

targeting mitochondrial 18 kDa translocator protein (TSPO) to determine microglial activation and a T1 MRI scan to study structural brain characteristics including brain volume, cortical thickness, and hippocampal shape. **Results:** Using a vertex-wise analysis, we observed a significant microglial activation-by-diagnostic group interaction in morphological measures across the left hippocampus. We observed associations between microglial activation and outward and inward morphological alterations in the dorsal and ventro-medial portions of the left hippocampus, respectively. These associations were only observed in first-episode psychosis group. There was no association between [18F]FEPPA binding and other structural brain characteristics.

**Discussion:** Our results, for the first time, suggest a connection between microglial activation and morphological alterations in hippocampus of first-episode psychosis.

### S170. AMYGDALA SUBNUCLEI VOLUMES IN FIRST-EPIISODE PSYCHOSIS: ASSOCIATION WITH CHILDHOOD ADVERSITY

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**Background:** The amygdala volume is reduced already in the first episode of psychosis. The amygdala is a key region in emotional processing, and its volume reduction has been associated with severity of childhood adversity in psychotic patients. Since the amygdala is comprised of separate subnuclei with distinct anatomy and function we wanted to study whether these effects are present in some subnuclei more than others in first episode of psychosis.

**Methods:** We studied amygdala subnuclei volumes in 68 first-episode psychosis (FEP) patients (mean age =  $27.1 \pm 6.2$ , 35 females) and 65 healthy controls (mean  $28.9 \pm 6.5$ , 33 females) randomly selected from the general population. Subjects underwent a T1-weighted MRI with 1mm isotropic resolution (Philips Ingenuity 3T). The subnuclei volumes were generated with a new automated algorithm in FreeSurfer. Childhood adversity was measured using the Trauma and Distress Scale Scores (TADS). Baseline group differences in the amygdala subnuclei volumes were tested using repeated measures general linear model. The analyses were restricted to the four largest subnuclei: the lateral, basal, accessory basal, and the corticoamygdaloid transition area with volumes > 100 mm<sup>3</sup>. There were no differences between hemispheres nor group by hemisphere interactions so left and right hemispheres were averaged. All group comparisons were corrected for age, sex, and total intracranial volume. Association between the volumes and the TADS scores in the FEP group were also corrected for cumulative exposure to antipsychotic medication.

**Results:** We found that amygdala subnuclei were smaller in the FEP patients than in the controls with regional specificity (subnucleus ROI\*Group  $p = 0.015$ ). In the FEP, the most robust reductions were in the lateral nucleus (Bonferroni corrected  $p = 0.036$ ,  $\beta = -64.15$ ). No statistically significant difference was observed in the basal nucleus, the accessory basal nucleus or the corticoamygdaloid transition area. The FEP patients had in average higher TADS total score ( $19.00 \pm 13.56$ ) compared to the HC ( $7.68 \pm 7.07$ ) ( $p < 0.001$ ,  $t = 5.84$ ).

We found that particularly the TADS physical abuse score (FEP(n)=63, HC(n)=59) associated significantly differently with some subnuclei in patients and control group (ROI\*Group\*Physical abuse  $p = 0.016$ ). The difference was significant only in the lateral nucleus (Group\*Physical abuse  $p = 0.048$ ,  $\beta = -34.97$ ). However, there was an overall nonsignificant trend of the negative association between lateral nucleus volume and all TADS scores in the FEP. Similar trend was not seen in the controls.

**Discussion:** We show that the amygdala subnuclei are differently affected already in the first episode of psychosis. Compared to the controls, the FEP patients had smaller lateral nucleus volume, but not basal, accessory basal nucleus or corticoamygdaloid transition area. The lateral nucleus volume was

also negatively associated with childhood traumatic experiences, particularly physical abuse in the FEP patients. These findings suggest the involvement of the lateral nucleus of amygdala in the association between childhood traumatic experiences and psychotic disorders. This is well in agreement with studies suggesting that the lateral nucleus of the amygdala is associated with fear learning, recovery from fear and regulation of fear expression.

