Background

Men, in comparison to women, live shorter and are more likely to suffer from fatal chronic conditions and heart disease at younger age. Premature death in men due to chronic diseases is one of the leading public health challenges. Effective, feasible and sustainable dietary recommendations are needed to help prevention and treatment of cardiometabolic diseases in this group.

Since the origins of nutrition science the main focus in research was placed on **WHAT to eat** to stay healthy and prevent diseases. With the Nobel-awarded finding on the **circadian rhythm** (24h physiological cycles regulated by internal body's circadian clock), attention was directed towards another aspect of human nutrition – on **WHEN to eat.** A new term has been coined for this area of research – **chrono-nutrition** (the interaction between circadian clock system and meal timing). The **time restricted eating (TRE)** is a type of dietary strategy, that is in line with those discoveries – it suggest to alter meal patterns, meaning eating only in certain times of the day in designated 'eating windows', which can vary in length (eating 6h, 8h or 10h/a day; e.g. from 8am to 6pm), with fasting for the remaining time of the day (water is allowed). Previous human studies have shown that TRE can reduce the risks of metabolic diseases in overweight and obese healthy individuals, but data on lean subjects with metabolic health problems is scarce. At the same time, a new approach in 'WHAT to eat' field of nutrition is emerging – a **flexitarian diet** (predominantly plant-based diet) is gaining more interests, being more environmental friendly and with beneficial effect on health.

Aim

Using the two latest approaches in dietary research related to WHEN and WHAT to eat the aim of the study was to find out whether **time restricted eating** and **flexitarian diet** (on its own and combined) can improve cardiometabolic health markers in normal weight, young men with metabolic abnormalities?

Methods

It is planned to enrol 96 men under 40 years old. We will look for men with elevated fasting blood glucose, blood lipids level and blood pressure but without diabetes and with normal body weight and waistline. The sample will be randomly divided into four groups (of 24 men) each receiving a different intervention (Fig.1.).

Participant from the flexitarian group will be asked to follow a diet that has been carefully designed for them by the PI and dietitian for the period of 8 weeks. Participants from the control group will receive general healthy eating recommendations.

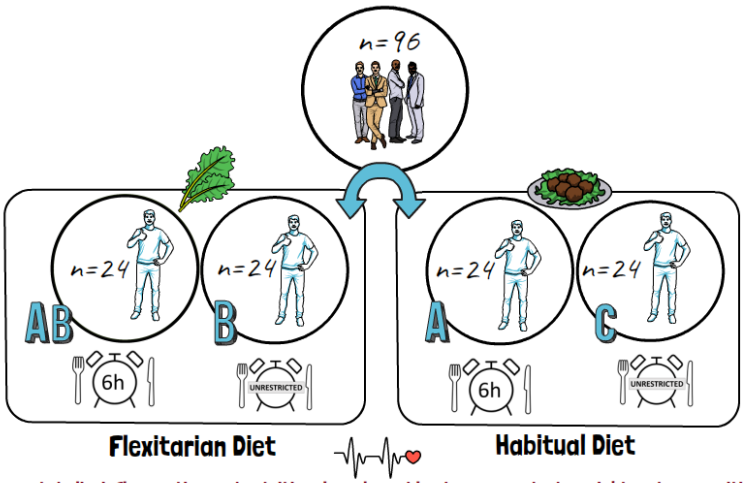

Fig.1. Intervention design. A: only time restricted eating (eating within 6h eating window); B: only flexitarian diet (mainly vegetables, fruit, legumes, pulses and very limited meat); AB: time-restricted eating together with flexitarian diet; C: a control group (normal diet and unrestricted eating).

Data will be collected at Gastronomy, Dietetic and Food Bioassessment Centre, which is a part of Human Nutrition Department, Food Science Faculty, University of Warmia and Mazury in Olsztyn on five occasions: during recruitment, on the equipment training day, at the beginning of the intervention, at the end of the intervention and 20 weeks from the start of the experiment – the so called 'follow-up" (to see if there were still any effects three months after the trial was over). We will investigate if the experiment had any effect on changes in metabolic, inflammation and nutritional markers, blood pressure and body weight and composition. We will also check if the diets had any effect on men's physical activity performance, sleep length and quality, general wellbeing and satisfaction with treatment.

Project's impact

The proposed study can test a potentially effective nutritional intervention which is feasible to adopt and sustainable (in line with recent planetary diet recommendations). Confirming its effectiveness can fill the research gap, providing new knowledge and approach to the prevention and treatment of metabolic abnormalities in young, lean men.