

Abstract

Modulation of Gut Microbiota through Nutritional Interventions in Behçet's Syndrome Patients: Preliminary Results from the MAMBA Study [†]

Giuditta Pagliai ^{1,*} , Silvia Turroni ² , Federica D'Amico ³ , Irene Mattioli ¹, Marta Tristan Asensi ¹ , Giacomo Emmi ¹ and Francesco Sofi ¹ 

¹ Department of Experimental and Clinical Medicine, University of Florence, 50134 Florence, Italy; irene.mattioli@unifi.it (I.M.); marta.tristanasensi@unifi.it (M.T.A.); giacomo.emmi@unifi.it (G.E.); francesco.sofi@unifi.it (F.S.)

² Unit of Microbiome Science and Biotechnology, Department of Pharmacy and Biotechnology, University of Bologna, 40126 Bologna, Italy; silvia.turroni@unibo.it

³ Microbiomics Unit, Department of Medical and Surgical Sciences, University of Bologna, 40126 Bologna, Italy; federica.damico8@unibo.it

* Correspondence: giuditta.pagliai@unifi.it

[†] Presented at the 14th European Nutrition Conference FENS 2023, Belgrade, Serbia, 14–17 November 2023.

Abstract: Background. Recent evidence suggests that the gut microbiota (GM) in Behçet's syndrome patients (BS) has low diversity and a peculiar layout. Diet is known to influence the GM, but to date no study has investigated its effect on these patients. Aim. To evaluate the effect of a lacto-ovo vegetarian diet (VD) and a Mediterranean diet supplemented with 2 g/die of oral butyrate (MD-Bt) in comparison with a Mediterranean diet (MD) on the GM in BS. Methods. Forty-four (27F; mean age: 46.9 ± 11.2 years) BS patients were randomly assigned to follow a VD, MD-Bt, or MD for 3 months each and then crossed over. Stool samples were collected from the participants at the beginning and at the end of each intervention phase. Samples were analyzed through 16S rRNA amplicon sequencing on an Illumina MiSeq platform. Results. Regarding alpha diversity, a decreasing trend after a VD (Shannon index: $p = 0.069$; observed species: $p = 0.08$) and an increasing trend after a MD (Shannon index: $p = 0.084$; observed species: $p = 0.079$) were observed. Regarding beta diversity, no significant separation was found between the sample groups either over time or between different interventions. Phylum-level taxonomic analysis showed a significant increase in Bacteroidetes (+2.6%; $p = 0.049$) following the MD and a significant reduction in Proteobacteria (−0.2%; $p = 0.035$) following the MD-Bt. At the family level, we observed a significant increase in Bacteroidaceae (+2%; $p = 0.05$) and Porphyromonadaceae (+0.3%; $p = 0.004$) after the MD, a significant reduction in Porphyromonadaceae (−0.4%; $p = 0.05$) and Rikenellaceae (−0.7%; $p = 0.03$) after the VD, and a significant reduction in Rikenellaceae (−0.2%; $p = 0.008$) and Turicibacteraceae (−0.02%; $p = 0.04$) after the MD-Bt. In addition, there was a significant increase in the genus Bacteroides (+2%; $p = 0.05$) and Parabacteroides (−0.2%; $p = 0.004$) after the MD. On the other hand, the MD-Bt, led to a significant increase in Clostridium (+1%; $p = 0.05$) and a significant reduction in Oscillospira (−0.6%; $p = 0.011$) and Turicibacter (−1.9%; $p = 0.04$). Conclusions. The MD appeared to have an overall better impact on the GM modulation of BS in terms of higher diversity and potentially beneficial compositional changes.



Citation: Pagliai, G.; Turroni, S.; D'Amico, F.; Mattioli, I.; Tristan Asensi, M.; Emmi, G.; Sofi, F. Modulation of Gut Microbiota through Nutritional Interventions in Behçet's Syndrome Patients: Preliminary Results from the MAMBA Study. *Proceedings* **2023**, *91*, 154. <https://doi.org/10.3390/proceedings2023091154>

Academic Editors: Sladjana Sobajic and Philip Calder

Published: 1 February 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: Behçet syndrome; gut microbiota; diet

Author Contributions: Conceptualization, G.P., G.E. and F.S.; methodology, G.P., S.T., G.E. and F.S.; formal analysis, G.P., F.D. and S.T.; investigation, G.P., I.M., M.T.A., G.E. and F.S.; writing—original draft preparation, G.P.; writing—review and editing, S.T., G.E. and F.S.; supervision, F.S. All authors have read and agreed to the published version of the manuscript.

Funding: This study is co-funded by the Italian Ministry of Health (Ricerca Finalizzata 2016; Reference Number: GR-2016-02361162) and by the Tuscany region. The study is also co-funded by a grant from the Associazione Italiana Sindrome e Malattia di Behçet (SIMBA) Onlus. The funders had no input into the design and conduct of the project; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of The Tuscany Region, Careggi University Hospital (protocol code 12773_SPE).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.