

Proposal for a Master Thesis Project

Title	Changing the Course of Obesity in Children
Background	The prevalence of obesity and its associated comorbidities is rapidly increasing world-wide and imposes a huge socio-economic burden due to increased morbidity and mortality. In children (age 5-19), the prevalence of obesity has dramatically risen and affects more than 124 million children worldwide . Obesity is not only a chronic disease in itself, but also a major risk factor for the world's leading causes of poor health and early death including cardiovascular disease, several common cancers, diabetes, and osteoarthritis. Childhood obesity is often carried through into adulthood, due to both physiological and behavioural factors, and preventing obesity in this age group, therefore provides a unique opportunity to halt a course to unhealthy adult life. The gut microbiota and bacteria-derived metabolites (e.g. short-chain fatty acids, SCFA) have been described to play an important role in obesity. The loss in microbial diversity observed in obesity has been linked to metabolic alterations including changes in SCFA abundance that could be improved with oral fibre supplementation , such as galactooligosaccharides.
Aim	The aim of this study is thus to assess the effect of a chewing gum containing galactooligosaccharides on body weight, metabolism, and the oral and intestinal microbiomes in a population of obese children.
Research work, methods	<ul style="list-style-type: none"> • Support a clinical study • Recruitment of patients, follow-up calls • Assistance during study visit, sample collection, preparation, and storage • Extract DNA from the oral & faecal samples, blood sample analysis by Mass-Spectrometry • Digestive hormone analysis by ELISA • Data analysis of first samples • Preparation of study products • Literature search and summary of evidence
Potential Relevance	Due to the nature of obesity's multifactorial pathogenesis with genetic and environmental contributing factors, current treatment strategies are often of limited success and there is a strong need for novel preventive and therapeutic strategies. Integrating dietary fibres into obesity therapy could be a promising approach in children and adolescents.
References	<ul style="list-style-type: none"> • Huwiler, VV, et al. Prolonged Isolated Soluble Dietary Fibre Supplementation in Overweight and Obese Patients: A Systematic Review with Meta-Analysis of Randomised Controlled Trials. <i>Nutrients</i> 2022, 14(13), 2627. • Nicolucci AC, et al. Prebiotics Reduce Body Fat and Alter Intestinal Microbiota in Children Who Are Overweight or With Obesity. <i>Gastroenterology</i> 2017;153:711–722. • Koh A, et al. From Dietary Fiber to Host Physiology: Short-Chain Fatty Acids as Key Bacterial Metabolites. <i>Cell</i> 2016;165:1332–1345. • Balmer ML, et al. Memory CD8 + T Cells Require Increased Concentrations of Acetate Induced by Stress for Optimal Function. <i>Immunity</i> 2016;44:1312–1324.
Requirements	<ul style="list-style-type: none"> • Excited about human health, children, microbiome, and nutrition • Comfortable working in an interdisciplinary team • Profound knowledge of basic statistics and Microsoft Office (Excel, Word, Power Point) • Fluent in German and English, written and verbal • Skills to search and extract information from the literature • Independent, systematic way of working
Preferred start date	July 2023 Standort Inselspital Bern (Teilzeit im Homeoffice möglich)
Contact details of supervisor	Valentina Huwiler (PhD student) valentina.huwiler@extern.insel.ch Research group of Prof. Maria Luisa Balmer maria.balmer@dbmr.unibe.ch Translational Immunometabolism Lab, Department for Biomedical Research (DBMR), Department for Endocrinology, Diabetes, Metabolism and Nutrition (UEM) and Diabetes Center Bern (DCB) Inselspital, Bern University Hospital https://www.udem.insel.ch/de/lehre-und-forschung/principal-investigators/prof-dr-maria-balmer/ https://pubmed.ncbi.nlm.nih.gov/?term=balmer%20ml

