BIDAC project update

Develop image processing pipeline for ex-vivo DTI of mouse models

Clement Vachet¹, Guido Gerig¹, Osama Abdullah², Edward Hsu², Naveen Nagarajan³, Mario Capecchi³

¹SCI Institute, ²Small Animal Imaging Core, ³Human Genetics Dept.

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Project update

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

<table>
<thead>
<tr>
<th>DWI InVivo</th>
<th>DWI ExVivo</th>
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<tbody>
<tr>
<td>![Image](B0 image 0.15x0.15x0.5 mm³ (68-dir DWI).jpg)</td>
<td>![Image](B0 image 0.13x0.13x0.1 mm³ (68-dir DWI).jpg)</td>
<td>![Image](B0 image 0.13x0.13x0.1 mm³ (12-dir DWI).jpg)</td>
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- DWI InVivo: B0 image 0.15x0.15x0.5 mm³ (68-dir DWI)
- DWI ExVivo: B0 image 0.13x0.13x0.1 mm³ (68-dir DWI)
- DWI ExVivo: B0 image 0.13x0.13x0.1 mm³ (12-dir DWI)
2) Adaptation of image processing framework from human imaging to small animal imaging

3) DTI analysis
   - **Method:** group-wise analysis
     - DTI atlas generation from population
     - Use of Brookhaven public parcellation
   - **Test on an ongoing study:**
     - 3 Knock-Out (KO) mice
     - 5 Wild-Type (WT) mice
Screenshots: DTI atlas

B0 with Brookhaven atlas parcellation

color FA image with tensor representation
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
  • Tract-based analysis

![Color by FA](image1)
![Color by global orientation](image2)
![Color by local orientation](image3)