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Intestinal permeability modulation through a polyphenol-rich dietary pattern in older subjects: MaPLE project outcomes and perspectives

Stefano Bernardi[1], Cristian Del Bo'[1], Simone Guglielmetti[1], Giorgio Gargari[1], Antonio Cherubini[2], Paul Kroon[3], Benjamin Kirkup[3], Nicole Hidalgo Liberona[4,5], Gregorio Peron[4,5], Raul Gonzalez Dominguez[4,5], Cristina Andres-Lacueva[4,5] and Patrizia Riso[1]

[1]*Department of Food, Environmental and Nutritional Sciences (DeFENS), Università degli Studi di Milano, Milan, Italy,*

[2]*IRCCS INRCA, Geriatria, Accettazione Geriatrica e Centro di ricerca per l'invecchiamento, Ancona, Italy,*

[3]*Quadram Institute Bioscience, Norwich Research Park, Norwich, United Kingdom,*

[4]*Biomarkers and Nutrimetabolomics Laboratory; Department of Nutrition, Food Sciences and Gastronomy; Food Technology Reference Net (XaRTA); Nutrition and Food Safety Research Institute (INSA); Faculty of Pharmacy and Food Sciences; University of Barcelona, Barcelona, Spain and*

[5]*CIBER Fragilidad y Envejecimiento Saludable (CIBERfes), Instituto de Salud Carlos III, Barcelona, Spain*

Abstract

In recent years, research has been focusing on strategies to counteract inflammatory processes and age-related diseases[(1)]. During ageing, a low-grade systemic inflammation is often associated to an altered intestinal permeability (IP) a condition that has been shown to promote inflammation possibly through the translocation of dietary and bacterial factors into the blood stream that activates the immune system[(2)].In this regard, dietary pattern and environmental factors could play a fundamental role because of their potential ability to modulate inflammation, IP and the gut microbial ecosystem (GME). Moreover, it has been hypothesized that bioactive compounds such as polyphenols may affect IP and GME[(3)].The MaPLE project (Microbiome mAnipulation through Polyphenols for managing gut Leakiness in the Elderly) aimed to investigate the hypothesis that a polyphenol-rich diet can improve IP condition in a target population with beneficial changes at intestine and systemic level. To this aim, a randomised, controlled, cross-over dietary intervention study (8-week polyphenol-rich diet versus 8-week control diet, separated by a wash-out period) was carried out in a group of older subjects (> 60 years) living in a well-controlled setting (i.e. nursing home). Markers related with IP, inflammation, oxidative stress, vascular function and intestinal microbial ecosystem were investigated in serum, urine and/or fecal samples. Moreover, blood bacteria DNAemia, and serum/urine metabolomics has been assessed. Moreover, a consistent nutritional evaluation of the standard menu (provided by the nursing home) and of weighed food diaries was performed, providing also data on actual polyphenol intake during the intervention. The results show there were higher levels of IP in the older subjects, and that the polyphenol-enriched diet changed the levels of serum zonulin, a marker of IP. In addition, an association between zonulin and blood bacterial load was demonstrated. Ongoing in vitro and in vivo experiments are exploring the potential effects of different polyphenols on IP and the mechanisms involved. The MaPLE project will generate new data to improve the understanding on the role of polyphenols in the modulation of intestinal microbiome and its interactions with the host.

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Conflict of Interest

There is no conflict of interest

References

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