### S171. ALTERED WHITE MATTER CONNECTIVITY IN PATIENTS WITH SCHIZOPHRENIA USING PUBLIC NEUROIMAGING DATA FROM SCHIZCONNECT

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**Background:** Several studies have produced a large body of evidence for white matter abnormalities related to schizophrenia. The literature has yet to achieve a state of consistency and reproducibility, and reported low integrity of white matter tracts vary between studies. Whole brain image study with large sample size is needed to address this issue. We investigated white matter integrity in connections between regions of interests (ROI) in the same hemisphere in patients with schizophrenia and healthy controls with public neuroimaging data from SchizConnect (<http://schizconnect.org>).

**Methods:** A final data set was consisted of 129 healthy controls and 122 schizophrenia patients. For each diffusion weighted image (DWI), a two-tensor full-brain tractography was performed, and DWI images were parcellated by processing and registering the T1 images with FreeSurfer and the Advanced Normalization Tools. We extracted a total of 36 tracts in the both hemisphere connecting ROIs in the same hemisphere with white matter query language. We compared means of diffusion measures between patients and controls, and evaluated correlations with Letter-number sequencing (LNS) test, Vocabulary test, letter fluency test, category fluency test, and trails A of the Trail Making Test (TMT). The Benjamini-Hochberg procedure with false discovery rate (FDR) of 0.05 was used to correct for multiple comparisons.

**Results:** We found a significant RD and TR increase of the left thalamo-occipital tracts and the right uncinate fascicle (UF), and a significant RD increase of the right middle longitudinal fascicle (MDLF), and the right superior longitudinal fascicle (SLF) ii in schizophrenia. There were correlations between the TR in the left thalamo-occipital tracts and letter fluency test, and the RD in the right SLF ii and LNS test, which did not survive after correction for multiple comparisons.

**Discussion:** These results indicate widespread abnormalities of white matter fiber tracts in schizophrenia, contributing to the pathophysiology of schizophrenia.

### S172. BRAIN METABOLITES AND THE RELATION WITH COGNITION AND PSYCHOTIC SYMPTOMS IN MEDICATION-FREE PSYCHOSIS AND CONTROLS: A PHARMACOLOGICAL MAGNETIC RESONANCE SPECTROSCOPY STUDY

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**Background:** Psychotic disorders are complex neuropsychiatric disorders characterized by positive, negative and cognitive symptoms. Over the recent years, several neurotransmitter systems and neurometabolites have been related to psychotic disorders but the exact underlying neurobiological mechanisms are still not well understood. One neurotransmitter system that has been increasingly related to psychosis is the cholinergic muscarinic system. Increased choline concentrations and reduced muscarinic M1 receptor expression have been reported in schizophrenia. Therefore, the present study investigated brain metabolite concentrations, their responsiveness to M1 receptor blockage, and their relation to cognitive, positive and negative symptoms in psychosis.

**Methods:** 31 medication-free subjects with a psychotic disorder (mean age 27 years) and 31 gender, age and IQ-matched healthy control subjects (mean age 25 years) were enrolled in the study. 1H-proton magnetic resonance spectroscopy (1H-MRS, PRESS) was used to measure brain metabolites in the anterior cingulate cortex (ACC) and striatum. Metabolites measured included choline (Cho), glutamate (Glu), glutamine (Gln), GLX, myoinositol (MI), N-acetylaspartate (NAA) and glutathione (GSH) (metabolite to creatine ratios were analyzed). All subjects were measured twice: once after placebo and once after a pharmacological challenge (4 mg. biperiden, a M1 receptor antagonist). The order of drug – challenge was counterbalanced. In addition, cognitive function was assessed using the Cambridge Neuropsychological Test Automated Battery (CANTAB) and psychotic symptom severity was assessed with the Positive and Negative Syndrome Scale (PANSS) to examine the relation between brain metabolites and cognition and psychosis symptoms.

**Results:** No significant differences were found in both ACC and striatal brain metabolite levels between subjects with a psychotic disorder and controls after placebo. Moreover, M1 blockade did not significantly affect brain metabolite levels in these regions and no group x challenge interaction effects were found. In addition, in both groups, no correlation was found between cognitive functioning and any of the brain metabolites. In subjects with a psychotic disorder, a positive correlation was found between striatal choline levels (after placebo) and negative symptom severity ( $p = 0.024$ ).

