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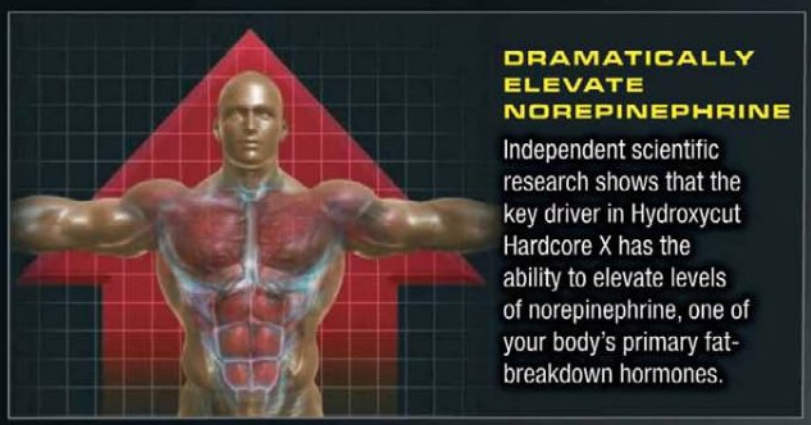

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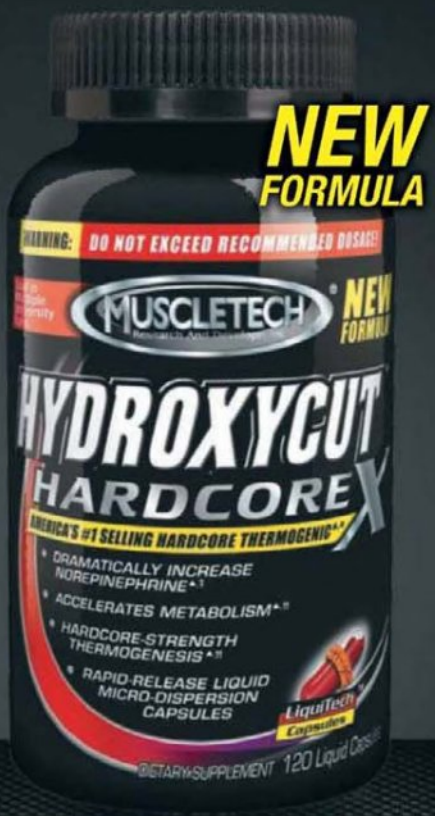

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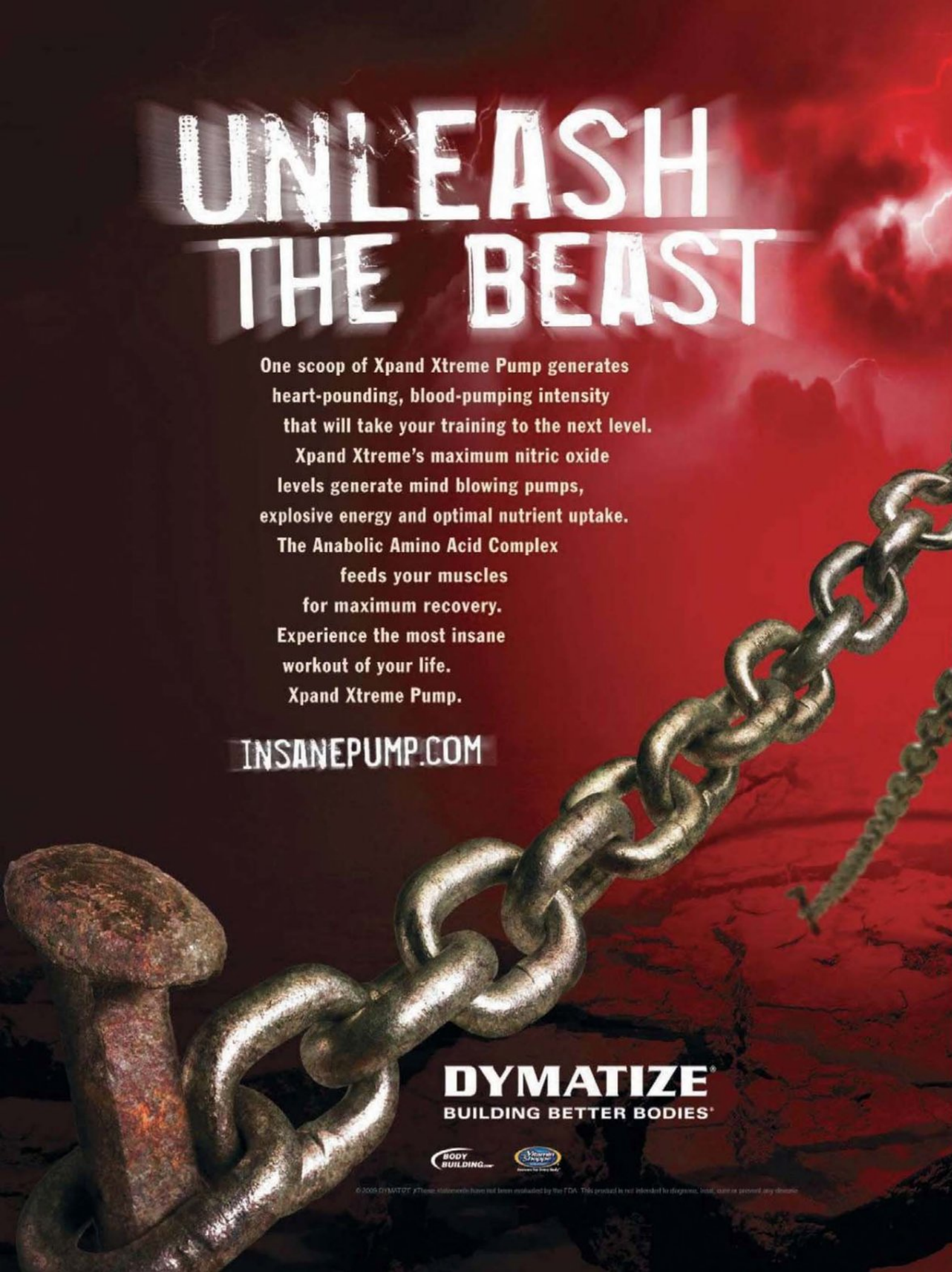
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Inside Edge

By Steve Blechman, Editor-In-Chief

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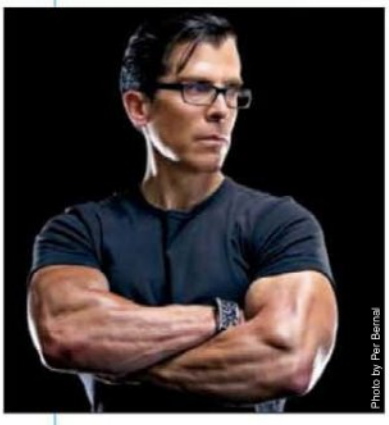

Photo by Per Bernal

BE THE BEST YOU CAN POSSIBLY BE

Lamborghini. Maserati. Ferrari Enzo. What do all of these have in common? They are high-performance vehicles. And high-performance machines require the right fuel, and the right high-intensity workouts for explosive power, strength and speed— and to ensure that their sleek, well-maintained bodies are the envy of every neighborhood.

Optimum performance for *your* rock-hard, polished, and well-oiled machine is the goal of this month's issue— to help you to develop that powerful, high-performance, muscular body that you *know* you can achieve—if you have the highest-sourced information to assist you in that quest. And as always, everything contained within these covers is cutting-edge and scientifically researched— so you *know* we've got *that* covered!

In a world of high-performance males, Bryan Clay represents a standard of excellence, power and strength— a true inspiration to us all— which is why he graces this month's cover. Bryan Clay is one in a short list of athletes who have appeared on the Wheaties cereal box; this is because Clay is, quite simply, one of the very best athletes in history. And after winning the Olympic gold medal in the decathlon at the Beijng Olympics in 2008, Bryan Clay earned his title of "World's Greatest Athlete."

In "Olympic Gold: Train With The Greatest Athlete in the World, Bryan Clay," on page 50, Thomas Fahey, Ed.D., gives us the training program of the man who has said, "I train for strength, power, and speed, that can transfer to all the events of the decathlon. Consequently, my workouts are appropriate for anyone trying to achieve all-around peak fitness." Bryan Clay's decathlon conditioning techniques can help anyone get stronger, faster, leaner and more powerful. You owe it to yourself to check out this high-performance workout!

Peak performance requires a combination of strength, power, cardiovascular endurance, agility and muscle endurance. In "Optimum Performance Workout: Build Muscle, Lose Fat, and Increase Power and Strength," beginning on page 62, Tom Fahey gives us a training program that emphasizes neuromuscular fitness, which will help you run faster, jump higher, hike longer, and drive a golf ball further. High-speed training is a revolutionary, scientifically-based training method that increases muscle strength and power, accelerates fat loss, and builds fitness for sports and daily activities; the results will astound you!

A high-performance life deserves to be fueled by high-performance nutrition. In "Optimum Performance Diet," on page 74, Dan Gwartney, M.D., gives us the new way to stay healthy, build muscle, burn fat and enhance energy and recovery. Citing Harvard University professor Walter Willet, M.D., Ph.D., the author of *Eat, Drink and Be Healthy*, Dr. Dan focuses on a sound and healthy diet as the *key* to optimum performance. Don't miss it!

A healthy nutrition program would not be complete without the correct supplementation. In "Optimum Performance Supplement Program," starting on page 90, Jose Antonio, Ph.D., takes a new look at caffeine, creatine, antioxidants, and polyphenols, and gives extra attention to that newcomer in the list of effective supplements, beta-alanine. Jose also discusses post-workout supplementation, as well as the best protein sources for skeletal muscle protein gain. You won't want to miss this well-researched study, to discover which supplements work best for you— and why.

You've done your workout, eaten clean, and kept up with your supplements; now it's time to rest and recover. In "Rest and Recovery: The First Growth Factors," on page 84, George L. Redmon, Ph.D., discusses the importance of sleep management— it's not the final frontier; it's the first and most important one to conquer. Recovery and rest are essential for building and repairing muscle; the REM stage of sleep is when your body does most of its internal repair work. Read Dr. Redmon's in-depth research into this vital topic, which includes a checklist of sleep deprivation symptoms, and a list of supplements that make the most of recovery time. Let's hear it for lying down on the job!

When it comes to performance— will Viagra help you as much in the weight room as it will in the bedroom? In "Viagra: What's Good For Sex Is Not Necessarily Good for Exercise Performance," on page 128, Thomas Fahey, Ed.D., discusses how increased muscle blood flow speeds the delivery of key amino acids to the muscles, which could potentially promote muscle protein synthesis and growth. Find out if Viagra helps 'pump you up'— in more ways than one!

