

MRSMouse

Open-Source Toolkit for J-difference Editing Spectra Processing and Analysis in Mice

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OBJECTIVES

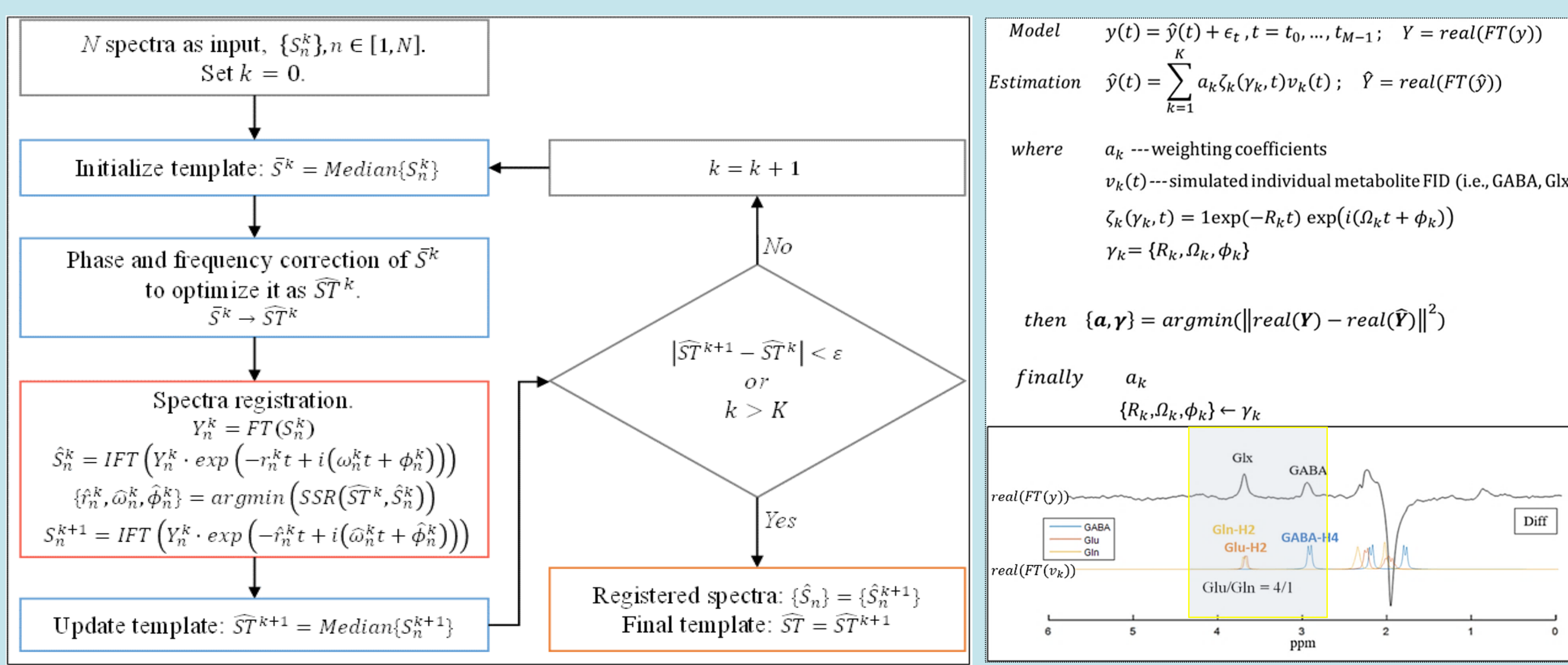
- To develop an open-source toolkit, MRSMouse, for J-difference editing (JDE) spectral processing and analysis in mice.
- To test the performance of MRSMouse toolkit in pre-clinical studies using *in vivo* mouse thalamic spectra acquired at 9.4T
- To further apply MRSMouse toolkit for *in vivo* human studies at 3T and discuss its clinical utility.

