BIDAC project update

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

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October 2014
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)
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

![Average volume differences: KO vs WT](chart.png)

- **ROI 1**
  - Average KO: 3.5 mm³ ± 0.5
  - Average WT: 2.5 mm³ ± 0.5

- **ROI 2**
  - Average KO: 1.5 mm³ ± 0.3
  - Average WT: 2.0 mm³ ± 0.4

**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