When you cruise down the street— are you a well-maintained, explosively-powered Lamborghini? Or a doughnut-fueled police cruiser? This month's FitnessRx for Men will put you on the road to high performance, as you burn fat, build muscle, and gain strength and power as never before!

And don't forget to check out FitnessRx's Woman Athlete of the Year, Dara Torres, on page 100. As an Optimum Performer, this superachiever has won no less than 12 Olympic medals; her determination and extraordinary accomplishments are an inspiration to us all! See you next time!

Steve

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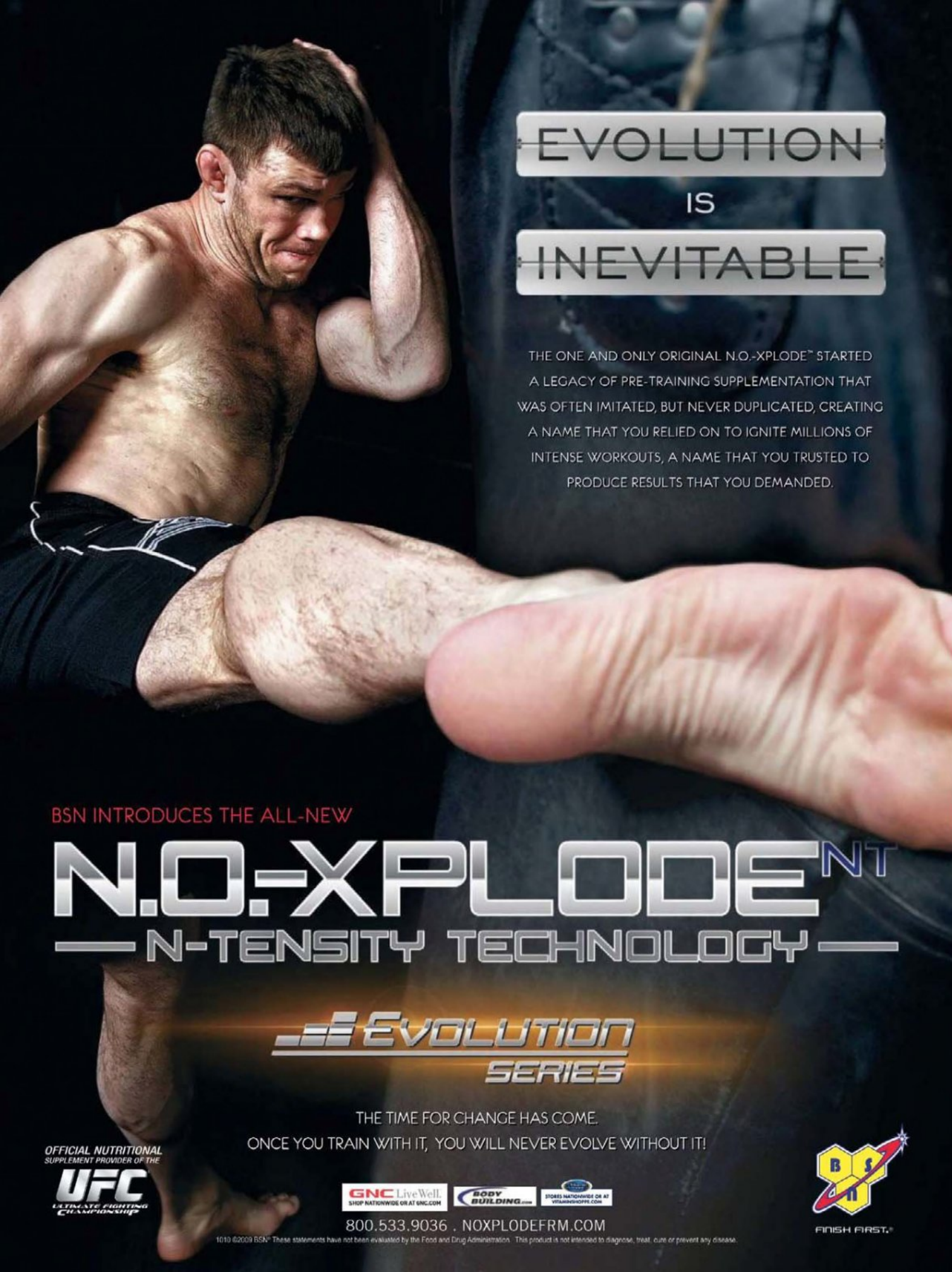
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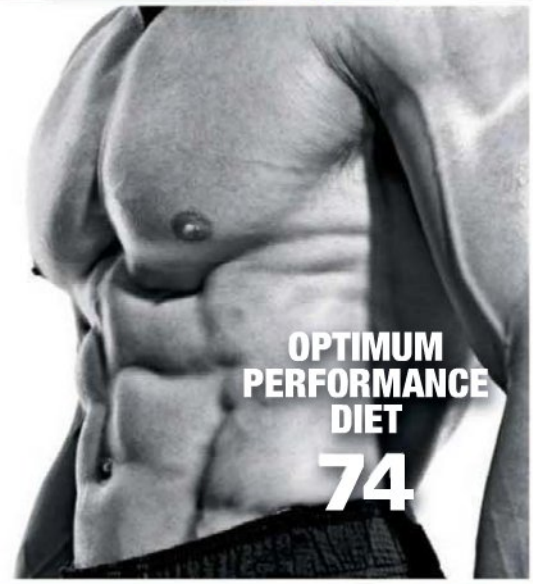

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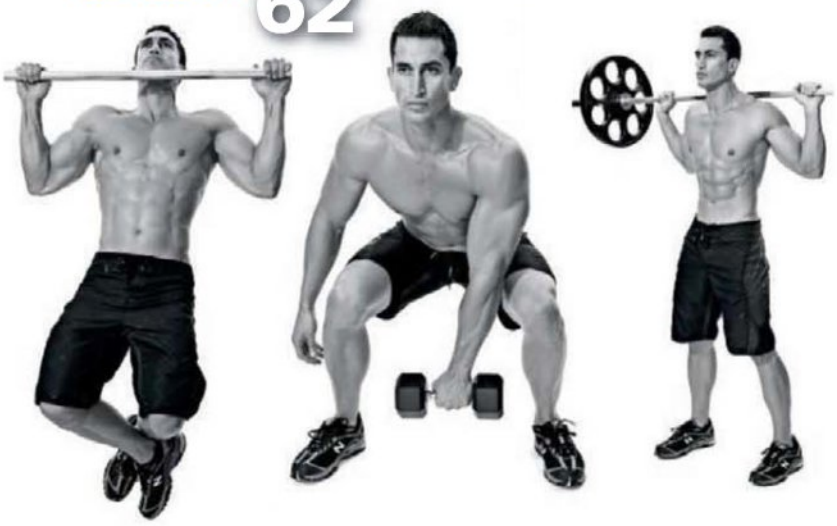

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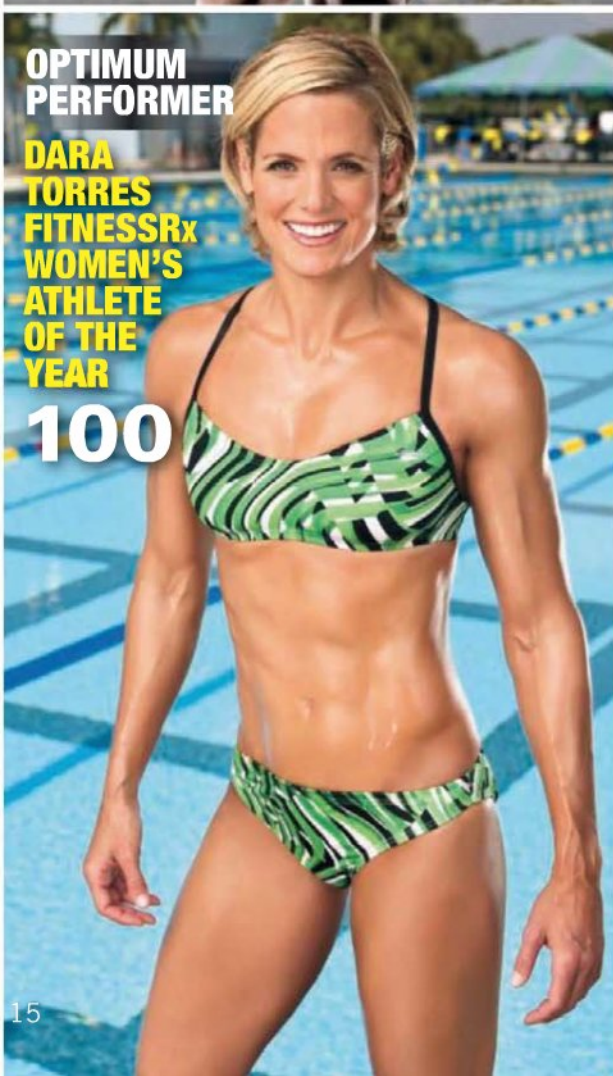

OPTIMUM PERFORMER
DARA TORRES FITNESSRx WOMEN'S ATHLETE OF THE YEAR 100

Mail Room

Still Making Gains at 45

Kudos to the folks at FitnessRx for Men. Nice work! Your publication does a very nice job of providing information for those of us who view bodybuilding as a long-term, healthful endeavor. I am 45 and have been lifting for over 25 years. I have always been 110 percent natural... and can honestly say I am still making gains. It seems more and more, the younger generation will sidestep perseverance in lieu of a quick fix. Only to find that the fiddler really does show up to dance—and that will, without a doubt, seem to occur at the worse time.

I like to keep my conscience clean and my ego in check, along with feeding my mind lots of data from FitnessRx for Men. Most importantly… BELIEVE IN YOURSELF!

Joel, e-mail

Hypertrophy-Specific Training

I am an avid reader of your magazine, specifically because of your focus on the interpretation of data on the field of exercise and nutrition. Recently, I have found Bryan Haycock's Hypertrophy-Specific Training (HST) and the website thinkmuscle.com. I was curious as to whether FitnessRx for Men has reviewed HST. What is your take on this mode of weight training?

James, e-mail

Thank you for your letter to FitnessRx for Men. Brian Haycock's Hypertrophy-Specific Training (HST) training emphasizes multi-joint functional training, quality over quantity, and planned rest periods. His website (thinkmuscle.com) backs up his training theory with research conducted during the past 100 years. He is a strong believer in specificity of training and rejects the training philosophy of constantly changing the training stimulus. Haycock's website is first-rate and he presents a scientifically-based training philosophy.

Thomas Fahey, Ed.D.

