

Winning With the

Enzymatic Edge

by Lee Labrada



Winning With The Enzymatic Edge

*Unlocking the power of
recovery for faster muscle and strength gains*

“Recuperate Faster – Grow Faster!”

By Lee Labrada

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ABOUT LEE LABRADA

One of the world's most well-known and celebrated bodybuilding legends, fitness expert Lee Labrada is the author of *The Lean Body Promise* (Harper Collins.)

Lee holds twenty-two professional bodybuilding titles, including Mr. Universe. He is one of few men in history to consistently place in the top four at the Mr. Olympia competition (the "Super Bowl" of bodybuilding) for seven consecutive years – a feat he shares with Arnold Schwarzenegger. In 2004, Lee was inducted into the IFBB Pro-Bodybuilding Hall of Fame.

Lee has appeared on the covers of more than 100 magazines worldwide and has appeared as a fitness and nutrition expert on ABC's *Extreme Makeover*, CNBC, FOX, NBC, CBS, CNN, WGN, and ESPN.

Lee's desire to help others reach their health and nutrition goals inspired him to found Labrada Nutrition, and to create a line of award-winning nutrition and supplement products. Equally successful in business as he is in the gym, Lee turned Labrada Nutrition into one of the fastest-growing privately held companies in the United States – earning Inc 500 status after only six years. Over the past few years, more than 60,000 people have taken advantage of Lee's exceptional nutrition education by subscribing to his free online newsletter at www.leanbodycoach.com.

In June 2002, Lee was appointed by the mayor as the first fitness czar for the city of Houston, where he helped launch Get Lean Houston!, a health and fitness campaign designed to get the city's residents into better shape. Lee is credited with helping Houston shed the dubious title of "America's Fattest City."

Lee holds a bachelor's degree in civil engineering from the University of Houston and lives in Houston, Texas with his wife and three young sons.



ABOUT DR. MARK TALLON

Dr. Mark J. Tallon is the lead researcher and formulator of Sorenzyme™. A world-renown biochemist who received his Ph.D. in muscle biochemistry from Southampton University, he has worked with some of the world's leading biochemists including world-renowned creatine researcher, Professor Roger Harris, and free-

radical and whey protein biochemist, Dr. Robert Child.

Dr. Tallon 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 holds a first degree with honors in exercise physiology (Kingston, London), a masters degree in nutrition science from Liverpool University (England) and a Ph.D. in nutritional biochemistry (Southampton University.)

Dr. Tallon's work has been published in science journals, trade and technical reports, and magazine articles. His expertise in nutrition and physiology has lead to direct work with Olympic and international level athletes. 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.

CHAPTER 1

THE NEXT QUANTUM LEAP IN MUSCLE SIZE AND STRENGTH

“BIG ENOUGH” — Isn’t!

Super-human muscular size has always fascinated bodybuilders and athletes. From Eugene Sandow to Arnold Schwarzenegger to Lee Haney to Ronnie Coleman, every time we think we’ve seen it all, someone comes along and blows the standard right out of the water!

In my professional bodybuilding career, I knew more about training and nutrition science than almost any of the champions that came before me. When I won the IFBB Mr. Universe, the Pro World Cup, and placed in the top four in the Mr. Olympia seven years in a row, believe me – I left no “cutting edge” stone unturned.

I was a pro and my job was to win. But the “secret” training techniques, calorie timing, nutrient intake and cycling that allowed me to stay in the money my entire career, are now *commonplace* amongst novice bodybuilders.

By adopting bodybuilding training and nutritional programs, athletes in all sports have gotten bigger, stronger and faster... *lots* bigger, stronger and faster. But “big enough” – isn’t! So where is the next quantum leap in super-human muscular size and strength coming from? The answer may surprise you.

THE SECRETS TO SUPER HUMAN SIZE AND STRENGTH?

Is the answer training?

We know more about training than ever before, whether it’s periodization, cycling, plyometrics, super-speed training, sports-specific agility or reaction training. All of these methods make athletes bigger, stronger and, quicker. Training has made, and will continue to make, a significant impact on our performance, but *this impact will most likely be incremental – not quantum.*

So is the answer nutrition?

Nutritional science has arguably offered more to bodybuilding than any other training methodology. For me to consistently peak every

single time that Joe Weider's Mr. Olympia came around, I had to make nutrition the key to winning the game. In the past few decades, bodybuilders have experienced huge advances in size and body composition..

But how much more improvement is left? *Lots* – but not because of the reasons you might think. The area most likely to generate the quantum improvement is **supplementation**, because of its very powerful supportive effect on growth. I say *supportive* effect because supplementation supports a solid training and nutrition program. You can't just sit around the house, drink vodka, watch "soaps," take a supplement, and get muscular! Supplements can supply essential and limiting nutrients which maximize the biochemical reactions in your body – especially those responsible for *recovery*.

It's not rocket science to imagine your growth potential if you could recover, at say, a 50% faster rate than you do now.

What if you could train arms *hard* every day? What if you didn't get sore because your body *recovered* faster (not because you took pain killers!)? What if you did squats today and were able to do them again tomorrow, with even more weight? Imagine the size and strength increases!

ARE YOU OVER-TRAINING— OR "UNDER-RECOVERING?"

What's the biggest and most common mistake that bodybuilders make? As a pro bodybuilder, I traveled the world giving seminars and speaking to thousands of bodybuilding athletes. Without a doubt, the biggest mistake is *overtraining*. More isn't better when it comes to training frequency, duration, and intensity. You want to stimulate growth - and then get out of the gym as soon as possible to let the recovery process begin! You don't grow in the gym – you grow out of the gym.

"There is no question in my mind that boosting recuperation is the factor with the biggest, most significant potential to create the next level of super-human muscular size and strength."

Today, after years of working with research and development scientists, I ask myself the question, "Are athletes really *over-training*, or are they *under-recuperating*?" There's a huge difference. Lots of people (we call them weekend warriors) exercise about once a week, but end up sore for five days afterward. Are they over-trained from just one afternoon workout? Or, because they are out of shape, eat poorly, drink too much, are stressed out,

and don't get enough sleep, are they *under*-recuperated?

THE WORD ON ANABOLIC STEROIDS

There's a lot of hoopla and controversy these days about anabolic steroids (I am *not* debating that they work, nor that they are illegal, nor that they are dangerous). The reason that anabolic steroids work is that *they enhance recovery!* If you know the science behind anabolic steroids, you know that they manipulate hormones and cellular activity during the *recovery* phase.

Steroid researchers were looking in the right place! Proof to my point: advanced recuperation techniques and research holds the biggest potential for future super-human muscle development. In fact, I don't think that anabolic steroids should be called *anabolic* steroids, I think that they should have been named *anti-catabolic* steroids!

That may sound like semantics, but steroids don't cause muscle growth *directly*. They support it *in*-directly during the most important phase – the recovery phase— by preventing *catabolism* or muscle breakdown. And, as we get bigger and stronger, recovery becomes proportionately *even more* important – a larger muscle under more stress, lifting heavier weights, needs more nutrients and time to recover than a smaller muscle!

