Sorenzyme

D.O.M.S. Recovery Enzymes

What is **Sorenzyme**?

SORENZYME™ is the brainchild of Labrada's Research & Development team and ***Dr. Mark J. Tallon***, a Nutritional Biochemist who is also one of the industry's leading minds in nutrient metabolism.

By combining two proven systems in immune and inflammatory control, the premise of this project was to develop a supplement that was safe, effective, all natural, and the first of its kind in the sports nutrition market to control D.O.M.S. (Delayed Onset Muscle Soreness) and ultimately deliver body-transforming results like no other product currently available. The result: SORENZYME™, a new tool for improved muscle recovery and growth.

Before you can fully appreciate the benefits of SORENZYME™ you must first understand the very problem that SORENZYME™ is designed to combat—the unwanted side effects of intense exercise.

The Basics of Muscle Damage

When you exercise to the point where the training load exceeds your physical capacity, you damage muscle tissue. This damage is actually the goal of weight training, i.e. to first cause muscle damage, then to optimize muscle repair through diet and rest—so the muscle can adapt to the stress placed on it by growing stronger. There are initially two parts to muscle damage from exercise, particularly eccentric exercise which leads to a lengthening of the muscle under tension. First, there is immediate mechanical damage; second, there is inflammation.

This second part is associated with changes in the chemical processes within muscle, such as inflammation and immune system suppression. The results of these effects are well known and commonly include, edema, pain, and immobility, with the latter as the reason for athletes being "out of the fight." These processes tend to peak up to 24-72 hours following exercise. In other words, this means a VERY BIG window of time before your muscles can function optimally again.

NOW, IMAGINE IF YOU COULD REDUCE THIS WINDOW WITH SUPPLEMENTATION? THAT'S RIGHT! YOU WOULD BENEFIT FROM INCREASED RECOVERY, GROWTH, AND PHYSICAL PERFORMANCE.

Manipulation of the Inflammatory Response...

As we briefly mentioned, inflammation is a major contributor to muscle damage and, more specifically, to the length of time it takes muscles to recover. Your natural response to any form of tissue damage whether through exercise (Muscle) or trauma (Sprain) is an increase in acute inflammation. The entrance of white blood cells into the damaged tissue (i.e. muscle) affects the degree of inflammation in damaged tissue. White blood cells are controlled by a group of specific cells called cytokines. These cytokines can act as either pro-inflammatory (increases inflammation) or anti-inflammatory (decrease inflammation) depending on which types are activated.

Another regulatory factor in the inflammatory response is your natural ability to recover between exercise bouts. Without adequate recovery, the muscle damage and cumulative depletion of vital nutrients and enzymes lead to over-training, *which is a state of decreased adaptation from exercise, lower performance levels, and a heightened incidence of fatigue (See figure 1).*

Therefore, the inflammatory response could be looked upon as a marker of injury and of your recovery capacity. Because very little inflammation is needed to bring about an adaptive response in your muscle following exercise, decreasing excessive inflammation could, in theory, enhance your RECOVERY and consequently, GAINS from exercise.

So, what nutritional and supplemental strategies can we best use to ameliorate these unwanted side effects of intense exercise?

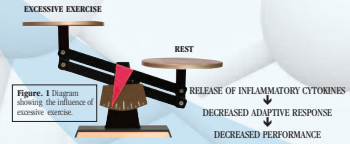

Figure. 1 Diagram showing the influence of excessive exercise.

Proteolytic Enzymes

What are they?

Protease supplementation is believed to inhibit the production of pro-inflammatory agents while stimulating the production of anti-inflammatory agents (Woolf et al. 1965; Vellini et al. 1986; Taussig and Batkin 1988). ***THE NET RESULT IS "LESS INFLAMMATION."***

How do they work?

Unlike aspirin-type drugs that can cause sever gastrointestinal upset and that can inhibit all types of good and bad prostaglandins (prostaglandin = a fatty acid based compound which plays a role in inflammation) (Donoho and Rylander 1962; Cirelli 1964; Deitrick 1965; Spaeth 1968; Seligman 1969), protease enzymes, such as those included in the SORENZYME™ formula, cause none of these undesirable effects yet still produce the beneficial anti-inflammatory effects (Taussig 1980).

The specifics on the protease mechanism of action are complex, but here is a brief overview: The anti-inflammatory action of protease is associated with increased tissue permeability, facilitating resorption of edema (tissue fluid build up) and accelerated recovery of damaged muscle tissue (Cirelli 1964; Smyth et al. 1967).

On a detailed biochemical level, protease supplementation increases proteolytic and fibrinolytic activity of the blood, increases tissue permeability, and inhibits prostaglandin (PGE2) release. These proteolytic enzymes also act on fibrinogen to stimulate the synthesis of anti-inflammatory prostaglandins (Livio et al. 1978; Pirotta et al 1978). Together these powerful anti-inflammatory tools give rise to a whole body decrease in tissue inflammation.

These fantastic actions mean protease supplementation possesses some of the most powerful recovery effects of any natural products and, unlike other products, truly carry the weight of the scientific community to back them up 100%.

