Results: FEP patients and healthy volunteers did not differ significantly in volume or thickness for both ERC and OFC regions at baseline. FEP patients demonstrated a significant increase in OFC volume ($F(22,1)=5.23$, $p=0.34$) and an increase in ERC thickness ($F(22,1)=12.80$, $p=0.002$) following treatment. Healthy volunteers had an increase in ERC volume ($F(27, 1)=4.99$, $p=0.35$). Cognitive switching, an indicator of executive functioning, was not predicted by our brain measures of interest at baseline. Following treatment, increased OFC volume predicted a worse performance on the cognitive switching task for patients ($\beta(22,1)=0.770$, $p=0.017$) but a better score for healthy volunteers ($\beta(23,1)=-0.712$, $p=0.044$). Symptom severity scores were not significantly related to our brain regions of interest.
Discussion: FEP patients have increase entorhinal cortical thickness and orbitofrontal cortical volume following an 8-week treatment of atypical antipsychotics. Increased OFC volume is associated with a decreased proficiency at cognitive switching for FEP patients but an increased proficiency for healthy volunteers. This difference may be due to underlying neurodevelopmental differences between psychosis patients and healthy controls and improvement in neurocognitive tasks may occur given a longer duration of antipsychotic treatment. These findings demonstrate the impact of atypical antipsychotics on cortical morphology in key regions associated with psychosis-spectrum disorders.

F182. SYMPTOM-RELATED STRUCTURAL BRAIN PATTERN IN PATIENTS WITH SCHIZOPHRENIA-A PARTIAL LEAST SQUARE ANALYSIS

Susanna Muckenhuber-Sternbauer*[,1], Anne Ruef[2], Peter Falkai[2], Dominic Dwyer[2], Nikolaos Koutsouleris[2]
[1]Ludwig-Maximilians-University, University Psychiatric Hospital; [2]Ludwig-Maximilians-University

Background: Multivariate neuroimaging studies of schizophrenia have revealed a generalizable neuroanatomical signature of the illness which however does not fully explain the variance of ist clinical phenotyps. A potential strategy to improve the mapping between the psychopathology and brain pathology of the disorder is to decipher the dictionary of symptom pattern and their neuroanatomical fingerprints. If successful, such a strategy could support a biologically informed revision of the taxonomy of psychosis.
Methods: 176 patients with first episode to chronic stages of schizophrenia were assessed using the Positive and Negative Syndrome Scale (PANSS) and scanned using T1-weighted magnetic resonance imaging (MRI). The patients`PANSS scores, sociodemographic data and disease course variables, as well as their grey matter volume maps (GMV) entered a multivariate Partial Least Square (PLS) analysis that decomposed unique patterns of brain-behavior covariance between these data domains into latent variales (LV). We tested the LVs for significance using nonparametric- permutation and bootstrap resampling techniques.
Results: Three LVs showed significant brain-behavioral constellations. The first pattern linked hippocampal and medial frontal cortex volume with negative symptoms, age and age of onset. The second pattern consisted of opposite correlation between positive and negative symptoms associated with positive loadings in the subcortical structures such as the thalamus, the caudate nucleus and negative loadings in the auditory, insular and medial prefrontal cortices. The third LV presented a pattern involving negative symptoms, illness duration and age of onset as well as volume reductions in the anterior insular and orbitofrotal cortices.
Discussion: Our results indicate that the heterogeneity of schizophrenia can be decomposed into clinically relevant brain-behavioral phenotyps of the disorder, suggesting a biologically-informed and disease stage-sensitive stratification of schizophrenic patients. This might provide a neurobiological basis for future stratified investigations of treatment effects and prognosis both in early and advanced stages of schizophrenia.

F183. FUSIFORM GYRUS ABNORMALITIES RELATED TO VERBAL INTELLIGENCE AND NEGATIVE SYMPTOMS IN FIRST-EPISODE PSYCHOSIS

Sang-Hyuk Lee[1], Jeong Hoon Kim[2], Sra Jung*[,1], Arira Lee[1]
[1]CHA Bundang Medical Center, CHA University; [2]Bundang Jesaeng Hospital

