AbstractID: 11650 Title: Shape matters: Utilization of a conformal voxel technique to acquire robust in vivo prostate MRSI at short echo times

**Purpose:** We seek to improve the quality of *in vivo* prostate MRSI data acquisition by utilizing an optimized conformal voxel technique coupled with a spatial-spectral excitation PRESS pulse sequence for short echo time acquisitions.

**Method and Materials:** All subjects were scanned on a GE 1.5T Signa MR scanner equipped with Echospeed gradients. A standard endorectal coil in combination with a torso phased-array coil was used. The PRESS pulse sequence was modified to include the optimized conformal voxel MR spectroscopic imaging technique (CV-MRS). This method uses up to twenty Very Selective Saturation (VSS) pulses, automatically positioned in three dimensions, to "conform" the excitation volume to the shape of the prostate, effectively nulling signal from periprostatic lipids. Subjects were scanned using both the standard PRESS and the optimized CV-MRS techniques at long and short echo times (TE). *In vivo* prostate spectra were collected and processed using a modified version of LCModel.

**Results:** We observed an average lipid reduction of 60±18% for 17 subjects over the entire prostate when using the optimized CV-MRS technique as compared to standard MRSI techniques. In specific regions along the peripheral zone, we observed lipid reduction greater than 95%. The effect of reducing the lipid contamination has resulted in a ~70% improvement in peak identification of key prostate metabolites, based on goodness-of-fit parameters. Furthermore, short TE acquisitions have resulted in a substantial increase in the citrate signal, full visualization of the citrate multiplet and other metabolites not seen at long echo times.

**Conclusion:** *In vivo* implementation of this optimized MRSI technique has confirmed the reduction in peripheral lipid contamination, and improved the quality of spectra throughout the prostate. Furthermore, this is the first demonstration of short TE in vivo prostate MRSI acquisitions, which provides significant signal increase and reveal short TE metabolites to potentially improve prostate cancer detection.