Scheda di Offerta Tesi

Titolo (provvisorio): Antagonistic role of natural and chemical compounds in cancer cell viability: technologically advanced study within bioreactor

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Motivazione e campo di applicazione

Three-dimensional (3D) and dynamic cell cultures represent fundamental tools for the comprehension of cellular phenomena, especially in the field of cancer disease. Clinically relevant in vitro models could help understanding tumor pathogenesis and cells chemoresistance, as well as predicting the outcome of pharmacological or natural treatments.

Obiettivi generali e principali attività

The goal of this thesis is to analyze cancer cell response to natural or chemical compounds that are currently under study with regard to their potential as tumor antagonists (e.g. curcuma, Aspirina®). The novelty besides this work is to carry out these experiments within a 3D, more realistic environment than standard cell cultures. To do that, cells will be cultured within 3D biomaterials under perfusion within a technological bioreactor. The stimuli acting on cells (e.g. fluid velocity and shear/stress) will be properly modeled and designed in order to recreate an environment as close as possible to the in vivo one, by the use of specific fluid-dynamics tools. The bioreactor set-up will be modified accordingly. The work will be constituted by a major experimental part and consequent data analysis.

Obiettivi di apprendimento (strumenti tecnici e analitici, metodologie sperimentali)

The goal of this thesis is to design a completely new technology, able to isolate circulating cells.

• CAD design
• Cell culture
• Fluorescence confocal microscopy
• Image analysis
• Bioreactor related methods
• Spectrophotometry
• Statistical and data analysis

Abilità e capacità richieste: interest in experimental work; initiative and curiosity

Numero massimo di studenti: 1