Where is the proof?

There is actually an abundance of scientific data! We have found the first studies dating back to 1957 on the influence of protease type enzymes (ingredients in SORENZYME™) and their anti-inflammatory effect (Innerfield 1957), which Calnan and his colleagues subsequently confirmed in 1963. From the early 60's onwards, studies directly related to athletes began.

In one such study, 225 boxers took a protease supplement 1-1.30 hours before a boxing bout. The results showed significantly less incidence of injury (Blonstein 1967). In a subsequent study on 28 professional soccer players (Chelsea Football club), a significant reduction of time lost on the field from soft-tissue and ligament injury was achieved compared to a placebo and previous seasons. *This data provides real world evidence of the effect of enzyme supplements for helping football players, boxers, and those involved in impact and high intensity sports to recover faster.* But, what about muscle tissue injury?

In a groundbreaking study by Miller et al (2004), a combination formula of proteolytic enzymes was used with doses at least equal to or less potent than those in SORENZYME™. These researchers investigated the effects of protease supplementation on muscle function and muscle damage following downhill running. The great thing about this study was that they actually measured

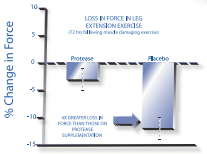

Figure. 2 Effect of protease supplementation on preventing muscle damage related loss of muscle function. "Leg Extension"

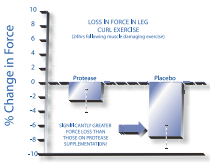

Figure. 3 Effect of protease supplementation on preventing muscle damage related loss of muscle function. "Leg Curl"

muscle function following damaging exercise in order to determine how quickly the ability to produce power and strength returned. (As a side note: the damage brought about in this study is greater than the damage you would likely ever face from a gym workout). O.K., so what were the results? Peak strength and speed of leg extension / flexion were assessed both before and after supplementation (See figure 2 and 3). Those subjects on the protease supplement had significantly greater recovery of strength and speed measured one day and two days following the muscle damaging exercise (Figure 1 and 2). Measures of pain were also significantly lower in the supplementation group. Just as a recap, here are the hard, cold facts for the protease supplemented group versus the placebo group-

- **4 TIMES LOWER LOSS IN FORCE PRODUCTION**
- **HIGHER RATE OF RECOVERY OF FORCE PRODUCTION**
- **63% LESS MUSCLE SORENESS**
- **LOWER INCIDENCE OF INJURY**
- **INCREASED IMMUNE FUNCTION**

As impressive as these results are, SORENZYME™ is actually formulated to yield even greater results than those noted in the aforementioned clinical study.

The results of the study show that following muscle damage, such as that caused following resistance-exercise, protease supplementation accelerates your recovery and adaptive responses to allow a faster return to FULL-STRENGTH and more intense workouts. This ultimately leads to greater gains in muscle mass and performance. But, with SORENZYME™ we didn't stop there!

Dr Mark J Tallon, *B.Sc M.Sc PhD CBiol Nutritional Biochemist*

Dr. Mark J. Tallon received his Ph.D. from Southampton University in Muscle Biochemistry specializing in carnosine metabolism and supplementation. He has worked with some of the world's leading biochemists including world-renowned creatine research Professor Roger Harris and free radical and whey protein biochemist Dr. Robert Child. He has a broad interest in exercise physiology and nutrition, with special expertise in nutritional biochemistry and its applications in the enhancement of elite athletic performance. Dr. Tallon also holds a first degree with honors in Exercise Physiology (Kingston, London) and a Masters degree in Nutrition Science from Liverpool University (England). Dr. Tallon's work has been published in scientific journals, trade journals, technical reports, and magazine articles. He is currently one of the few consultants with a monthly column in the world's largest supplier publication focused exclusively on the sphere of nutraceuticals and functional foods.

Dr. Tallon has been involved in teaching undergraduate and graduate courses in Physiology, Nutrition, and Histology. His expertise in Nutrition and Physiology has lead to direct work with Olympic and international level athletes including triathletes, martial artists, and sailors. At present, he is Chief Science Officer of Oxygenix Ltd (www.oxygenix.com) a consultancy firm specializing in regulatory compliance of dietary supplements extending to product development, clinical trial construction, and advertising claims for European and North American markets. He is also Co-Founder of Cr-Technologies, a specialist supplement and food ingredient firm. Dr. Tallon is currently a member of the Institute of Biology (London) and is a certified biologist. Other affiliations include Institute of Food Technologists, The Physiological Society and the American Medical Writers Association.

- Attenuates Delayed-Onset Muscle Soreness (D.O.M.S.), the post-workout soreness that prevents you from making faster muscle gains.
- Can reduce post-workout inflammation to speed recovery time by up to 63%*
- Unique anti-catabolic formulation protects against post-workout cortisol elevation. Cortisol is a stress hormone that eats away at muscle and promotes body fat.
- Scientifically formulated based on clinical results in humans.*

**Miller et.al., "The effects of protease supplementation on skeletal muscle function and D.O.M.S. following downhill running." Journal of Sports Sciences;22,365-372; 2004.*

LABRADA® NUTRITION

www.labrada.com

Greater Post-Workout Recovery

Because Labrada is a company based on quality, value, and advanced nutritional products we fortified SORENZYME™ with sitosterols.

