**Behavior and LFP analyses in an Alzheimer’s disease rat model (human ApoE4 KI) - Nick**

Rat 381’s code folder has all the required functions and codes to create the data struct and do analyses.

Behavior data analyses:

1. Head scans on the circle track
2. Object-place-association task

Electrophysiology analyses:

Rat 381 – ApoE4 Alzheimer’s

Rat 326Z (and potentially more WT rats will be added soon) – Wild-Type

Based on Kemere et al. 2013

Graphical user interface

Description automatically generated with medium confidence

Some important excerpts relevant to the analyses:

In particular, we noted that there were changes in power in three physiologically relevant frequency ranges (Figure 2), two associated with CA3 drive: slow gamma (20–55 Hz) and ripple (150–250 Hz) oscillations, and one which has been associated with EC drive: fast gamma oscillations (,65–140 Hz).

Found that the normalized power of slow gamma was largest when the animal was still and decreased smoothly with the log of movement speed.

Find that the correlation between speed and gamma power is largest when the speed and gamma power are measured at the same time (lag = 0) and decreases rapidly with increasing lags.

Diagram

Description automatically generated

Diagram, engineering drawing

Description automatically generated

Diagram, engineering drawing

Description automatically generated

Additionally, we have to explore these (some example plots from other studies for reference):

From Monaco et al. 2014

Chart, line chart, histogram

Description automatically generated

From Tort et al. 2009

Diagram, text

Description automatically generated

Here is the outline for figures: (3 panels)

Panel 1 - Behavior analyses results from ApoE4 and ApoE3 rats.

Panel 2 – Pure LFP Power Spectrum plots for specific bands and their differences when compared between Rat 381 and WT rat/s.

Panel 3 – Phase-Phase and Phase-Amplitude coupling measures and their plots compared between Rat 381 and WT rat/s.

*For Nick:*

*The actual details/plot designs will have to be come up based on these ideas and the reference papers that are shared.*