Best Shape of His Life

DragonTownDan with dancers Sensuelia & Bunny Bee. Photo by Russ Clark

I wanted to pass along fierce appreciation for your insightful articles and solid workout tips. Your staff continually provides cutting-edge nutritional advice, the cornerstone of a great physique. I can always count on your publication to deliver the goods from cover to cover, and issue to issue. The results speak for themselves every time I perform, by helping to keep me in the best shape of my life to deliver the "DragonTownDan Stage Show."

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Alpha Males

Really enjoyed the article "Are You A True Alpha Male?" in the September 2009 issue. The world needs more Alpha Males; there are too many out-of-shape guys walking around who will have health problems later in life. We have to push ourselves in the gym, and not be so quick to wimp out and call it a day. It's all about attitude as much as physical achievement. And speaking of Alpha Males, the piece about Tom Avery ["Leader of the Pack"] was the perfect complement to your Alpha Male story. Tom is an Alpha Male, if ever there was one!

Hector, e-mail

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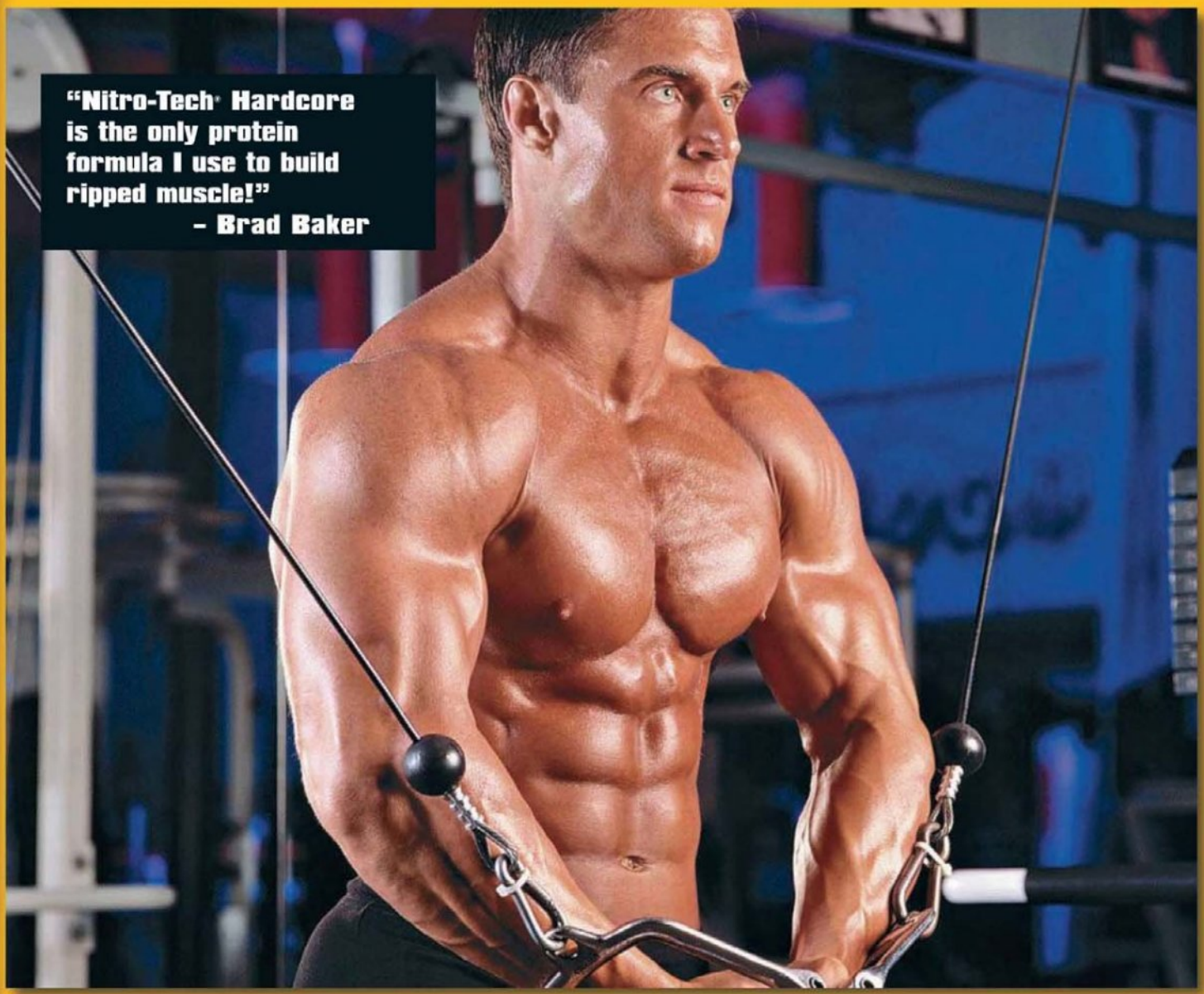

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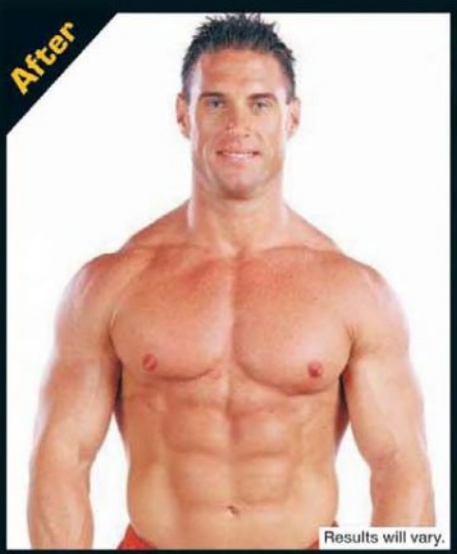

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Brad Baker, Michael Ferrer and Alex Jacobsen also used other MuscleTech® supplements and have been remunerated. In a 6-week clinical study, test subjects gained, on average, 8.8 lbs. of muscle. Nitro-Tech Hardcore is patented. © 2009

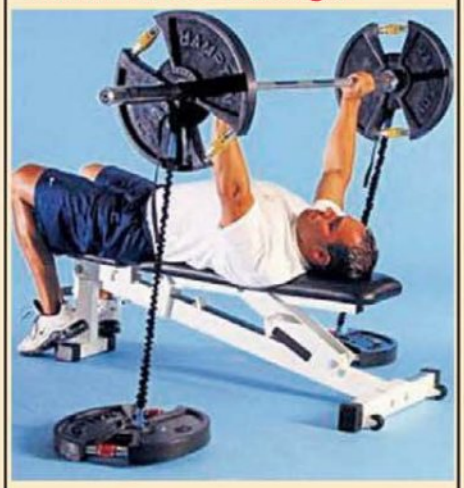
Moderate-Intensity Aerobic Exercise Boosts Testosterone Levels

In October 2008, the United States Department of Health and Human Services (USDHHS) issued exercise guidelines for healthy adults that advised at least 150 minutes per week of moderate-intensity physical activity. The report cited hundreds of studies demonstrating the health benefits of regular exercise. It seems as though every week scientists find new ways that exercise benefits health. Polish scientists showed that moderate exercise, such as that recommended by the USDHHS, increased testosterone levels in healthy men. Five weeks of training on a stationary bike increased testosterone by 15 percent, maximal oxygen consumption (a measure of cardiovascular fitness) by 3.7 percent, and pedaling power by 8.2 percent. Testosterone decreases gradually with age and contributes to loss of muscle and bone mass, poor sexual performance, psychological depression, and decreased quality of life. Regular, moderate-intensity exercise is a simple way to maintain testosterone levels and prevent some of the effects of aging. *(International Journal Sports Medicine, 30:489-495, 2009)*

Endurance and Strength Workouts Interfere With Each Other

The genetic and biochemical mechanisms of adaptation to weight training and endurance training are different. A review of literature by John Hawley from Australia concluded that mixing training methods causes interference in physiological adaptation. High-intensity muscle contractions, which occur during weight training, promote muscle strength and growth. Low-intensity, prolonged exercise, such as distance running or cycling, builds muscle cell mitochondria (cell energy centers) and promotes endurance. Endurance workouts activate a biochemical pathway linked to improved muscle endurance (AMPK-PGC-1alpha) and depress a pathway linked to muscle hypertrophy (Akt-mTOR-S6K). The reverse occurred following weight training. Doing different types of exercise in close proximity (e.g., weight training followed closely by endurance training) interferes with the adaptation to both types of exercise. People adapt to varying types of training best when they do them on separate days, or at least at different times of the day. This is important information for gym rats, power athletes, and endurance athletes. *(Applied Physiology Nutrition Metabolism, 34: 355-361, 2009)*

Elastic Bands Increase Bench Press Strength



Most elite powerlifters use elastic bands or chains to provide variable resistance during the lifts. Athletes attach them to the bar, and the resistance increases during the exercise as the bands stretch or the chains come off the floor. Limited research supports their use.

Matthew Muller from Kent State University and colleagues found that elastic band training increased bench press strength more than traditional bench press training alone. During a six-week training program, men did either 5 sets of 5 repetitions in the bench at 85 percent effort using bands, or at 100 percent effort without bands. Strength gains were nearly 8 percent greater when using bands. The study showed that elastic band assist training is an effective way to improve weightlifting strength. *(Paper presented at American College of Sports Medicine Annual Meeting, May 28, 2009)*

How High-Intensity Interval Training Works

Short bouts of maximal-intensity exercise (HIT) build high levels of fitness quickly. A remarkable study by Canadian researchers found that six sessions of high-intensity interval training on a stationary bike increased muscle oxidative capacity (citrate synthase) by almost 50 percent, muscle glycogen by 20 percent, and cycle endurance capacity by 100 percent.

The subjects made these amazing improvements exercising a mere 15 minutes in two weeks (4-8 sets of 30 seconds of exercise, maximum; 4 minutes rest between sets). A follow-up study in moderately-active women using the same training method showed that interval training increased whole-body and skeletal muscle capacity for fat use during exercise. The key element in both studies was training at 100 percent of maximum effort.

Martin Gibala from McMaster University in Canada described the physiological adaptations to HIT in a review of literature. HIT activates an oxidative enzyme system— peroxisome proliferator-activated receptor-gamma coactivator 1alpha; PGC-1alpha— normally turned on by endurance exercise that stimulates the growth of mitochondrial

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mass, which is highly related to endurance capacity. Mitochondria are the energy centers of the cells that convert food energy into energy the muscles and other tissues can use for exercise and metabolism. HIT is an amazing way to train that produces large results in a short time. *(Applied Physiology Nutrition Metabolism, 34: 428-432, 2009)*

Eccentric Strength Increases More Than Concentric Strength During Intense Weight Training

When muscles exert force, they contract eccentrically when they lengthen and concentrically when they shorten. Muscles can exert more force eccentrically than concentrically, particularly at fast movement speeds. During standard weight-training exercises, muscles contract at higher percentages of maximum during the concentric phase of the lift because eccentric muscle strength capacity is greater.

