RE: Cortical Thickness Update

From: **Rachael Garner** | Rachael.Garner@loni.usc.edu Thursday, Jun 3, 8:29 AM

To: **Riikka Immonen** | riikka.immonen@uef.fi

Cc: **Ryan Cabeen** | Ryan.Cabeen@loni.usc.edu, **Aubrey Martinez** | aubreylmartinez@gmail.com, **Sweta Bhagavatula** | sbhagava@usc.edu

Hi Riikka,

We spent the last month testing the cortical thickness pipeline on Project 2 imaging modalities and wanted to share an update. As the pipeline was optimized for MT data, we found that MGE or MGE derived images did not produce reliable cortical thickness estimation outputs (including t2star, r2star and various extractions over the 13 echoes including base/biased/mean images produced by Ryan). Given this, we believe that it makes most sense to move forward with submitting a manuscript for the pipeline as is, and we can concurrently work on reoptimizing the pipeline for MGE data (e.g. the denoised MGE) for a second manuscript.

We plan to work on an MT manuscript draft, using your gold standard thickness measurements as validation, and can send to you to review for co-authorship. Let us know how this sounds – we are happy to set up a call to walk through any of the outputs or discuss next steps with the manuscript. Thank you again for all your guidance and collaboration.

Warm regards,

Rachael Garner
Project Specialist
Laboratory of Neuro Imaging
USC Stevens Neuroimaging and Informatics Institute
Keck School of Medicine of **USC**
University of Southern California

Email: Rachael.Garner@loni.usc.edu

From: **Riikka Immonen** | riikka.immonen@uef.fi Friday, Jun 4, 3:52 AM

To: **Rachael Garner** | Rachael.Garner@loni.usc.edu

Cc: **Ryan Cabeen** | Ryan.Cabeen@loni.usc.edu, **Aubrey Martinez** | aubreylmartinez@gmail.com, **Sweta Bhagavatula** | sbhagava@usc.edu

Hi Racheal,

Thanks for the update!
Excellent that you have done the testing with other modalities – did you get it to work on ANY cortical areas / how

far off are we there? (no need to go through all details – if you have a pic of a representative case I could eye-ball it to get the idea) Anyhow, now you have the answers for reviewers and EpiBios crew.

Yes, I agree with the plan – go ahead with the manuscript, and I'll review for my part. If you plan to keep it as methodology paper and (only) refer to the biomarker aspect/potential & explain the EpiBios context, rather than using it to epileptic / non-epileptic grouping, then there is no need to more extensive discussions beforehand. But if you wish to claim about some predictive value in posttraumatic epilepsy (I.e. use the epilepsy outcome classifications), then we need to arrange a wider discussion including Asla Pitkänen and Olli Gröhn.

Do you actually need still some 2days postTBI thickness measures from me? (I recall not to have completed those..?) Let me know if you do!

Best Regards,
Riikka

Riikka Immonen, PhD
Preclinical MRI Scientist, Project Researcher EpiBioS4Rx

University of Eastern Finland | UEF | A.I. Virtanen Institute for Molecular Sciences
Kuopio Campus | Bioteknia
Neulaniementie 2 | P.O. Box 1627 | 70211 Kuopio | Finland
+358 50 343 7044 | riikka.immonen@uef.fi

www.uef.fi | www.uef.fi/aivi

From: **Rachael Garner** | Rachael.Garner@loni.usc.edu Tuesday, Jun 8, 9:12 PM

To: **Riikka Immonen** | riikka.immonen@uef.fi
Cc: **Ryan Cabeen** | Ryan.Cabeen@loni.usc.edu, **Aubrey Martinez** | aubreylmartinez@gmail.com, **Sweta Bhagavatula** | sbhagava@usc.edu

Hi Riikka,

Sorry for the delay – I took some vacation time off. The issues were largely in tissue segmentation steps prior to the cortical thickness estimation. Poor gray matter segmentation resulted in the ANTS cortical thickness algorithm failing. I put together some representative cases of the tissue segmentation for various modalities that I'll show on the call tomorrow – see one screenshot attached. Some more anterior regions are ok but lateral contrast was not as good. I'm sure we can work towards optimizing the "averaged" echoes to yield better gray matter contrast that would improve this.

For this paper, we plan to introduce the methodology only, not use it as a putative biomarker. We should be able to put this paper out quickly (much of a draft has already been written for Aubrey and Sweta's university senior thesis) so then we can focus on optimizing the pipeline for MGE & multi-project analysis.

It would be great if you could add the 2days postTBI cases. So far, we have received your measurements for 30d sham and TBI cases.

We appreciate all your help!
Rachael

Rachael Garner
Project Specialist
Laboratory of Neuro Imaging
USC Stevens Neuroimaging and Informatics Institute
Keck School of Medicine of **USC**
University of Southern California

Email: Rachael.Garner@loni.usc.edu

From: **Rachael Garner** | Rachael.Garner@loni.usc.edu Monday, Jun 21, 3:37 PM

To: **Riikka Immonen** | riikka.immonen@uef.fi
Cc: **Ryan Cabeen** | Ryan.Cabeen@loni.usc.edu, **Aubrey Martinez** | aubreylmartinez@gmail.com, **Sweta Bhagavatula** | sbhagava@usc.edu

Hey Riikka

I wanted to make sure you received the below message – we are happy to find a time to call if you would like to check in about any details. We are hoping to finalize the manual labels soon so we can show some preliminary statistics for one of Olli's upcoming calls.

Best,
Rachael Garner
Project Specialist
Laboratory of Neuro Imaging
USC Stevens Neuroimaging and Informatics Institute
Keck School of Medicine of **USC**
University of Southern California

Email: Rachael.Garner@loni.usc.edu

From: **Riikka Immonen** | riikka.immonen@uef.fi Friday, Jul 2, 4:18 AM

To: **Rachael Garner** | Rachael.Garner@loni.usc.edu
Cc: **Ryan Cabeen** | Ryan.Cabeen@loni.usc.edu, **Aubrey Martinez** | aubreylmartinez@gmail.com, **Sweta Bhagavatula** |

sbhagava@usc.edu

Hi Rachael,
sorry, I did miss the mail below – and sorry for the delay.
Please find attached the table with 2d-post-TBI measures added.
Cortex swollen and clearly the contrast between GM-WM gone in those locations – posing challenge to the segmentation surely.

Take care!
BR
Riikka
