Concurrent Session 15: Diet and health

Weight loss with and without exercise improves cardiovascular disease risk markers, but not endothelial function in patients with type 2 diabetes

T Wycherley1,2, GD Brinkworth2, JD Buckley2, M Noakes1, XS Cleanthous1, PM Clifton1

1CSIRO Human Nutrition, Adelaide, South Australia 5000
2ATN Centre for Metabolic Fitness, University of South Australia, Adelaide, South Australia 5000

Background – Endothelial dysfunction is a key feature of type 2 diabetes (T2D) and plays a significant role in the early development of atherosclerosis. While lifestyle interventions incorporating weight loss and increased physical activity are advocated as the first line of treatment for T2D, the effects of weight loss, particularly when combined with exercise training on endothelial function in patients with T2D are largely unknown.

Objective - To compare the effects of a moderate energy restricted diet, with and without aerobic exercise training on endothelial function, oxidative stress and established markers of cardiovascular risk in patients with T2D.

Design – Using a parallel randomised controlled study design, 29 sedentary, overweight and obese patients with T2D followed a 12-week moderate energy restricted diet (~5000 kJ/day, ~30% energy deficit consisting of two meal replacements and one self-prepared high protein meal) whilst either maintaining their habitual physical activity levels (DO, N=16) or undertaking a progressive aerobic exercise training program (DE, N=13).

Outcomes – Both interventions resulted in significant reductions in body weight (DO 9.5%, DE 9.0%, P<0.001 for time), body fat (14.3%), waist circumference (9.3%), blood pressure (7/4 mmHg), fasting glucose (24%), HbA1c (18%), triglycerides (38%), total cholesterol (12%, P=0.001) and malondialdehyde (28%, P<0.001), but there were no differences in the magnitude of these effects between treatments. At baseline, endothelial function assessed by brachial artery flow-mediated dilatation FMD was similar in both groups (DO 2.5±5.7%, DE 4.3±4.6%; P=0.26) and did not change after the interventions (P=0.76).

Conclusion – In overweight and obese patients with T2D, weight loss with and without aerobic exercise training did not improve FMD, but was effective in improving glycemic control and a range of cardiovascular risk factors.

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A novel whey protein hydrolysate (NatraBoost XR) enhances recovery of isometric muscle torque following eccentric exercise

JD Buckley1, R Thomson R1, AM Coates1, M Rowney2, PRC Howe1

1ATN Centre for Metabolic Fitness, School of Health Sciences, University of South Australia.
2MG Nutritionals Pty Ltd, Brunswick, Australia

Background – A novel hydrolysate (NatraBoost XR, NBXR) of whey protein isolate (WPI) reduced production of tumor necrosis factor-α (TNFα) and increased cell growth in vitro.

Objectives – This study examined whether feeding NBXR could enhance recovery of muscle function following eccentric exercise.

Design – Muscle soreness (MS, by visual analogue scale), serum creatine kinase activity (CK), plasma TNFα and insulin concentrations, and knee extensor peak isometric torque (PIT) were determined in 40 healthy sedentary males at baseline. 100 maximal eccentric contractions (ECC) of the knee extensors were then performed. MS, CK TNFα, insulin and PIT were then reassessed prior to consuming 250 ml of flavoured water (FW; n = 11), or 250 ml of FW containing 25 g of NBXR (n = 6), WPI (n = 11) or casein (C, n = 12) in a double-blind randomised parallel design. All assessments were repeated 1, 2, 6 and 24 hr later, and supplements were consumed at 6 and 22 hr.

Outcomes – There was no difference in PIT between groups at baseline (P = 0.70). PIT decreased in all groups following ECC (P < 0.001), with no difference in the reduction between groups (P > 0.58). PIT remained suppressed in WPI, C and FW, but recovered rapidly in NBXR such that it was not different from baseline by 2hr (P > 0.05) and was greater than all other groups a 6 hr (P < 0.01) and 24 hr (P < 0.001). MS increased in all groups following ECC (P < 0.001) and remained elevated, with no difference between groups (P = 0.93). TNFα (P > 0.83) and CK (P > 0.32) did not change from baseline. Insulin increased transiently in NBXR and WPI only at 1 hour (P < 0.001), but the increases were not different from each other (P = 0.77).

Conclusion – NBXR enhanced recovery of PIT following eccentric exercise. The effect did not appear to be mediated by suppression of inflammation or MS, or by any anabolic effect of insulin. The enhanced recovery may be related to the activity of some novel peptide(s) in the hydrolysate.