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## (POS-33) Multi-Directional Myelinated Axon Sizes in a Female Mouse

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The brain is composed of various cells, including neurons which transmit electrical signals via axons. These axons, grouped together in fibre tracts, make up the brain's white matter. Postmortem studies suggest that changes in axon diameter and density within the fibre tracts are associated with disorders such as Alzheimer's disease, schizophrenia, autism spectrum disorders, and more. In vivo measurements of axon diameters could provide an understanding of when and how these changes occur to help determine whether they contribute to disease development. Results obtained from newly developed diffusion magnetic resonance imaging (MRI) can be compared to the gold standard, electron microscopy (EM). MRI overestimates axon diameters possibly due to its unidirectional measurements. Our objective is to measure the distance across myelinated axons in multiple orientations to determine if the direction of MRI measurements affects the estimated size of the axons. Using ImageJ, a 0.77  $\mu$ m<sup>2</sup> grid, set either horizontally and vertically or at ±45⊠ angles, was placed on ten

9.4  $\mu$ m x 6.6  $\mu$ m EM images from a female mouse. If a grid line crossed a complete axon, a line was drawn along the grid line and its length recorded to represent the diameter. Currently, data was collected and analyzed for one of the ten images. The weighted mean diameters, weighted by area, were 0.7±0.1  $\mu$ m, 0.7±0.1  $\mu$ m, 0.7±0.2  $\mu$ m, and 0.57±0.05  $\mu$ m for the horizontal, vertical, +45⊠, and -45⊠ directions, respectively. Analysis of Variance (ANOVA) demonstrates no significant difference between the various angled diameters for the single slice. Further research must be conducted to determine if the angle of the measurement makes a significant change once all of the data are analyzed. The authors thank Dr. Zou Yue for performing the perfusion fixation, the Vanderbilt Cell Imaging Shared Resource Core for performing the EM, and NSERC and The University of

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Keyword-1

Keyword-2

Keyword-3

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