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The role of increased fruit and vegetable intake and the antiatherogenic properties of high density lipoproteins in subjects with type-2 diabetes

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Abstract

The cardioprotective properties of high density lipoproteins (HDL) include their involvement in reverse cholesterol transport and their ability to stimulate glucose uptake and fatty acid oxidation, which oppose insulin resistance. However, in type-2 diabetes these cardioprotective properties of HDL are diminished, which increases cardiovascular disease (CVD) risk. Conversely, increased fruit and vegetable (F&V) intake has been suggested to reduce CVD, although direct trial evidence in subjects with type-2 diabetes is lacking. Therefore, this study examined if increased F&V consumption influenced functional aspects of HDL in a population with diabetes.

Eighty subjects with type-2 diabetes were randomized to either a low (1-portion/day) or high (6-portions/day) F&V diet for 8-weeks. Fasting serum was collected pre and post intervention. HDL was subfractioned into HDL_2 and HDL_3 by rapid ultracentrifugation. Carotenoids were assessed in serum, HDL_2 and HDL_3, by HPLC. Functional aspects of HDL_2 and HDL_3 were assessed by monitoring their association with serum amyloid A (SAA) and the activities of the HDL-associated enzymes, paraoxonase-1 (PON-1), lecithin-cholesterol-acyl-transferase (LCAT) and cholesterylester-transfer-protein (CETP).

Between group analyses identified that the carotenoids increased in serum, HDL_2 and HDL_3, which was particularly apparent in HDL_3 (lutein, p=0.012; zeaxanthin, p=0.000; β-cryptoxanthin, p=0.043; α-carotene, p=0.000; lycopene, p=0.018). Additionally, the activities of PON-1 and LCAT increased in HDL_3 (p=0.038 and 0.005, respectively), while the activity of CETP decreased in HDL_3 (p=0.010).

These results have provided first time evidence that increased F&V intake improved functional aspects of HDL in subjects with type-2 diabetes, which has the potential to reduce CVD risk.

Biography

Jane McEneny completed my Ph.D in 2000 from Queen's University Belfast. I am a lecturer in the Centre for Public Health (Nutrition and Metabolism Group), Queen's University Belfast, UK. To date I have published 66 papers in reputed journals, with an additional 4 having been accepted for publication. I serve as an editorial board member of the Nutrition and Biochemistry section within the Journal of Sports Science. I am also an invited senior judge for the Society of Free Radical Biology and Medicine's annual conference and have been an invited Chair for the annual conference of the UK Nutrition Society.