Institut de Neurociències
UNIVERSITAT DE BARCELONA

Doctoral Thesis Candidate

Exercise the Mind and Brain. A Multimodal intervention in stroke

Founded by: Fundació La Marató de TV3 (Ictus i lesions medul·lars i cerebrals traumàtiques, 2016)

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Our group is seeking candidates to apply for upcoming calls for Doctoral Fellowships (FI and FPU).

Candidates:

- We are looking for highly motivated students interested in neuropsychology.

- Very good academic records are required. The fellowships are competitive, and the academic qualifications are the evaluation item with a heaviest weight on the final score of the candidate. The final cut-off mark for obtaining a stipend has been around 8.5 in the last calls.

Project:

A single rehabilitation strategy cannot cope with the motor, cognitive, emotional, behavioural and psychosocial deficits that follows stroke. Cognitive training has proven its effectiveness in the recovery of specific functions. Aerobic exercise has also been reported to induce neuroplasticity and it has some beneficial effects following stroke. Mindfulness is another way to enhance neuroplasticity that has received an increasing amount of interest in recent years in different populations; however, the neurobiological mechanisms underlying neuroplasticity that is the base of the recovery in these interventions and their combination have not been studied, yet.
The main objective of this project is to develop an evidenced-based multimodal investigation of combined intervention strategies in chronic stroke patients and to clarify the neuroplasticity mechanisms underlying physical exercise and mindfulness strategies in combination with cognitive training on post-stroke recovery. To provide a more integrative perspective, we have adopted a multi-disciplinary and multi-modal approach using

biochemical, neuroimaging and social-psychological measurements combined with computational modelling.

Methodology: This is a longitudinal, parallel, single-blinded, randomized controlled trial with a sample of 156 participants at 6 to 36 months after stroke. Participants will be randomly allocated to three groups with combined interventions for 3 months. The first group will receive computer-based cognitive training (CCT) combined with aerobic exercise, the second group will receive CCT combined with mindfulness, and the third group, as an active control group, will receive CCT combined with stretching. Multimodal investigations will be carried out before and after the training. We expect to find enhanced recovery in our two experimental groups; however, the benefit from the trainings is expected also to depend on the individual condition.

We aim to disentangle how all the aforementioned factors influence enhancement and their different mechanisms, so that we can more comprehensively understand the effectiveness of these combined therapeutic interventions.