However, Danish researchers led by Emil Sundstrup, found that gains were greater in eccentric than concentric strength during a 12-week weight-training program using standard lifts (squat, hack squat, knee extensions, leg curls, and calf raises). This study showed the importance of including eccentric muscle contractions in strength-training programs. *(Paper presented at American College of Sports Medicine annual meeting, May 28, 2009)*

Multiple Sets Best For Beginning Weight Trainers

Most weight-training studies on beginners or untrained people showed that multiple sets produce no more benefit than single-set workouts. Critics say that these studies were poorly supervised and that multiple sets would be superior if people trained hard.

Brazilian researchers, using untrained college-age men, found that multiple sets produced greater strength gains than single sets. Subjects performed 8-12 repetitions of knee extensions and elbow flexions on a resistance machine (isokinetic dynamometer) for 1 or 3 sets during a six-week training period. Multiple-set programs were best for beginning weight trainers. *(Paper presented at American College of Sports Medicine Annual Meeting, May 28, 2009)*

Anabolic Hormone Response to Weight Training Greater in Men than Women

Increased levels of anabolic hormones, such as testosterone and IGF-1, are critical for the training responses that increase muscle mass and strength. For example, studies by Shalender Bhasin from Boston University found that increases in muscle hypertrophy were directly proportional to blood testosterone levels. Men have larger muscles than women, so the response of anabolic hormones to training might be significant in determining the training response.

A study from Springfield College in Massachusetts, led by Jason Sawyer, found marked gender differences in testosterone and IGF-1 following a weight-training workout. The authors speculated that gender differences in mechanical stress during the exercise might have accounted for the differences in hormonal response. *(Paper presented at American College of Sports Medicine Annual Meeting, May 28, 2009)*

Abdominal Crunches Activate Core Muscles Better Than Planks

Core muscle development is central to keeping fit, and serves as the foundation for peak performance in almost all sports. Many personal trainers deemphasize traditional abdominal exercises such as crunches, in favor of Pilates exercises such as planks. Anthony Caterisano and co-investigators from Furman University in Greenville, South Carolina found that crunches activated the rectus abdominis (six-pack muscle) and external obliques (side ab muscles) 20 percent greater than planks. They measured muscle activation using electromyography. Crunches build core muscle strength better than planks. *(Medicine Science Sports Exercise, 41: 198-199, 2009)* ■

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Obesity Suppresses Testicular Function

Obesity is bad for your sex life. Most women don't like fat guys, and excess adipose tissue interferes with metabolic health that controls erections and testosterone levels. Australian researchers, in a review of literature, concluded that obese men tend to have lower testosterone and the biologically-active free testosterone. To make matters worse, age-linked declines in testosterone occur faster in overweight and obese men.

Obesity increases risk factors linked to low testosterone levels such as obstructive sleep apnea, insulin resistance, and type 2 diabetes. High body fat levels, particularly in the abdomen, interfere with hormones that control the reproductive system and decrease sperm quality. Weight loss increases testosterone and free testosterone and improves reproductive health. *(Molecular and Cellular Endocrinology, in press; published online June 18, 2009)*

Mini-Fast Plus Exercise Promotes Fat Loss

Most people have a difficult time trying to lose weight, and more than 90 percent of people who lose weight gain it back again within 12 months. Our genes are programmed to protect us from starvation. The body perceives low-calorie diets as an assault on its well-being. Weight regulation centers in the brain preserve energy stores by slowing down metabolic rate and increasing appetite.

Is it possible to fool Mother Nature? Mexican researchers from the Oasis of Hope Hospital in Tijuana found that exercising after short fasts (12-14 hours) promoted fat loss. Exercise involved prolonged, moderate-intensity aerobics. Participants practiced this procedure three to five times per week for 12 weeks. The average person in the study lost 16 pounds. The body uses available fuels and will mobilize fat stores when carbohydrates are not readily available.

We need more research to determine if mini-fasts plus exercise is a viable weight-loss method. *(Medical Hypotheses, in press; published online July 3, 2009)*

High-Carbohydrate Diets Linked to Lower Obesity Rates

Low-carbohydrate diets promote weight loss best during the first six months of dieting, but high-carbohydrate diets are best for long-term weight control. A study of nearly 5,000 healthy adults from Canada, led by Anwar Merchant from the University of South Carolina, showed that people who ate more carbohydrates were less likely to be obese or overweight.

They divided the sample into quarters according to daily carbohydrate intake. The highest quarter consumed about 100 fewer calories per day and ate nearly double the fiber of the lowest quarter. The highest quarter also consumed 30 percent less protein and 50 percent less saturated fat.

An editorial from the American Dietetic Association said that while the study provided important information, it did not explore the influence of the type of carbohydrates in the diet on obesity and being overweight. The study showed the importance of including carbohydrates in the diet for long-term weight control, particularly whole grains, fruits, and vegetables. *(Journal of the American Dietetic Association, 109:1165-1172, 2009; 109: 1163-1164, 2009)*

Atkins Diet Linked to Heart Disease in Middle-aged Man

The Atkins diet, which is high in protein and fat and low in carbohydrates, is effective for short-term weight loss. For years, many heart specialists and public health experts criticized the diet because it is high in saturated fats, which promote heart disease.

A case study of a 51-year-old man showed the possible dangers of the diet. The diet causes ketosis, which produces methylglyoxal— which is recognized as a significant cause of blood vessel and tissue damage. Before going on the diet, he showed no evidence of coronary artery disease. His cholesterol and LDL (bad cholesterol) were low, at 145 and 85 mg/dL mg per deciliter, and a heart calcium scan showed no evidence of coronary artery disease.

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154, and he developed erection problems and chest pain. He was hospitalized for chest pain and had severe narrowing of one of his coronary arteries (supplies blood to the heart). Afterward, he went off the Atkins diet and his cholesterol and LDL returned to his pre-Atkins levels, and he stopped having erection problems.

This was only one case, so it doesn't mean that the Atkins diet will have this effect in everyone. *(Journal of the American Dietetic Association, 109: 1263-1265, 2009)*

Exercise Does Not Increase 24-Hour Fat Burning

Exercise increases the capacity of muscle to use fat. A review of literature by Edward Melanson and coworkers from the University of Colorado Denver School of Medicine concluded that exercise does not increase 24-hour fat use. The popular belief that exercise increases fat oxidation after exercise is a myth. Exercise promotes weight maintenance by creating a negative caloric balance and increasing muscle mass, which increases metabolic rate. The body uses fat stores when energy expenditure exceeds energy intake and fat intake is less than fat oxidation. Researchers concluded that moderate-intensity exercise would not burn more fat unless people consumed fewer calories and less fat. While exercise is not a cure-all for fat loss, it has many positive effects on metabolic, musculoskeletal, and cardiorespiratory health. *(Exercise Science Sports Reviews, 37: 93-101, 2009)*

Mississippi and Alabama are the Fattest States

Every year, the Trust for America's Health and the Robert Wood Johnson Foundation release a detailed report on the status of obesity in America. The 2009 report showed that America is in the midst of a public health disaster that is on par with the economic meltdown. Adult and childhood obesity rates increased two to three times during the past 30 years. In 2008, obesity rates increased in 23 states and didn't decrease in even one state.

Mississippi and Alabama are the fattest states, with obesity rates of 32.5 percent and 31 percent, while Colorado is the skinniest, with 18.9 percent obese. Health care costs expanded at an alarming rate during the past 10 years, in part due to the obesity epidemic. The economic downturn has increased the incidence of psychological depression and made it more difficult for families to purchase healthy foods, so it is likely that the obesity rate will continue to increase further in the years to come. *(www.healthyamericans.org, July 2009)*

CDC Reports Increase in Obesity Rate

The Centers for Disease Control reported that obesity rates in the United States increased from 25.6 percent in 2007 to 26.1 percent in 2008. Five states in the South have obesity rates greater than 30 percent. Health experts see no end in sight. The economic meltdown increased stress levels in millions of Americans, which contributes to weight gain. The economy has made it more difficult for the average family to afford healthy foods such as fruits, vegetables, and whole grains. Efforts to increase physical activity levels in adults and youth have been total failures.

People must take personal responsibility for their expanding waistlines by exercising more, consuming fewer calories, and eating healthier foods. Obesity rates are much higher than they were during the Great Depression, so the problem is more complex than lack of financial resources. *(Reuters, July 9, 2009)* ■

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Scientists, coaches, and athletes argue endlessly about the best protein supplement for enhancing muscle protein synthesis. Whey and soy proteins are digested faster than casein, so supplement makers often mix blends to maximize amino acid availability for as long as possible. However, little research supports the use of one type of protein over another.

Researchers from McMaster University in Canada found that a supplement containing whey protein hydrolysate accelerated muscle protein synthesis at rest and after weight training better than soy or casein protein. The researchers speculated that whey protein promoted muscle protein synthesis best because it was digested faster and was better able to increase blood levels of leucine, which is a critical signaling compound for promoting protein synthesis. *(Journal of Applied Physiology, in press; published online July 9, 2009)*

Coenzyme Q10 Increases Interval Sprint Capacity

Coenzyme Q10 is a vitamin-like chemical that helps supply energy to the cells. Some athletes experience coenzyme Q10 depletion during training and might benefit from supplements. Scientists from Selcuk University School of Medicine in Turkey found that men who took 100 milligrams per day of oral coenzyme Q10 (CoQ10) increased performance during repeated sprints on a stationary bike (5 Wingate tests; all-out 30-second sprints), compared to when they took a placebo (fake CoQ10). CoQ10 increased peak power and average power and reduced the perception of fatigue.

A Japanese study found that Coenzyme Q10 (100 or 300 milligrams per day for eight days) improved performance and reduced the perception of fatigue during intense endurance exercise and interval training. The larger dose produced the greatest effects. Coenzyme Q10, particularly in doses of 300 milligrams per day, might prevent fatigue and boost performance during intense sprint exercise, but we need more research before we can recommend it as an effective performance-enhancing supplement. *(Journal Strength Conditioning Research, in press; published online July 28, 2009)*

Medium-Chain Triglycerides Boost Endurance Capacity

Medium-chain triglycerides (MCTs) have been called nutritional optimizers and 'fatless fat.' They provide a lot of energy in a small volume, just like fat, yet are absorbed and used rapidly, just like carbohydrates. They may also reduce body fat, improve carbohydrate and protein metabolism, enhance absorption of essential minerals, and decrease the risk of cardiovascular disease by reducing blood triglycerides and cholesterol.

