BIDAC project update

Develop image processing and analysis pipeline for in-vivo and ex-vivo MRI & DTI of mouse models

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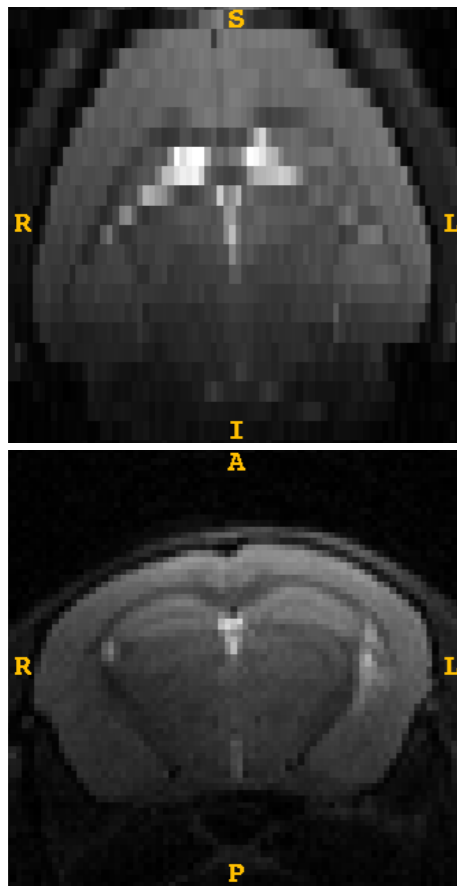*[1]SCI Institute, [2]Small Animal Imaging Core, [3]Human Genetics Dept.*
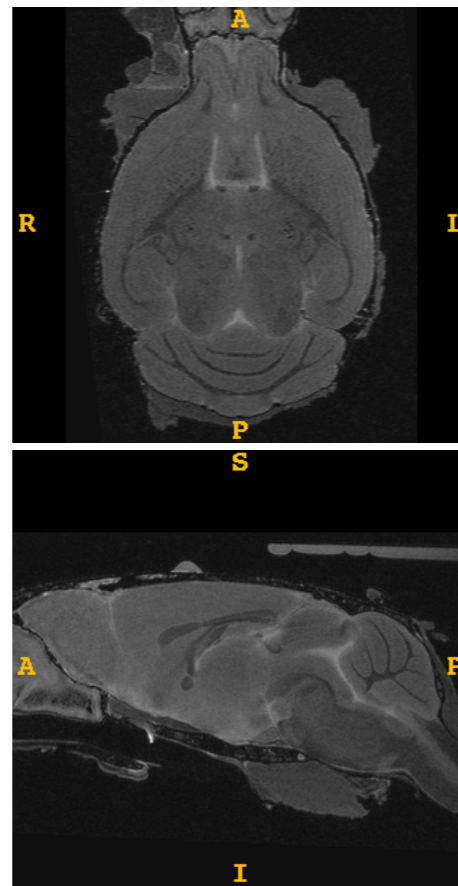
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Project update

1) **Optimization of in-vivo and ex-vivo MRI & DWI mouse brain acquisitions in collaboration with Small Animal Imaging core**
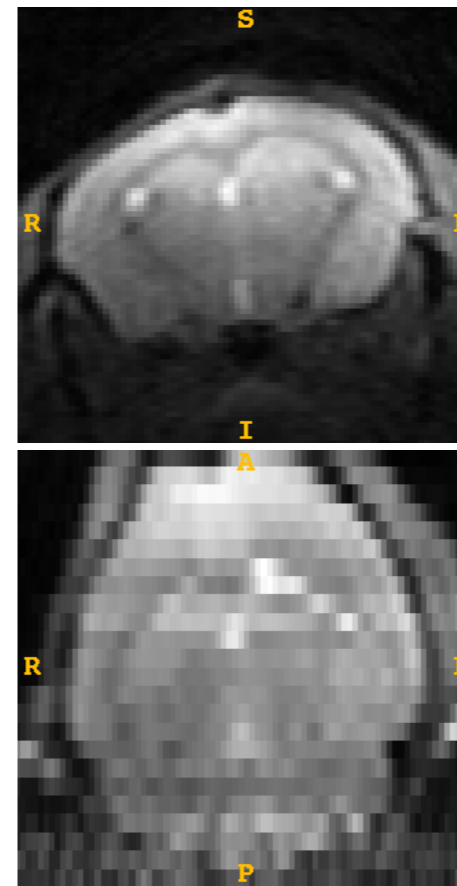

