Protocol of the trial

PREVENTOMICS in software for professionals

A mobile app will be developed by software engineers of METADIETA to present the information generated by the PREVENTOMICS platform to both European recruitment centers: University of Southampton(USOTON) and Jagiellonian University Medical College (JUMC). Afterwards, the USOTON and JUMC teams will use the resulting app to visualize the metabolic and genetic status of the volunteers and design the personalized diet in consequence, according to the individual's needs, lifestyle and preferences.

BICENTER STUDY WITH ADULTS WITH ABDOMINAL OBESITY (UK and Poland)

Objective

The purpose of this bicenter study is to examine the soundness of the PREVENTOMICS personalized software for professionals to enhance a reduction of weight and waist circumference and favorable changes in the metabolomic profile compared to general dietary recommendations in clinically healthy overweight and obese subjects from UK and Poland over the course of 4 months.

Inclusion criteria

Subjects will be eligible for enrolment into the study if they are men or women aged 18-65 years, have a waist circumference >94 cm (for men) or > 80 cm (for women), which, according with the International Diabetes Federation, indicates abdominal obesity In European populations, a BMI (in kg/m2) 25-40 (overweight and class I and II obesity) and if they provide written informed consent.

Exclusion criteria

Subjects will be excluded if they meet any of the following criteria: diagnosed with diabetes [or serum glucose ≥125 mg/dL (6.9 mmol/l)], other metabolic and endocrine disorders, chronic diseases (cardiovascular disease, kidney disease - or a serum creatinine ≥1.7 mg/dl (150 µmol/l) for men and ≥1.5 mg/dl (132 µmol/l) for women-, cancer, pulmonary diseases, coeliac disease, Crohn's disease, etc.); having a BMI (in kg/m2) >40; being pregnant or planning to become pregnant within the study period; intake of drugs or nutritional supplements; prescribed medicine to control inflammation or dyslipidemia (or cLDL ≥ 4.9 mmol/L); consumption of more than 14 drinks of alcoholic beverages per week. Subjects with hypertension and taking antihypertensive drugs (metabolically neutral) will be not excluded and allowed to continue their prescribed dosage.

Study design

All procedures involving human subjects will be approved by the relevant Clinical Research Ethical Committee (Jagiellonian University Bioethical Committee for Polish cohort). This study will be conducted according to the guidelines established in the Declaration of Helsinki. The study will be registered at isrctn.com.

The study will be a single-blind randomized, carried out with clinically healthy overweight, class I and II obese adult participants with abdominal obesity. Due to the nature of the study, the participants cannot be blinded to the intervention, although the investigators who will perform the sample and data analysis will be blinded.

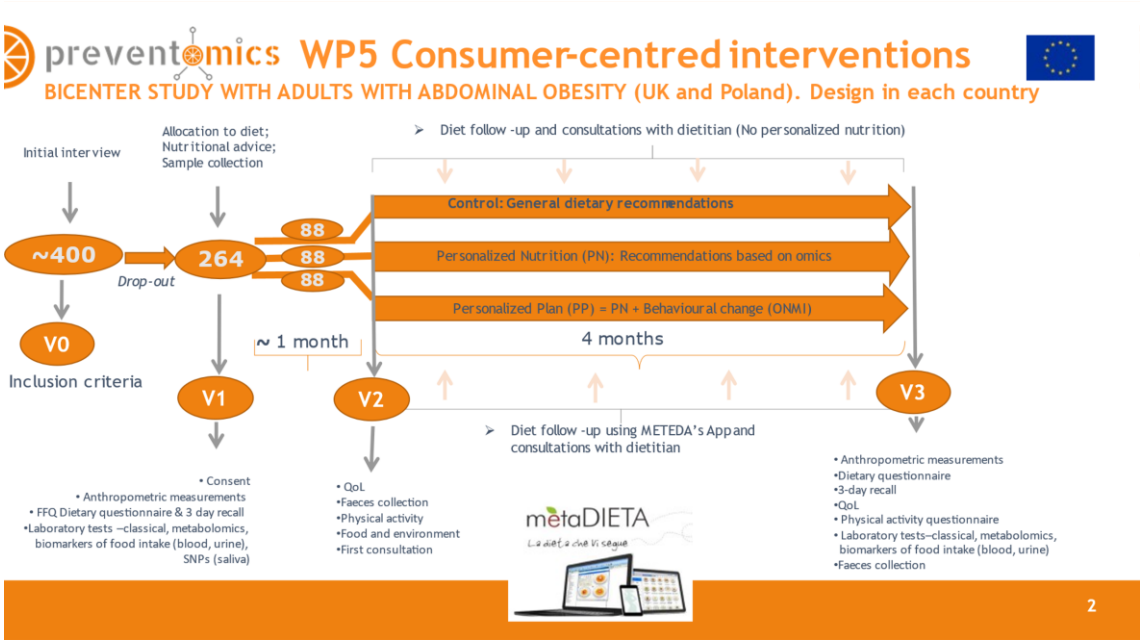
Based on sample size calculations 528 volunteers from two European countries (UK and Poland) will be recruited for this bicenter study (i.e. 264 participants per country). The Polish subjects will be recruited from the patients of Out-Patient Clinic for Metabolic Disorders, Klinika Krakowska, Poland, Krakow, ul. Mehoffera 6 and through announcement in the local press. The study will be started after obtaining the approval of the relevant Bioethics Committee and the written informed consent from the subjects.

