

The impact of prebiotics, probiotics, and gut-derived metabolites on intestinal health and skeletal muscle metabolic and oxidative capacity

Citation for published version (APA):

Otten, B. M. J. (2025). *The impact of prebiotics, probiotics, and gut-derived metabolites on intestinal health and skeletal muscle metabolic and oxidative capacity*. [Doctoral Thesis, Maastricht University]. Maastricht University. <https://doi.org/10.26481/dis.20250116bo>

Document status and date:

Published: 16/01/2025

DOI:

[10.26481/dis.20250116bo](https://doi.org/10.26481/dis.20250116bo)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

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Summary

The gut microbiome, which is formed by a diverse ecosystem of microorganisms, plays an important role in human health. It influences processes such as nutrient absorption, vitamin production, and immune system regulation. Recent studies suggest that gut-derived metabolites may also impact muscle function and physical performance.

This research explores the effects of prebiotics, probiotics, and short-chain fatty acids (SCFAs) on gut and metabolic health. In individuals with gluten sensitivity, the administration of a specific probiotic demonstrated increased levels of a protective serine protease inhibitor (serpin) in the gut, potentially mitigating adverse effects of accidental gluten exposure.

Prebiotic interventions tailored to the unique composition of individual microbiomes were found to enhance endurance performance, suggesting a role for personalized nutrition in optimizing physical outcomes. Additionally, *in vitro* studies revealed that a specific combination of SCFAs stimulate glucose uptake in skeletal muscle cells, while promoting oxidative skeletal muscle fiber types.

These findings highlight the potential of microbiome-targeted interventions to improve both health and exercise performance outcomes.