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DIETARY NITRATE AND NITRIC OXIDE: WHAT'S GUT TO DO WITH IT?

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Our group have demonstrated broad physiological benefit resulting from dietary nitrate ingestion among diverse clinical groups, including improved exercise tolerance and decreased blood pressure in hypertension, obstructive sleep apnoea, COPD, cardiomyopathy and cystic fibrosis. These effects are due to reduction of dietary nitrate to nitrite and nitric oxide (NO)[1-6]. This reduction of nitrate to nitrite requires specific nitrate reductase enzymes, which are mainly commensal bacteria in the gastrointestinal tract, particularly the oral cavity. The resulting nitrite can be reduced to NO and this can occur spontaneously under acidic/hypoxic conditions (e.g. intragastrically). Controlled trials have demonstrated that disrupting dietary nitrate reduction to nitrite by use of either antibiotics7or anti-bacterial mouth wash[8-10] decreases or abolishes the biochemical effects and physiological effects of nitrate ingestion. Additional research has reported that increasing gastric pH through use of proton pump inhibitors (PPI) can decrease systemic NO elevations induced by nitrate ingestion by 95%[11-14]. Further research has demonstrated that PPI use can decrease the hypotensive effect of nitrite15 and that antibacterial mouthwash use can increase blood pressure[16,17]. There is a suggestion that dietary nitrate is a major, beneficial component of vegetables Strong evidence suggests that disrupting the nitrate-nitrite-nitric oxide pathway via gastrointestinal tract modulation with antibiotics, mouthwash and/or PPI can attenuate some benefits of vegetable consumption. Clinicians should consider the potential detriments as well as the benefits before utilizing these agents.

BIOGRAPHY

Conor P Kerley, PhD, BSc, H. Dip is an Irish dietitian and nutrition researcher. Dr. Kerley developed an interest in nutrition and lifestyle after becoming ill at age 15. He then went on to study nutrition and dietetics at Trinity College Dublin and the Dublin Institute of Technology. It was during this time that he read The China Study and became interested in plant-based nutrition. After graduating, he earned his PhD from the School of Medicine and Medical Sciences at University College Dublin before completing postdoctoral work with The School of Human Health and Performance at Dublin City University. He is currently a content specialist with the Center for Nutrition Studies.

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