

# EPIBIOS Rodent Planning Feb 25, 2019

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Attending: Riikka, Olli, Neil, Ryan

When: Feb 25, 2019 4:30pm

## Grant development

R01 in June 2019?

When does EPIBIOS end?

Total in R01 Jan. 7M for

Finland is good for NIH, low indirect cost rate 8%?

Resting-state fMRI

awake/slightly is our strength

rsfMRI with anesthesia makes no sense

structural connectome analysis good to do, not in current EPIBIOS

individualized analysis, rsfMRI as a biomarker

need strong justification for intl involvement

(previous connection with EPIBIOS will help)

two institutions can collect more data and improve statistical power

common data elements

simultaneous mri+eeg expertise helped before

individualized analysis is attractive to NIH

how to combine with fMRI?

innovation: multi-shell diffusion

oscillating gradients?

dynamic rsfMRI - 30 min session?

what is a project that ties all things together?

what tools are necessary for making it analysis easier

share LONI pipelines for analysis? what is Toga involvement?

what phenotype show we look at?

behavior is enough? how about recovery prediction?

mild vs severe? and repeat models?

reviewers consider mild to be more important, since it is more common

mild TBI has limited work on rodents, especially microstructure

NODDI is not a favorite, what else can we try?

epilepsy is the area where we have the strongest case

we have the data available, we have the model done

CCI

key features: biomarkers, rsfMRI, and advanced DWI

what about behavior? mazes

key approach: individual subjects

include Martin since he has a paper

what is our ground truth?

ex vivo is not enough these days, people have questions about fixation

how can we use CLARITY?

histology is not well suited for longitudinal

connectivity vs microstructure?

functional connectivity in rats is more novel

make we should make a repository of data

collect a comprehensive dataset for model selection

make it possible for people to evaluate

maybe talk to fernando calamente?

see Paul thompson's paper about hydi

conclusions:

structural - functional connectivity to predict biomarkers

machine learning addition

## Image Analysis

Cortical lesion mapping, described by Riikka

Use atlas registration and manually drawn cortical label

Take threshold and compute regional statistics

This will be what Asla, Terry, et al. want most

After this we can move on to more interesting things

what about QSM?

phase map can help distinguish heme from white matter, e.g. at hippocampal commissure

→ what volume of brain is heme?

→ compute regional estimates of fraction of heme

what algorithm to use?

lesions percentage

iron load

quantitative metrics MTR, T2star, DTI

advanced stuff

thalamus and group averaging

connectivity

pericontusional region metrics

look at normal appearing tissue around the lesion

→ we need a good lesion and brain mask for this

check B1 image for quality control

- don't do quantitative checks, but do qualitative checks

thalamo-cortical connections

looking at symmetry and changes in ipsilateral side

how to handle cortico-cortico

how to deal with global amount of connectivity

look at shams and see before tbi cases

we need:

cortico-cortico

thalamo-cortico

hippocampal

interesting but difficult:

brainstem pathways for REM sleep?

determining thalamus changes

look at tensor mode in thalamus

helps to determine how tensor shape is changing

machine learning

combine our feature vectors

## Paper

Harmonization paper, combining data

Z-scores?

Papers Feb 26

Harmonization across sites, z-scores?

Diffusion Methods - multi-fiber approaches

Single patient -

Step 1: add scripts for importing UCLA and melbourne data

wishtar rat is used in atlas

look at TBM between templates?

TBM looking at changes over time

look out for MTR