

AbstractID: 5238 Title: Preliminary study of Glu and Gln metabolites in brain tumors at a 4T system

**Purpose:** *in vitro* <sup>1</sup>H MRS studies have suggested that Gln/Glu ratio is useful in detecting an early stage of malignant transformation. Due in part to the technical difficulty, *in vivo* detection of well-separated Gln and Glu of human tumors has not been reported. A recent study proposed that a standard STEAM sequence with optimized TE/TM (80/50 ms) can be used to simultaneously detect Gln and Glu peaks around 2.4 ppm with virtually no spectral overlap at 4T. In this study, we report preliminary results of the application of this technique for brain tumors.

**Method and Materials:** <sup>1</sup>H MRS of eight patients with brain tumors were acquired with a quadrature head coil in a 4T system. Four patients had biopsies within two weeks of their respective MRS study, and the remainder had biopsies prior to their scans. A standard STEAM sequence was used with TE=80ms, TM=50 ms, TR = 2 -3 seconds, spatial resolution = 4 - 12 cm<sup>3</sup>, and acquisition time =15-30 minutes. All data sets were processed using LCModel.

**Results:** In addition to providing “typical” characteristics of NAA, Cho, and Cr for brain tumors, one of the striking observations is consistent and remarkable increase in Gln concentration (water as reference) and Gln/Cr ratio for all cases studied; while decrease in Glu concentration (water as reference) but wide variability in Glu/Cr ratio (0-3 times of corresponding contralateral control). The results also demonstrate occurrences of opposite changes between Gln and Glu content for brain tumors, illustrating the importance of simultaneously detecting Gln and Glu for the study of tumor metabolism. The consistent and remarkable increases in Gln content suggest direct Gln involvement in tumor metabolism, in agreement with previous biochemical analysis.

**Conclusion:** *In vivo* Glu, Gln can provide useful information to help diagnosis of brain tumors.