THE EFFECTS OF VELOSITOL ON EXERCISED-INDUCED MYOKINES

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ABSTRACT

Study Product: Velositol® (amyllopectin chromium complex)

Preclinical Study Design:
- 2-week old male Wistar rats weighing approximately 250–300 g were reared at 22 ± 2°C in a 12/12-hour light/dark cycle and randomized into four exercise conditions: control, exercise + whey protein, exercise + whey protein + Velositol treatment groups. Doses of whey protein were increased from 6 to 40g equivalents. All rats completed a 10-day warm-up and a 2-hour pre-exercise glucose load before each 4-hour test. Results showed that all active treatment groups significantly increased muscle serum levels compared to the exercise control group (p<0.05). However, all groups supplemented with Velositol + whey protein had significantly higher muscle levels compared to whey protein alone (p<0.05). The increases in muscle levels, seen in the Velositol + whey protein treatment group, were significantly correlated (p=0.0001) with increases in muscle protein synthesis (p=0.021).

In a clinical study, blood samples were collected from four subjects for pharmacokinetic analysis of myokines. These subjects participated in a double-blind, crossover design study, where they consumed a beverage containing 6g whey protein or 6g whey protein + 2g of Velositol and then completed a 2-hour warm-up and a 2-hour pre-exercise glucose load before each 4-hour test. Results showed that myokine levels were higher in Velositol + whey protein treated subjects. Of particular interest were the increases in muscle and fractalkine, both being exercise-responsive myokines involved in muscle growth and endurance.

Conclusions: In conclusion, preclinical and clinical data support the beneficial effects of the addition of Velositol to whey protein on enhancing levels of various myokines after exercise. These data present a novel mechanism by which Velositol exerts its beneficial effects on increasing muscle protein synthesis.

METHODS & MATERIALS

Background: Velositol is a novel nutritional component comprised of a modified-release chromium complex and a specialized form of amylopectin. This compound has been clinically shown to double exercise-induced muscle protein synthesis when added to a whey protein supplement. One mechanism of action is believed to be via increased skeletal muscle insulin sensitivity and improved amino acid metabolism leading to increased mTOR activation and muscle protein synthesis. Another potential mechanism of action may be via enhanced myokine levels. Myokines (e.g., muscle and fractalkine) are cytokines released by muscle during exercise that lead to muscle protein synthesis and hypertrophy. To evaluate if myokines are affected by Velositol, the following preclinical and clinical studies were conducted.

Methods and Results: In a preclinical study, 8-week old male Wistar rats weighing approximately 250–300 g were reared at 22 ± 2°C in a 12/12-hour light/dark cycle and randomized into four exercise conditions: control, exercise + whey protein, exercise + whey protein + Velositol treatment groups. Doses of whey protein were increased from 6 to 40g equivalents. All rats completed a 10-day warm-up and a 2-hour pre-exercise glucose load before each 4-hour test. Results showed that all active treatment groups significantly increased muscle serum levels compared to the exercise control group (p<0.05). However, all groups supplemented with Velositol + whey protein had significantly higher muscle levels compared to whey protein alone (p<0.05). The increases in muscle levels, seen in the Velositol + whey protein treatment group, were significantly correlated (p=0.0001) with increases in muscle protein synthesis (p=0.021).

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RESULTS: PRECLINICAL MUSCLE LEVELS

The intake of nutrients that increase essential amino acid (EAA) and insulin levels during exercise are important for muscle protein synthesis (MPS) and growth (See Fig. 1). The essential trace mineral chromium has been shown to increase insulin sensitivity and as such may enhance the molecular mechanism of MPS. The positive effects of chromium and amyloglucoside MPS have been demonstrated in a clinical study showing that Velositol (2g) significantly increases MPS when added to 6g of whey protein (WP) (1).

An additional mechanism of action may be via enhancement of myokines. Myokines are muscle-specific derived peptides produced and secreted in response to muscular contractions. Myokines may act as signaling molecules to various organs, impacting exercise-induced metabolic changes and skeletal muscle remodeling (2). Muscle and fractalkine are two types of myokines. Disruption of muscle activity has been shown to decrease aerobic capacity, muscle oxidative capacity and mitochondrial count (3). Fractalkine has been shown to have a role in muscle regeneration after injury and is thought to be crucial for hypertrophy (3). Therefore, the results of these studies may provide insight into the cellular mechanisms by which Velositol increases MPS when added to whey protein. These results may be of interest to those interested in preventing or enhancing muscle mass and exercise-induced muscle protein synthesis.

REFERENCES


These studies were conducted at CAMS and Final University in Elazig, Turkey and funded by Nutrition 21, LLC.