



FUNCTIONAL EXPLORATION & NEUROMODULATION OF THE CNS (FENNSI)

PI: Antonio Oliviero, neurologist; MD, PhD.

Internship type: Clinical research

Internship Language: English/Spanish

Location: National Hospital for Paraplegics, Toledo. The hospital is at 50 minutes bus ride from Madrid. The National Hospital for Paraplegics is a monographic state hospital founded in 1974 to treat patients with spinal cord injuries and address their specific needs. The hospital is also among the very few in Europe for housing clinicians, basic scientists, therapists, psychologists and support personnel whose expertise relates directly to the spinal cord injury.

<http://hnparaplejicos.sescam.castillalamancha.es/en/profesionales/investigacion>

Summary

The FENNSI group main research interest is centered on studying the central nervous system (CNS) physiology and the clinical application of non-invasive neuromodulation techniques. Moreover, the group is interested in functional evaluation of the central and peripheral nervous system in neurological disorders, with special attention given to the spinal cord injury. Accordingly, we pursue four main research lines: 1) Spinal cord injury clinical trials, 2) Noninvasive neuromodulation (TMS, tDCS, tSMS), 3) Brain-computer interface and 4) Cognitive and hand function evaluation for clinical and research purposes.

Methodology

We are testing different drugs to improve clinical signs related to the affected motor functions and use the noninvasive brain stimulation approach in treating neuropathic pain. Specifically, we use transcranial static magnetic field stimulation as a new noninvasive neuromodulation strategy and work on improvement of brain-computer interface (BCI). The main goal is to speed up the learning process in the BCI users by improving the 'informative' signals detection and decoding.

Activities

Students will have the opportunity to learn about different psycho-neurophysiology tests and the basic principles of transcranial magnetic stimulation, data acquisition and analysis. Depending on their previous experience and the patient availability, the students will have the opportunity to assist and/or observe experiments with human subjects where we assess reflexes and simple motor task performance in control and lesioned patients.

Requirements

Typically students should have passed an introductory neuroscience course. The research questions are generated by faculty, but approaches and methods are feasible for students participating in research for the first time. The students will be working with trained technicians or postdocs so that they can maximize their experience and learning while doing meaningful research.