Japanese researchers found that endurance capacity was higher following two weeks on a diet high in MCTs (6 grams per day for two weeks) than following a diet low in MCTs. The exercise consisted of 40 minutes on a stationary bike at 60 percent effort, followed by exercise to exhaustion at 80 percent effort. Blood lactate and perception of effort were lower during exercise following the high MCT diet. These results do not agree with other studies in the literature. *(Journal Nutritional Science Vitaminology, 55: 120-125, 2009)*

Maltodextrin Preserves Muscle Glycogen During Prolonged Endurance Exercise

Carbohydrates are the principle fuels during exercise at intensities above 65 percent of maximum effort. Since the 1960s, we've known that high-carbohydrate diets promote

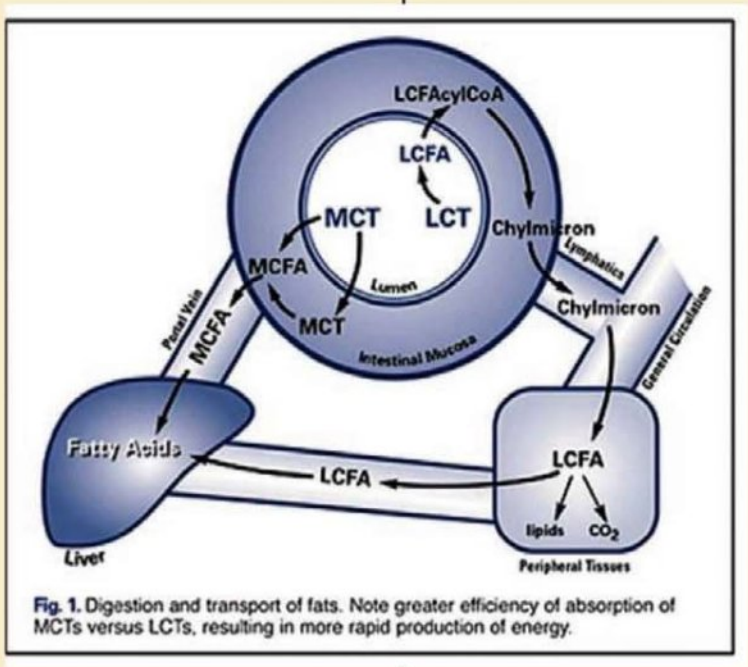

Fig. 1. Digestion and transport of fats. Note greater efficiency of absorption of MCTs versus LCTs, resulting in more rapid production of energy.

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References: 1. S. A. Jebb et al., Int J Obes (Lond) 30, 1160 (Jul, 2006). 2. H. B. Henriksen, S. O. Kolset, Tidsskr Nor Laegeforen 127, 2259 (Sep 6, 2007). 3. E. Ventura et al., Arch Pediatr Adolesc Med 163, 320 (Apr, 2009).

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endurance capacity better than low-carbohydrate or mixed diets. While fats contain more energy per gram than carbohydrates, they take longer to metabolize. Consequently, carbohydrates provide more energy per liter of oxygen consumed than fats. In other words, carbohydrates are faster fuels. Unfortunately, we store only about 400 grams of glycogen throughout the body, which limits endurance capacity.

Popular energy drinks contain carbohydrates to help provide fuels for prolonged exercise. When first introduced, these drinks contained the glucose polymer maltodextrin, because it could deliver large amounts of glucose (sugar) without being overly sweet-tasting. Gradually, maltodextrin was replaced by high-fructose corn syrup in most sports drinks, because it was cheaper.

In a study on rats, Brazilian researchers showed that pre-exercise feeding with maltodextrin preserved muscle glycogen in active muscles. In humans, this effect would help athletes involved in prolonged endurance events recover faster and exercise more intensely during subsequent workouts. *(JEPonline, 12: 30-38, 2009)*

Waxy Maize Starch Maintains Blood Sugar

Hardcore weight training involves a delicate balance between increasing muscle mass and minimizing fat. During 'bulking' or mass-building phases, protein and calorie intake are critical for turning on chemical pathways that promote muscle protein synthesis. Unfortunately, unbridled caloric intake also leads to increased fat deposition. When trying to lose fat, hunger is the enemy. Intense training regimens must continue, while maintaining energy levels and restricting calorie intake. Waxy maize starch (WM) is a complex carbohydrate that helps stabilize blood sugar, without increasing insulin and causing wild fluctuations in hunger and satiety.

A Purdue University study showed that consuming a supplement containing WM caused lower blood sugar and insulin responses than drinking a beverage containing maltodextrin and table sugar or eating white bread. Waxy maize starch effectively sustains blood sugar and prevents hunger. It might be a useful supplement with 'mass' appeal if you want to get huge. *(Nutrition Research, 29: 383-390, 2009)*

Creatine Promotes Recovery After Eccentric Exercise

Creatine monohydrate increases strength and muscle mass in most people. It also speeds recovery after heavy training. An Australian study led by Matthew Cooke showed that creatine promoted recovery after intense eccentric exercise (4 sets X 10 reps negatives (lengthening contractions) at 120 percent maximum effort on leg presses, knee extensions, and leg curls). The workout was designed to cause muscle injury and soreness. During recovery, muscle strength was 10-21 percent higher in men consuming creatine supplements, compared to a placebo (fake creatine). Blood creatine kinase levels, a marker of muscle damage, was 84 percent lower in men taking creatine. Creatine monohydrate promotes recovery from muscle damage caused by eccentric exercise and is an excellent supplement for serious weight trainers. *(Journal of the International Society of Sports Nutrition, 6: 13, 2009; online journal)*

Sodium Bicarbonate Increases Performance

Sodium bicarbonate (baking soda) improves sprint performance in events lasting less than 2 minutes, such as the 800-meter run. It works by increasing blood bicarbonate, which acts as a buffer against metabolic acids.

Polish researchers led by Adam Zajak found that sodium bicarbonate (17 grams mixed in water) improved swim sprinting speed in teenage swimmers during the first 50-meter sprint of an interval training workout (four 50-meter sprints) and decreased the overall time of the workout by 2 seconds. Blood lactate increased after exercise following bicarbonate administration because the buffer speeds the movement of lactate from the muscles to the blood. The swimmers had no side effects, but most studies reported gastrointestinal upset and diarrhea from taking bicarbonate supplements.

Bicarbonate might be a useful supplement during intense weight-training sessions and for athletes training for high-intensity sports. Don't take sodium bicarbonate before a competition without trying it in practice, because about 50 percent of athletes have unpleasant gastrointestinal side effects! *(Journal of Sports Science and Medicine, 8: 45-50, 2009)* ■

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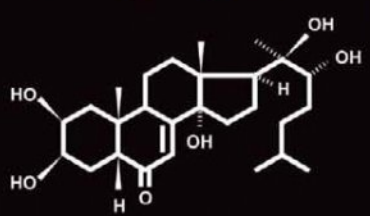

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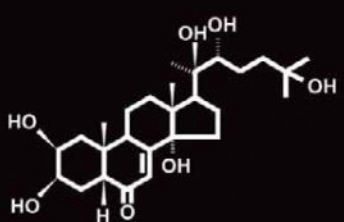

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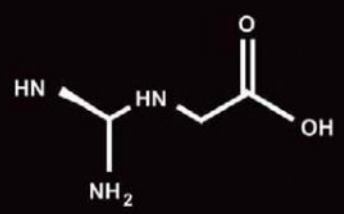

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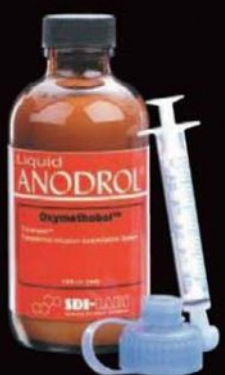

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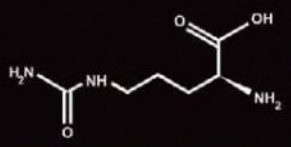

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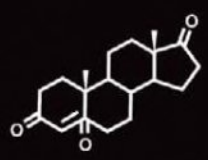
*MasterbolanTM (Drostanozol) may be typically used as a muscle hardener and strength increaser. It has notably been able to sharpen the appearance of individuals that already carry a low bodyfat percentage. Drostanozol has a chemical structure that may assist in recovery from bouts of extreme body stress including heavy weight training. Upon administration of Drostanozol, subdermal water levels may drop dramatically. Users often report of the skin taking on an almost paper thin appearance. This effect is highly desired in bodybuilders seeking a hard, ripped and dense pre-contest condition. Masterbolan is a highly recommended combination to any cycle to add incredible hardness, strength and enhance recovery during weight training.



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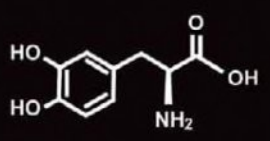

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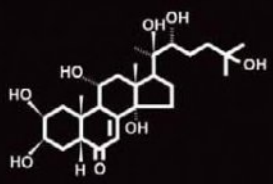

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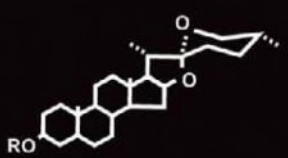
*This non-steroidal substance has gained much popularity among athletes due to its reputed ability to act as a gonadotropic stimulant and estrogen blocker. Clomex GonadotropolTM, the active ingredient in Omifen, stimulates the pituitary gland to increase levels of gonadotropic hormones. It may also naturally suppress estrogen levels, which can make muscles appear rock hard and dense. Users have been very enthusiastic about Omifen with reports of greatly reduced post cycle crashes. This is a term used to describe the drop in athletic performance and "smoothing out" that commonly occurs upon completing a cycle of effective quantity and duration. Recommended for the final weeks of a cycle, Omifen may dramatically help to prevent side effects, improve muscle hardness and enable the user to keep the gains that were worked so hard for.



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WARNING:

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Anabolic Cycle Information: Utilizing empirical and anecdotal evidence, scientific research has shown that anabolic compounds are most effective when used in a logical sequence referred to as a cycle. The term cycle refers to the duration of time that passes while concurrently taking pre-determined combinations and dosages of anabolic agents. A synergistic action, or an amplified effect, has been shown to occur when two or more anabolics are administered simultaneously. Along with stacking anabolics, proper consideration must be addressed to the strategic development of the cycle, which effectively maps the muscle cells for receptor downgrade. This deliberate planning prevents attenuation or ever allowing the body to build a tolerance to the administered agents.

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2	2 / Day	4cc / Day	
3	2 / Day		4cc / Day
4	2 / Day		4cc / Day
5	2 / Day	4cc / Day	
6	2 / Day	4cc / Day	
7	2 / Day		4cc / Day
8	2 / Day		4cc / Day

*EXPECTED RESULTS: Intermediate gains in muscle mass, strength, density and volume.

