

APPLICATION OF A MULTISPECIES PROBIOTIC REDUCES GASTRO-INTESTINAL DISCOMFORT AND INDUCES MICROBIAL CHANGES AFTER COLONOSCOPY

J. Labenz^{1*}, D. P. Borkenstein¹, F. J. Heil², A. Madisch³, U. Tappe⁴, H. Schmidt⁵, B. Terjung⁶, I. Klymiuk⁷, A. Horvath^{8,9}, M. Gross¹⁰, V. Stadlbauer^{8,9}

Presenter: Valentina Wagner¹¹

Affiliations:

¹ Department of Internal Medicine, Diakonie Klinikum Jung-Stilling, Siegen, Germany.

² Praxis Dr. Heil und Dr. Müller, Andernach, Germany.

³ Department of Internal medicine I, Hospital Clinic Siloah, Hanover, Germany

⁴ Gastropraxis an der St. Barbara Klinik, Hamm, Germany.

⁵ Praxis für Innere Medizin und Gastroenterologie Dr. H. Schmidt, Berlin, Germany.

⁶ St.-Josef-Hospital Bonn Beuel, Bonn, Germany.

⁷ Division of Cell Biology, Histology and Embryology, Gottfried Schatz Research Center, Medical University of Graz, Graz, Austria.

⁸ Division for Gastroenterology and Hepatology, Department of Internal Medicine, Medical University of Graz, Graz, Austria.

⁹ Center for Biomarker Research in Medicine (CBmed), Graz, Austria.

¹⁰ Department of Internal medicine, Internistisches Klinikum München Süd, Munich, Germany.

¹¹ International Scientific Training, International Business Relations Department, Institut AllergoSan, Graz, Austria.

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Abstract

Objectives: The intestinal lavage is required before screening colonoscopy in order to optimally prepare the bowel. This significantly affects the intestinal microbiome and can also lead to persistent intestinal symptoms. The objective of this study was to test if probiotic administration following screening colonoscopy favourably influences the composition of the gut microbiome and reduces the incidence of post-interventional bowel symptoms.

Methods: In a randomised, double-blind, multicentre study, individuals presenting for screening colonoscopy received a multispecies probiotic (*Bifidobacterium bifidum* W23, *Bifidobacterium lactis* W51, *Enterococcus faecium* W54, *Lactobacillus acidophilus* W37, *Lactobacillus rhamnosus* WGG and *Lactococcus lactis* W19) or placebo daily for 30 days. To define the microbiome, 16S rRNA sequencing was performed on stool samples from all subjects immediately before bowel lavage and 30 days after colonoscopy. Participants kept a stool diary in which complaints as well as stool consistency and frequency were recorded and assessed according to the Bristol Stool Scale (BSS).

Results: 91 patients were initially randomised but 4 were excluded (modified ITT population: n=87, of which n=45 verum and n=42 placebo). Compliance and tolerability were very good in both study arms. Genetic sequencing of the gut microbiome showed a higher absolute change in alpha diversity of the gut microbiome in the verum group compared to placebo (Shannon index, p=0.036). No significant shifts were detectable with regard to beta diversity. The probiotic administration also led to a significantly increased abundance of *Enterococcus*

faecium W54 ($p < 0.05$). Taking the probiotic resulted in fewer days with stool of BSS form 1 or 2 as an indication of delayed transit (median: 2 vs. 5 days, $p = 0.044$). In the verum group, there were fewer days with gastrointestinal symptoms and flatulence ($p = \text{ns}$).

Conclusion: Taking a specially formulated multispecies probiotic for 30 days after a colon lavage for screening colonoscopy can reduce post-interventional intestinal symptoms and influence the intestinal microbiome by, among other things, significantly increasing the relative abundance of the probiotic bacterial strain *Enterococcus faecium*.