Background: Researches have shown that verbal intelligence of first-episode psychosis (FEP) can be deteriorated. Only a few studies have investigated about neural correlates of verbal intelligence in FEP. Fusiform gyrus is often referred to the "visual word form area (VWFA)", also known to be systematically activated by reading. The object of this study is to explore the relationship between the volume of language processing regions and the verbal IQ (VIQ) in FEP.
Methods: 102 patients with FEP and 54 HC were enrolled this study. All subjects were right-handed. All patients were interviewed and diagnosed with the diagnostic criteria in Structured Clinical Interview for DSM-5 and examined by means of MRI at 3 Tesla at base line. Schizophrenia patients were measured their IQ through Korean-Wechsler Adult Intelligence Scale (K-WAIS). Positive and Negative Syndrome Scale (PANSS) were administered at baseline and 8 weeks after antipsychotics administration for patients. We used the FreeSurfer software package for estimating the volume of language processing area including pars triangularis, pars opercularis, insula, Heschl's gyrus, Planum temporale and fusiform gyrus of left dominant hemisphere.
Results: Compared to the HCs, first-episode psychosis patients showed volume reductions in fusiform gyrus ($p=0.000$) and pars opercularis ($p=0.006$) of left hemisphere among language related regions after Bonferoni correction. We found that only the volume of fusiform gyrus of left hemisphere showed significant positive correlation with VIQ ($r=0.30$, $p=0.026$) and also showed positive correlation with its subscales (vocabulary subscale ($p=0.042$), arithmetic WAIS subscale ($p=0.012$), similarities subscale ($p=0.034$)). In addition, the volume of fusiform gyrus of left hemisphere were significantly negative correlated with the score of PANSS Negative subscale at 8 weeks ($p=0.016$) after antipsychotics administration.
Discussion: These findings suggest that the fusiform gyrus can be related to the verbal intelligence in first-episode psychosis patients and it may be associated with the severity of negative symptoms after treatment.

F184. TESTING THE GABA-GLUTAMATE HYPOTHESIS FOR SCHIZOPHRENIA IN RELATION TO AUDITORY HALLUCINATIONS - PRELIMINARY RESULTS

Helene Hjelmervik*[,1], Alexander R. Craven[2], Erik Johnsen[3], Kristiina Kompus[1], Rune A. Kroken[3], Else-Marie Løberg[3], Kenneth Hugdahl[3]
[1]University of Bergen; [2]University of Bergen, NORMENT Center of Excellence, University of Oslo; [3]Haukeland University Hospital, NORMENT Center of Excellence, University of Oslo; University of Bergen

Background: The gamma-aminobutyric acid (GABA)-glutamate hypothesis of schizophrenia suggests a neurotransmitter imbalance – reduced GABA and increased glutamate - which causes disruption of the modulation between inhibitory GABAergic interneurons and excitatory glutamatergic neurons. In the left superior temporal gyrus (STG) both hyperactivation and increased glutamate levels have previously been associated with auditory hallucinations in schizophrenia patients. However, the STG GABA-glutamate imbalance by simultaneously measuring GABA and glutamate in the same subjects has not previously been tested, and was therefore the aim of the present study. We hypothesized reduced GABA and increased

glutamate in the patients relative to controls. Furthermore, reduced GABA and elevated glutamate in STG should be related to severity of auditory hallucinations in these patients.
Methods: The current study tested 23 schizophrenia patients (18 hallucinating and 5 non-hallucinating) and 53 healthy controls. The sample included both female and male participants above the age of 18. All patients were on medication, and they were tested at different times relative to the treatment onset. Magnetic resonance spectroscopy (MRS) was used to acquire data from voxels in the right and left superior temporal gyrus (Heschl's gyri) with a 3T GE 750 Discovery MR scanner. PRESS and MEGA-PRESS sequences were applied to measure glutamate and GABA, respectively. Voxel tissue water was used as reference for glutamate and GABA. Scores on the Positive and Negative Syndrome Scale (PANSS) were also collected, and used to differentiate hallucinating from non-hallucinating patients.
Results: Separate 2(Group) x 2(Hemisphere) ANOVAs were estimated for GABA and glutamate. No main or interaction effects came out significant for GABA (All $F(1,73)<2.7$, $p>0.1$, $\eta2<0.03$). The analysis for glutamate resulted in a main effect of Hemisphere ($F(1,74)=24$, $p<0.001$, $\eta2=0.25$) in which the right STG showed overall higher concentrations than the left STG. In addition, an interaction effect between Group and Hemisphere was found ($F(1,74)=5.22$, $p=0.03$, $\eta2=0.07$). Bonferroni Post-hoc analysis showed significantly elevated glutamate levels in patients relative to controls in the right STG only ($p=0.005$). Furthermore, a multiple regression analysis was estimated between severity of hallucinations (PANSS P3 item) at the time of testing, and GABA and glutamate values in left and right STG. Although the overall model fit was non-significant, an approximate significant correlation was found between hallucination severity and left STG glutamate levels ($\beta=0.36$, $t=2.1$, $SE=0.17$, $p=0.05$).
Discussion: The present study found higher glutamate levels in schizophrenia patients relative to healthy controls in the right STG. In spite of no overall differences in glutamate in the left STG, as initially hypothesized, glutamate levels in this region was found to predict severity of auditory hallucinations. One could speculate that the additional neuronal activity associated with auditory hallucinations elevate glutamate to 'normal levels' corresponding to that of healthy controls. The increased glutamate levels in the right STG seems (linearly) unrelated to auditory hallucinations and future analysis should test whether other symptoms are related to this finding. Overall, the study found only limited support for the GABA-glutamate hypothesis; In spite of increased glutamate in one of the regions, GABA was not found to be reduced in patients and was unrelated to auditory hallucinations.