We have to start thinking about growth as being much more dependant on *recovery* than stimulation. We have to look for ways to enable our bodies to handle more stimuli more often, by recovering, *and growing*, faster. With methods like electrical muscle stimulation, hyper-barometric chambers, deep tissue massage, chiropractic, and PNF stretching, to name a few, there is no question that the science of recuperation is booming. At the forefront of emerging sciences is Enzymology.

Enzymology, the study of enzymes, and how they can be applied to enhancing athletic performance, is one of the most exciting and new areas of sports nutrition and exercise physiology. It also holds the most promise and potential for supporting the next quantum leap we talked about!

CHAPTER 2

MUSCLE INJURY AND SORENESS FROM WEIGHT TRAINING: D.O.M.S.

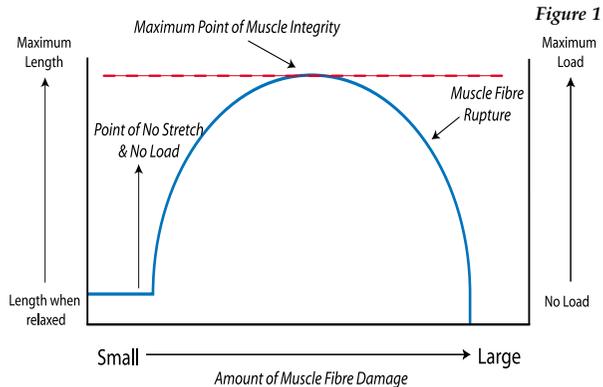
D.O.M.S. AND ITS CAUSE— WHAT IT MEANS TO YOU

If you want a muscle to grow and become stronger you must train it intensely – there's no debate about that. During intense exercise, it's inevitable that some degree of muscle damage will occur. In fact, this stress is a goal of training, as it actually stimulates the muscle to adapt by increasing protein uptake and becoming bigger and stronger. Our goal is to optimize the repair process through whatever recuperative technology is available, including scientifically based nutrition and rest.

There are two phases to muscle damage from exercise.

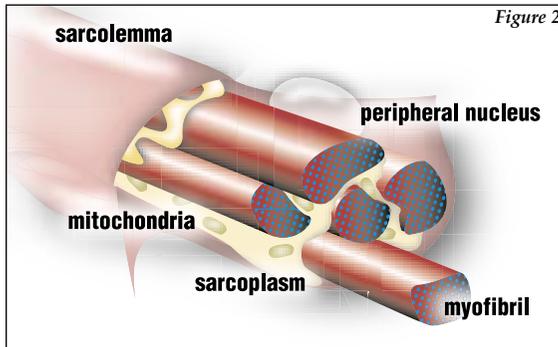
The **first phase** is immediate mechanical damage. Muscle cells or fibers can get injured from the

stretch and strain that training loads inflict. This type of muscle damage can be referred to as *micro-trauma* because it occurs at a cellular level. (See Figure 1)



The **second phase** of muscle injury is associated with changes in the biochemical processes within muscle tissue following intense exercise. These changes are powerful, including *inflammation* and

immune system suppression. Some inflammation is necessary for healing, but too much inflammation actually destroys healthy muscle! (See Figure 2)



The result? Pain, soreness, swelling

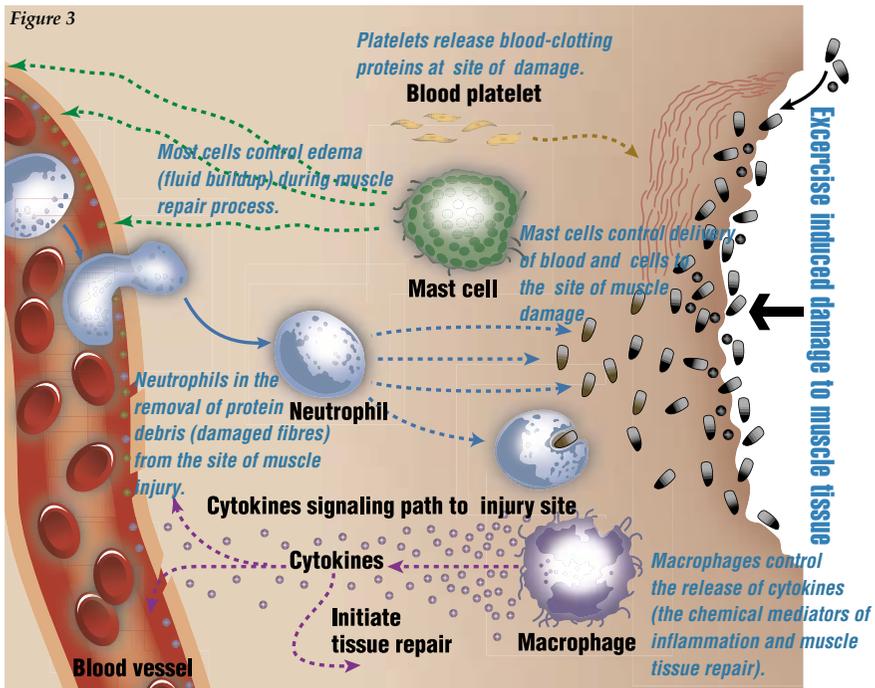
(edema) and stiffness. These processes tend to peak 24-72 hours following exercise. That's a very big window of time – too much time - before your muscles can function optimally again!

Because this intense pain does not occur immediately following exercise it is described as *delayed onset muscle soreness (D.O.M.S)*. The current available evidence from electron micrographs following exercise suggests that D.O.M.S results from damage to the muscle fibers and connective tissues. [1]

IS INFLAMMATION HOLDING YOU BACK?

Often times, the secondary injury (resulting from the inflammatory response) causes more cell damage and death than the initial mechanical damage itself! That's why immediate therapy is required – such as ice (and some of the enzymes we'll discuss in a minute) to control the inflammatory response and therefore reduce secondary tissue damage.

Inflammation is a major contributor to muscle damage and, more specifically, the length of time it takes muscles to recover. As mentioned, while the inflammatory response usually resolves within 72 hours, healing and adaptation may take up to 6 weeks. [2]

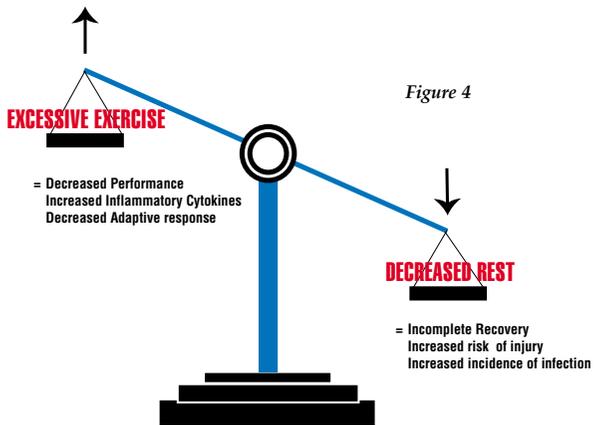


Let me go technical on you for a moment. The prime player in dictating the degree of inflammation is the entrance of white blood cells into the damaged (muscle) tissue. This is controlled by a group of specific cells called cytokines. These cytokines can act as either pro-inflammatory (*increases inflammation*) or anti-inflammatory (*decrease inflammation*) agents depending on which types are activated (See Figure 3).