MRI InVivo

MRI ExVivo

DWI InVivo

DWI ExVivo

FLASH image
0.15x0.15x0.5 mm3
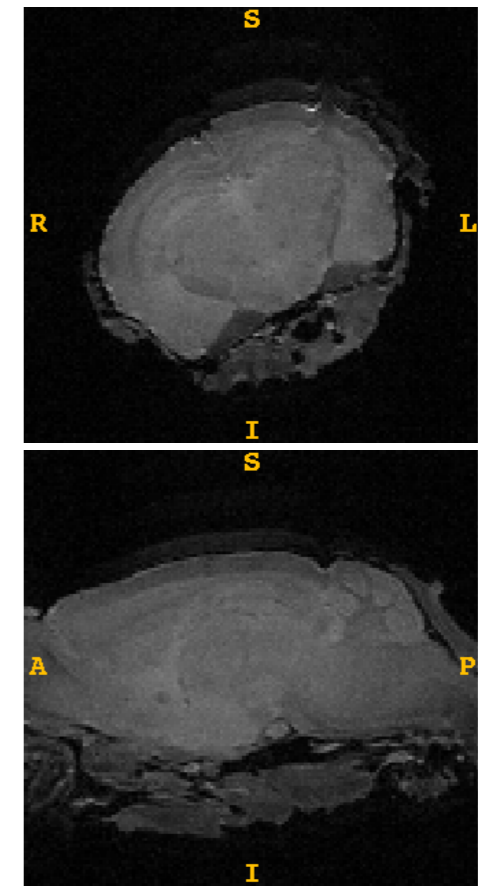
FLASH image
0.5x0.5x0.5 mm3

B0 image
0.15x0.15x0.5 mm3
(68-dir DWI)

B0 image
0.13x0.13x0.1 mm3
(68-dir DWI)

Project update

2) Adaptation of image processing framework from human imaging to small animal imaging

