

Study of the association between phenolic metabolotypes and cardiometabolic health in response to chronic intake of (poly)phenols

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State of the art

The rise in the incidence of obesity worldwide has led to an increase in cardiometabolic diseases, for which plant-based diets are effective preventive strategies. Plant bioactive compounds as **(poly)phenols may have potential health benefits**, but their bioavailability and physiological effects are conditioned by a large inter-individual variability.

Aim

The **PRE-CARE-DIET study** aims at exploring the association between aggregate phenolic metabolotypes and cardiometabolic health in response to the chronic consumption of personalised (poly)phenol-rich diets.

Study design

Up to 500 volunteers (40-80 y.o., BMI 18-35 kg/m²) at **cardiometabolic risk** will be recruited and profiled according to their ability to metabolize (poly)phenols, as assessed through an **oral (poly)phenol challenge test** previously developed to classify individuals on two aggregate phenolic metabolotypes (Figure 1 and 2). Of these, 330 will be enrolled in a randomised controlled intervention, each assigned to one of the two metabolotypes (165:165).

In a first observational phase, eating habits under free-living conditions will be studied. During the intervention phase, for each metabolotype, 110 volunteers will be randomly assigned to the treatment arm and 55 to the control arm.

They will follow a sustainable, **plant-based, personalised diet, with a $\geq 50\%$ increase in the current (poly)phenol intake** (by increasing the consumption of products such as green tea, coffee, cocoa, legumes, whole grains, nuts, and fruit juices), or general recommendations for a healthy diet, respectively, over 16 weeks (Figures 1 and 3).

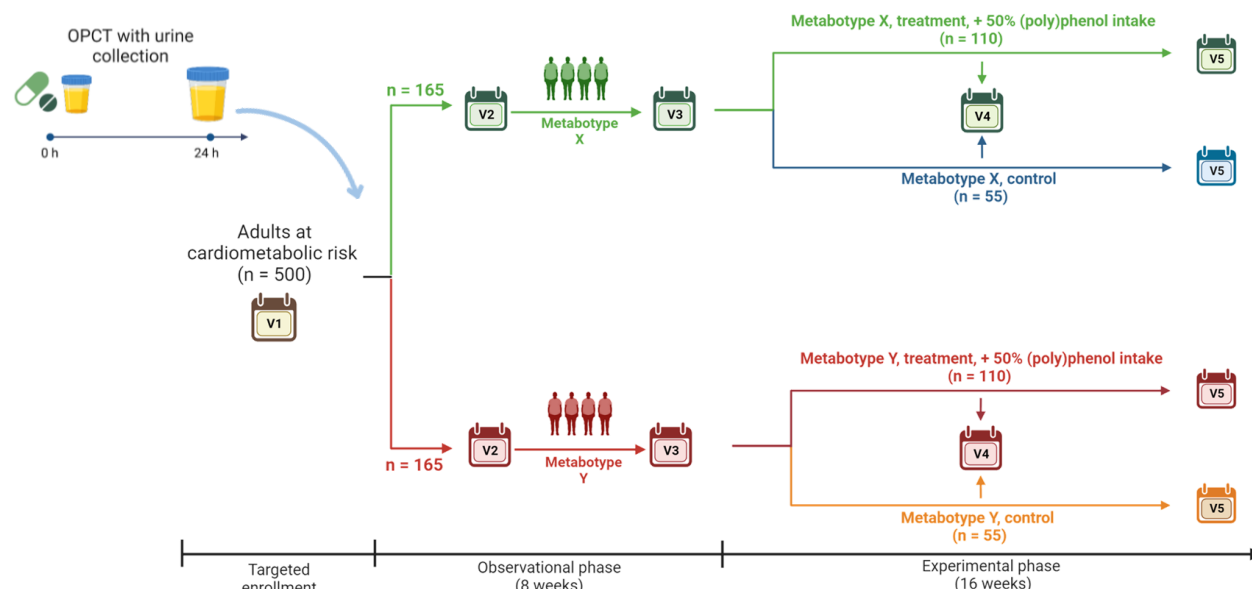


Figure 1 – PRE-CARE-DIET study design.

Data and outcomes

Anthropometric parameters, body composition, blood pressure, and biological samples (blood, urine, faeces, and saliva) will be collected.

Eating habits and lifestyle (physical exercise, sleep, and health status) will be assessed.

Deep phenotyping will be applied using **metabolomics, microbiomics, genomics, and multiple other outcomes**.

The primary outcome is the **SCORE2/SCORE2-OP risk score**, while other cardiometabolic risk scores and biomarkers are secondary outcomes.

This study has the potential to provide valuable insights into the individual variability in response to plant-based diets and **demonstrate the potential of precision nutrition on the prevention and management of cardiometabolic diseases**.

Table 1 – Gantt diagram for this PhD thesis project.

Activity	Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A1) Targeted recruitment																									
A2) Observational period																									
A3) Intervention period																									
A4) Data analysis																									
A5) Thesis and Paper Preparation																									

References

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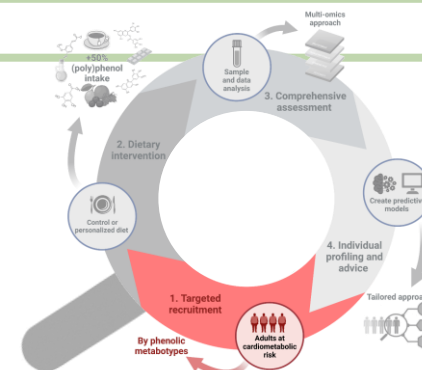


Figure 2 – Targeted recruitment of subjects at cardiometabolic risk.

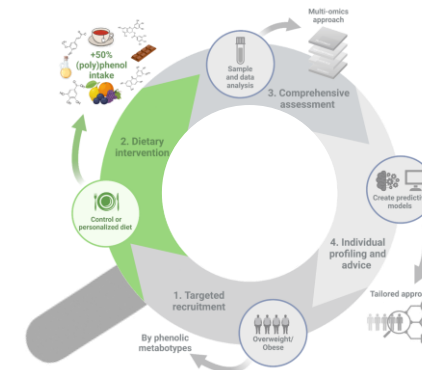


Figure 3 – Dietary intervention phase with a $\geq 50\%$ increase in the current (poly)phenol intake in the intervention group.

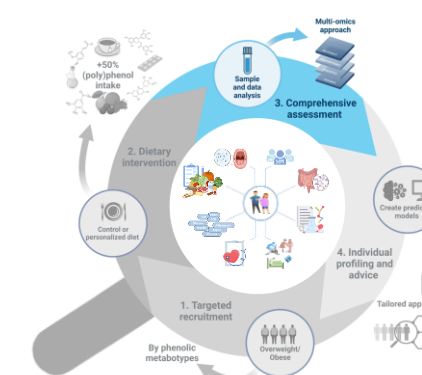


Figure 4 – Data collection and outcomes, using a multi-omics approach.

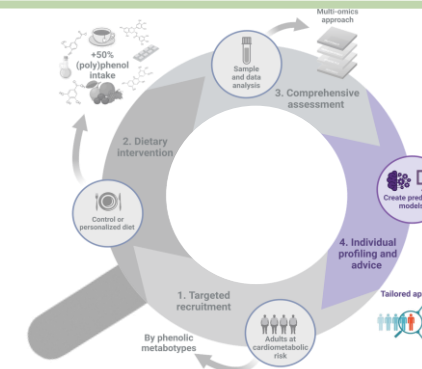


Figure 5 – Developing predictive models for individual advice.