BACKGROUND

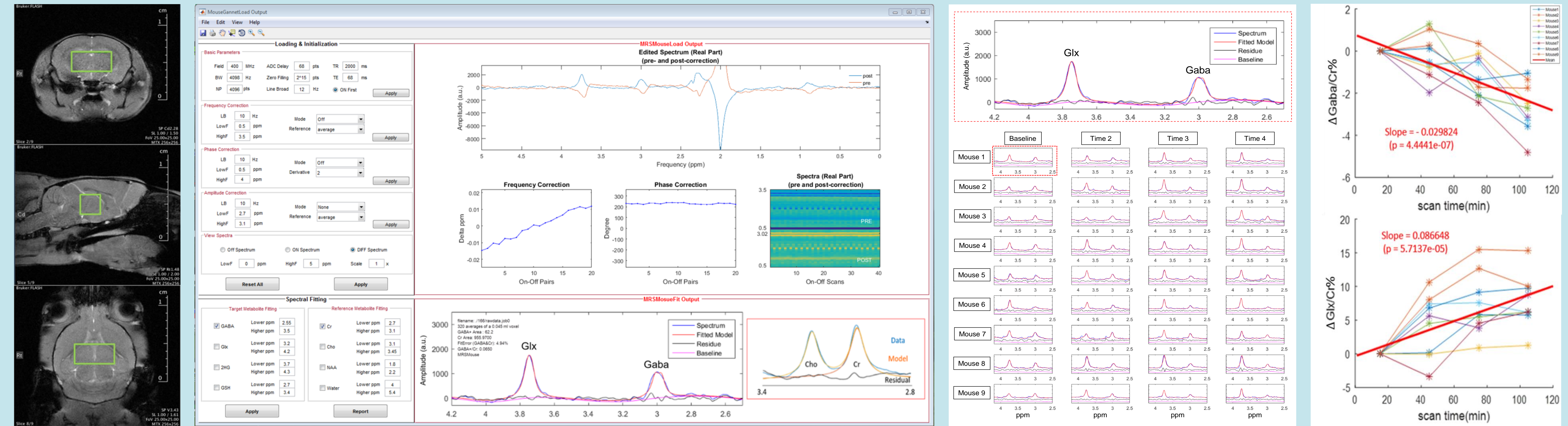
- MRS spectral editing studies of mice have been limited due to difficulties in spectrum processing and the lack of a standardized software package for analysis.
- Inspired by the idea of image registration, which has been extensively used for MR image analysis, in this work, we present an automated JDE spectra processing and analysis pipeline built upon the idea of spectrum registration.

METHODS

- Loading Scanner Raw Data**
- Initialization:** multi-channel combination, zero-filling, line broadening.
- Spectrum Registration:** 'On', 'Off', 'On'-Average to 'Off'-Average.
- Preparation for Spectrum Fitting:** 'Off'-Average, 'Diff'-Average, basis set.
- Spectrum Fitting:** 'Off'-Average, 'Diff'-Average, basis set, LCMModel.
- Reports:** quality, quantity.