Another regulatory factor in the inflammatory response is your ability to recover *completely* between training sessions. Without complete recovery and adaptation, the damage discussed above, along with the cumulative depletion of vital metabolites and enzymes, contribute to a perpetually *under-recuperative* state (which some people mistakenly call “over-training”).[3] Then that leads to a state of *decreased* adaptation from exercise (think less muscle growth!), lower performance levels, and a heightened incidence of fatigue (See figure 4.) In this case, training itself can become a negative stimulus, not a positive one.

THE BIGGER YOU ARE...

It’s important to remember that some inflammation is a *good* thing. A controlled amount of inflammation can actually help growth. However, too much inflammation (like that caused by very intense weight training) can inhibit muscle growth.



The inflammatory response can be looked at as an indicator of injury. Its disappearance can then be looked at as an indicator of your recovery capacity. Because only a relatively small amount of inflammation is needed to bring about a positive adaptive response in your muscle following exercise, *decreasing excessive inflammation* could, in theory, enhance your recovery and gains from training (more hard evidence for this later).

Remember too, that the bigger you get and the harder and heavier you train, the more microtrauma and inflammation that you subject

Imagine if you could reduce the time it takes you to recover from workouts with supplementation! You could subject your muscles to another growth-stimulating workout sooner and get faster growth and strength increasing results!

yourself to – and hence the bigger (longer) the recuperation window is required.

... THE HARDER YOU FALL!

You need more *recovery*! The basic premise of recovery is to allow the systems in your body, which have been placed under stress to adapt. The adaptive responses (your results!) will be relative to the stimulus, but are likely to include: increased muscle mass, increased cross-sectional muscle fiber area, increased capillary density, increased red blood cell count, increased androgen receptor sites and increased rate of motor unit activation.

By optimizing nutrition and rest, we can enhance the recovery process. The importance of the recovery process cannot be overstated! Without adequate recovery, the muscle and liver become depleted of glycogen (a key energy source), fatigue sets in and the immune system can become suppressed. The exciting and groundbreaking news is that we *can* manipulate and help minimize the inflammatory phase of muscle damage with enzyme therapy!

CHAPTER 3

THE ENZYMATIC EDGE

ENZYMES: MUSCLE PSEUDO-SCIENCE OR MIRACLE?

For decades, we have seen thousands of supplements hit the health food shelves offering a wide array of performance, health, and physique enhancing properties. The problem is that many of these supplements lack once essential ingredient – *science*. Like a salsa sauce, too many nutrition companies out there are taking a bit of this ingredient and a bit of that, without looking at how that combination really acts upon the human body.

Enzymes are such a new and exciting class of nutrients with such exciting potential that we feel it is our responsibility to give you the pure facts before they get diluted by pseudo-scientists. The literature provides clear insight on how enzymes can support training intensity, recovery, physique development and health. The specific formulation we will refer to is in the new product Sorenzyme™.

Here, I want to give you an in-depth review of how and why Sorenzyme™ can deliver fantastic physiological and biochemical results, supporting a dramatic improvement in recovery from your training. Working with Mark Tallon Ph.D. and, our Research & Development Team at Labrada Nutrition, we have backed-up our findings with “Gold-Standard” academic references and peer-reviewed science. I am not a scientist, but a bodybuilder who wants to benefit from all that science has to offer – and I know you do too!

Let me pause and tell you how fortunate we all are to have a guy like Mark Tallon Ph.D. working with us in the area of human performance (see “About Dr. Mark Tallon” at the beginning of this book for more details on Dr. Tallon’s credentials). Mark’s Ph.D. in muscle biochemistry has given us tremendous insight into the untapped potential in recovery science.

DYNAMITE COMES IN SMALL PACKAGES

The chemistry of enzymes is as old as biological science itself. All enzymes are high molecular weight proteins made up principally of chains of amino acids linked together by peptide bonds. [4] They help control countless biochemical reactions in our body. These essential biological catalysts are so wide spread and integral to our

functioning that, as they degrade with age, so does the efficiency of our bodies. This leads to many age related illnesses and disease states. [5]

To place that statement in context, every one of our estimated 10-100 trillion cells are linked to at least 4000 different enzymes capable of bringing about a different series of chemical reactions. It is not surprising that in conditions where human deficiency of systemic and digestive enzymes are present, replacement therapy can bring about metabolic and digestive balance to enhance optimum health. [6]

The use of enzymes in the diagnosis and treatment of disease has been around for thousands of years. They have been used by ancient tribes and medicine men over the ages in various concoctions. [7] Formal scientific research on enzymes only began in the 1920's. Within the past few decades, interest in diagnostic and therapeutic enzymology has progressed at a rapid rate.

As a result, more and more therapeutic properties are surfacing. The use of enzymes to manage acute conditions such as athletic

ENZYME SCIENCE

The word enzyme has its roots in Greek, literally meaning "in yeast." Enzymes were first discovered in 1833 by two researchers, Anselme Payen and Jean Persoz, who found that a malt extract contained a substance which converted starch into sugar. [11] The study of enzymes did not progress much further until about the 1920's when enzyme purification was possible. This led to the crystallization of the first enzyme, urease. [12] Following these developments, the researcher John Howard Northrup and co-workers were able to isolate and crystallize proteolytic enzymes, which provided conclusive evidence that enzymes were proteins that are active outside of cells. [13]

The size of an enzyme can vary anywhere from a few hundred to a few thousand amino acids. Most enzymes are only active in water and are very specific in their actions, normally only affecting (speeding up) one type of reaction. This specificity can be elegantly explained by the *lock and key* analogy (Figure 5), where a substrate (e.g. amino acids) fits in the enzyme active site like a lock fitting its key.

Enzymes are very susceptible to damage and small changes in pH (the level of acidity) or temperature or ionic strength can deactivate them. This fragility is inherent to most proteins but especially to enzymes.

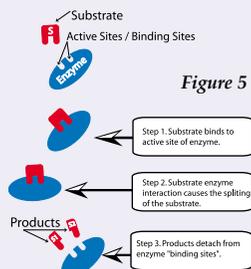
Enzymes carry out many different functions in the human body, but the primary role is facilitating chemical reactions that build-

Because enzymes are fragile, getting results from oral supplementation had been difficult - until now

up, breakdown and transform compounds from the body's raw materials such as foods. Enzymes unlock the nutritional value of foods

by releasing the vitamins, minerals, proteins and amino acids contained within them so that they can be used to repair and support cell life. **For many enzyme reactions to function correctly, they may need additional elements in the form of a vitamin or mineral. These elements are known as "co-enzymes".** That's why vitamin and mineral supplementation is *essential* to muscular growth and performance – you can have the most powerful engine in the world, but if it is missing a spark plug, its horsepower will suffer!