**Discussion:** These results suggest that there are no differences in ACC and striatal brain metabolites between medication-free subjects with a psychotic disorder and healthy controls and that these metabolites are not influenced by acute muscarinic M1 receptor antagonism. The significant correlation between striatal choline and negative symptom severity in the psychosis group could indicate that the cholinergic system is involved in negative symptom pathology. This is the first study that examined the influence of M1 receptor blockade on brain metabolites and therefore these results warrant replication.

### S173. GREY MATTER VOLUME DEFICITS IN PATIENTS WITH A FIRST EPISODE NON-AFFECTIVE PSYCHOSIS AND SUICIDE RELATED BEHAVIOUR

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**Background:** Suicide represents the main cause of premature death in first episode psychosis (FEP) patients. However, our understanding of suicidal behaviour in this population is limited. During the last decade, several

works have related suicidal behaviour in FEP patients with structural abnormalities in frontal and temporal areas as well as specific structures such as hippocampus, insula and amygdala. The main aim of this work was to analyse the possible structural brain abnormalities associated with suicide-related-behaviour in a large sample of FEP patients.

**Methods:** We use a voxel-based morphometry (VBM) analysis in 146 FEP individuals: 24 FEP with and 122 without suicidal behaviour. All images were taken in the same 3T Phillips scanner. The CAT 12 toolbox, which is implemented in SPM12 was used for VBM analysis of the data. A two-sample t-test was set with sex, age, handedness, total intracranial volume and global disability score as nuisance covariables. We applied threshold-free cluster enhancement (TFCE) with 5000 permutations and corrected for multiple comparisons (FWE) at  $p < 0.05$ .

**Results:** A gradual reduction of grey matter volume related to presence of suicide-related-behaviour was found in frontal area, specifically in superior frontal gyrus, middle frontal gyrus, precentral gyrus, inferior frontal gyrus and orbital gyrus. In addition, significant reduction was found in middle temporal gyrus as well as in posterior cingulate gyrus and precuneus.

**Discussion:** Our results are in line with previous works which related suicidal behaviours with reduced frontal regions. Frontal areas are involved in: i) cognitive analysis; ii) foresight and weighing consequences of behaviour; iii) considering future and making predictions; iv) impulse control; v) delaying gratification; vi) inhibiting inappropriate behaviour; vii) initiating appropriate behaviour. Reestructuraria esta frase así: On the other hand, precuneus is involved in: i) episode memories; ii) reflective self-awareness; iii) executive function; and iv) it is activated during judgements. Finally, cingulate gyrus has been strongly associated with emotional responses to pain, regulation of aggressive behaviour and decision making. Finally, middle temporal gyrus appears to play an important role in retrieving semantic information.

This study provides some insights about brain abnormalities associated with suicide-related-behaviours in FEP patients. In particular, the areas reported in this study are related with important functions such as impulsivity, emotional processing information, responses to pain and aggressiveness which are strongly associated with suicide-related-behaviours. Further studies are necessary to replicate the relevance of these structures in suicidal behaviour in FEP patients.

### S174. ABNORMAL SOCIAL COGNITION RELATED TO STRUCTURAL DISCONNECTIVITY IN SCHIZOPHRENIA

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**Background:** Social cognition impairments are found in schizophrenia patients and hamper their ability to form social relationships. The biological underpinnings of this social cognition impairment are poorly investigated. We hypothesize that structural disconnectivity, which is replicated in schizophrenia, might have a relevant role in social cognition.

**Methods:** The study we present here is under development. We have assessed social cognition using the Mayer, Salovey and Caruso emotional intelligence test (MSCEIT) in 30 patients with schizophrenia and 20 healthy controls. Structural connectivity is assessed with anatomical and Diffusion weighted (DWI) images acquired in a 3 Tesla MRI system. Anatomical and DWI images are processed to obtain fractional anisotropy (FA) values in the tracts connecting prefrontal cortex with anterior cingulate, superior temporal gyrus, insula and superior parietal cortex. The following statistics are assessed i) the differences in MSCEIT scores between patients and controls, ii) the differences in FA values between groups, iii) the relation between MSCEIT punctuation and FA values.