



Thesis Project Form

Title (tentative): Design, development and validation of a system for evaluating the electrical activity of the enteric neuromuscular system

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Description

Motivation and application domain

The project is part of the activities foreseen in WP2 (â€Digital Twinâ€™™) of the PNRR funded project RAISE. The ultimate goal is to study the interaction between muscle and neuronal cells for personalized therapies in case of pathologies affecting the nervous/enteric system. This basic science study is the first step towards the realization of electroceutical-based systems to treat pathologies of the neuro-enteric system affecting the pediatric population, such as the PIPO (Pediatric Intestinal Pseudo Obstruction).

General objectives and main activities

The specific activities of this Master Thesis work are;

- Development of a stimulation and monitoring system of the electrical activity through MEA that combines electrical stimulus, chemical stimulus (possibly in perfusion), electrical readout, optical readout
- Software implementation of image analysis for the evaluation of cellular contraction
- Training in basic cell biology techniques
- Training on acquisition and analysis of MEA electrical signals
- System test (data acquisition and analysis) on 2D Smooth Muscle Cells (SMC) cultures, alone and in co-culture with central nervous system cells. If possible, also test on 3D SMC and ex vivo tissue.

Training Objectives (technical/analytical tools, experimental methodologies)

The thesis will allow training in neuroengineering, in vitro electrophysiology, cell biology, imaging, data analysis, and code writing.

Place(s) where the thesis work will be carried out: CNR, Via de Marini, 16149, Genova & DIBRIS, UNIGE

Additional information

Pre-requisite abilities/skills: Coding expertise is recommended for the data analysis part. Experimental and previous lab activities are appreciated.

Maximum number of students: 2