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Dietary nitrate: Novel, innovative roles in common, diverse cardiometabolic disorders

Statement of the Problem: Despite medical advance, cardiometabolic pathologies, including cardiac and respiratory diseases are major causes of premature morbidity and mortality worldwide. Cost effective, safe and sustainable therapies are urgently required. Nitric oxide (NO) is a potent vasodilator. NO synthesis can be facilitated in vivo by reduction of dietary nitrate (NO³⁻) to NO independent of NO synthase, possibly providing therapeutic effect. Multiple cardiometabolic pathologies are associated with perturbations in NO, including hypertension (HTN) and obstructive sleep apnoea syndrome (OSAS). To extend findings from our preliminary studies (1,2), we hypothesized that dietary NO³⁻ may have utility in HTN and OSAS. We conducted 2 separate double-blind, randomized, placebo-controlled, crossover trials of daily NO³⁻ supplementation (concentrated beetroot juice) compared to placebo (PL; matching nitrate-depleted beetroot juice) for 14d among a group of well-characterized, treated yet uncontrolled hypertensives(3) and subjects with newly diagnosed OSAS(4). We recruited 20 uncontrolled hypertensives (mean age=63y, mean BMI=31kg/m², mean no. of antihypertensives=2) as well as 12 adults with severe OSAS (mean apnoea-hypnoea index=74, mean age=52y, mean BMI=31kg/m²). Assessments were conducted on three occasions, baseline (day 1), midpoint, (day 15) and endpoint (day 29) - before and after each intervention period and included plasma nitrate as well as 24h ambulatory blood pressure. Daily dietary nitrate was well-tolerated, safe, led to increased plasma NO metabolites and decreased BP profiles in uncontrolled hypertensives and OSAS. Dietary nitrate has potential as a novel therapeutic, adjunct strategy in difficult to treat BP. In a review review, we wrote that 'increased green vegetables consumption may provide similar/ superior benefits to nitrate supplementation in a cheaper, safer, and potentially tastier context' (5). Considering the low cost and safety profile of foods containing dietary nitrate, this concept appears promising as an adjunct therapeutic strategy for elevated blood pressure.

Biography

Conor P Kerley has his expertise in chronic disease prevention and treatment. He received his Bachelor's degree in Human Nutrition and Dietetics from Trinity College Dublin and his PhD from University College Dublin. He has presented his award winning findings at multiple national and international nutrition and medical conferences. His research has been published in international peer-reviewed medical journals and has attracted over €210,000 in research funding to date. In addition to his clinical research, He served as chairperson of the Scientific and Research Steering Group of the Irish Nutrition and Dietetics Institute and is an active member of several professional societies including the Irish Nutrition and Dietetics Institute, Nutrition Society, The National Blood Pressure Council and The True Health Initiative. The current work is based on his design and implementation of a novel, innovative nutrition education intervention in addition to an exercise focused rehabilitation program.

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