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GUT MICROBIOTA, PROBIOTICS AND OBESITY: WHAT DOES CURRENT EVIDENCE SHOW?

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Background: Obesity is a complex, multifactorial disease associated with metabolic dysfunction, chronic low-grade inflammation, and increased risk of cardiometabolic complications. Growing evidence indicates that the gut microbiota participates in host energy homeostasis and may influence adiposity through microbial metabolites, bile-acid signaling, intestinal barrier integrity, immune pathways, and the gut–brain axis. These findings have stimulated interest in probiotics as a potential adjunctive strategy for obesity management.

Objective: To critically summarize current evidence on the relationship between gut microbiota and obesity and to evaluate the efficacy and limitations of probiotic supplementation in improving anthropometric and selected metabolic outcomes in adults with overweight or obesity.

Methods: Recent systematic reviews, umbrella reviews, meta-analyses, and randomized controlled trials were considered, with emphasis on studies evaluating probiotic interventions and clinically relevant outcomes, including body weight, body mass index (BMI), waist circumference, body fat, glucose regulation, lipid parameters, and inflammatory markers. Particular attention was given to heterogeneity related to probiotic strains, dosage, intervention duration, dietary context, and participant characteristics.

Results: Current evidence supports a biologically plausible association between gut microbial composition and obesity, although no single microbial profile has been consistently established as a universal marker of obesity or weight-loss response. Probiotic supplementation has demonstrated modest improvements in selected anthropometric outcomes in several meta-analyses. A 2024 umbrella review reported small but statistically significant reductions in BMI, body weight, and body fat mass, while another umbrella review found beneficial effects of probiotics, prebiotics, and synbiotics on selected anthropometric and cardiometabolic markers. However, the certainty and methodological quality of the evidence remain variable, with substantial heterogeneity among trials. Strain-specific effects are particularly important, and

findings from one probiotic preparation cannot necessarily be generalized to other strains or combinations.

Conclusion: The gut microbiota represents a relevant component of the biological pathways involved in obesity, but its role is complex and influenced by diet, lifestyle, host characteristics, and microbial ecology. Current clinical evidence suggests that selected probiotics may provide modest additional benefits when combined with established lifestyle-based approaches, rather than functioning as a standalone treatment. Future research should prioritize adequately powered, longer-term randomized controlled trials, standardized outcome measures, strain-specific characterization, and investigation of responder phenotypes to clarify which probiotic interventions may have clinically meaningful effects in obesity management.

Keywords: gut microbiota, probiotics, obesity, dysbiosis, metabolism