Project log – week 44

Analysis of new Olink proteomics data from S3WP: toward multi-omics integration

Overview

I have started with an initial meeting with my supervisor to discuss the course requirements and project details. Literature research and method exploration have been going as planned.

Summary of activities and deliverables reached

- Literature review: read publications regarding the S3WP programs (1), the prior proteomics analysis (2, 3), examples of longitudinal studies and plasma protein analyses (4)
- Schedule recurrent meetings with my supervisor María Bueno Álvez:
    - Update course information: inform supervisor
    - Agree on meetings and communication
    - Review project proposal, focus on project key steps and time plan
    - Data transfer and handling (getting started)

Summary of results

No results are available yet. The data access is planned to happen early next week (W45).

Reflection task

The project aims to perform a comprehensive longitudinal proteomics profile based on the new proteomics data from the S3WP cohort. Even though the research topic is not new, the data set is greatly upgraded from approximately 1500 proteins detected (3) to more than 5000. With the development of the new Olink HT technique, we require the updated analysis of the meaningful data from the S3WP cohort to extract more insights and re-establish the wellness molecular profile on the proteomics level. This research (together with selective multi-omics integration if possible) will contribute directly to several important applications such as advancing precision medicine and biomarker discovery or understanding the disease mechanism on the population scale

Updated project plan

The project plan remains unchanged with preparation for data access for the upcoming weeks (table 1).

Table 1. Project plan

	Week										
Tasks	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**1**	**2**
Literature search											
Method exploration											
QC & pre-processing											
Platform comparison											
New proteomics analyses											
Result interpretation											
Presentation											
Report											

Reference

(1) Bergström G, Berglund G, Blomberg A, Brandberg J, Engström G, Engvall J, et al. The Swedish CArdioPulmonary BioImage Study: objectives and design. Journal of Internal Medicine [Internet]. 2015 Jun 19;278(6):645–59. Available from: https://doi.org/10.1111/joim.12384

(2) Tebani A, Gummesson A, Zhong W, Koistinen IS, Lakshmikanth T, Olsson LM, et al. Integration of molecular profiles in a longitudinal wellness profiling cohort. Nature Communications [Internet]. 2020 Sep 8;11(1). Available from: https://doi.org/10.1038/s41467-020-18148-7

(3) Zhong W, Edfors F, Gummesson A, Bergström G, Fagerberg L, Uhlén M. Next generation plasma proteome profiling to monitor health and disease. Nature Communications [Internet]. 2021 May 3;12(1). Available from: https://www.nature.com/articles/s41467-021-22767-z

(4) Wang J, Zenere A, Wang X, Bergström G, Edfors F, Uhlén M, et al. Longitudinal analysis of genetic and environmental interplay in human metabolic profiles and the implication for metabolic health. medRxiv (Cold Spring Harbor Laboratory) [Internet]. 2024 Sep 24; Available from: https://www.medrxiv.org/content/10.1101/2024.09.23.24314199v1