

The composition of the human intestinal microbiota in anorexia nervosa patients before and after weight gain compared with normal-weight participants (MICROBIAN)
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Introduction: Of all mental disorders anorexia nervosa (AN), has the highest mortality rate. Besides psychological and environmental factors also physiological factors could be causative for this disease – the gut microbiota could be one such factor. Changes in the composition of the intestinal microbiota have been associated with several diseases such as obesity, type 2 diabetes and chronic inflammatory bowel disease. Besides the influence of the gut microbiota on host metabolism, it can also affect brain function and behaviour.

Objective: The objective of this study was to examine in a substantial number of participants i) to what extent the intestinal microbiota of AN patients is perturbed in comparison to NW participants and ii) whether these perturbations are recovered after weight gain.

Methods: The gut microbiota and short-chain fatty acids in stool samples of AN patients ahead of (n=55) and after (n=44 out of the 55) weight gain during inpatient hospitalization were compared to NW participants matched for age and gender (n=55). Additionally, detailed information on dietary intake and gastrointestinal complaints were collected.

Results: We show profound microbial perturbations in AN patients as compared to NW participants, with higher levels of mucin-degraders and members of *Clostridium* clusters I, XI and XVIII and reduced levels of the butyrate producing *Roseburia spp.*

Branched-chain fatty acid concentrations, being markers for protein fermentation, were elevated. Distinct perturbations in microbial community compositions were observed for individual restrictive and binge/purging AN-subtypes. Upon weight gain, microbial richness increased, but perturbations in microbiota and SCFA profiles in addition to several gastrointestinal symptoms did not recover.

Conclusions: These insights provide new leads to modulate the microbiota in order to improve the outcomes of the standard therapy.

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