Protease Supplementation Improves Muscle Function after Eccentric Exercise

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ABSTRACT

BUFORD, T. W., M. B. COOKE, L. L. REDD, G. M. HUDSON, B. D. SHELMADINE, and D. S. WILLOUGHBY. Protease Supplementation Improves Muscle Function after Eccentric Exercise. *Med. Sci. Sports Exerc.*, Vol. 41, No. 10, pp. 1908–1914, 2009. Protease supplementation has been purported to reduce the damaging effects of eccentric exercise and accelerate recovery of muscle function, possibly by regulating inflammation. **Purpose**: To determine the effectiveness of protease supplementation in attenuating

"These enzymes are critically involved in numerous physiological processes ranging from the digestion of food particles to highly regulated systems such as blood clotting or immunological function..."

45-min downhill (−17.5%) treadmill protocol at 60% of $\dot{V}O_{2max}$. An additional four blood draws and three muscle function tests

"The results of the present study indicate that 21 d of dietary supplementation with orally ingested proteases significantly improves muscle function..."

protease group. Significant group × time interactions ($P < 0.05$) were observed, including elevations in circulating eosinophils and basophils in the protease group coinciding with lower levels of serum cyclooxygenase 2, interleukin 6, and interleukin 12 in this group. **Conclusions**: Protease supplementation seems to attenuate muscle strength losses after

"...reductions in circulating IL-6 and IL-12 in the protease group may have contributed reduced muscle inflammation and thus improved muscle force."

Eccentric exercise involving lengthening muscle con-

"This result not only indicates a potential beneficial effect on health but also seems to support the hypothesis that protease supplementation may reduce inflammation by inhibiting the arachidonic acid cascade..."

disruptions a present as ultrastructural damage, such as Z-line streaming (16), and as myofibrillar leakage of proteins, such as creatine kinase (CK), lactate

"Our data also led us to speculate that it remains possible that inhibition of the arachidonic acid pathway plays a role because of the significant repression of COX2 in the protease group..."

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"By far our most intriguing finding is the increase in circulating eosinophils and basophils in the protease group..."

challenge to muscle as it induces increases in serum cortisol

mmal dis-
articipants
MS, with
rce after a
8).

In addition to the mechanically induced damage, an inflammatory response to the muscle damage is also typically mounted by the immune system and is generally

ng leuko-
exist (22).
esponse to
after exercise, strain injury,
or return to musculoskeletal loading after periods of inactivity (3,30,33). At present, it is unclear whether muscle
cial to the
tion of in-
an obligatory component of the muscle repair process (17,29,33), other data indicate that muscle force decrements after exercise cannot be fully explained by mechanical damage and are correlated with inflammatory cell invasion (14,19). Much interest in developing practical interventions to reduce muscle inflammation after muscle

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