Co-enzymes may give the enzyme the structure it needs to create the 'active site' necessary to perform its function. If a needed co-enzyme is not available, the enzyme may not be able to become active and will *not* function at 100% efficiency. An example of one such co-enzyme is magnesium, which participates in over 300 enzymatic reactions.



injury as well as chronic conditions like arthritis, diabetes and atherosclerosis is now emerging as a significant treatment intervention. [8, 9]

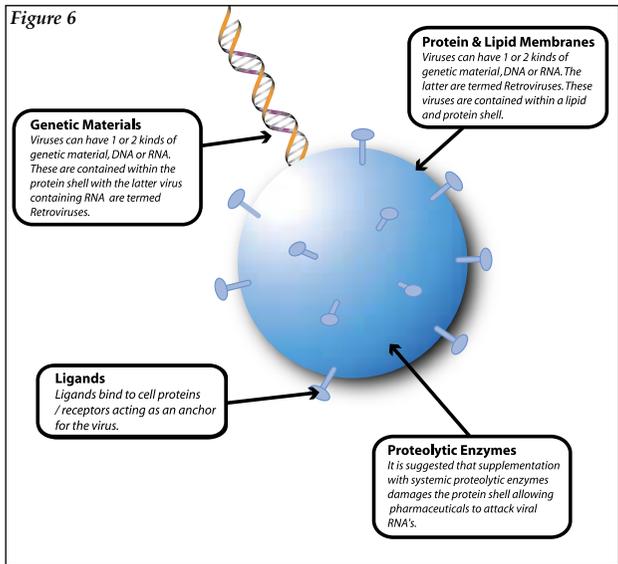
As we age, there is a decline in many of the enzyme systems that support our ability to produce energy, bring about movement, digest food, and heal.

As such, enzymes given as oral supplements could retard these age-related physiological changes leading to a better quality of life and, enhanced athletic performance. [10] Even so, there are many research reports on the effects and positive affects of enzymes that have yet to be applied!

CAN ENZYMES BOOST YOUR IMMUNE SYSTEM ?

Viruses are ultramicroscopic infectious agents that replicate themselves only within living cells. They are composed of a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein. In the treatment of diseases caused by viruses, enzymes have been proven to be very effective. This is because enzymes can help break down the virus' protective protein coating, making the DNA or RNA more easily attacked by the immune system. (Figure 6)

As evidence for the activity and benefits of enzymes as agents against viruses, Dr. Billigmann published a study on enzyme treatment on the herpes zoster virus. [14] Over a period of 14 days, two groups of 96 patients each were given either acyclovir or an enzyme combination preparation. They concluded that overall, the enzyme preparation showed identical effectiveness with the expensive drug acyclovir, and thus also confirmed the results of a prior



study. [15] Later, Dr. Bartsch commented that enzymes were “far superior” for treatment of viral conditions. That doesn’t mean that enzymes are necessarily cures, but they may help the body do a more effective job of fighting the infection. The potential is, at least, very interesting.

ENZYMES AND YOUR DIGESTION

Digestive enzymes include **lipases**, **proteases**, and **amylases** to help break down fats, proteins, fibers, and carbohydrates, respectively. These enzymes help digest your food to give your body the nutrients it needs. While our digestive process is adaptable, a very large portion of our population suffers from some kind of digestive disorder such as gas, bloating, heartburn, and constipation. These problems can be caused by stress, medication, life-style (like eating on the run!), disease, and genetics.

The good news is that digestive enzymes can often help. Studies on pancreatic and other digestive enzymes have shown impressive results in helping the body with digestive problems. [16] [17]

Note: Sorenzyme™ is not a digestive enzyme preparation. Sorenzyme™ contains enzymes that do not occur naturally in the body. Sorenzyme™ works on a systemic (whole body) level.

INFLAMMATION — THE FIRE IN YOUR MUSCLES

Researchers are still learning more every day, but suffice to say that inflammation in its simplest form is the body’s response to injury, infection, or illness. It’s primary function is to destroy or inactivate foreign invaders and set the stage for tissue repair. Damaged cells release a number of powerful chemicals including prostaglandins, proteins, calcium, and potassium ions. [18] This results in the attraction of white blood cells, causes capillaries to leak fluids in the area (swelling), and the pH of the tissue to changes— making nerves more irritable (pain.)

ENZYMES CAN CONTROL INFLAMMATION

Enzymes have been shown to affect this series of inflammatory events. [19] [20] While the precise mechanism of action remains unclear, studies suggest that various formulas and combinations of proteolytic enzymes may have important contributions to make in the treatment of inflammation. These formulas may include:

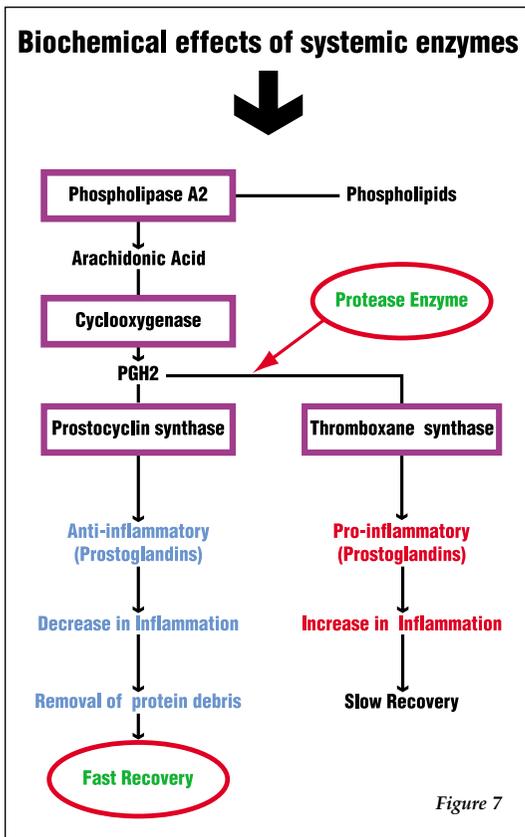
pancreatin or its primary proteases, trypsin and chymotrypsin; plant-derived bromelain or papain; amylase; lipase; other enzymes; and possibly, plant-derived flavonoids.

Proteolytic or protein-splitting enzymes (also known as proteases) have been shown to control the inflammatory response inclusive of sports injuries. [21] Pancreatic enzymes, such as pancreatin, trypsin and chymotrypsin have been used as a natural treatment for systemic treatment of inflammation. [22] Other widely used proteolytic enzymes include bromelain, derived from pineapples, and papain from papayas.

CAN ENZYMES SPEED WOUNDS HEALING?

