

Name: Eugenia Poh

Title: Online rTMS during a visual learning task: differential impacts on visual circuit and behavioral plasticity in adult ephrin-A2A5^{-/-} mice

Date: Thursday 2 November 2017

Time: 3pm

Venue: Murdoch University, South Street Campus, Education and Humanities building (building no. 450, room 3.001)

Further information: abstract below

Seminar Series: Western Australian Neuroscience Methods Group

Abstract

Repetitive transcranial magnetic stimulation (rTMS) induces plastic changes in normal and abnormal neural circuits. Here we study the potential synergistic interactions between low-intensity rTMS (LI-rTMS) and endogenous brain activity to promote beneficial long-term neural circuit reorganisation. We delivered LI-rTMS to ephrin-A2A5^{-/-} mice engaged in a visual learning task because their morphologically abnormal visual maps have been shown to be beneficially impacted by LI-rTMS. Mice received chronic implantation of a detachable coil support and underwent 2 weeks of daily training in a two-choice visual discrimination task with concomitant LI-rTMS or sham (no stimulation control). Visuomotor function, corticotectal and geniculocortical topography were assessed at the end of the intervention. The visual learning task prevented the beneficial anatomical reorganisation in the corticotectal projection induced by LI-rTMS alone, but did not affect geniculocortical projections and visuomotor function. Intriguingly, there was an increase in the total number of trials completed by task+LI-rTMS mice in the visual learning task, but accuracy was not affected. Furthermore, follow-up tests showed no difference in locomotor activity. These results suggest that interactions between intrinsic brain activity and LI-rTMS may not always be synergistic on abnormal neural connectivity; and may modulate motivation and drive. We have developed a method to investigate the 'online' effects of LI-rTMS in awake freely moving mice that can be used to better understand rTMS interactions with intrinsic brain activity, an essential step in improving future clinical translation.