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Individual results may vary

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10 WEEK PRECISION FORM MINI CYCLE

WEEK	D-Bol	Anodrol	Test Sus.	Equidren	Master.	Winni-V	HGH	Omifen
1	2 / Day	4cc / Day				†		
2	2 / Day	4cc / Day				†		
3	2 / Day	4cc / Day				†	††	
4	2 / Day	4cc / Day				†	††	
5			4cc / Day	3 / Day		†	††	
6			4cc / Day	3 / Day	3 / Day	†	††	
7			4cc / Day	2 / Day	3 / Day	†	††	
8			4cc / Day		2 / Day	†	††	
9							††	4 / Day
10							††	4 / Day

*EXPECTED RESULTS: Intermediate gains in muscle mass, strength, definition and hardness.
† Winni-V is taken 1 tablet prior to working out only.
†† Somotroph HGH is to be taken nightly using 1 dropperful.

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WEEK	D-Bol	Anodrol	Test Sus.	Winni-V	Omifen
1	4 / Day	4cc / Day		†	
2	4 / Day	4cc / Day		†	
3	4 / Day	4cc / Day		†	
4	4 / Day	4cc / Day		†	
5	4 / Day	4cc / Day		†	
6	4 / Day	4cc / Day		†	
7	4 / Day	4cc / Day		†	
8	4 / Day	4cc / Day		†	
9		4cc / Day	4cc / Day	†	
10		4cc / Day	4cc / Day	†	
11		4cc / Day	4cc / Day	†	
12		4cc / Day	4cc / Day	†	
13					4 / Day
14					4 / Day

*EXPECTED RESULTS: Advanced gains in muscle mass, strength, density and volume.
† Winni-V is taken 1 tablet prior to working out only.

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14 WEEK PRECISION FORM PEAKING CYCLE

WEEK	D-Bol	Anodrol	Test Sus.	Equidren	Master.	Winni-V	HGH	Omifen
1	2 / Day	4cc / Day				†		
2	2 / Day	4cc / Day				†		
3	2 / Day	4cc / Day				†		
4	3 / Day	4cc / Day				†		
5	3 / Day	4cc / Day				†		
6	3 / Day	4cc / Day				†		
7	4 / Day	4cc / Day				†	††	
8	4 / Day	4cc / Day				†	††	
9	2 / Day		4cc / Day	3 / Day		†	††	
10			4cc / Day	3 / Day	3 / Day	†	††	
11			4cc / Day	2 / Day	3 / Day	†	††	
12			4cc / Day		2 / Day	†	††	3 / Day
13							††	3 / Day
14							††	3 / Day

*EXPECTED RESULTS: Advanced gains in muscle mass, strength, definition and hardness.
† Winni-V is taken 1 tablet prior to working out only.
†† Somotroph HGH is to be taken nightly using 1 dropperful.

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Low Testosterone Increases Heart Attack Risk

Risk factors of heart attack and stroke include high blood pressure, abnormal blood fats, cigarette smoking, physical inactivity, obesity, and diabetes. Add low testosterone levels to the list. Researchers from the Boston University School of Medicine, in a review of literature, concluded that low testosterone levels increase the risk of cardiovascular disease and premature death from all causes. Other negative health consequences include decreased sex drive, erectile dysfunction, reduced muscle mass and strength, bone loss, chronic fatigue, and depression. Low testosterone levels in aging men are a significant public health issue that has received little attention. *(International Journal Impotence Research, 21: 261-264, 2009)*

Low Testosterone Linked to Metabolic Syndrome

Low testosterone is an important marker of poor metabolic health. Andrét Guay from Harvard Medical School, in a review of literature, concluded that low testosterone levels increase the risk of the Metabolic Syndrome— a cluster of disease-promoting disorders that include high blood pressure, abnormal blood fats, insulin resistance, type 2 diabetes, inflammation, abdominal fat deposition, and blood-clotting abnormalities. He stopped short of recommending testosterone supplements to treat the problem.

Supplementing testosterone in aging men has been a controversial subject since the hormone was first isolated in 1934. Prescriptions for testosterone increased threefold in the last 10 years, but many physicians worry that the benefits do not offset the side effects. Leading a healthier lifestyle will enhance metabolic health and increase testosterone, reduce body fat, boost muscle and bone mass, improve blood sugar regulation, and reduce the risk of the Metabolic Syndrome. You can improve testosterone metabolism by living a healthier lifestyle— even if you take testosterone supplements. *(Journal Andrology, 30: 370-376, 2009)*

Exercise Reduces the Risk of Cancer

Regular moderate-intensity exercise reduces the risk of heart disease, stroke, and premature death, but its effects on the risk of cancer are less clear. A 16-year-long study in Finland showed that moderate-intensity physical activity reduced the risk of cancer by nearly 50 percent.

Scientists examined more than 2,500 men with no history of cancer at the beginning of the study and re-examined them nearly 17 years later. Exercising regularly at a moderate intensity (5.2 Mets: equivalent to a brisk walk) for 30 minutes at a time provided protection against the disease. Exercise was most protective against lung and gastrointestinal cancers. The study showed that regular physical activity reduced the risk of the deadliest and most common types of cancer. *(British Journal Sports Medicine, in press; published online July 28, 2009)*

Physicians Beginning to Accept 'Male Menopause'

Low testosterone (T) levels, sometimes called male menopause or andropause, increase the risk of heart disease and are linked to type 2 diabetes, decreased muscle and bone mass, prostate cancer, and depression. Low T impairs metabolic health, promotes obesity, and decreases sexual performance. It is a serious public health issue that robs men of their energy levels and quality of life.

Testosterone supplementation has a bad name because of steroid scandals in baseball, cycling, track and field, and football. Scary tales promoted by the media and some segments of the medical community link testosterone to deadly heart attacks, cancer, liver disease, and psychotic behavior. Consequently, many physicians are gun-shy about prescribing it to their patients. That's changing.

Increasingly, physicians realize that low T is a highly treatable medical condition. T therapy can turn the lights back on and make men feel better, improve their relationships, boost mental and physical health, and might even make them live longer. *(ABC News, August 10, 2009)*

Sperm Quality Linked to Long Life

Get strong if you want to live longer. Most exercise recommendations mention muscle strength as an afterthought. Aerobic exercise strengthens the cardiovascular system, protects the heart and blood vessels from disease, and reduces the

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risk of heart attack and heart-related sudden death. A 19-year-long study of 8,762 men aged 20 to 80 conducted at the Aerobics Institute in Dallas found that men with the highest levels of strength were less likely to die each year from heart disease, cancer, or any other cause. The men received medical exams and physical fitness tests during the 1980s and their status was reevaluated nearly 20 years later. Greater strength reduced the risk of death from all causes by 32 percent, 50 percent from heart attack, and 32 percent from cancer, compared to the 'weakest' one-third of men. Increasing strength might make you live longer and increase your quality of life. Weight training should not be a substitute for aerobic exercise— you should do both. *(British Medical Journal, 337: a439 2008)*

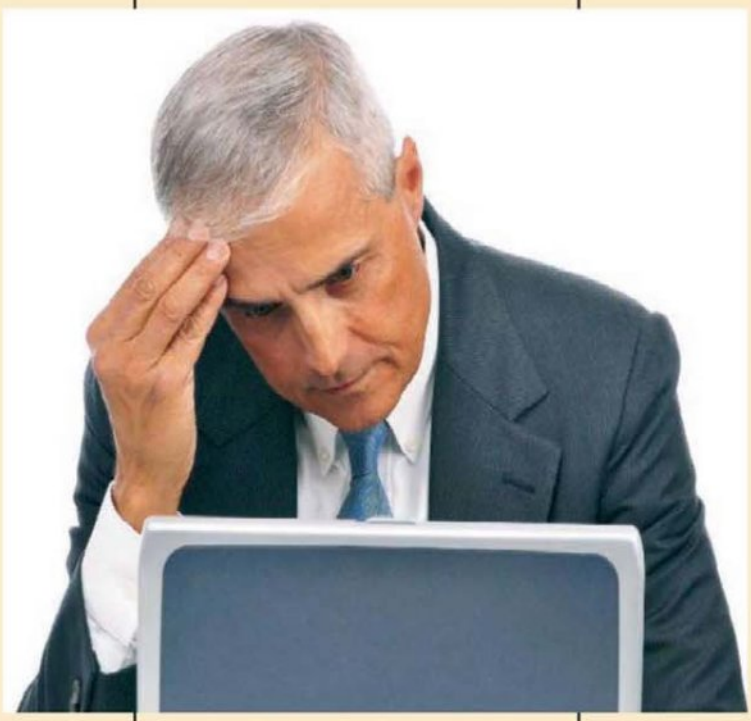
Lowering Blood Pressure Below 140/90 Provides No Health Benefits

The Centers for Disease Control and Prevention classify blood pressure at or above 140/90 as high (hypertensive) and 130-139/80-89 as pre-hypertensive. Normal blood pressure is 120/80. Some experts think that people should lower blood pressure below normal levels.

An analysis of studies involving more than 22,000 people with high blood pressure showed no differences in heart attacks, stroke, or deaths (deaths per year) from reducing blood pressure to 135/85, compared to 140/90. Patients with diabetes and kidney disease are routinely advised to reduce blood pressure below 125/75 through medication, diet, and exercise. We need more studies in these patients before we rescind this advice. *(Cochrane Database of Systemic Reviews, issue 3: CD004349, 2009)*

Stress Turns Your Hair Gray

Have you noticed the increase in people with gray hair since the economic collapse? The nation's stress level has catapulted into the stratosphere and has turned us into a nation of gray heads. Look at photos of presidents Clinton and Bush at the beginning and end of their eight-year terms. By year eight, both had turned prematurely gray because of the constant stress of the job.



A study from the Cancer Research Institute at Kanazawa University in Japan showed that stress damages the genes that control cells called melanocytes. These cells secrete pigments that give hair its color. Stem cells that control melanocyte growth and repair die off gradually during constant stress, which causes gray hair. The best way to maintain a youthful hair color is to minimize stress throughout life— or use hair dye. *(Cell, 137: 1088-1099, 2009)*

Platelet-rich Plasma Speeds Healing of Muscle Strains

Repetitive strain injuries are extremely common in bodybuilders because they often practice high-rep, high-set programs to failure. Standard treatment for these injuries includes rest, ice, compression, elevation, and non-steroidal anti-inflammatory medications. The injuries often take a long time to heal and are extremely frustrating for athletes.

A new treatment called platelet-rich plasma (PRP) might speed healing. The technique involves extracting blood platelets (a type of blood cell) from the athlete's blood and then injecting them into the injured muscle. Jason Hammond from the Union Memorial Hospital in Baltimore and colleagues, in a study on rats, found that PRP shortened recovery time after muscle strain. The technique worked better following repetitive strain injuries than sudden muscle strains.

Currently, few physicians offer this treatment, but it looks extremely promising. PRP might be the answer to curing those muscle injuries that just won't go away. *(American Journal Sports Medicine, 37: 1135-1142, 2009)* ■

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No Benefit Linking Dextrose and Creatine

Creatine monohydrate supplements have been around for more than 15 years. While highly popular, creatine is relatively cheap, so it's not all that profitable for supplement makers. In an effort to stay competitive and increase profits, companies have tried to bind creatine to various substances to speed its uptake and effectiveness.

