Universitat Pompeu Fabra Barcelona | Master in Bioinformatics for Health Sciences

Master project 2020-2021

Personal Information

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Project

Computational genomics

Project Title:

Discovering unexpected cancer-protective effects of common medications

Keywords:

Cancer, therapy, common medication, genetics, GWAS, epidemiology

Summary:

Development of a new cancer-target drug costs hundreds of millions of EUR and on average 10 years of experimental work before approval. However, overall success rate is less than 10%. Thus, drug repurposing is received much attention and new indications of existing drugs are accounting for 20% of new products. Systematic analyses of thousands of developed/approved drug or compounds have found many with previously unrecognized anti-cancer activity. While these evidence mainly derive from in vitro cellular assays, large-scale studies of population-based health care records integrated into genetic information are currently possible. Preliminary data from our group has discovered that certain drugs used for non-cancer common conditions have large protective effects regarding cancer progression and metastasis. In this project, we aim to estimate the beneficial effects of common medications on cancer patient survival by integrating and modeling epidemiological and health care data from two European populations. The effects will be further deciphered at the germline genetic level by meta-analyses of GWASs. This proposal is integrated into experimental assays also performed at the recipient group.

References:

• Bycroft et al., The UK Biobank resource with deep phenotyping and genomic data, Nature 562, 203–209(2018). • Bolivar et al., SIDIAP Database: Electronic Clinical Records in Primary Care as a Source of Information for Epidemiologic Research, Med Clin. 138(14):617-21 (2012). • Pantziarka et al., Hard Drug Repurposing for Precision Oncology: The Missing Link? Front Pharmacol. 9: 637 (2018). • Corsello et al., Discovering the anticancer potential of non-oncology drugs by systematic viability profiling. Nat Cancer doi:10.1038/s43018-019-0018-6 (2020).

Expected skills::

Candidate(s) are expected to be proficient in programming in R and to have strong background on statistics.

Possibility of funding::

To be discussed

Possible continuity with PhD: :

To be discussed