the attention network and default mode network, to facilitate access to attention and working memory [2]. Our findings suggest a role for the insula in modulating attentional capacity in ADHD.

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151. Diffusion Imaging in Individuals with Partial Deletions of the Williams Syndrome Critical Region

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Background: Williams syndrome (WS) is a rare neurodevelopmental disorder resulting from hemizygous microdeletion of ~25 genes on chromosome 7q11.23. Individuals with WS usually exhibit mild to moderate intellectual disability and pronounced difficulty on tests of visuospatial construction. Prior Diffusion Tensor Imaging (DTI) studies have established that WS is associated with altered white matter (WM) integrity. Studying individuals with partial deletions (PD) in the WS chromosome region (WSCR) could provide insight into the role of a smaller set of genes within that region.

Methods: Twelve individuals (9 females; mean age = 35.3 ± 13.8 (SD) years) with PDs in the WSCR participated in this study. Participants had IQs within the normal range (mean = 96.9 ± 10.8), cognitive profiles consistent with the WS pattern, and varying 7q11.23 deletions which included the elastin (ELN) and LIM-domain kinase 1 (LIMK1) genes; none of the deletions included GTF2IRD1 or GTF2I. Five participants had deletions of only ELN and LIMK1. Twelve healthy individuals matched for age (mean = 35 ± 12.2 years), IQ (mean = 99.6 ± 8.5), and gender (7 females) served as the control group. Diffusion Weighted Images (DWI) were acquired on a GE Signa 1.5T Scanner (2x2x2 mm resolution, 120 gradient directions, b-values between 0 and 1200). DWIs were corrected for head movement and eddy currents using TORTOISE [Pierpaoli *et al*., 2010]. Fractional anisotropy (FA) maps were derived using TORTOISE and were registered in a common space with Tract Based Spatial Statistics (TBSS [Smith *et al*., 2006], part of FSL [http://www.fmrib.ox.ac.uk/fsl/]). Also radial (RD) and longitudinal diffusivity (LD) were analyzed. Nonparametric statistical tests were performed using FSL's randomise procedure with 2000 permutations, using threshold free cluster enhancement (TFCE) for family-wise error corrections of multiple comparisons over the whole brain. In addition, we ran probabilistic tractography from a sphere (20 mm diameter) located around the intraparietal sulcus, where optimized VBM analysis had shown a loss of gray matter volume in the PD group as compared to controls. We binarized the tracts, transformed them into MNI space, and compared paths in PD and healthy controls with TFCE.

Results: We observed significant reductions of FA throughout the brain in PD individuals relative to controls (Fig. 1). 71% of the voxels in 48 major tracts were significant at a threshold of $p < 0.01$, with peaks of significance in the right cingulum bundle, right external capsule and left internal capsule, which contained the most significant voxel (MNI coordinates: x = -40,y = -38, z = -3). RD was increased in PD as compared to controls, although less significantly than FA, but with a similar diffuse pattern. LD did not differ significantly across the groups. Participants with PD in the WSCR were significantly more likely to have fiber paths passing through the superior longitudinal fasciculus than were healthy controls ($p < 0.05$).

Discussion: Reductions in FA accompanied by increases in RD and no change in LD may suggest changes in myelination or possibly fasciculation of axons in major tracts. The alteration in fiber paths emanating from the intraparietal sulcus would support the latter hypothesis.

Our results suggest that alterations in WM integrity in WS are related to a subset of genes in the WSCR. Since LIMK1 and ELN are the only deleted genes common to our entire PD group these findings implicate these two genes in particular. More work is necessary to understand the impact of LIMK1 and nearby genes on WM structure as measured by DTI.

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152. Functional and Anatomical Connectivity Underlying Vulnerability to Auditory Hallucinations in Schizophrenia Spectrum Disorders

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Background: Auditory hallucinations (AH) are a cardinal feature of schizophrenia (SZ) and other psychotic disorders. While a consistent finding in SZ patients with AH has been volume reductions of the superior temporal gyrus (STG), the literature suggests that abnormalities underlying AH are not confined to a single locus but involve distributed brain regions. The "dysconnectivity" hypothesis, first proposed by Wernicke, suggests that SZ arises from abnormal interactions between brain regions. In this study, we used resting state fMRI (rsfMRI) and diffusion tensor imaging (DTI) to assess both functional and anatomical connectivity underlying vulnerability to AH.

Methods: We studied 3 groups: SZ, schizoaffective, or schizophreniform patients with AH (n = 27), those with no history of AH (NAH; n = 14), and healthy controls (HC; n = 28). Patients were stably medicated and recruited from inpatient and outpatient services at McLean Hospital. Participants were 18-65 years old (AH 40 ± 11; NAH 37 ± 10; HC 37 ± 9 years), with no substance abuse in the past 3 months, no significant medical or neurologic disease, and no electroconvulsive therapy in the previous year. We used the Psychotic Symptom Rating Scale (PSYRATS) to collect information about patients' AH.

We acquired a 10 min resting state fMRI scan (TE/TR 24/2500 ms, 42 slices, voxel size 3.5 mm3 isotropic) using a Siemens 3T Trio MR scanner. We performed a seed region analysis of low frequency spontaneous oscillations using FSL version 4.1.6. We placed a