What are they?

A sterol is a form of lipid found in all higher plants and in low concentrations in human tissues (Pegel 1997). Sterols can also be found and consumed in diets rich in fruits, nuts, seeds, and vegetables.

The structure and function of sterols is very much like that of cholesterol in cell membranes—acting as a storage and transport agent for fatty acids as well as promoting their conversion to fatty acids such as Linoleic acid (Leikin and Brenner 1989). These sterols are better known as phytosterols because of their discovery in plants.

How do they work?

Sterols and particularly the beta-sitosterols, as found in SORENZYME,™ have been demonstrated repeatedly to have beneficial effects on health and post exercise recovery. Sitosterol consumption has been shown to increases the activity of some of our body's most powerful immune cells (↑ T-Cell activity, ↑CD4) and to decrease the levels of inflammatory chemicals (↓ IL-6). Beyond this, beta-sitosterols decrease elevated cholesterol levels and also help decrease the catabolic and fat storage hormone cortisol (Bouic et al. 1999). This may mean you not only up-regulate your immune system, but also enhance your ability to maintain muscle mass and lose body fat.

Where is the proof?

In 1999, a great study came out of South Africa that looked at the effects of beta-sitosterols on post marathon immune suppression and inflammation. (Just a quick note: when we look through the literature, the inflammation and muscle damage from running a marathon is far higher than that from resistance exercise. Therefore, the positive effects for a bodybuilder/weight training athlete should be even greater than they are for the marathon runners).

Dr. Bouic and colleagues hypothesized that supplementation with clinically proven doses of sitosterols would enhance the immune response to post-exercise inflammation. In essence, exercise-induced inflammation creates a window for post-exercise infection. It was hoped that beta-sitosterol supplementation would prevent this. The results confirmed these hypotheses exactly as supplementation prevented immune suppression and pro-inflammatory responses as defined by cortisol to DHEA ratios (measures of inflammation) and the lower appearance of pro-inflammatory cytokines among all supplemented athletes.

THIS SHOWS THE CONCENTRATION OF BETA-SITOSTEROL IN SORENZYME™ CAN REALLY BOOST YOUR IMMUNE SYSTEM AND FIGHT INFLAMMATION—WHICH LEADS TO FASTER RECOVERY AND LESS TIME OUT OF YOUR TRAINING DUE TO ILLNESS.

Enhancing Absorption = enhanced results

The uptake of a nutrient must always be considered when using any supplement. So, what is the absorption profile of the nutrients in question? For sitosterols, you absorb about 5% of the ingested dose. Protease supplements range from between 40% for bromelain (Kelly 1997) and greater for mixed protease products (Miller et al. 2004). Before we go into how to enhance the availability of these nutrients what should be remembered is that SORENZYME™ already contains dosages clinically

proven to enhance performance, recovery, and reduce inflammation. However, we believe further enhancing the bio-availability of these active compounds will further accelerate and intensify their fantastic effects.

How did Labrada enhance the absorption of SORENZYME™?

Of all nutrients clinically shown to aid absorption, one stands out—piperine. Piperine is a major component of Black Pepper (Piper longum Linn; Piper nigrum Linn) that has been shown to inhibit enzymes that control the transport of different nutrients through the gut (Atal et al. 1981; Velpandian et al. 2001). Piperine has been shown to increase absorption of nutrients up to 60%.

Conclusions

The ingredients in SORENZYME™ have been shown to reduce D.O.M.S., post exercise inflammation, and improve immune function. Additionally, there is evidence that the immune enhancing/anti-inflammatory action can keep increasing for up to 6 months with continued use. (Miller et al. 1999).

This means the longer you take SORENZYME™, the better the effects. The data suggests a cumulative effect of the protease enzymes by either the body's "up-regulating" of its own protection system or by the storage of the supplemented enzymes in muscle tissue until there is a greater need for muscle repair, as with muscle damage and training.

Is SORENZYME™ the same as digestive enzymes?

There is no doubt that once the Labrada team hits the market with the first D.O.M.S. muscle recovery system, the rest of the industry will come out with their imitation formulations. You will also see companies coming out saying digestive enzymes are the same as our muscle recovery enzymes, but that is not the case; let's clear this issue up!

Medical doctors often turn to digestive enzyme products to promote good digestion and enhance nutrient absorption, but not as a means of decreasing inflammation or removal of protein debris that inhibit the return of optimum muscle function.

Our selection and concentration of enzymes are specifically chosen because of their effects on muscle tissue and healing on a systemic (WHOLE BODY) level, not just your digestive system. This means the activity levels of these enzymes are remarkably different from the activity levels of digestive enzymes. So, don't be fooled! The SORENZYME™ formulation is as unique as it is powerful.