Meeting Dec 5, 2019

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Tags	

Rodent Analysis Focus Group Meeting

Where: UCLA

When: Dec 5, 2019

Who: Dominique Duncan, Rachael Garner, Marianna La Rocca, Ryan Cabeen, Neil Harris, Greg Smith, Rick Staba, Cesar Santana Gomez, Brian Rundle

What:

1. *MRI Updates:*

Greg:

- Atrophy maps from z-score analysis
- Threshold z-score map and compute area to estimate injury
    - Images show less heme signal than expected
    - Heme not differentiable from white matter until 5mo
    - Rodent 1019: Early heme absorbed by edema
- Try denoising to improve signal
- SWI analysis with phase information

Ryan:

- Pipeline for diffusion image processing is complete; case 1019 shown
- Extractable diffusion variables (MD, FA, RD...etc) for 18 bundles

Marianna:

- Generation of average MTR from multi-echo

- Brain extraction and normalization
- Application of lesion-mapper (used for human), facing challenges in translating human analysis tools to rodent data

Rachael:

- Applied active contour to average MTR and DWI for lesion segmentation
- Will try on B0 next

1. *EEG Updates*
    - Machine learning tools that have been applied to human EEG can be tested with rodent data
        1. Concern over whether features that are applied to human data (those identified by expert reviewers: rhythmic delta, periodic discharges) are relevant to epileptogenesis or unrelated response to trauma
    - Limited progress due to lack of rodent data
        1. Einstein: one, clean 20 minute segment
        2. UCLA: a few raw 5-10 minute segments of sleep spindles, SWD
- Finland: no EEG shared (one test file uploaded to IDA)

1. *Potential Projects*
    - Separately look at T2 and T2* effects
    - Examine if animals with greatest global loss of tissue show changes in specific tracts
        1. Does earlier change in tracts predict total loss of tissue at 5mo
        2. Rate of change in bundles
    - Connect seizure onset zone to imaging – localization to categorize subjects by lesion type (e.g. all frontal origin, ipsi, contra, etc.)
    - Prioritize sleep spindles, spike wave discharges for epileptiform analysis now, then turn to HFO and other features later
        1. # of events, burden, length of event

- Epileptiform analysis: not # of (not pathological necessarily) but rate of event evolution over time that is predictive of epileptogenicity (also amplitude for HFO)

Next Steps

- Need for additional EEG data – Cesar will share 4-6 hrs of cleaned segments with labels (start/end time) for sleep spindles and spike wave discharges
- Once shared, Marianna will run UCLA data through machine learning
- Mohammad will apply entropy analysis and share (method might remove some false positive HFO detections)