For example, in 2004, a study on 26 healthy volunteers who had a small sample of skin removed (skin biopsy) and were given oral protease supplements showed that the test group had soft-tissue wound healing accelerated 77%. [23] These proteolytic enzymes act on fibrinogen to stimulate the synthesis of anti-inflammatory (good)

prostaglandins. [24] This study showed that proteolytic enzymes may modulate the inflammatory cycle and up-regulate the healing process. **(Figure 7)**



ENZYMES AND YOUR JOINTS

In studies on osteoarthritis, bromelain and papain have also long been used as individual treatment therapies. [25,26] Additional studies have also demonstrated that bromelain offers therapeutic benefits in treatment of arthritis, sports injuries and musculoskeletal injuries and knee pain. [27,28,29]

Interestingly, outside of improved overall psychological well-being, there was shown to be a significant dose-response relationship (better results as dose increases). [30] These are just two of many studies that show how proteolytic enzymes support the body's own natural ability to modulate the inflammatory response. Appearing at least equal in efficacy to NSAIDs, they have fewer undesirable side effects.

SPORTS INJURY: TAKE AN ENZYME AND CALL ME IN THE MORNING

Athletic injuries are usually *soft tissue* injuries (mixed in with some fractures). Strains, sprains, hematomas and contusions are common types of soft tissue injuries. When these injuries occur, athletes want complete recovery and they want it *fast* – their competitiveness or livelihood may depend on it.

Aspirin-type drugs, which can cause stomach upset, inhibit *all* types of prostaglandins (fatty acid based compounds), both the “good” kind and the “bad” kind. Both of these types of prostaglandins play important roles in inflammation [31,32]. Unlike aspirin, protease enzymes such as bromelain cause little inhibition of the “good” prostaglandins, while having beneficial anti-inflammatory effects. [33]

Proteases have anti-inflammatory activity because they increase tissue permeability (the ability for chemicals to pass in and out of cells), facilitating resorption of edema (control of tissue fluid build-up) and accelerated recovery of damaged muscle tissue [33,34]. Sports injuries are often treated with protease enzymes because of their ability to reduce inflammation and speed the healing of bruises, swelling, and other injuries. [35,36]

There's no question that all of that sounds interesting - and as we look at muscle recovery from bodybuilding type workouts, things get even better!

The studies on enzyme therapy show that athletes who use enzymes can heal faster without any long-term side effects.

CHAPTER 4

WHAT ENZYMES CAN DO FOR BODYBUILDERS

ENZYME COMBINATIONS

While there is abundant research on the anti-inflammatory and recovery aspects of single enzymes, there is also a growing body of research on various *combinations* of enzymes. For example, combinations of bromelain and trypsin have been studied for their anti-inflammatory activity. These formulas were shown to be more effective in reducing edema (swelling) than either enzyme alone, which suggests that there is a positive synergy when enzymes are combined.

BEYOND DIGESTIVE ENZYMES

Many naturopaths turn to digestive enzyme products to promote good digestion and enhance nutrient absorption, but not for decreasing soreness or enhancing muscle recovery. They contend that many people are lacking enzymes because of inadequate diets, over-refined foods, environmental toxins, and poor health. We have seen that digestive enzymes can have systemic effects. So while “digestive” enzymes are involved in the digestive process, their effects go way beyond digestion.

This has other implications: the source that the enzymes are extracted from needs to be remarkably different to those chosen for purely digestive health, and they must be delivered in a combination *proven* to influence muscle recovery. Does such a combination of enzymes exist? Yes!

ENZYME RESEARCH EVERY BODYBUILDER NEEDS TO KNOW ABOUT

As we’ve seen, inflammation may prolong skeletal muscle recovery after the microtrauma of intense training. Complete recovery after intense training does not occur until the inflammation subsides and the tissue is repaired. We have seen that protease enzymes may shorten recovery time after injury by controlling the intensity and duration of the inflammatory response. [37]
But what, specifically, does the research tell us about muscle tissue injury from intense, bodybuilding-type training?

IT'S ALL DOWNHILL FROM HERE!

In a groundbreaking study by Miller et al (2004), the effects of a multi-enzyme formula examined the effects on muscle function and muscle damage following downhill running (which is known to cause significant microtrauma). [38]

Why downhill running? Because the muscular contractions experienced during downhill running are largely *eccentric* contractions, meaning that while tension in the muscle is increasing, the muscle is becoming longer – not shorter. This puts tremendous sheering stress on the muscle fibers, causing more micro trauma per contraction than a typical concentric type contraction, where the muscle shortens and tension increases. Bodybuilders call exercises that create eccentric contractions “negatives”. One thing for sure – if you want to experience pure delayed onset muscle soreness (DOMS) do negatives!

In the study, ten matched pairs (males of similar age, height, weight, and fitness), ran at a 110% grade for 30 min at 80% of their predicted maximal heart rate. The participants either consumed two enzyme formula tablets or a placebo, depending on which study group they were in, four times a day beginning one day before exercise and lasting a total of four days.

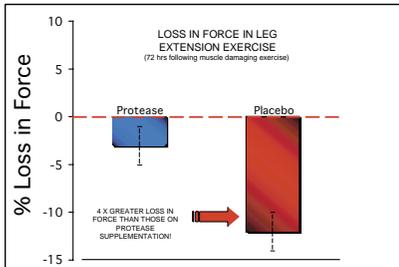


Figure 8. Effect of protease supplementation on preventing muscle damage related loss of muscle function. “Leg Extension”

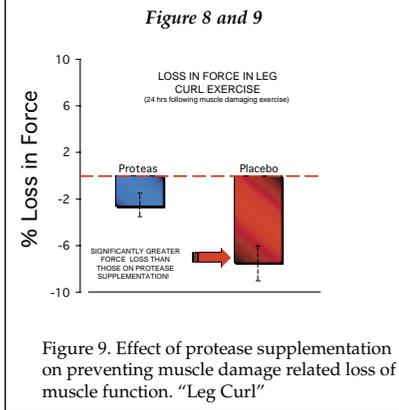


Figure 9. Effect of protease supplementation on preventing muscle damage related loss of muscle function. “Leg Curl”

WOULD YOU LIKE 63% BETTER RECOVERY?

The subjects in the study were evaluated for perceived muscle soreness. They were also tested in knee extension/flexion (torque and power) and leg curls. The findings were fascinating! **The group taking the protease supplement showed a shorter recovery time of muscle force and power - and less D.O.M.S! (Figures 8 and 9).** [38] These findings have major implications for the entire field of

Athletes taking the enzyme formula supplement showed a shorter recovery time of muscle force and power - and less D.O.M.S!

athletics and bodybuilding in particular!

The great thing about this study was that they actually measured muscle function following damaging

exercise and then measured how quickly the athlete's ability to produce power and strength returned. That's the kind of stuff we want to know! As an aside, the microtrauma on the muscle fibers brought about in this study is probably much greater than most bodybuilders would ever cause in the gym.

