UNIVERSITY OF GENOA
DEPARTMENT OF INFORMATICS, BIOENGINEERING, ROBOTICS AND SYSTEMS ENGINEERING
MASTER'S PROGRAM IN BIOENGINEERING

Dibris

Thesis Project Form

Title (tentative): In vitro characterization of the mechano-electrical response of cardiac muscle cells to chemiotherapy drugs

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Description

Motivation and application domain

Chemiotherapy, often used to treat cancer, is known to cause adverse effects to the heart muscle (among other organs) that can eventually result in heart failure. Cardio protective strategies are therefore needed in order to prevent such secondary, and potentially deadly, effects.

General objectives and main activities

The general objective is to develop a novel methods to measure quantitative parameters based on electrical and mechanical measurements that characterize the electro-mechanical coupling of the cardiac tissue.
The method will be tested on single cardiac muscle cells cultured in-vitro that will undergo treatments with doxorubicin, a drug commonly used in chemiotherapy.
The activities will regard both the execution of coupled electrical and mechanical measurements using state of the art instrumentation and the extraction and analysis of parameters to validate the proposed experimental method.

Training Objectives (technical/analytical tools, experimental methodologies)

- electrophysiology measurements using MicroElecotrode Arrays (MEAs)
- atomic force microscopy measurements to detect cell contraction beating
- development of data analysis software to extract electro-mechanical coupling

Place(s) where the thesis work will be carried out: DIBRIS

Additional information

Pre-requisite abilities/skills: Attitude toward experimental work and problem-solving

Maximum number of students: 2