F185. BRAIN STRUCTURAL PATTERNS DIFFERENTIATE EARLY- AND LATE-ONSET CANNABIS USE IN PSYCHOTIC PATIENTS: PRELIMINARY RESULTS FROM THE PRONIA STUDY

Nora Penzel*[,1], Peter Falkai[1], Nikolaos Koutsouleris[1], Joseph Kambeitz[1]
[1]*Ludwig Maximilian University*

Background: Cannabis use is considered to be one of the most important environmental risk factors for developing psychosis. Previous research indicates that consumption which is initiated during adolescence is associated with a higher risk of adverse effects. It has been proposed that in this period cannabis use may be more harmful due to the disruptive impact on the endocannabinoid system which is critically involved in brain development. Multiple studies indicate structural brain alterations in patients with schizophrenia as well as in cannabis users. However, the effect of cannabis use on brain development in patients with psychosis is currently only poorly understood. Thus, in the current analysis we employed a multivariate approach to investigate the hypothesis that early cannabis use might be associated with marked alterations in brain structure that are distinct from alterations in late-users.
Methods: n=39 patients with recent onset psychosis (ROP) and cannabis abuse of the PRONIA sample took part in a structural MRI (sMRI) scan and were clinically assessed with respect to their cannabis use characteristics and psychotic symptoms using the positive and negative symptoms scale (PANSS). Patients were grouped into early-users (n=21, onset before age of 18) and late-users (n=18, onset after age of 18). Multivariate pattern classification was performed on the basis of sMRI data to differentiate early- and late-users.
Results: Early- and late-users did not differ with respect to age, gender or amount of current cannabis use. Early-users showed significantly higher PANSS scores compared to late-users ($p < 0.05$). Structural MRI allowed the differentiation between early- and late-users with 72 % (81 % of the early-users, 61 % of the late-users).
Discussion: The current results indicate a distinction between psychotic patients with cannabis abuse who started to consume before the age of 18 and those who did later in life. The groups could be distinguished by means both of their clinical data, i.e., more severe psychotic symptoms in the early-users, and of their neuroanatomical data. These findings are in line with former literature, indicating that cannabis use during the period of adolescence is associated with persistent and more severe negative outcomes than use which is initiated in the adulthood. However, due to the relatively low sample size, these results serve only as preliminary results and need further investigation.

F186. TAPETUM ABNORMALITIES IN FIRST-EPISODE PSYCHOSIS AND RELATIONSHIP TO SYMPTOM SEVERITY AND DURATION OF UNTREATED PSYCHOSIS

Sun Woo Lee[1], Arira Lee[1], Kang-Soo Lee[1], Jeong Hoon Kim[2], Sang-Hyuk Lee*[,1]
[1]*CHA Bundang Medical Center, CHA University;* [2]*Bundang Jesaeng Hospital*

Background: Diffusion tensor imaging (DTI) studies have shown white-matter (WM) abnormalities in most corpus callosum segments in first-episode psychosis (FEP) patients. However, the tapetum, one of its sub-segments, is not fully studied until now. This study focuses on tapetum and its relationship with psychotic disorders using DTI with symptom severities and duration of untreated psychosis (DUP).
Methods: Ninety-five FEP patients and thirty healthy controls (HCs) were enrolled. Tapetum, region of interest was extracted using 3D slicer and tract-based spatial statistics (TBSS) were used for DTI analysis. All patients were assessed DUP and clinical symptoms by Scale for the Assessment of Positive Symptoms (SAPS), Scale for the Assessment of Negative Symptoms (SANS) at baseline.
Results: TBSS revealed that fractional anisotropy (FA) values of tapetum in FEP is significantly decreased compared to HCs ($p<0.01$, FWE-corrected). Exploratory correlational analysis revealed significant negative correlations between FA values of left tapetum and baseline SAPS total scores ($r =-0.278$, $p<0.05$), bizarre behavior subscale scores ($r =-0.310$, $p<0.01$), positive formal thought disorder subscale scores ($r =-0.348$, $p<0.01$), inappropriate affect subscale scores ($r =-0.315$, $p<0.01$) and SANS avolition-apathy subscale scores ($r =-0.257$, $p<0.05$). Also FA values of left tapetum was negatively correlated with DUP ($r =-0.426$, $p<0.00$).
Discussion: FEP patients show a significant reduction in WM integrity of left tapetum, also show correlation with clinical symptoms and DUP. These results suggested that left tapetum may play a role in symptom severities and prognosis in FEP.

F187. TBSS ANALYSIS OF WHITE MATTER ALTERATIONS IN SCHIZOPHRENIA PATIENTS VS. HEALTHY CONTROLS – RELATION TO AUDITORY VERBAL HALLUCINATIONS

Justyna Beresniewicz*[,1], Rene Westerhausen[2], Erik Johnsen[1], Kenneth Hugdahl[4], Kristiina Comps[1]