Universitat Ramon Llull, IQS - Blanquerna
Department: Bioengineering
Group: Biomaterials - Pharmacology

Title: *Tumor-antigen expression in lung cancer: a meta-analysis for finding candidate biomarkers for mRNA vaccine*

Working Plan:
Nanotechnology plays an important role in the recent technological advances in the fields of drug design and delivery as well as in disease diagnosis, therapeutic and preventive medicine. The nanotechnological applications to disease diagnosis, prevention, monitoring and treatment have been referred to as nanomedicine, which is expected to revolutionize pharmacotherapy in the near future. One of the most recently revolutionary advances in nanomedicine is the development of therapeutic vaccines, capable of modulating and activating the immune system for treating diseases.

Until now, vaccines were only used in preventive medicine. However, they have been proposed as a therapeutic treatment against diseases that involve immune system suppression, like cancer. Therefore, the encapsulation of tumor-associated-antigens coding mRNA into nanosystems, can used for generating adaptive immunity against cancer cells through systemic administration.

In this project, we propose preforming a meta-analysis on Non-Small Cell Lung Cancer (NSCLC) tumor-associated-neoantigens expressed in oncologic patients. This data will be provided by collaborators with the Ramon Llull University inside the TUMOROUT international project from the Transcan initiative. It is a fully computational project, lead by a collaboration between two URL faculties: Institut Químic de Sarrià (IQS) and Blanquerna. It intends to identify the most relevant antigens expressed in NSCLC for the future development of the mRNA-based vaccine. The objectives for the candidate are learning to code in R using R Studio and learning to interpret clinical and statistical data in a rational and independent manner. Overall, this master's thesis is a computational project lead by IQS and Blanquerna, focused on data analysis on clinical data for a future development of a immunotherapeutic vaccine.