Universitat Pompeu Fabra Barcelona | Master in Bioinformatics for Health Sciences

Master project 2020-2021

Personal Information

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Group	Chemistry of Health Initiative

Project

Structural bioinformatics

Project Title:

Automated structure- and sequence-based optimisation of antibody developability potential

Keywords:

Antibody design, Biopharmacueticals developability, drug development

Summary:

Owing to their outstanding performances in molecular recognition, antibodies are extensively used in research, diagnostics, and therapeutics, with more than 90 drugs already approved in the market. However, antibody development for therapeutic applications remains a long and costly process, also because therapeutic applications often require these molecules to withstand stresses that are not present in vivo. Antibody developability is defined as the likelihood of an antibody drug candidate with suitable functionality to be developed into a manufacturable, stable, safe, and effective drug that can be formulated to high concentrations while retaining a long shelf-life. In particular, antibody developability is determined by the presence of chemical liabilities, and by key biophysical properties including thermodynamic stability and solubility. Students are invited to work at the University of Cambridge within the Chemistry of Health initiative in the Department of Chemistry to develop a computational method and associated web server for the automated prediction of mutations that improve antibody developability potential. The applicant will work in a highly multidisciplinary research team where computational method development and corresponding experimental validation are carried out side-by-side. The outcome of this research will have an impact in the emerging field of computational antibody design, and it will improve and accelerate the 'hit-optimisation' step in biopharmaceutical pipelines.

References:

Sormanni, P., Aprile, F. A. & Vendruscolo, M. Third generation antibody discovery methods: in silico rational design. Chem. Soc. Rev. 47, 9137–9157 (2018)

Expected skills::

Python programming language is required. Beneficial: web server development and some knowledge of structural biology.

Possibility of funding::

To be discussed

Possible continuity with PhD: :

To be discussed