A Creighton University study compared the effects of creatine versus creatine plus dextrose on creatine retention in muscle. Dextrose triggers insulin release, which could enhance creatine uptake. They found that both forms of creatine are equally effective. Hardcore weightlifters should buy bulk creatine monohydrate from a reputable manufacturer and forget about the bells and whistles. *(Paper presented at the American College of Sports Medicine Annual Meeting, May 28, 2009)*

Low-Glycemic Index Meal Boosts Performance In 40-Kilometer Cycling Time Trial

Cycling time trials are prolonged, high-intensity events requiring ready availability of carbohydrates for fuel. Carbohydrates come from stored glycogen in the muscles, liver glycogen, gluconeogenesis (liver converts various fuels to blood sugar), and dietary intake of carbohydrates.

British researchers found that a 40-kilometer cycling time trial was 4 percent faster, following a low-glycemic index meal after a high-glycemic index meal. Both meals contained 1 gram of carbohydrate per kilogram of bodyweight. Glycemic index is a measure of how fast foods increase blood sugar. Low-glycemic index meals provided more sustained glucose release, which might spare scarce muscle and liver glycogen during intense, prolonged exercise. These results may not apply to short-term, high-intensity exercise. *(International Journal Sports Physiology Performance, 4: 331-344, 2009)*

Low-Fat Diets Healthier After Weight Loss

High-protein, low-carbohydrate diets promote weight loss in sedentary people during the first six to 12 months of a weight-reduction program, but they may not be the best solution for weight trainers and long-term cardiovascular health. In a University of Maryland Medical Center study, 26 healthy adults consumed the Atkins, South Beach, and Ornish diets for one month each. Blood fats and blood vessel health deteriorated when subjects consumed the high-fat, high-protein Atkins diet. They showed improved blood vessel health and a 12 to 17 percent decrease in LDL (the bad cholesterol) on the South Beach or Ornish diets, which are lower in saturated fats than the Atkins diet. The study showed that diets lower in fat were best for long-term weight management and cardiovascular health. *(Journal American Dietetic Association, 109: 713-717, 2009)*

No Difference Between High- or Low-Glycemic Index Meals on High-Intensity Exercise Performance

Glycemic index is a measure of how fast a meal increases blood sugar. Foods such as white bread, table sugar, and corn syrup have high-glycemic indexes and cause rapid spikes in blood sugar and insulin. Foods higher in fat and fiber have lower glycemic indexes and provide dietary carbohydrates more slowly.

A study from the University of Saskatchewan in Canada showed that the glycemic index of a pre-exercise meal had no effect on performance during 90 minutes of intermittent high-intensity exercise on a treadmill. The test subjects perform better after consuming either meal compared to fasting. A good pre-game meal is important for performance in either intense or endurance exercise. The study showed that consuming calories was more important than the composition of the meal. *(International Journal of Sports Physiology Performance, 4: 367-380, 2009)*

The Mediterranean Diet Reduces Abdominal Fat

The Mediterranean diet is high in pasta, olive oil, fruits, vegetables,

lean meats, fish, nuts, and wine. People living in Mediterranean countries have the lowest heart disease rates and greatest longevity in the world. Diet may play an important role in their excellent health.

A large study of nearly 500,000 men and women aged 25 to 70 living in 10 European countries found a

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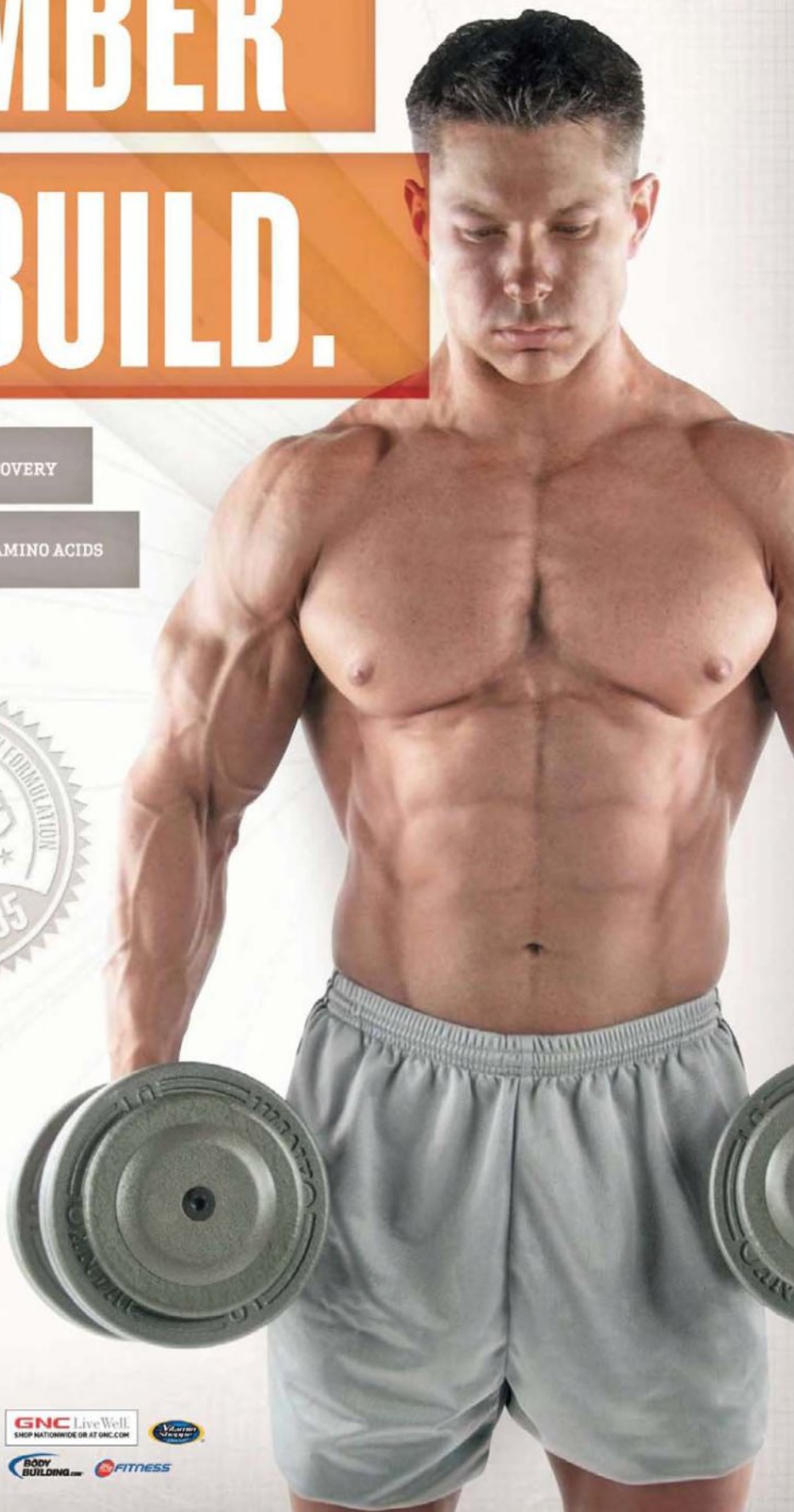

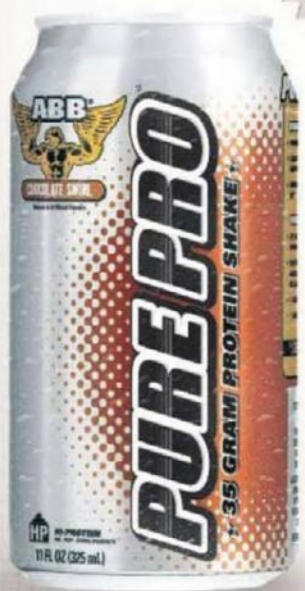

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reduced risk of abdominal obesity in people who followed the Mediterranean diet. The relationship was strongest in men from northern European countries. People living in France, Norway, and Sweden were the thinnest, while those living in Greece and Spain were the fattest. Europeans were considerably leaner than Americans. The Mediterranean diet has positive effects on metabolic health and preventing obesity. *(Journal Nutrition, 139: 1-10, 2009)*

Taurine Increases Strength and Protects Muscle Cells

Taurine is an amino acid that helps regulate cell fluid balance, protects cells against reactive oxygen species, stabilizes cell membranes, decreases inflammation, and helps regulate cell electrolytes (i.e., calcium ion). It is found in high concentrations in nerve and muscle cells. It is also a prominent ingredient in many energy drinks and training supplements. However, few studies have examined its effectiveness in improving athletic performance or increasing strength or muscle mass.

An Australian study using rats subjected to high-frequency electrical stimulation found that supplementing taurine increased muscle taurine levels by 40 percent and muscle strength by 4.2 percent. It also reduced F-isoprostane production— a sensitive measure of cell membrane breakdown by reactive oxygen species (highly-reactive chemicals produced naturally during metabolism). The study showed that taurine increased strength and protected muscle during intense stimulation. *(Journal Of Applied Physiology, 107: 144-154, 2009)*

Muscles Need Amino Acids for Growth

Muscle mass declines gradually after age 40. Muscle loss eventually leads to decreased strength and quality of life. Muscle is in a constant state of synthesis and breakdown, and requires adequate protein intake to maintain size, even when overloaded through weight training.

Amino acids that make up proteins serve as chemical signalers and building blocks for muscle proteins.

Stuart Phillips from McMaster University summarized how weight training and protein intake cause muscle growth. Leucine is the key amino acid for turning on muscle protein synthesis (mTOR pathway), but muscle hypertrophy grinds to a halt without the full complement of essential amino acids. Following intense resistance exercise, muscle protein synthesis occurs in direct proportion to protein intake, peaking at 20-40 grams. The mTOR pathway is most active in fast-twitch muscle fibers, which respond best to high-intensity weight training. Peak muscle growth occurs when you concentrate on these fibers by emphasizing high-stress training programs.

