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MASTER'S THESIS PROPOSAL
TITLE*: Evaluation of Nanocarrier Transport Across a 3D Blood–Brain Barrier Spheroid Model
SUMMARY: The blood–brain barrier (BBB) is a major obstacle to the delivery of therapeutic agents to the central nervous system. Reliable in vitro models that closely mimic the BBB are essential for evaluating the ability of nanocarriers to reach the brain before advancing to in vivo studies. The aim of this Master's Thesis is to use an established three-dimensional (3D) BBB spheroid model to evaluate the transport of lipid-based nanocarriers across the barrier. Fluorescently labelled nanocarriers loaded with model cargo will be incubated with BBB spheroids, and their uptake, penetration and distribution within the spheroid structure will be analysed by confocal laser scanning microscopy. Quantitative image analysis will be performed to compare the transport efficiency of different nanocarrier formulations and identify factors influencing BBB permeability. This project will provide practical training in advanced 3D cell culture, nanocarrier characterization, fluorescence labelling, confocal microscopy and image analysis, while contributing to the preclinical evaluation and optimization of nanocarriers for brain drug delivery.
Additional information:

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Student Profile: We are looking for a motivated student interested in translational oncology, liquid biopsy, and bioinformatics. No prior programming skills (R/Python) are required, as the computational workflow relies on interactive web tools, public databases, and graphical user interfaces (Cytoscape).

Guaranteed Feasibility: Being a 100% in silico project, its feasibility is fully guaranteed regardless of external laboratory constraints or time limitations. The workflow is highly structured, ensuring a smooth learning curve and a timely thesis submission.

Scientific Output & Project Impact: The comprehensive regulatory networks and biomarker signatures identified during this Master's Thesis will serve as a crucial preliminary screening phase. This work will provide the exact molecular candidates to guide and optimize a future cost-effective experimental validation. Additionally, the extensive data mining and literature curation performed could serve as the basis for a systematic review or a high-quality computational research article.

Available Resources: The GreBic group will provide the starting transcriptomic datasets (DEGs at T0, T1, TF), clinical data, and the necessary guidance for using the public bioinformatic repositories.

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MASTER'S THESIS PROPOSAL
TITLE*: Preclinical Stroke Research Using Animal Models
SUMMARY: Stroke remains one of the leading causes of neurological disability, and preclinical research is essential to improve our understanding of the mechanisms underlying brain injury and to develop novel therapeutic strategies. This project is part of an experimental research program using animal models of stroke. Depending on the progress of the different ongoing projects, the student may participate in several stages of the preclinical research process, including animal monitoring throughout the experimental protocol, functional assessment through behavioral testing, collection and processing of biological samples, histological and immunohistochemical analysis of brain tissue, as well as the interpretation and discussion of the results obtained. The overall aim of the project is to provide the student with a comprehensive understanding of experimental design and the main techniques used in translational stroke research, while allowing them to gain hands-on experience in experimental methodologies, data analysis, and interpretation of scientific results in a biomedical research environment.
Additional information:

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