Conclusions: Identifying brain regions associated with obesity awareness may provide biomarkers for personalized and targeted interventions, such as non-invasive brain stimulation, which could impact treatment engagement and patient outcomes.
Keywords: Obesity, Illness Awareness, Functional Magnetic Resonance Imaging (fMRI), Treatment Adherence, Non-Adherence

P561. Multivariate Relationships Between Social Cognitive Performance and Functional Connectivity During Task and Rest Across Schizophrenia Spectrum Disorders and Healthy Controls

Lindsay Oliver[1], Colin Hawco[2], Navona Calarco[2], Ju-Chi Yu[1], Iska Moxon-Emre[1], Vinh Tan[1], James Gold[3], George Foussias[2], Pamela DeRosse[4], Miklos Argyelan[4], Robert Buchanan[3], Anil Malhotra[4], and Aristotle Voineskos[2]

[1]Centre for Addiction and Mental Health, [2]Centre for Addiction and Mental Health, University of Toronto, [3]Maryland Psychiatric Research Center, [4]The Zucker Hillside Hospital

Background: Schizophrenia spectrum disorders (SSDs) feature social and non-social cognitive deficits, associated with functional outcome. Social cognition includes lower- and higher-level processes, subserved by partially dissociable neural networks. We aimed to identify multivariate relationships between cognitive performance and functional connectivity across SSDs and healthy controls (HCs) during task and rest. We hypothesized that functional connectivity during social processing would covary with specific cognitive domains.
Methods: Participants (SSD N=196, HC N=157) completed functional magnetic resonance imaging (fMRI) during the Empathic Accuracy (EA) task and rest (RS), and social and non-social cognition tasks. Partial least squares correlation was used to identify latent variables (LVs) for EA and RS capturing multivariate brain-behavior relationships from functional connectivity metrics between 392 regions and 15 cognitive measures. Permutation testing and bootstrap resampling (1000 iterations) were used to evaluate significance and reliability.
Results: Two significant EA LVs were identified ($p<.05$), explaining 72.3% and 9.1% of the variance. EA LV1 captured an association between better performance across cognitive measures and increased within- and between-network connectivity. LV2 reflected an association between worse lower-level social cognitive performance and increased default, cingulo-opercular, and frontoparietal network connectivity. One significant RS LV was identified ($p=.001$), explaining 84.2% of the variance. RS LV1 captured an association similar to EA LV1, with more involvement of visual, somatomotor, and subcortical networks.
Conclusions: Overlapping and divergent connectivity patterns appear to covary with better cognitive performance during social processing versus rest. Our results support the value of task-based fMRI to identify functional connectivity patterns associated with specific social cognitive functions.
Supported By: NIMH R01; NARSAD/BBRF
Keywords: Schizophrenia Spectrum Disorders, fMRI, Functional Connectivity, Social Cognition, Neurocognition

P562. Increased Amplitude of Hippocampal Low Frequency Fluctuations in Early Psychosis: A Two-Year Follow-Up Study

Maureen McHugo[1], Baxter Rogers[2], Suzanne Avery[1], Kristan Armstrong[1], Jennifer Blackford[3], Simon Vandekar[1], Neil Woodward[1], and Stephan Heckers[1]

[1]Vanderbilt University Medical Center, [2]Vanderbilt University Institute of Imaging Sciences, [3]University of Nebraska Medical Center

Background: Neuroimaging studies have revealed hippocampal hyperactivity in schizophrenia. In the early stage of the illness, hyperactivity is present in the anterior hippocampus and spreads to other regions as the illness progresses. Resting state functional MRI signal amplitude may be a proxy measure for increased metabolism and disrupted oscillatory activity, both consequences of an excitation/inhibition imbalance underlying hippocampal hyperactivity. Here, we used fractional amplitude of low frequency fluctuations (fALFF) to test the hypothesis of progressive hippocampal hyperactivity in a two-year longitudinal case-control study.
Methods: We analyzed longitudinal resting state fMRI data collected over two years from 59 individuals in the early stage of psychosis and 67 demographically similar healthy individuals. fALFF was calculated using AFNI 3dRSFC and extracted from individual-specific regions of interest for the anterior and posterior hippocampus.
Results: We found increased fALFF in the anterior and posterior hippocampus of individuals in the early stage of psychosis at study entry ($t=3.96$, $p<0.001$). Contrary to our hypothesis of progressive hippocampal dysfunction, we found evidence for normalization of fALFF over time in psychosis (Group X Time interaction: $F=7.73$, $p=0.006$).
Conclusions: Our findings support a model in which hippocampal fALFF is a marker of psychosis vulnerability or acute illness state rather than an enduring feature of the illness.
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Keywords: Schizophrenia, Hippocampus, ALFF, Longitudinal, Excitation/Inhibition Imbalance

P563. An fMRI Study Exploring the Neural Correlates of Transsaccadic Deficits in Psychotic Disorders

Staci Board[1], Elizabeth Kruse[1], Tyler Lesh[2], Weiwei Zhou[1], Cameron Carter[2], and Wilsaan Joiner[1]

[1]University of California, Davis, [2]UC Davis Imaging Research Center

Background: Patients with schizophrenia and bipolar disorder with psychotic features (PSY) have been hypothesized to have a disruption in corollary discharge (CD), an internal copy of a motor command. Saccadic eye-movement tasks have

been used to study CD and have suggested that PSY have altered transsaccadic perception compared to healthy controls (HC). It has also been suggested that PSY have altered neural activity compared to HC during saccadic tasks.