All volunteers will be examined by a relevant health professional to assess whether they meet the conditions for inclusion and have no contraindications. For this purpose, medical interview, physical examination and laboratory tests will be performed. Depending on the clinical condition, selected laboratory tests will be carried out in the local laboratory (blood tests – with complete blood count (CBC), lipids profile, creatinine, uric acid, ALT, GGT, glucose, TSH, and ions etc.)

After the confirmation of the inclusion criteria, the 264 individuals that will be recruited in each country will be randomly assigned to one of the three intervention groups. Randomization will be performed according to age, gender and BMI.

Fasting blood samples, saliva samples, fecal samples and morning urine samples will be taken from individuals of all groups. Serum, fecal and urine samples will be protected and stored until analysis or until sent to consortium partners; The samples will be stored at the appropriate temperature until the analyzes.

In Jagiellonian University (JU) pilot one group (88 subjects; control group,) will receive general dietary recommendations used to reduce weight in obesity (1200 – 1500 kcal/day) for a period of 4 months. The second group of 88 subjects will receive dietary recommendations based on personalized nutrition (PN group). The third one (88 subjects) will receive personalized nutrition and behavioural messages (to change life style habits) additionally (Personalized Plan, PP). To do that, METADIETA will process the information generated by the PREVENTOMICS platform (metabolome, genotypes, biometric, clinical and classic biochemical variables) and will present the results to the research group, which will design the personalized diet for the 4 month period of intervention according to the individual's needs, lifestyle and preferences. An initial training period in the use of the software will be provided by METADIETA to the nutritionists of the research center. In addition, technological support will be provided by the MEDADIETA engineers if the nutritionists need to deal with possible technological problems.



All the participants will be evaluated at the beginning of the study and after 4 months of PN, PP or general diet. At the beginning, the subjects will attend the center in the morning after an overnight fasting (> 8 hours without food or drink except water). Saliva, blood and morning urine will be collected to perform the analyses of SNPs (ALIMENTOMICA), metabolomics (EURECAT) and food intake biomarkers (UNIPR). The classical biochemical markers will be measured in SOTON and JU. Additionally, fecal samples analysis will be performed in LEITAT.

A detailed food consumption and dietary habits questionnaires as well as physical activity interview will be collected for all study participants.

All subjects will have anthropometric measurements (body weight, BMI, waist circumference, hip circumference) performed and assessment of the percentage of fat and lean mass in the body.

After completing the above measurements and taking samples of biological material, all participants will be asked to use an isocaloric diet for 4 weeks. This period of time is necessary to perform the essential laboratory analyses to develop personalized dietary recommendations.

The results from integrated computational modelling of the lifestyle, metabolome, genotypes, anthropometric, clinical and classic biochemical variables (estimated time, 1 month) will be translated into personalized dietetic advice for the relevant intervention group. After 4 months of dietary intervention, all participants will also attend the center and will be evaluated as commented above. Urine, fecal and blood samples will be also collected and the analysis with the PREVENTOMICS platform will be carried out at the end point of the intervention. In the control group, the outcome measurements will be collected in parallel with the PN and PP groups. Subjects of all groups will be also advised every month to consult a nutritionist to monitor the course of dietary treatment. Additionally each participant will have opportunity to contact nutrition consultant (by phone) to resolve current daily problems. All groups will be instructed not to change their usual level of physical activity during the study.

The outcome of the pilot will be used to determine whether the use of Preventomics personalized software is more efficient in reducing waist circumference and weight and in improving metabolic status than the implementation of general dietary recommendations in clinically healthy overweight and obese subjects with abdominal obesity.

During the pilot, PREVENTOMICS software will be evaluated in terms of usability of the system, including particular experience of the nutritionists with the system, considering different aspects such as: quality of technology (efficiency, effectiveness, usefulness, completeness and accuracy), reliability of the system (reliability, security, interoperability and ease of repair and maintenance), usability and acceptance (ease of use, graphic design acceptance, user satisfaction, navigation, user control, time, user experience, mental effort, support, learning and acceptance), use of monitoring (frequency, modus operandi, user profile, context in the platform's use), problem solving and interaction/quality of outcome.

Data handling procedures

The collected data will be used only for analysis and purposes related to the project and will be protected according to the procedures for privacy and intellectual property rights defined in the consortium agreement

Storage: the platform will provide a cloud-based environment, and additionally the data from JU center will be placed on a well-secured server of the Jagiellonian University. Any databases will be encrypted and all personal data will be anonymized upon completion of the project.

All samples of biological material that will be sent to consortium partners will be encrypted.