Effect of the Hyperimmune Egg Supplement on Regulation of Insulin-like Growth Factor-I

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Abstract

Hyperimmune egg (HIE) protein is a powdered, pure egg product derived from chicken hens immunized with more than 26 killed pathogens of human origin. It contains immunomodulatory factors that stimulate immune response and improve performance. This study aimed to determine if supplementation with HIE positively altered the bioavailability of Insulin-like Growth Factor-I (IGF-I) and Insulin-like Growth Factor-binding protein 1 (IGFBP-1) and -3. The data indicates that additional research is necessary to fully understand the impact of HIE on IGF-I and IGFBP-1 regulation.

Introduction

Hyperimmune egg (HIE) protein is a powdered, pure egg product derived from chicken hens immunized with more than 26 dead pathogens (e.g., Shigella, Staphylococcus, Escherichia coli, Salmonella, Pseudomonas, pseudomonas, Haemophilus, and Streptococcus) of human origin. Oral supplementation of HIE has been shown to stimulate muscle growth, improve performance, and shorten recovery time after exercise; however, the impact of HIE on IGF-I and IGFBP-1 and -3 is unknown. The purpose of this study was to determine if supplementation with HIE would positively alter circulating IGF-I levels and IGFBP-1 responses.

Methods

Twenty-four recreationally active males aged 23.6 ± 0.8 yrs, height 176 ± 2 cm, weight 69.2 ± 0.8 kg and 17.1 ± 0.5% body fat were randomly assigned to either HIE (n=12) or an egg protein placebo (PLA) group (n=12). Participants abstained from their regular exercise routine for the duration of the study and were supplemented with 4.5 g·d⁻¹ for 2 d, 9 g·d⁻¹ for 2 d and 13.5 g·d⁻¹ for 4 d. HIE and PLA supplements were identical in appearance and taste before and after mixing with 237 mL of low carbohydrate milk. Blood samples were collected following 20 min of seated rest on Days 1, 8, 9, 10 and 11. On days 1, 8, and 10, participants performed an exercise performance test battery. ANCOVA was used to determine significant differences between or within the groups during the 10 d of supplementation with initial differences between groups serving as a covariate. Significance was set at p < 0.05. RESULTS: IGF-I significantly increased from Day 1 to Day 8 (HIE: 31.5 ± 17.4 %, PLA: 0.68 ± 4.6 %, p<0.05) and significantly decreased (P<0.05) from Day 8 to Day 9 (0.4 ± 5.6 %) and Day 10 (13.7 ± 3.5 %). IGFBP-1 decreased in HIE (P<0.05) from Day 8 to Day 9 (3.3 ± 2.4 %) and Day 10 (3.2 ± 3.2 %).IGFBP-3 levels were not meaningfully altered. CONCLUSIONS: The results suggest that oral supplementation with HIE for 10 d produced noteworthy variations in IGF-I and potentially meaningful variations in IGFBP-1. Although IGF-I was unresponsive, this finding may be a result of the exercise bout not producing a significant catabolic state due to the relatively low rest periods (~15 min) between the exercise tests. While the magnitude of the results were not as large as expected, a positive influence was observed indicating that HIE protein supplementation did positively alter the bioavailability of IGF-I. These results indicate that HIE protein supplementation may provide the body a greater ability to recover from exhaustive exercise.

Purpose

The purpose of this project was to determine if supplementation with BioChoice®Immune26® for 10 days differentially stimulated IGF-I and its bioavailability regulating binding proteins (IGFBP-1 and IGFBP-3).

Results

The data from this study supports exercise performance results including significant decreases in submaximal heart rate (~6 bpm) and significant increases in anaerobic power (9%), maximal strength (3 kg) and muscular endurance (2 reps) in HIE vs. PLA.

Discussion

The supplement dosing was titrated over 5 days in an effort to prevent previously reported gastrointestinal disturbances. No subjects in PLA and only one subject in HIE reported any signs or symptoms of gastrointestinal disturbance and no subjects in either group reported any other changes in health status during their 10 d study period.

Supplementation with hyperimmune egg protein for 7 d resulted in significant (P<0.05) increases in IGFBP-3. However following exercise IGFBP-3 was significantly (P<0.05) decreased for 48 hours which corresponded with a non-significant but expected decrease in circulating IGF-I. The decrease in circulating IGF-I most likely represents an increase in receptor binding at the muscle cell.

The subjects supplementing with hyperimmune egg protein appear to have experienced a greater recovery capacity as indicated by comparing successive exercise performance results.

The data from this study supports exercise performance results indicating by comparing successive exercise performance results.

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