

SENSORIMOTOR RESEARCH GROUP, HNP, TOLEDO



PI: Julian Taylor, PhD. and Julio Gomez Soriano, PhD.

Internship type: Clinical and basic research

Internship Language: English

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

Spinal cord injury is associated with a significant reduction in quality of life and independence of patients due to the neurological injury and limited recovery of the sensorimotor function system, which includes the development of debilitating symptoms such as spasticity, paralysis and pain. Our research activities have two main objectives: i) Improvement of early diagnosis of spasticity and pain, based on the measurement of pathophysiological changes associated with spinal cord injury, and ii) Development of new sensory stimulation techniques for the neurorehabilitation of spasticity, paralysis and pain whilst promoting adaptive sensorimotor neuroplasticity after spinal cord injury.

Methodology

To achieve these objectives we combine various experimental techniques to measure “pain” and “spasticity” in animal models and human subjects employing standard neurological and new diagnostic tests that can spot the most damaging signs of these symptoms. In the clinical lab we perform investigator and industry lead clinical trials to improve the diagnosis of these symptoms in the course of their rehabilitation in the hospital and also at home. This allows us to test standard and new treatment strategies in collaboration with our specialized medical staff.

Activities

Depending on their previous knowledge, curiosity, personal and time dedication, students will have the opportunity to participate in subjects testing, to learn about human data acquisition and analysis, to get familiar basic clinical neurophysiological techniques (electromyography, reflex and startle response), neurological assessment of sensorimotor function (isometric and isokinetic muscle force) and pain psychophysics (conditioned pain modulation with electroencephalography tests) and participate in our weekly lab meetings.

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 internship objective is to maximize student experience and learning while doing meaningful research.