3) MRI analysis

- **Method:** atlas-based segmentation
  - Use of Brookhaven public atlas
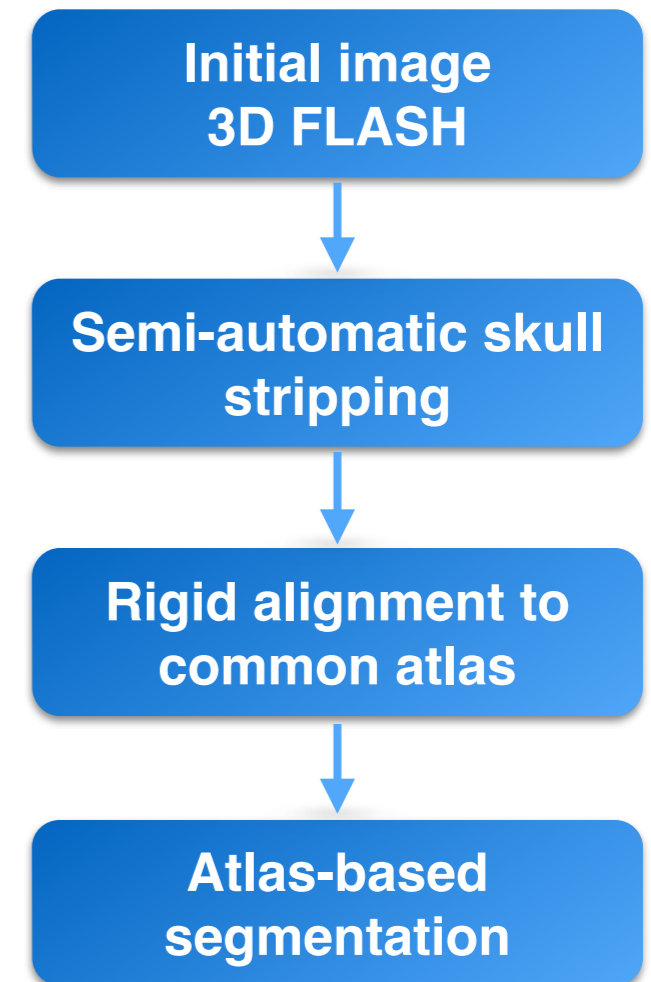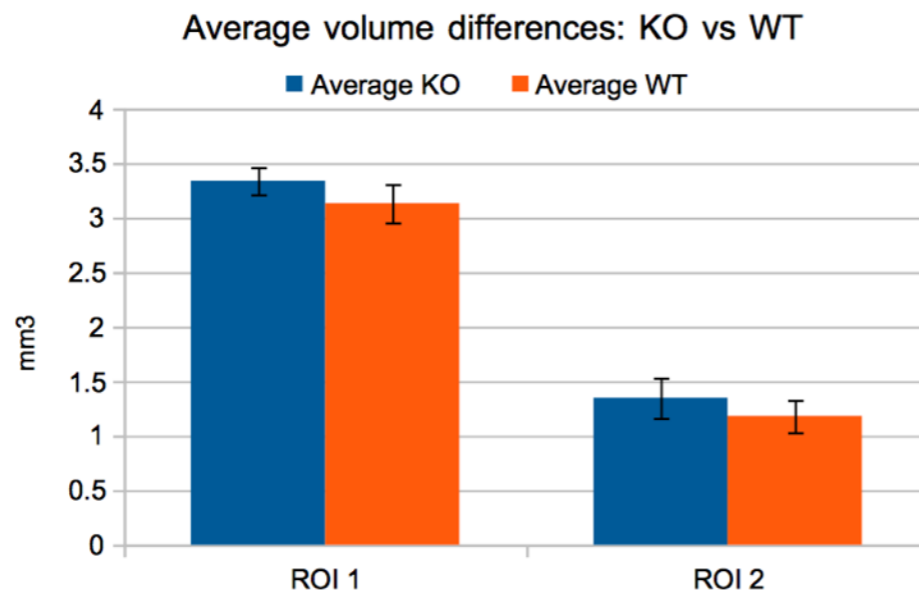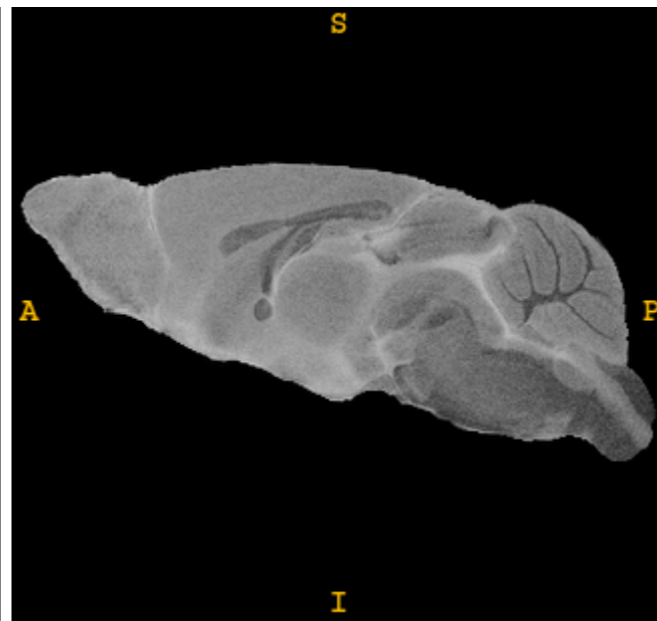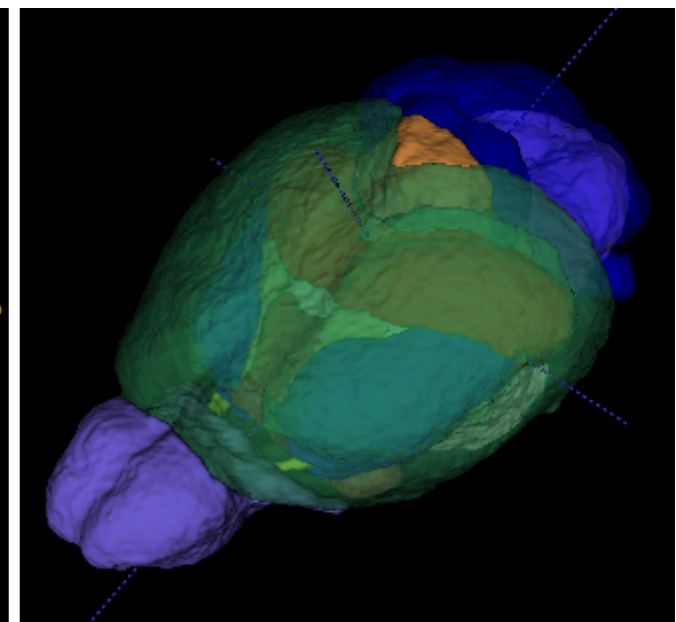- **Ongoing study:** 9 KO & 9 WT mice

