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Parametric Imaging of White Matter and Grey Matter of Fixed Sheep Brain CLAUDIA CHAMBLISS, University of Mississippi, WILL NEWMAN, Rhodes College, CECILLE LABUDA, University of Mississippi, BRENT HOFFMEISTER, Rhodes College — The frequency slope of attenuation (FSA) in sheep brain specimens was measured at multiple locations to generate parametric images (PIs) that characterize its spatial distribution. The goal was to determine whether grey and white matter can be differentiated in a single specimen by measuring the FSA in regions containing only grey matter and only white matter. Tissue specimens were 1-cm-thick slices of preserved sheep brain prepared from the transverse cardinal plane. Ultrasonic measurements were performed using broadband transducers with center frequencies of 3.5, 5.0, 7.5 and 10 MHz. The transducers were mechanically scanned to acquire signals over entire specimens. The FSA was calculated at each scan location and these values were imported into image processing software to generate the PIs. By comparing the PIs to photographs of the specimens, regions of interest (ROIs) containing only white matter and only grey matter were selected in the PIs. The average FSA and the standard deviation in each ROI was measured. Measured values in white matter for the mean and standard deviation over all samples and frequencies of the FSA ranged from 0.634 - 1.459 dB/cm•MHz and 0.019 - 0.169 dB/cm•MHz respectively. For grey matter FSA ranged from 0.429 - 0.955 dB/cm•MHz with standard deviation ranging from 0.016 - 0.08 dB/cm•MHz. These results indicate that the spatial mean of the FSA is higher for white matter than for grey matter and thus a high probability of differentiating these types of matter in a single specimen.

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