Mapping Brain Glutamate in Humans: Sex Differences in Cigarette Smokers

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Statistical Analysis Plan

General Linear Mixed Modelling (GLMM) as provided by the python 3 statsmodel software package was used. Participant's age, gray-matter (GM) content of the volume of interest (VOI) and the B0-inhomogeneity (measured as the CrT FWHM in ppm of the best fit WS spectrum) of the VOI were generally found to be important nuisance variables. All models included these nuisance variables although for brevity, regression results for these nuisance variables are not reported here. In general the GLMM modeling was performed for the neurometabolite water-referenced concentration. The specific regressors of interest depended on the hypotheses specified for each specific aim. Specific Aim 1 (A1a) hypothesized a statistically significant relationship between sex and neurometabolite concentration. For A1a only data obtained from the abstinent EPSI were used and sex was the only regressor of interest. Specific Aim 1 (A1b) hypothesized a statistically significant relationship between circulating estrogen and progesterone and glutamate. Therefore A1b analysis used both pre- and post-smoking EPSI data from only female participants and the only regressor of interest was estrogen Aim 2 hypothesized statistically significant relationships between glutamate and sex, assessment time (pre- and post-smoking and both sex and assessment time). Regressions having $p < 0.05$ were taken as statistically significant.