Initial image 3D FLASH

↓

Semi-automatic skull stripping

↓

Rigid alignment to common atlas

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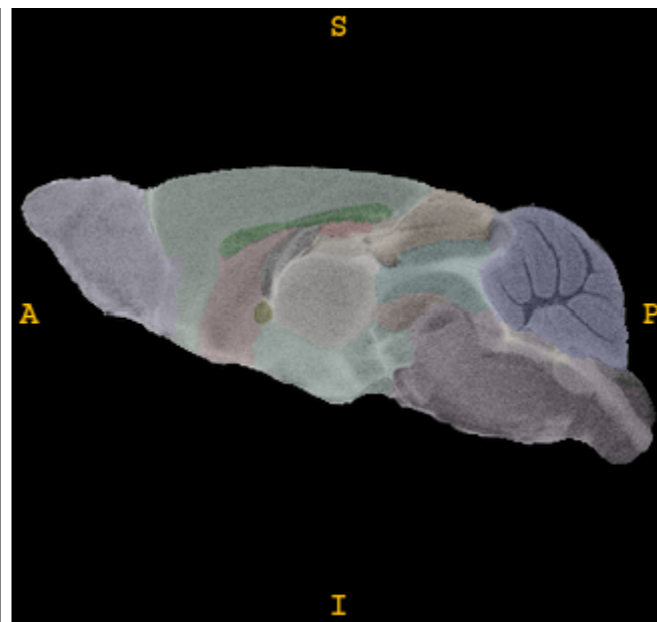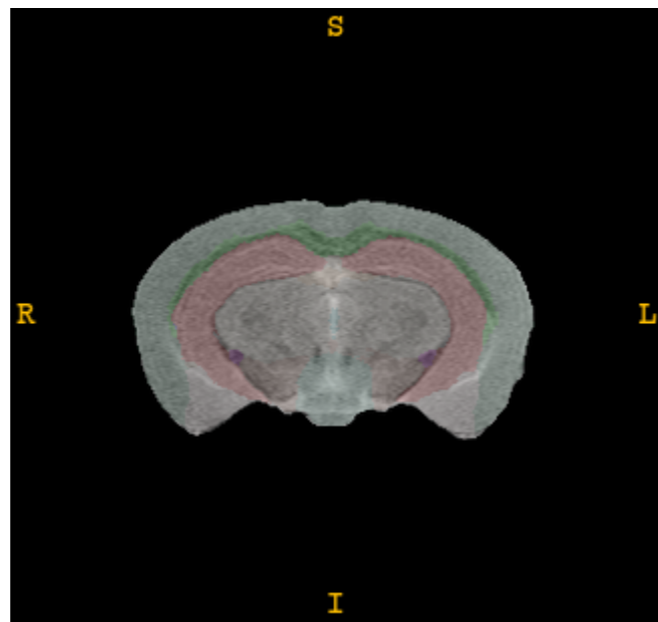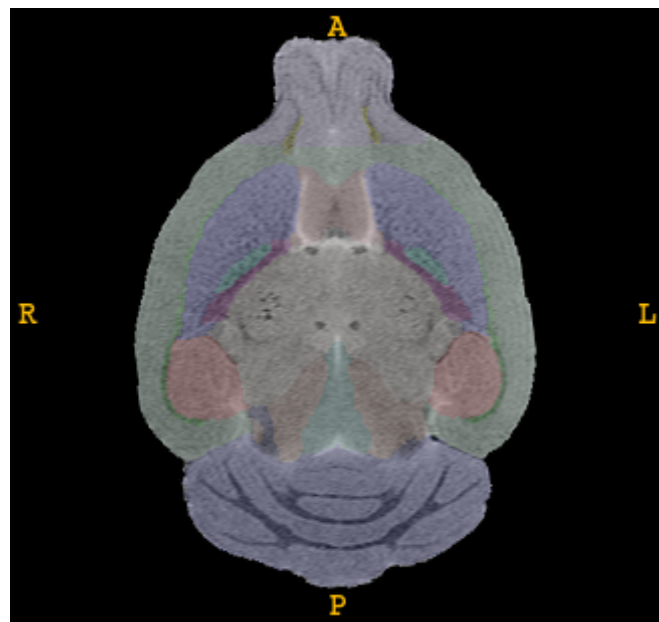**Atlas-based segmentation**

Figure: Image processing framework

MRI analysis

Skull-stripping (top) and lobar parcellation (bottom)

Lobar parcellation (20 ROIS) overlayed on a specimen (use of Brookhaven public atlas)

Conclusion

- **Contributions**

  - Developed joint expertise and Utah HSC capabilities for mouse image acquisition and analysis

  - Processing and statistical analysis were tested on ongoing study of a Hoxb8 mouse model of OCD (Obsessive Compulsive Disorder)

    - This will lead to co-authored publication and potential future grant writing

- **Next steps**

  - Diffusion Tensor Imaging (DTI) analysis