Objective: Sweet taste receptors are stimulated by natural carbohydrates but also non-caloric natural and artificial sweeteners, for example in energy-reduced softdrinks. Epidemiological studies suggest associations between those dietary components and the development of metabolic diseases. The reason for this relationship might be found in an unfavorable incretin release after ingestion of artificially sweetened food. As a result from the SEGATROM study, we are conducting the ILIAS project which aims to highlight possible selective properties of certain sweeteners and to assess the real-life effects under prolonged stimulation.
Methods: First, we will focus on short-term effects of several artificial sweeteners with different chemical structures. Additionally, a four-week stimulation with or without AS in a cross-over design is scheduled. As in SEGATROM, oral stimulation tests will be conducted. Plasma levels for glucose, insulin, GIP, GLP-1 and PYY will be assessed until 120 minutes after ingestion.
Results: The sweetener trials of the already completed SEGATROM study focussed primarily on saccharin, an AS with both sweet and bitter taste. Preliminary results show significantly higher insulin, GIP and GLP-1 levels under combined saccharin-glucose stimulation compared to glucose alone. PYY levels remained similar. Saccharin alone did not reliably seem to stimulate incretin release.
Conclusions/Outlook: The preliminary results from SEGATROM support the hypothesis, that food containing AS (e.g. softdrinks) may facilitate metabolic derangements, possibly by disturbing a beneficial incretin profile. As saccharin also stimulates bitter receptors, the role of sweet taste receptors could not entirely be clarified by the SEGATROM study, thus requiring a broader experimental design. We will investigate, if other sweeteners show similar or different effects, if co-administration of glucose is mandatory for the incretin release and if long-term effects on insulin sensitivity can be detected after four weeks of continuous stimulation.
Protocol registration: NCT02219295 (clinicaltrials.gov)
Funding Source: Federal Ministry of Education and Research

3. PREVIEW: Prevention of diabetes through lifestyle intervention and population studies in Europe and around the world - more than 2,000 volunteers randomized to the 3-y intervention trial

(Jennie Brand-Miller)

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Objective: PREVIEW is a 6-y EU project (2013-2018) under the FP7, KBBE programme. It involves 15 partners from Europe, Australia, Canada, and New Zealand. The primary goal is to identify the most efficient lifestyle pattern for the prevention of type-2 diabetes (T2D) in a population of pre-diabetic overweight and obese individuals.
Methods: The project comprises 2 main lines of evidence: a 3-y multicentre, 2x2 factorial, clinical, randomized controlled trial (RCT) with up to 2,500 participants as well as large population studies in about 170,000 individuals across all age groups. This presentation is focused on the RCT.
The impact of a high-protein, low-glycemic index diet vs a moderate protein, moderate-glycemic index diet in combination with moderate or high intensity physical activity on the incidence of T2D and