

Personalized Health Master Course

Project in Genomic Medicine

Mission:

To develop a personal pharmacogenomic passport to improve drug prescription

Description:

Starting from existing exome or genome sequencing data and current pharmacogenomic knowledge, you will be asked to imagine a user-friendly interface (e.g. electronic report, web interface, mobile app) that can be used to personalize drug prescription.

Specific tasks:

- To identify the drugs for which “actionable” human genetic variants exist.
- To extract the variants of interest from personal genomes / exomes.
- To develop (or adapt) algorithms that predict how the selected variants impact drug efficacy, toxicity or metabolism.
- To generate a personal pharmacogenomic passport that could be used in the clinic.

To overcome the initial data preparation hurdle, an optional example tutorial was made which covers the steps going from genetic data to drug-gene interaction [1]. Additional optional reading [2-4] and database examples [5-7] illustrate the *how* and *why* of pharmacogenomics.

Resource Persons:

Simon Tang, EPFL: simon.tang@epfl.ch (group supervisor)

Dr. Flavia Hodel, EPFL/CHUV: flavia.hodel@chuv.ch (lecture)

Dr. Dylan Lawless, EPFL: Dylan.Lawless@epfl.ch (background tutorial/lecture)

Prof. Jacques Fellay, EPFL: Jacques.fellay@epfl.ch (course leader)

Contact Simon when you are ready to begin.

Reference code/material will be provided.

References:

1. Case study tutorial by Dylan: <https://lawlessgenomics.com/topic/pharmacogenomics>
2. Pirmohamed, M. **Pharmacogenomics: current status and future perspectives.** *Nat Rev Genet* (2023). <https://doi.org/10.1038/s41576-022-00572-8>
3. Mary V. Relling & William E. Evans. **Pharmacogenomics in the clinic.** *Nature* 2015; 526, 343–350. doi: [10.1038/nature15817](https://doi.org/10.1038/nature15817)
4. Yip VL, Hawcutt DB, Pirmohamed M. **Pharmacogenetic Markers of Drug Efficacy and Toxicity.** *Clin Pharmacol Ther.* 2015;98(1):61-70. doi: [10.1002/cpt.135](https://doi.org/10.1002/cpt.135)
5. Table of Pharmacogenomic Biomarkers in Drug Labeling:
<http://www.fda.gov/drugs/scienceresearch/researchareas/pharmacogenetics/ucm083378.htm>
6. PharmGKB - pharmacogenomics knowledge resource: <https://www.pharmgkb.org/>
7. DrugBank <https://go.drugbank.com>