Internship proposition
One page max
M2 I3/0HNU 2024-25

Lab: CRCI2NA
Team: SOAP, Signaling in Oncogenesis, Angiogenesis, and Permeability
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Candidate:

Title of the internship:
Using a 3D coculture model to assess the endothelial phenotypes in brain tumors

Summary of the internship proposal:
Glioblastoma are among the highest invasive and vascularized tumors. Current therapeutic approaches consist of maximal surgical resection followed by chemo- and radiotherapy. However, these are largely ineffective and GBM almost invariably recur, resulting in a median survival of 15 months. The glioblastoma stem-like cell population (GSCs) represents a cell autonomous reservoir of aberrant cells capable of initiating, sustaining, and repopulating the tumor mass. They reside within a protective vascular niche in close interaction with brain endothelial cells (ECs). Within this context, external cues, such as secreted soluble factors, extracellular vesicles (EVs), and extracellular matrix (ECM) orchestrate a mechanical and paracrine signaling loop between GSCs and ECs. However, the functional consequences of this reciprocal communication within the endothelial compartment remain poorly understood.
In this project, brain ECs will be cultured in the presence of patient-derived GSCs secretome, EVome, and matrisome. Their functional properties will be further assessed both under static and flow conditions. Specifically, morphological changes at cell-cell junctions, acto-myosin cytoskeleton, and focal adhesions will be scrutinized using advanced imaging techniques. Furthermore, their angiogenic potential will be evaluated through 3D angiogenesis assays in a recently developed spheroid model.
This project combines cutting-edge methodologies, including in vitro models derived from patient samples, brain endothelial cell culture under flow conditions, and advanced imaging techniques. The aim is to unravel the intricate signaling pathways mediated by extracellular cues such as cytokines, matrices, and vesicles. Ultimately, our findings will provide an original entry point for the development of future therapeutical interventions aimed at disrupting the crosstalk between tumor cells and blood vessels.

Option(s) linked to the project:

- o Clinical Research Profile
- o Data Analyst Profile
- x Experimental Biology Profile