

Anti-Inflammatory Benefits of Proteolytic Enzymes

BioLight's protease blend is proven to be an effective inflammation modulator as evidenced by an independent study conducted at Baylor University.

BACKGROUND: Biochemically, physiologically, or clinically, inflammation can be defined as the biological repair response following any disruption of the cell's structural or functional integrity by injurious agent(s) (internal or external) to the body. Based on this definition, injury brought about by sports or athletic activities will trigger a biological repair response. Any therapeutic agent or dietary supplement that could enhance this biological repair response would not only be helpful in athletic events but also in healthcare, as inflammation remains a common denominator to any health challenge.

BioLight Technologies has formulated unique protease blends that provide numerous health benefits, most notably enhanced blood rheology, enhanced digestion of proteins, control of inflammation, and removal of protein debris from the circulatory system. These protease blends are comprised of several proteolytic enzymes that are able to sustain the acidic environment of the stomach without the addition of any excipients or coating agents.¹ In an effort to specifically determine some of the biochemical actions of BioLight's proteases on inflammation, a randomized, double-blinded, and placebo-controlled study was conducted at Baylor University under the direction of Dr. Darryn Willoughby.²

OBJECTIVES: The study was designed to determine the effects of BioLight's proteolytic enzyme blend on muscle function and inflammation following strenuous exercise.

METHODS: The study was conducted in a randomized, double-blinded, placebo-controlled manner. The selection of 29 physically active healthy males with an approximate average age of 22 was by consent and upon approval of the study guidelines by the University of Baylor Institutional Review Board for Human Subjects. Following the baseline testing (T1), the participants were divided into two groups: one group of 14 received BioLight's protease blend whereas the other group of 15 received a placebo made up of cellulose. The participants took their respective supplements for 21 days. On day 21 the participants were subjected to another series of tests (T2), followed by an intense physical exercise regimen. Immediately following exercise, the tests were performed again (Post) as well as at 3, 24, and 48 hours. The participants continued taking the supplement until all testing had been completed.

RESULTS: BioLight's protease blend proved to be more effective than the placebo in modulating several key inflammatory mediators and improving muscle strength as evidenced by the following data.

Tumor necrosis factor alpha (TNF α) is a cytokine that plays an important role in the inflammatory response, stimulating the secretion of IL1 and IL6. The secretion of TNF α needs to occur in any type of inflammatory or disease process, however its persistent secretion and long term effects on the body could be harmful. For health and recovery, a controlled synthesis and secretion of TNF α is desired. The following figure shows how BioLight's proteases allowed the synthesis and secretion of TNF α to occur immediately post-exercise, followed by a controlled and steady reduction after 3, 24, and 48 hours.

Interleukin 1 beta (IL1 β) in high concentrations within the blood circulation induces fever, triggers the inflammatory response of the liver including a blood pro-coagulation effect, and promotes catabolism. The levels of IL1 β were relatively lower in the protease group than the placebo group. Additionally, the rise in IL1 β immediately post-exercise for the protease group (**24%**) was less than half that seen in the placebo group (**62%**) and demonstrates effective control of inflammation.

Interleukin 6 (IL6) is a pro-inflammatory cytokine promoting fever and high levels of acute phase liver proteins. In the placebo group the increase in IL6 post-exercise was double that of the protease group. Also the protease group had overall lower serum concentrations of IL6 than the placebo group.

Interleukin 12 (IL12) is another pro-inflammatory cytokine. Looking at the study results post-exercise to 48 hours post-exercise, the levels of IL12 dropped 63% in the protease group compared to a 16% increase in the placebo group. This further demonstrates the beneficial effects BioLight's protease blend can provide in the modulation of inflammation.

