AbstractID: 6938 Title: In vivo prostate MRSI using an improved outer volume suppression technique

Purpose: To implement, *in vivo,* an optimized prostate 3D MR Spectroscopy Imaging (MRSI) technique which improves outer volume suppression of peripheral lipid and reduces lipid contamination of prostate spectroscopic imaging.

Method and Materials: All scans were performed on a General Electric 1.5T Signa MR scanner equipped with Echospeed gradients. A standard quadrature head coil was used for all phantom experiments and an endorectal coil (Medrad Inc.) in combination with a torso phased array coil was used for all human experiments. A water/oil phantom was designed to simulate the prostate and surrounding lipid signal. The product spectroscopy pulse sequence was modified to include twenty or more optimized spatial saturation pulses. 3D MRSI spectra, employing the optimized prostate spectroscopy technique, was collected from both phantom and *in vivo* prostate.

Results: Phantom results obtained using a standard 3D MRSI technique, which uses 4 manually placed spatial saturation pulses, showed significant lipid contamination well within the object where lipid is not present. Using the optimized spectroscopic technique on the prostate phantom we observed a 80% reduction in peripheral lipid. The 3D MRSI spectra revealed that significant reduction within all parts of the phantom were observed. Consistent with our phantom experiments, initial *in vivo* 3D MRSI of the prostate demonstrates, in some voxels, up to 100% reduction of lipid contamination due to peripheral contamination.

Conclusion: Phantom results indicate that significant lipid contamination occurs when using manually placed spatial saturation pulses. Using this novel, optimized MRSI technique has significantly reduced the problem related to lipid contamination. *In vivo*, implementation of the optimized MRSI technique has confirmed the decrease in peripheral lipid contamination. Thus a technique has been established which reduces the negative effect of perisprostatic lipid in prostate spectroscopy.