Dramatic Declines in Senescence Associated Beta-Galactosidase of Skeletal Muscle after Exercise in Men Consuming Rg1 from Ginseng

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Abstract

Introduction: Panax ginseng has been claimed to have ergogenic and anti-aging properties in humans. However, previous studies present mix results. The changing component profiles of ginseng with seasons may undermine scientific observation.

Methods: we examined longitudinal changes of senescence associated beta-galactosidase (SABG) in human skeletal muscle before and after exercise (0 h and 3 h) after ginseng-based Rg1 supplementation. Twelve young men were enrolled in this randomized double blind placebo controlled crossover study, under two occasions: Placebo (5mg starch) and Rg1 (5 mg) supplementations 1 h prior to a high-intensity cycling (70% VO₂max for 1 h).

Results: A substantial decrease (from 1.6% to 0.6%, P < 0.05) in SABG positive signal of vastus lateralis muscle below baseline during the Rg1 trial was observed, in particular, 9 out of the 12 individuals showed complete elimination of SABG number to an undetected level, whereas no such change was observed during the Placebo trial. Apoptotic DNA fragmentation (+4% ~ +6%, P < 0.01) and macrophage (CD68⁺) infiltration (+2%, P < 0.01) increased immediately after 1 h cycling. Increases in iNOS, IL-6, and myogenic factor Myf5 mRNA levels induced by exercise were elevated in the Rg1 trial. During recovery, decreases in apoptotic DNA fragmentation (-4%) occurred 3 h after exercise, only in the Rg1 trial. Cycling time at 80% VO₂max significantly increased after Rg1 supplementation compared with Placebo (+12%, P < 0.05).

Conclusions: Our data suggest the ginseng component Rg1 sensitize phagocytic macrophage and assists senescent cell clearance in human skeletal muscle after exercise.

Keywords: Inflammation; Aerobic exercise; Muscle biopsy