Clinical Lipidomics Data Analysis - Data Processing and Statistical Analysis

Workshop Outline

In the first part, we will inspect and process a targeted MS-based plasma lipidomics raw dataset, starting from peak areas. In particular, we will be looking at import of analytical data and metadata, internal standard-based normalization and quantification, diverse analytical and data quality control assessment and plots, batch/drift-correction, lipid nomenclature, QC-based feature filtering and reporting. We will go through the processing workflow step-by-step using R scripts/notebooks with relevant R packages. As an example dataset for this workshop we will use a published dataset (Tan et al. , Variability of the Plasma Lipidome and Subclinical Coronary Atherosclerosis, *Atheroscler Thromb Vasc Biol*, 2021 DOI: 10.1161/atvbaha.121.316847)

In the second part, we will inspect the overall data trends from both sample meta data and lipidomics data via visualization and dimension reduction. The data set comes from a lipidomics study of individuals at high risk of cardiovascular diseases, where the participants were invited monthly for blood sampling up to five times and their coronary artery plaque burden was assessed using computed tomography coronary angiography (CTCA) at the end of the follow-up. Using custom R code, we practice synchronizing the quantitative lipidomic data and their plaque burden data (outcome) and cluster subjects by different plaque types. Using the repeated measure data and linear mixed effects model, we compute population-level properties of lipid species such as within-individual and between-individual variability (coefficients of variation) for lipid species. Finally, we search for lipid species whose visit-to-visit variability is associated with different plaque types.

Who Should Attend

Anyone interested in the processing, organization and interpretation of clinical lipidomics datasets.

We will provide datasets and R scripts covered in the course. We encourage you to bring your computer with R/RStudio installed or use RStudio Cloud (https://rstudio.cloud/) to run the data analysis yourself. However, you are also very welcome to attend this workshop without any computer and/or knowledge in R.

When and Where

This workshop will be held in the hybrid format on March 20th, 2022, 2:00 - 6:00 PM (Singapore, GMT+8). Location on-site: Centre for Life Sciences, Level 1 #01-05, 28 Medical Drive, National University of Singapore, Singapore 117456 (https://goo.gl/maps/mwAWT5eZet1yR9QBA). Online: The Zoom link will be provided soon.

Registration and Costs

To sign up, please visit the iSLS11 registration at https://eventengage.live/events/isls11/register and indicate 'I would like attend a workshop', we will then follow up with you. Alternatively, if you prefer to attend the workshop only, please directly drop us a message. The workshop is free for all participants.

Moderators

- Hyungwon Choi, PhD, Associate Professor. Principal Investigator. Cardiovascular Research Institute, NUS Medicine, National University of Singapore
- Bo Burla, PhD, Senior Research Fellow. Head Data@SLING, Singapore Lipidomics Incubator (SLING), Life Sciences Institute, National University of Singapore

Contact

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