Cyclooxygenase 2 (COX2) is an enzyme that is involved in pain and inflammation. The greater its activity, the greater the pain and inflammation, and a decrease in COX2 activity results in less pain. Several pharmaceutical drugs are used to help control its activity; however, those drugs are not without serious side effects. This study revealed that COX2 levels in the protease group were significantly lower than in the placebo group. Note also that these levels appear more controlled in the protease group post-exercise, whereas the placebo group showed a 41% increase in COX2.

This finding by the researchers at Baylor provides a scientific basis to BioLight's belief that its proteases are very effective pain management products.

Force production in quadricep flexion and extension was measured to assess the effect of the protease blend on muscle strength and performance. Both groups showed a loss in force production in quadracep extension, however the protease group showed less loss compared to the placebo.

The more impressive findings were seen in quadricep flexion. The protease group not only performed better than the placebo, they actually showed an increase in muscle strength from baseline levels.

CONCLUSION: Relative to the inflammatory mediators TNF α , IL1 β , IL6, and IL12, the study results show that BioLight's protease blend has considerable potential for use in controlling inflammatory conditions in the body. The data also showed a beneficial decrease in COX2 activity, which shows these proteases can be used to manage pain without negative side effects. And according to the study results, the force production measurements showed protease supplementation led to improved muscle performance and an increase in muscle strength. The data provides scientific evidence confirming BioLight's positive clinical results using proteolytic enzymes in the treatment of various health challenges characterized by inflammation.³

DISCUSSION: It is a known fact that inflammation is a common denominator in any pathological condition and occurs as long as the body is functioning. The causative agents may be varied, but the body's basic response is the same. While the Baylor study used strenuous exercise to induce inflammation, the data points are characteristic of any condition that causes cellular injury, such as trauma, infection, or tumor growth, for example.

Furthermore, studies have shown that decreases in IL12 help control some autoimmune disorders, suggesting BioLight's protease as a good candidate in the management of certain degenerative disorders. Consequentially, the beneficial effect of protease on various inflammatory mediators, pain, and muscle strength could be extended to many other health challenges and implemented in a multitude of healthcare practices.

A controlled secretion of TNF α helps pro-inflammatory cytokines IL1 and IL6 respond appropriately, helping to modulate acute inflammation and control chronic inflammation. Modulated inflammation also reduces COX2 levels, which can result in less pain. This combination of decreased inflammation and lessened pain has the potential to enhance muscle performance, evidenced here as improved tolerance in sustaining the greater force production exercise load.

RECOMMENDATIONS: BioLight's protease blend is recommended for acute and chronic inflammatory conditions that may arise from trauma, infection, or any degenerative disease process. These results also deserve special attention in the area of athletic performance, where protease would be a healthy alternative for supporting pain management, reduced recovery time, and enhanced muscle performance.

An objective of any wellness plan is to control inflammation either directly or indirectly. One of the functions of orally administered proteolytic enzymes as adjunct therapeutic agents is to trigger the inflammatory response and then also control it. BioLight's protease blend is a proven product for controlling inflammation, a valuable dietary supplement to be used as an adjunct therapeutic agent for the management of pain and to help control the debilitating effects of inflammation.

References:

- 1 Stability and Activity of Supplemental Digestive Enzymes in a Simulated Gastric Fluid Environment: Quantitative Evidence Proving the Efficacy of Supplemental Enzymes. Research brief by M. Mamadou, Ph.D.
- 2 Dietary Protease Supplementation Attenuates Eccentric-Exercise Induced Force Production Decrements by Augmenting Leukocyte Activity and Systemic Inflammation. Thomas W. Buford, Matthew B. Cooke, Liz Redd, Geoffrey M. Hudson, Brian D. Shelmadine, Cecelia Curts, and Darryn S. Willoughby, Exercise and Biochemical Nutrition Laboratory, Baylor University, Waco, TX.
- 3 BioLight Health and Wellness Protease Ultra: An Inflammation Modulation Product as Evidenced By An Independent Study Conducted at Baylor University by Buford et al., 2008. Commentary and discussion by M. Mamadou, Ph.D.