To *summarize these important findings*, the group taking the enzymes experienced:

4 X LESS LOSS IN FORCE PRODUCTION
HIGHER RATE OF RECOVERY OF FORCE PRODUCTION
63% LESS PERCEIVED MUSCLE SORNESS
LOWER INCIDENCE OF INJURY
INCREASED IMMUNE SYSTEM FUNCTION

These results prove that protease supplementation accelerates your recovery and adaptive responses following muscle damage such as that caused following resistance exercise. This can allow a faster return to FULL-STRENGTH, so that you can train more intensely more often, which leads to greater muscular gains!

CHAPTER 5

ENZYME'S PERFECT PARTNER

THE SYNERGIES OF ENZYMES WITH STEROLS

As we have learned, enzymes can work systemically to control inflammation, reduce soreness, and decrease recovery time. Is there anything else that works like that? Currently, there is really only one other dietary supplement with enough clinical evidence to even compare it to enzymes: *plant sterols*.

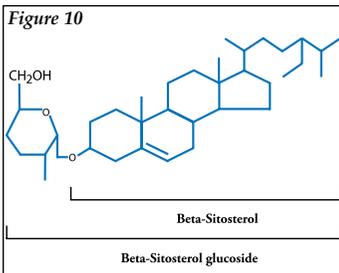
Plant sterols and sterolins (plant fats) can have important effects on the immune system. [39] More specifically, the plant sterol, *beta-sitosterol* and its associated *glucosides* have a wealth of both clinical and exercise based data to suggest that they can enhance the powerful effects of enzymes for the athletic population.

As such, a supplement combining both enzymes and plant sterols should bring about amazing effects on: 1) the recovery from the immune system suppression caused by intense training and 2) help control excess inflammation from muscle damage.

WHAT ARE STEROLS?

Sterols (better known as *phytosterols* because they were discovered in plants) are a form of lipid found in high concentrations in plants and in low concentrations in human tissues. [40] They can also be found in fruits, nuts, and vegetables but are normally extracted from pumpkin seeds to make supplements. [41] Chemically, their structure and function is very much like that of the cholesterol in cell membranes and is similar to the base structure of testosterone. **(Figure 10)** Sterols act as a storage and transport agent for fatty acids. [42]

Studies on sterols have shown their effect on many diseases



including: cancer, cardiovascular disease, diabetes, and HIV/Aids. [43,44] Sterols have been shown to have anti-inflammatory effects as well as to be antipyretic (fever fighting), [45] anti-carcinogenic, [46] and insulin mimetic [47]. So how do sterols work and what are the most effective forms? And what

about the specifics regarding their effect on exercise performance? Fortunately, research provides us some answers.

HOW STEROLS WORK

Here's the good news: sterols (particularly beta-sitosterols) have been repeatedly proven to have beneficial effects on health and post exercise recovery. Sitosterol has been shown to directly activate T-cells and decrease levels of inflammatory chemicals. Beta-sitosterols have also been shown to decrease elevated cholesterol levels and also help decrease the stress hormone, cortisol. [48,49]

What's the bad news? There's a growing body of evidence showing that **intense exercise can increase the loss of beta-sitosterols from the body.** [50] That means that for athletes who train intensely, beta-sitosterols replacement can be very important. A 1999 study examined the effects of beta-sitosterol on post-marathon immune suppression and inflammation. [49] Incidentally, the muscle damage suffered from enduring a marathon is far greater than that typically experienced from working out in a gym!

This study measured the levels of inflammatory agents and the catabolic stress hormone cortisol in the athletes. [51]

The test theory was that beta-sitosterol supplementation would provide a means of fighting the decline in immune function and reduce the inflammatory effects of the muscle damage in the marathon runners. The study on twenty runners showed that, compared to a placebo, runners taking beta-sitosterol (60mg /day for 4 weeks prior to the event) had lower levels of inflammatory chemicals (cytokine "IL6") and lower circulating levels of cortisol. These effects would lead to faster recovery times, allowing the next training session to be more effective.

THE IMPORTANCE OF PROTEIN

The process of recovery and growth is influenced by a number of factors. I can't stress enough that **adequate protein is critical to building muscle.** There is a ton of research about protein intake and bodybuilding, some of which I wrote about in my book, *The Lean Body Promise* (Harper Collins). The current scientific literature puts the protein needs of bodybuilders at over 1 gram per pound of bodyweight per day.

Without enough protein, muscle growth becomes very difficult! I'm also a firm believer that protein supplements are one of the most important supplements for any athlete training intensely. That's why I both recommend and use **Lean Body®** Meal Replacement Powders and Ready-to-Drink Shakes. They are great when used as high-protein meals — delicious and convenient to use any time of the day.

Or, for a heavy duty serving of protein (ideal for those who are seriously trying to pack on muscle quickly!), I recommend **Lean Body®Mass 60**, a terrific low-sugar weight gainer with creatine; **IsoPower 60™**, a 100% pure whey protein isolate ideal for post-workout meals; or **ProV60™** Protein Blend, a time-release blend of five proteins. These protein supplements all contain 60 grams of high-quality, delicious protein per serving, the highest of any on the market. For more information, visit www.labrada.com.

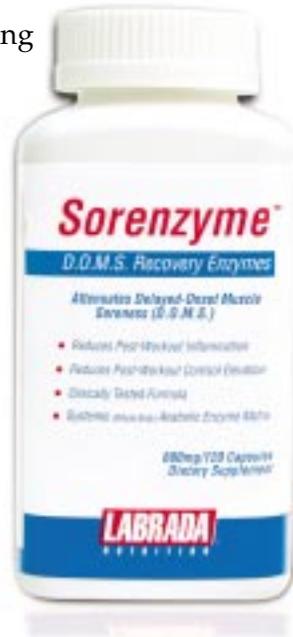
CHAPTER 6

SORENZYME™: DEVELOPED FOR BODYBUILDERS AND ATHLETES

WORKOUT MORE OFTEN, RECOVER FASTER, AND GROW FASTER

There's no question that the research offers bodybuilders some exciting possibilities. In fact, scientific research, along with decades of bodybuilding experience, was the starting place for the development of the totally new, revolutionary, systemic enzyme, muscle-recovery supplement called **Sorenzyme™**.

In brief, Sorenzyme™ is a nutritional supplement formulated to speed recovery so that you can workout more often and grow bigger – faster! Sorenzyme™ decreases muscle damage and muscle soreness caused by excessive exercise-induced inflammation. Sorenzyme™ is aimed at modulating and controlling the inflammatory and immune system response to the stress of intense training.



As an avid bodybuilder and athlete, I wanted to develop a supplement that helped me to be at full strength a day or so after a hard-core workout, with half the muscle pain I would usually have. I wanted to feel fresher and more ready physically, as well as psychologically, to **attack** that next training session and, as a result, *grow faster*. With Sorenzyme™, I now have this, and you can too!

