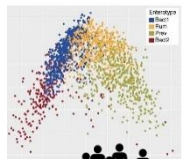


Microbial Enterotypes in Personalized Nutrition for Improving Metabolic Health:

A Proof-of-Concept Study

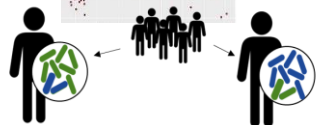
Mattea Müller¹, Madeline Bartsch^{1,2}, Shoma Berkemeyer², Sabrina Woltemate³, Marius Vital³ and Andreas Hahn¹

Introduction and Aim



Enterotypes: distinct type of microbiome community dominated by specific bacteria^a

-> Might be helpful in personalizing diet recommendations



Bacteroides Type (B-type)

- associated with high-fat and animal protein diets in Western societies

Prevotella Type (P-Type)

- associated with high-fiber diet in rural societies
- specialized in utilization of arabinoxylans**

Aim of this study:

To investigate the effect of enterotype-based fiber supplementation in P-type and B-type individuals on glucose homeostasis, appetite, hunger, and circulating short-chain fatty acids (SCFAs).

Study Design

Screening



24 healthy adults
BMI 20-28 kg/m²
Aged 30 - 65y

Inclusion cut off



12 P-Types
(>10% fecal *Prevotella*)



12 B-Types
(>10% fecal *Bacteroides*)

Cross-over study



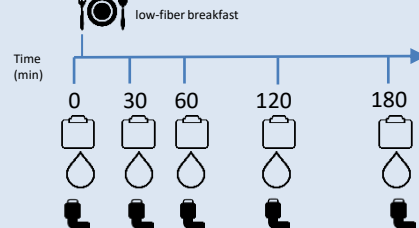
15g/d
Arabinoxylan



15g/d
long-chain
Inulin



Placebo



Appetite, hunger and satiety scores

Glucose, insulin, lipids, GLP-1, PYY and SCFA

H² breath excretion

Results and Outlook

Table 1. Patient Characteristics

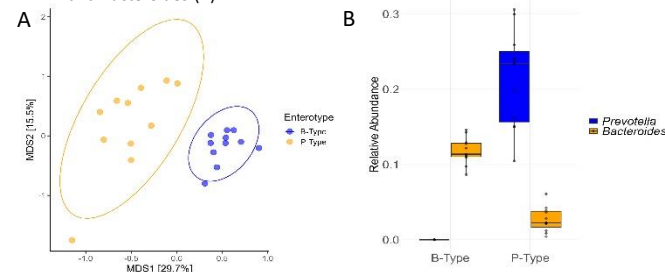
Variable	N	B-Type, N = 11 ¹	P-Type, N = 11 ¹	p-value ²
Age	22	52 (34, 56)	46 (35, 56)	0.7
Sex	22			>0.9
female		8 (73%)	9 (82%)	
male		3 (27%)	2 (18%)	
BMI	22	21.80 (21.00, 26.50)	22.40 (21.95, 25.05)	0.6
WH_ratio	22	0.78 (0.77, 0.83)	0.81 (0.77, 0.84)	0.8
Fasting_glucose	22	5.00 (4.95, 5.25)	5.20 (4.90, 5.45)	0.7
Fasting_insulin	22	5.10 (4.40, 7.40)	5.10 (3.35, 7.35)	0.7
HOMA	22	1.20 (1.00, 1.65)	1.30 (0.75, 1.75)	0.8

¹ Median (IQR); n (%)

² Wilcoxon rank sum test; Fisher's exact test

Baseline characteristics of P- and B- types showed no differences in metabolic parameters (Table 1).

Gut microbiome composition differed between P- and B- types, which explained 8% (PERMANOVA bray curtis $P > 0.01$) of the observed variance and was not influenced by any confounding factors (age, sex, stool consistency (A)). P- and B- types are dominated by differences in *Prevotella* and *Bacteroides* (B).



The stratification based on the cut-off of 10% in *Prevotella* and *Bacteroides* successfully stratified enterotypes. Blood metabolites are currently measured and expected at the end of 2023.

14TH EUROPEAN NUTRITION CONFERENCE
FENS 2023, Belgrade, Serbia

Sava Center
14-17th November 2023



*Vieira-Silva, *S Nature* (2020)

**Gálvez EJC, *Cell Host Microbe* (2020)

1 Institute of Food Science and Human Nutrition, Leibniz University Hannover, Germany 2 Nutrition Lab, Faculty of Agricultural Sciences and Landscape Architecture, Osnabrueck University of Applied Sciences, 3 Institute for Medical Microbiology and Hospital Epidemiology, Hannover Medical School