

Concurrent Session 1: Functional Foods I

Health benefits of ZESPRI™ GOLD Kiwifruit: effects on muscle performance and fatigue and immune responses

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Background – Kiwifruit is one of the most nutrient dense fruits and a rich source of vitamins, minerals dietary fibre and plant phytochemicals, particularly carotenoids. It has been shown to have health benefits beyond basic nutrition and may be viewed as one of the new ‘Superfruits’.

Objective – During exercise and training the body is “stressed” and immune responses may be compromised. We have focussed on muscle health and immune support, both important areas for maintaining health and ‘wellness’, and investigated the ability of ZESPRI™ GOLD Kiwifruit to improve muscle cell function, reduce muscle fatigue and enhance immune responses.

Design – To investigate effects on muscle, adult male mice soleus muscles were connected to force transducers in an organ bath and stimulated with electrodes to twitch and fatigue (over 15 secs) with or without a 15-min pre-incubation with the fruit extract. For immune response effects mice were fed a ZESPRI Gold kiwifruit puree for 20 days during which time they were orally immunised with a model protein antigen, ovalbumin (OVA), plus a suboptimal dose of adjuvant and antigen-specific antibodies and cell-mediated immune response were compared with immunised mice fed a sugar control. Possible mechanisms were investigated using human blood cells where effects on phagocytosis and natural killer cell activity were determined.

Outcomes –The ZESPRI™ GOLD Kiwifruit treated muscles displayed a marked increase in maximum force and an observable delay in fatigue onset compared to the untreated control muscles. The ZESPRI™ GOLD Kiwifruit puree allowed the detection of significant increases in OVA-specific antibodies (total Ig and IgG) in the serum under sub-optimal immunisation conditions and an OVA-specific cell-mediated response from gut associated mesenteric lymph node cells but not from spleen cells. It also stimulated human granulocyte and monocyte phagocytosis but not human natural killer cell activity.

Conclusions – The results provide the first evidence that ZESPRI™ GOLD Kiwifruit can improve muscle performance, prolong time to muscle fatigue and modulate antigen specific immune responses. They suggest that it could be useful as a new type of functional food ingredient for sports drinks and others foods targeted at immune support.