

## **Progress Report**

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### ***Title of Project:***

Characterising the physiological and functional role of neuronal oscillatory interactions following mild traumatic brain injury.

### ***Summary:***

Within Australia, traumatic brain injury (TBI) is one of the most common forms of acquired brain injury, being associated with more than 22,000 hospitalisations per year. The vast majority (80-90%) of TBIs are classified as mild (mTBI) and are responsible for the bulk of this impact. Although mTBI has long been considered to have only short-lived and mild symptoms, we now know that this is not actually the case. In fact, there is growing recognition of the serious and persistent side-effects experienced by many patients. Unfortunately, though, we still understand very little about the changes within the brain that drive these devastating side-effects. This limits our ability to identify patients that are likely to experience persistent problems, or to provide treatment.

Although limited, our current understanding of mTBI suggests that changes to the way in which different parts of the brain communicate with each other is important in generating long-term side-effects of injury. This process is referred to functional connectivity and underpins how the brain handles information. However, the mechanisms that drive these changes in functional connectivity are not known. Within the current project, we sought to better characterise how functional connectivity is altered by mTBI by: (1) examining how injury influences the interaction between different brain waves and (2) how this relates to the side-effects of injury.

### ***Hypothesis vs Findings***

We expected that mTBI patients would have reduced oscillatory interactions in brain areas showing altered functional connectivity (H1) and that reductions in oscillatory interactions would be related to functional deficits of injury (H2). Unfortunately, progress in data collection has been significantly delayed due to several factors. This includes:

- Issues with implementing functional assessments that are critical for the success of the project. This includes lengthy delays (on two separate occasions) waiting for the delivery of hardware from international suppliers.
- Personal issues of key research staff.

Despite these substantial limitations to progress, all infrastructure is now in place and data collection is in full swing. We hope to have all control data, and the majority of patient data, collected by the end of 2023.

***Unanswered Questions***

Given the delays mentioned above, we are currently unable to identify what remains un-answered.

***What these research outcomes mean***

Given the delays mentioned above, we are currently unable to provide any interpretation of research outcomes.

**Please submit this report as a PDF using the following naming convention:**

**Lastname Firstname – Simplified Project Title**

**For example: Smith Jane – The anatomy of the Brain.PDF**