p=0.027$) but this association was not demonstrated by patients ($R=.027$, $p=0.474$). Relative to healthy volunteers, first episode patients also showed a significantly lower availability of cannabinoid 1 receptors in the anterior cingulate (Hedge's $g=0.7$) which was positively correlated with cognitive performance on the Wechsler Adult Intelligent Scale digit symbol coding test ($R=.519$, $p=0.006$) but inversely associated with the severity of delusional symptoms measured using the Positive and Negative Syndrome Scale ($R=-.570$, $p=0.033$).
Discussion: We demonstrate for the first time as far as we're aware that cannabinoid 1 receptor availability is linked to the neural correlates of memory encoding in healthy volunteers. We also demonstrate that first episode psychosis patients altered hippocampal functional activation during a memory task in the context of a hippocampal dysregulation in the cannabinoid 1 receptor. These findings extend an existing body of literature highlighting the role of the hippocampus in the pathophysiology of psychosis. These findings have implications for the understanding and treatment of memory deficits in schizophrenia.

F181. CHANGE IN PREFRONTAL-LIMBIC MORPHOLOGY AND COGNITION IN DRUG-NAÏVE FIRST-EPISODE PSYCHOSIS PATIENTS FOLLOWING ATYPICAL ANTIPSYCHOTIC TREATMENT: A BRIEF LONGITUDINAL STUDY

Melissa Woodward*[,1], Geoffrey Smith[1], William Honer[1], Vina Goghari[2], Lili Kopala[1], Kristina Gicas[1], Allen Thornton[3], Wayne Su[1], William MacEwan[1], Donna Lang[1]
[1]University of British Columbia; [2]University of Toronto; [3]Simon Fraser University

Background: Atypical antipsychotics are thought to normalize structural morphology in subcortical regions, however their effect on cortical volume remains equivocal.1,2 Studying the impact of atypical antipsychotic treatment on cortical structure in drug-naïve first-episode psychosis (FEP) patients is an opportunity to elucidate the effects of illness chronicity and treatment. Previous work has indicated the potential for short-term atypical antipsychotic treatment to increase cortical thickness in FEP patients, particularly the rostral and caudal middle frontal cortices.3 Both entorhinal and orbitofrontal cortices are decreased in patients with schizophrenia and impairment in prefrontal-limbic circuitry has been linked with cognitive impairment in patients.4,5 We examined the ability of an eight-week atypical antipsychotic treatment to increase entorhinal cortex (ERC) and orbitofrontal cortex (OFC) volume and thickness and improve symptom severity in drug-naïve FEP patients.
Methods: Twenty-three FEP patients treated with risperidone or quetiapine and 28 healthy volunteers completed structural 3T magnetic resonance imaging, neurocognitive testing and clinical assessments at baseline, four weeks and eight weeks. Volumetric segmentation of the cortical regions of interest was performed with Freesurfer 5.3 software. Baseline and eight-week follow-up assessments were used to calculate change scores for clinical, cognitive and structural variables to compare between groups. Change in volume, clinical and cognitive scores were analyzed with ANCOVA with age, antipsychotic dose and total brain volume entered as covariates.