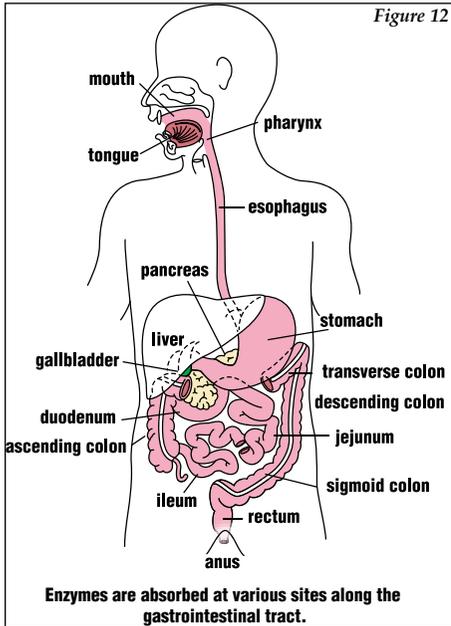
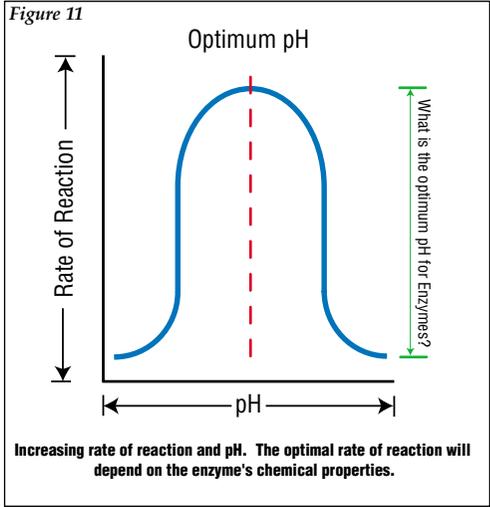
To recap, the research on the primary enzymes in Sorenzyme™ showed that athletes taking the enzymes experienced:

- 4 X LESS LOSS IN FORCE PRODUCTION
- HIGHER RATE OF RECOVERY OF FORCE PRODUCTION
- 63% LESS PERCEIVED MUSCLE SORNESS
- LOWER INCIDENCE OF INJURY
- INCREASED IMMUNE SYSTEM FUNCTION

Sounds great – but while these scientific studies and my personal experience with enzymes sparked the concept of a recovery formula, I wanted to take things a step further. **So we made the doses of the active enzymes and sterols used in Sorenzyme™ higher than those used in the original research studies, along with other key ingredients.** These other ingredients round out the formula, making it even better by improving absorption!

ABSORB MORE, USE MORE

No matter what ingredients a supplement contains, if your body can't absorb them, they'll do you no good! Such is the case with enzyme supplements. The absorption of enzymes is dependant upon their sensitivity to pH (e.g. stomach acid), temperature, liver function, and foods that are eaten with them, just to name a few.



But, not all enzymes are harmed by the low pH of the stomach. Enzyme sensitivity to acids and temperature vary. **(Figure 11).**

Another factor influencing enzyme uptake is the section of the gastrointestinal tract where it is absorbed.[52] **(Figure 12)**

Perhaps, the most relevant way for us to measure which enzyme formula is absorbed best, is to measure the enzyme's effects on performance - let's cut to the chase!

SORENZYME™ ENHANCES BIO-AVAILABILITY

So what is *bioavailability*? Simply put, bioavailability is a measure of the amount of an ingredient that actually reaches the bloodstream. By definition, when a medication is administered intravenously, its bioavailability is 100%. However, taken orally, lots of other factors, some of which we mentioned above come into play, including acidity (pH), liver function, the presence of food, etc..[53] One of the most important factors influencing bioavailability is the rate at which the ingredient is broken down by the liver. If an ingredient is rapidly metabolized by the liver, the amount of ingredient that reaches systemic circulation is reduced. The challenge is to develop a formula which has all the right ingredients in the right amount - and to then make sure that the highest percentage of that formula becomes bioavailable.

There are two approaches to successfully enhancing the action of systemic enzymes.

Firstly, you can use the most widely accepted approach and use an enteric coat that shields enzymes from the low pH in the stomach. However, an enteric coating may cause the enzyme to be released in the wrong part of the intestine, where it can't be absorbed or transported well.

The second method to influence absorption is by adding a nutrient proven to actually aid in the absorption of other nutrients.

HOW PIPERINE INCREASES YOUR NUTRIENT UPTAKE

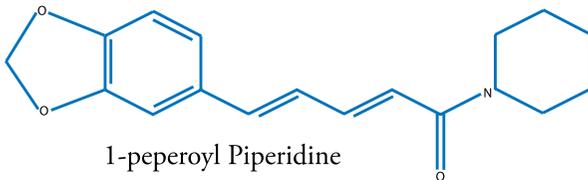


Figure 13

The Chemical Structure of Piperine

The research proven ingredient I'm talking about is "piperine" (Figure 13) Piperine (1-peperoyl piperidine)[54] is a major component of black pepper which

has been shown to inhibit proteins that control the transport of nutrients through the gut. [55,56] One such protein is known as **P-glycoprotein (PGP)** which is a part of a larger family of nutrient transporters that control the absorption/transport of nutrients in and out of the gut.

Another protein affecting nutrient transport is an enzyme named **CYP3A4**. CYP3A4 is an enzyme which controls the breakdown, or “oxidation” of a nutrient. When CYP3A4 is inhibited, the blood levels of a nutrient increases.

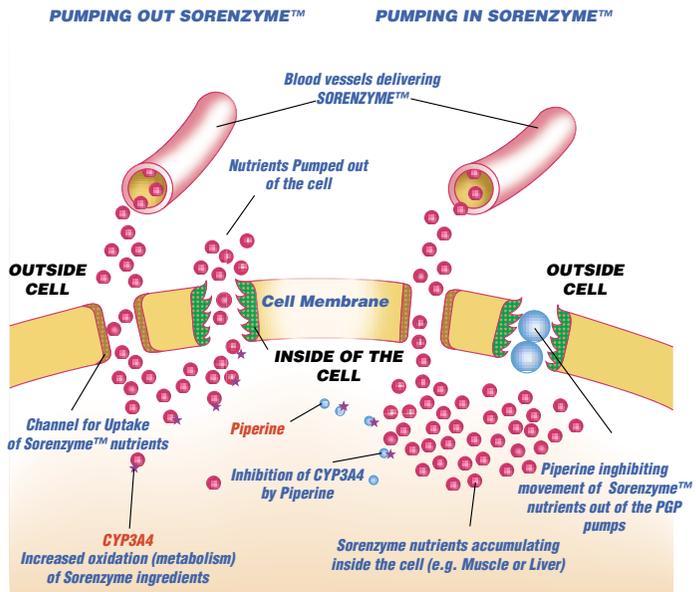
By inhibiting/blocking the activity of PGP and CYP3A4, we can get more nutrients into the blood and surrounding muscle tissue. Indeed, many studies have shown that by inhibiting these proteins the amount of drug/ingredient taken in orally is massively increased. [57,58] (Figure 14)

Utilizing the natural power of piperine to inhibit the proteins mentioned above, we have enhanced the bioavailability of the compounds within Sorenzyme™. How much can piperine enhance absorption? Back in 1999 and 2000, two studies looked at the effect of piperine on absorption of sitosterols and protease enzymes. [59,60] **The results were dramatic – showing a 60% increase in absorption over placebo group.** [59].