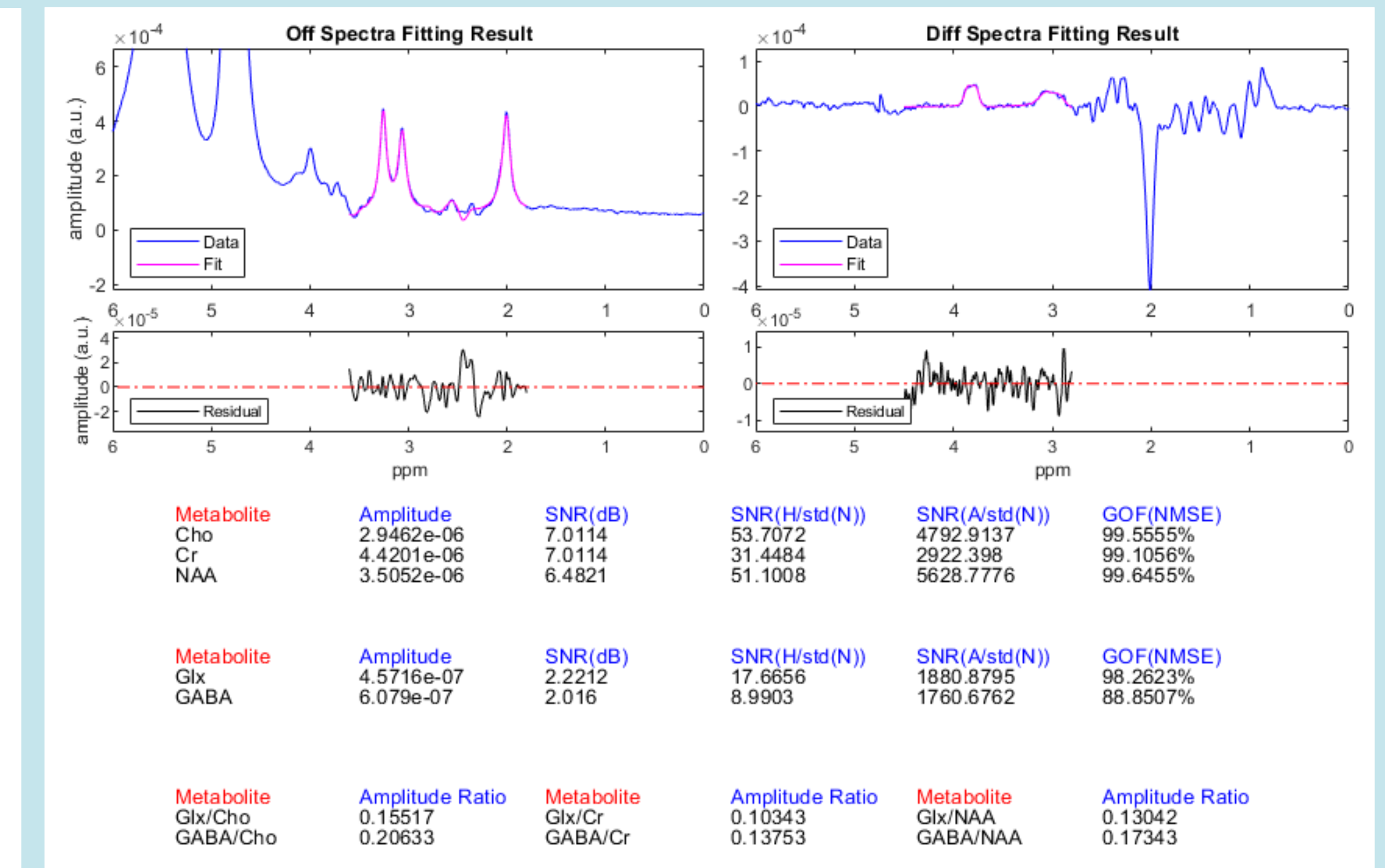
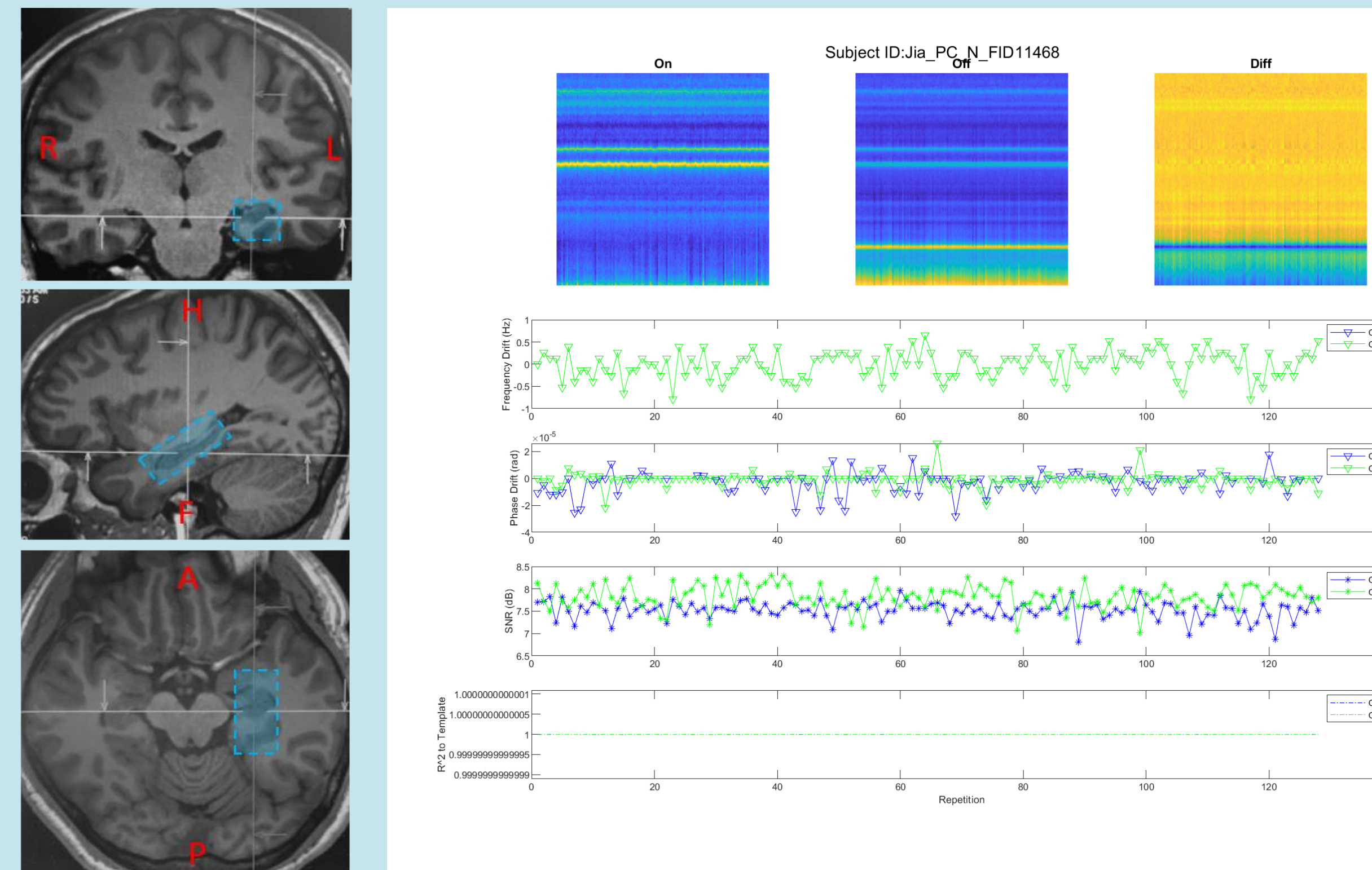
RESULTS - GUI & REPORTS



Guo et al., 2018. <https://onlinelibrary.wiley.com/doi/full/10.1002/nbm.3837>. Please contact sas68@cumc.columbia.edu and jg3400@columbia.edu.

Apply to Human

Scanner: Prisma.
Field: 3T.
Region: left hippocampus.
Sequence: MEGA-PRESS.
TR/TE: 2000/80 ms.
Coil: Head volume coil
64 channel.
Voxel Size: 40 x 20 x 25 mm³ (AP x HF x LR).
Averages: 160.
Scan Time: 11m06s.



CONCLUSION

- We developed an open-source toolkit, MRSMouse, designed for automated processing and analysis of JDE spectra and tailored for mouse studies at 9.4T.
- With Bruker raw data (and clinical scanner raw data) supported, MRSMouse is fully automated and rater-independent and is specifically designed to deal with low S/N spectra.
- We anticipate that it will be a useful tool for the adoption of JDE studies in translational animal (and clinical human) researches.

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