Methods: 28 PSY and 18 HC performed a transsaccadic detection task during a functional MRI scan. Trials were binned based on the size of the target movement during the saccade, from zero (no change) to long (2.5 degree change). Psychometric functions were derived for 26 PSY and 17 HC from decisions made inside the scanner.

Results: PSY displayed a significantly greater perceptual threshold than HC ($p=.038$). Both groups showed significantly greater neural activity in response to long jumps compared to zero jumps in dorsal anterior cingulate cortex ($F=8.139, p=.007$), superior parietal cortex ($F=11.709, p=.001$), and medial dorsal thalamus ($F=44.000, p=.012$). Additionally, there was a significant interaction between trial type (from short to long) and group neural activity with PSY showing increased activity and HC showing decreased activity in the superior parietal cortex ($F=4.347, p=.043$).

Conclusions: Results from this preliminary study suggest PSY show altered neural activity during transsaccadic tasks. Disruption in CD may be contributing to PSY perceptual thresholds and increased neural activity. Future analysis correlating neural activity with clinical symptoms will provide additional information about the role of CD in psychosis.

Supported By: RO1

Keywords: Brain Imaging, fMRI, Psychosis Disorders, Saccade, Corollary Discharge

P564. Frontostriatal Neurochemical Profiling of the Healthy Human Brain Using Magnetic Resonance Spectroscopy and [^{18}F]-FDOPA Positron Emission Tomography

Julia L. Versel[1], Daniel P. Eisenberg[1], Stefano Marenco[1], Philip D. Kohn[1], Michael D. Gregory[1], Jasmin B. Czarapata[1], and Karen F. Berman[1]

[1]National Institute of Mental Health, Intramural Research Program, National Institutes of Health

Background: Dysfunction of prefrontal GABAergic neurons and abnormalities of striatal presynaptic dopamine synthesis are important phenotypes in neuropsychiatric illnesses such as schizophrenia. Recent meta-analyses of magnetic resonance spectroscopy (MRS) studies suggest that lower GABA levels in dorsal anterior cingulate cortex (dACC) may be associated with psychosis. Further, a number of positron emission tomography (PET) studies have found schizophrenia-associated dopamine synthesis excesses in the striatum, although these findings are mixed. Despite illness models highlighting frontostriatal circuit dysfunction, it is unclear whether variability in cortical GABA and striatal dopamine synthesis are related phenomena in humans, which would have implications for findings in clinical populations.

Methods: Fifty-seven healthy individuals (mean age 36.6±11.7, 26 females) underwent [^{18}F]-FDOPA PET imaging, a measure of dopamine synthesis capacity, as well as single-voxel MRS acquired from the gray matter of the dACC encompassing both hemispheres to measure GABA levels. Unscaled GABA values were normalized to creatine (Cre) values. Voxel-wise tests of association between these two parameters were conducted with AFNI software to interrogate and more finely localize regions of association between quantified measures of [^{18}F]-FDOPA tracer-specific uptake (K_i) in the striatum and GABA/Cre levels in dACC, with age and sex as covariates.

Results: There was an inverse association between dACC GABA/Cre values and [^{18}F]-FDOPA K_i, most prominently localized to clusters in the right putamen ($p<0.005$, uncorrected).

Conclusions: These findings suggest reciprocal cortical GABA-striatal dopamine relationships are observable in the living human brain and may be relevant to development of neurochemical biomarkers in neuropsychiatric disorders such as schizophrenia.

Supported By: National Institute of Mental Health Intramural Research Program

Keywords: [^{18}F]DOPA PET, Functional MRS, Translational Neuroscience

P565. Exploring Cortical and Thalamic Disfunction in Schizophrenia Using the Hilbert Huang Transform

Samuel Buck[1], Xiaopeng Song[2], Fei Du[2], and Dost Ongur[2]

[1]McLean Hospital, [2]McLean Hospital, Harvard Medical School

Background: Most approaches to the analysis of resting-state BOLD-fMRI data assume that BOLD signal reflects spontaneous neural oscillations, the frequency-domain properties of which are poorly understood. The frequency of neural signaling from these sources varies rapidly with time. Techniques which capture these nonstationary dynamics may therefore reflect clinically significant differences in neural activity. One such technique is the Hilbert-Huang transform, which empirically decomposes a signal into different rhythms of variable frequency, termed Intrinsic Mode Functions (IMFs).

Methods: Resting-State fMRI of 71 patients with schizophrenia and 74 healthy control participants were obtained from the NITIC's publicly available COBRE dataset. After preprocessing the images, the Hilbert-Huang transform was performed on each voxel to decompose the original signal into several IMFs, each associated with different BOLD activity rhythms. The energy-weighted average of the frequency of these IMFs at each point in time, a quantity termed the Hilbert-Weighted Frequency (HWF), was then calculated.

Results: Several cerebral areas showed elevated HWF for the first IMF in patients compared to controls, including clusters in the occipital cortex ($t(141.8)=4.04, p<0.001$) and thalamus ($t(136.7)=5.36, p<0.001$). The HWF for the other IMFs were not significantly different between patients and controls.

Conclusions: These results demonstrate the utility of applying techniques sensitive to the nonstationary nature of neural time series to fMRI data. Increases in HWFs were found in areas critical to sensory processing, which is impaired in Schizophrenia, indicating that neural activity frequency was abnormally high or faster in patients. Further investigation of