In another human study, combining Coenzyme Q10 with piperine (half the piperine you get in a dose of Sorenzyme™) enhanced absorption 30% compared to placebo. [60] In one final study, piperine combined with curcumin, resulted in bioavailability being increased

2000% (That’s right 2000% - it’s not a typo!). Now, that’s the stuff that bodybuilders need!

That’s why we added piperine to Sorenzyme™!



Effects and interaction of ppg and CYP3A4 on Sorenzyme™ metabolism.

CHAPTER 7

HOW TO USE SORENZYME™ EFFECTIVELY

READY TO USE SORENZYME™?

So, great research and experience has lead to an even greater formulation for bodybuilders in specific and athletes in general -but we aren't done yet. There's more - we also believe that *timing* and *cycling* of Sorenzyme™ can enhance results.

Four capsules of Sorenzyme should be taken with 8 oz water on an empty stomach directly after training. You should then wait 30 minutes before eating your post-workout meal. **You can take a second dose again 4-6 hours later.** For your post-workout meal, you should have a protein / carbohydrate shake such as Labrada's Lean Body Meal Replacement or Ready to Drink shake. This will help you replenish muscle glycogen, and provides an anabolic environment to support muscle growth.

If you are really train intensely, you can take a second dose of SORENZYME™ two to three hours after your last meal of the day.

Sorenzyme can also be taken first thing in the morning on an empty stomach, 30 minutes before breakfast. This is a great way to start your day, as high circulating enzyme levels add to your recovery potential. Then, you don't have to worry about any interference with vitamin absorption.

DURATION OF USE AND CYCLING

How long do you need to take SORENZYME™ before you get the maximum benefits? Once again, we look to the research for answers. The other major study that forms the basis for SORENZYME™ is that of Bouic et al.. **This study suggests that immuno-supressed individuals can keep getting measurable increases in benefits for up to six months of constant use. These results are then maintained as usage is maintained.**

Cycling is a process involving taking a drug or supplement for a set period, then taking some "time off" with no use before starting back on the supplementation/drug regime. The rationale behind this on/off/on process is usually for one (or more) of three reasons:

1. Long-term, continual use is toxic
2. Long-term, continual use decreases the body's natural mechanism of absorption (for example long term *continuous* creatine supplementation decreases creatine transporter activity)
3. Long-term, continual use may decrease important chemicals/nutrients in our bodies.

In the case of Sorenzyme™, it is *possible* that continual, long term may decrease some of the body's natural enzymes used for digestion. However, a study in 1998 demonstrated no changes in human pancreatic enzyme secretion after 4 wks of oral pancreatic enzyme therapy at conventional doses. [61]. Nonetheless, **it may be best that Sorenzyme™ be cycled for 6-8 weeks "on" followed by a 7-10 day phase of being "off" to help ensure that each cycle is maximally effective.**

CHAPTER 8

RECUPERATE FASTER – GROW FASTER!

ARE YOU READY FOR A QUANTUM LEAP IN GROWTH?

Bodybuilding is the foundation for the enhancement of both super-human physiques. It is also the “foundation sport” for increased performance in *all* sports. It’s no secret that there is no better, faster way to change the size, strength or shape of your muscles than with resistance training.

To pack on muscle fast, you must train intensely. Then you must create the adaptive response you desire by optimizing your physical recovery. To recover quickly and completely, you must provide ample amounts of rest and nutrition. To tilt the recovery equation in your favor and make the huge muscle and strength gains you desire, you must go further. This is where nutritional science will provide you the next quantum leap in muscle growth possible.

The science and benefits of systemic enzymes offer bodybuilding athletes a new and unparalleled opportunity to take their muscular development to new levels. Begin using Sorenzyme™ as part of your training and nutritional regimen today, and start enjoying faster recovery from your workouts!

Good luck and remember: Recuperate faster – grow faster!

At Labrada Nutrition, we feel that these new systemic enzymes offer bodybuilders a REAL QUANTUM leap for greater muscular development. They reduce inflammation and soreness after training and they increase your recovery, so that you can grow muscle faster and bigger!

DISCLAIMER:

Food ingredients and food additives (such as dietary supplements) may be *generally regarded as safe* (GRAS) by the Food and Drug Administration if a group of independent experts agree there is enough scientific evidence to assure safety. The ingredients found in SORENZYME™ (Systemic enzymes, Sterols, Piperine) are all GRAS approved and research on the individual ingredients is impressive in this regard. However, as with milk, peanuts or any variety of foods, a small percentage of the population with certain food allergies may react to various ingredients.

Always consult a physician before taking any dietary supplements if you are on medication, have peptic ulcers, have allergies to herbal extracts, or are pregnant and/or lactating.

No information contained herein is meant for the diagnosis and or treatment of any disease, nor is SORENZYME™ meant for the treatment of any disease.

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Winning With the Enzymatic Edge

Unlocking the power of recovery

Recuperate faster from your workouts, so that you can grow faster!
Are there unknown secrets to Super Human Size and Strength?

It's not rocket science to imagine your growth potential if you could **recover** between workouts, at say, a **50% faster rate than you do now**.

What if you could train arms *hard* every day? What if you didn't get sore because your body *recovered* faster, not because you took pain relievers such as ibuprofen? What if you did squats today and were able to do them again tomorrow, with even more weight? Imagine your size and strength increases!

There is no question in my mind that boosting recuperation is the factor with the biggest, most significant potential to create the next level of super-human muscular size and strength.

The reason that anabolic steroids work is that *they enhance recovery!* If you know the science behind anabolic steroids, you know that they manipulate hormones and cellular activity during the recovery phase.

But what I have discovered just recently leads me to believe that with new, heavily researched ingredients, in the form of an enzyme formula called **SORENZYME™**, **HUGE GAINS** in recovery and consequently, in **SIZE** and strength **ARE POSSIBLE**, without the use of illegal anabolic steroids or prohormones.

In this book, you will find an in-depth review of how and why **Sorenzyme™** can deliver dramatic improvements in recovery from your training, creating an environment for faster muscle growth.

Working with Mark Tallon Ph.D. and, our Research & Development Team at Labrada Nutrition, we have backed-up our findings with "Gold-Standard" academic references and peer-reviewed science.

Now you too can enjoy...

- 400% LESS LOSS OF STRENGTH FOLLOWING WORKOUTS
- 63% LESS PERCEIVED MUSCLE SORENESS
- LOWER INCIDENCE OF INJURY
- INCREASED IMMUNE SYSTEM FUNCTION
- WORKOUT MORE OFTEN, RECOVER FASTER, AND GROW FASTER!



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