IQS

Department: Bioengineering and Department of Organic and Pharmaceutical Chemistry

Group: Biomaterials - Pharmacology

Title: *Tumor-antigen expression in breast 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 be used for generating adaptive immunity against cancer cells through systemic administration.

In this project, we propose performing a meta-analysis on Breast Cancer tumor-associated-neoantigens expressed in oncologic patients. 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, focused on data analysis on clinical data for a future development of a immunotherapeutic vaccine.