People over 40 are less responsive to key amino acids, so they should consume protein often during the day to maintain muscle mass and prevent atrophy (muscle breakdown). Older adults should combine weight training and adequate protein intake to preserve muscle mass as they age. *(Applied Physiology Nutrition Metabolism, 34:403-410, 2009)*

L-Arginine Boosts Oxygen Transport in the Lungs During Exercise

L-Arginine is an important amino acid for increasing nitric oxide release (NO) by the cells lining the blood vessels. NO helps regulate blood flow. Increasing NO levels could promote muscle blood flow and improve the capacity to regulate blood distribution during exercise. A study from Ghent University in Belgium found that L-Arginine improved lung function during exercise in seven physically-active men. They were given L-Arginine (7.2 grams per day for 14 days) or a placebo (fake arginine). L-Arginine accelerated oxygen transport speeds in the lungs following a series of exercise bouts at 80 percent of maximum effort. L-Arginine was probably effective because it increased NO levels in the blood, which promoted pulmonary blood flow. *(Medicine Science Sports Exercise, 41:1626-1632, 2009)*

Antioxidants Important For Semen Quality

Reactive oxygen species, such as oxygen ions, free radicals, and peroxides, are produced naturally during metabolism. They can be highly destructive, and damage cell membranes and DNA. Substances called antioxidants that are produced naturally by the body and consumed in the diet can neutralize reactive oxygen species and protect vital cells. Spanish researchers showed that the antioxidant content of the blood was related to semen quality. They found that men who ate large amounts of meat and full-fat dairy products had lower semen quality, while those who ate more fruits and vegetables had better-quality semen. They also commented that environmental toxins are also compromising reproductive health. *(Fertility and Sterility, in press; published online May 2009)* ■

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Regular Sex Important for Sperm Quality

Every guy who works out knows that when it comes to muscle, you use it or lose it. The same goes for your reproductive system. Australian researchers, led by David Greening from the Sydney In-Vitro Fertilization Clinic, showed that sperm quality improved by 20 percent in men who ejaculated daily for seven days. The researchers concluded that couples trying to conceive should have sexual intercourse daily for seven days prior to ovulation.

Previously, urologists recommended that couples abstain from sex for five to seven days before ovulation so that men could build up sperm volume. It appears that older sperm is more susceptible to DNA damage, which can decrease the chances of fertilization and increase the risk of birth defects. *(Paper presented at the European Society of Human Reproduction and Embryology, June 2009)*

Most Women Use Vibrators

Does your significant other carry a picture of her vibrator in her wallet instead of you? A study from the Kinsey Institute at Indiana University showed that a majority of women aged 18 through 60 use vibrators. That means that if she's not using the sex toy with you, her vibrator is getting more action than you are.

On a brighter note, women who use vibrators are sexually better adjusted than those who don't. Vibrator users scored higher on measures of sexual desire, arousal, lubrication, orgasm, and overall sexual function. Few women reported side effects from vibrator use. The study involved a sample of 3,800 women chosen to represent a cross-section of Americans. The research showed that if you are looking for a highly sexual woman, ask her if she uses a vibrator. *(Journal Sexual Medicine, 6: 1857-1866, 2009)*

Guys With Fat Guts Can't Get It Up

Most women don't like guys with fat guts. Belly fat is unsightly and guys with beer bellies usually don't have game. They also have erection problems. A Canadian study from Queens University in Kingston, Ontario found that men with large waist circumferences or obese body mass indexes (a measure of weight to height) were 50 percent more likely to have erectile dysfunction than leaner men.

The study involved 3,941 men 20 years or older who participated in the National Health and Nutrition Examination Survey. Men who exercised at a moderate intensity for at least 150 minutes per week and maintained a waist circumference of 40 inches or less usually maintained normal erection function, regardless of total body fat. The best way to keep it up is to lose the gut and exercise regularly. *(Journal Sexual Medicine, 6: 1990-1998, 2009)*

High Cortisol Levels Linked to Sexual Problems in Men

Cortisol is a stress hormone released by the adrenal glands, which are located on the top of each kidney. During times of stress, the adrenals release cortisol to help provide fuel for emergencies and promote tissue-healing inflammation. Chronically high levels of cortisol can suppress the immune system and cause cellular destruction throughout the body.

Japanese researchers showed that high cortisol levels can also interfere with sexual function. They measured saliva and blood levels of cortisol and testosterone and found that elevated cortisol levels impaired the capacity for erections, decreased sexual desire, and interfered with satisfaction during intercourse. They found no relationship between testosterone levels and sexual function. The link between elevated cortisol and bad sex was low and might not be clinically significant. *(International Journal of Impotence Research, 21: 207-212, 2009)*

Beer Glasses Affect Men More Than Women

How many times have you gone to bed with a '10' and woke up with a '2'? According to British researchers from Brunel University, this is much more likely to happen to a man than to a woman. While casual sex is relatively common in men and women,

Male Enhancement Pills . . .

Is it a Hoax or Do They Really Work?

Dr. Daniel Stein, M.D.

I wish I had a dollar for every patient or person that asked me over the last few years about increasing the size of "that certain part of the male body." The preoccupation with size that men have is a mystery to most women. The fact is it is completely normal for most men to want to be larger. It doesn't matter if they are smaller than average, average, or larger than average. It's even been my experience that guys that are almost too big, so big in fact that many women wont go near them with a ten foot pole (sorry about that) still want to be larger!

I was so intrigued by this fact that I started to do research about the "so called" male enhancement pills that came on the market several years ago. The concept that a simple pill could noticeably increase the size of a man's organ seemed plausible, but I wanted to know more. I had done much research over the years about certain sexually enhancing compounds available, so I believed the concept was sound that a pill could be made to make a man larger.

My first task was to look at some of the ads I had seen in magazines for male enhancement. There were some amazing claims by many of these makers. My personal favorite was a cream that claimed to make men instantly larger. I had to laugh out loud when I read what it said. The ad read, "apply cream, rub vigorously, increase your size." I thought for a minute and then decided you could put virtually anything on a man, including guacamole, and if he rubbed vigorously it would increase his size. Then there was an ad for a pill, that if taken daily, would increase the length of a man by 3 to 4 inches in just a few *short* days (sorry about the "short" comment).

I'm sorry, but after all those years of medical school, I know enough about anatomy to know that a guy who is 5 inches in length isn't going to add 3 to 4 inches to his little friend unless he buys a rope, gets a large brick, finds a bridge and...well, you get the picture. At about this time I was beginning to think that perhaps these makers hadn't found the magic mixture of compounds I had hoped they might have.

As the founder of both the Stein Medical Institute and the Foundation for Intimacy, I have spent most of my adult life trying to improve men and

"a simple pill could noticeably increase the size of a man's organ seemed plausible..."

women's sexual health. I pride myself on being the best medical doctor I can be and my reputation is important to me. So, when out of the clear blue sky, I got a call from the makers of Extenze, the leader in male enhancement, wanting me to be in one of their TV commercials, I thought, "Boy, did they pick the wrong guy!"

Little did they know that I had done real research into this concept and had recently looked at some of these male enhancement products. But the makers of Extenze seemed to be genuinely convinced that their product really worked, and they claim to have sold over 100 million capsules to men all over the world. "Over 100 million capsules taken by men." With that single declaration, they had my interest. Either Extenze really worked or these guys were the world's greatest snake oil salesmen. So I requested that they send me Extenze formula so I could review it, then we would talk.

I then visited the Extenze.com web site, where I found a page that showed the top twelve adult film stars, all holding Extenze and endorsing it. I thought to myself, "Is it possible Extenze actually works?"

The next day I received the proprietary Extenze formula and there it was, virtually all of the ingredients that I hoped would be in a male enhancement product, 19 pharmaceutical grade nutraceuticals. There was Yohimbe (which used to be available by prescription only,) L-Arginine, Maca...all of it was there.

I contacted the makers of Extenze the very next day and asked them what they needed me for. They explained that they had a desire to have a medical doctor in their T.V. commercials to talk about the effectiveness of the ingredients in Extenze. At that moment an idea sprang into my head. I told them if they would let me improve the formula of Extenze, I would do the commercial for free!

Before I knew it I was working with their

"they claim to have sold almost a quarter of a billion capsules to men"

chemists at the manufacturing plant where we added the most revolutionary thing to the formula of Extenze. We added DHEA, also known as the "mother of all hormones." DHEA is the most important human prohormone and is the prohormone that converts into testosterone in men. DHEA levels decrease with the aging. Production peaks in a man's early 20's, and declines about 10% every 10 years. Low levels of testosterone can lead to low sex drive and a smaller sex organ.

After a few more weeks of tweaking the formula of Extenze, we were done. The new Extenze formula has been selling even better then the old formula, with over 75% of sales to repeat customers. Extenze has been on the market for 7 years and has sold almost a quarter of a billion capsules to men all over the world. It doesn't matter if you're 18 or 80 years old. In my opinion Extenze can make you larger, harder and increase both your intensity and pleasure and it is as simple as taking a single tablet daily. Extenze is so sure it would work for anyone that they're sending out a free one-week supply of Extenze for nothing more then the cost of a postage stamp. You can contact them directly at 800-491-4533. I recommend any man healthy enough to engage in sexual activity should try Extenze. You have nothing to lose but a lot to gain. ★

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women have higher standards.

They asked nearly 1,000 male and female students from the U.S., Germany, and Italy to rate the likelihood of having a one-night stand with someone who propositioned them and was either slightly unattractive, moderately attractive, or exceptionally attractive. Looks had no effect on a man's decision to have casual sex, while most women required that her potential sex partner be exceptionally attractive. The study also found differences between countries. Italian and American men would sleep with anything that moved, while German men were more selective. *(Medical News Today, August 12, 2009)*

Most Guys Prefer Average-Shaped Women

Soft-porn magazines such as Playboy and Penthouse are full of large-breasted women with small waists and curvaceous butts. While men love to look at these photos, they are not the kind of women they prefer.

An Australian study of the body preferences of 100 men showed that most guys prefer women with normal body shapes. They were shown 201 line drawings of female torsos with different size hips, waists, and shoulders. Overwhelmingly, the men chose torsos of average-shaped women. The men also gravitated toward average body shapes when shown photos of Playboy centerfolds, Australian escorts, and average Australian women. The study showed that a large gap exists between sexual fantasy and reality. *(New Scientist, June 13, 2009)*

Premature Ejaculation May Be A Genetic Disorder

Premature ejaculation (PE) is the most significant sexual problem in men— more prevalent than erectile dysfunction, low sex drive, delayed or inhibited orgasm, or physical abnormalities of the penis. It affects more than 30 percent of men and is psychologically traumatic for men and women. Men feel sexually inadequate and less masculine. PE destroys self-confidence and can ruin current and future relationships. Psychological counseling and numbing gels are the most common treatments, but neither method works very well.

A Finnish study found that PE is partly a genetic disorder. They studied 3,946 twins and their brothers. When one twin had PE, the other twin was more likely to suffer from the problem than an older or younger brother (identical twins have the same genes). Scientists might be able to develop drugs that can influence the genes controlling ejaculation. *(International Journal of Impotence Research, 21: 62-67, 2009)*

Guys with ED Have Shorter Dicks

More than 50 percent of men over 40 have moderate-to-severe erectile dysfunction (ED). To add insult to injury, they also have shorter penises. Egyptian researchers from Cairo University, in a study of more than 1,000 men, found that stretched penis length was more than one-half-inch shorter in men with ED than in normal men (4.4 inches vs. 5.1 inches), while stretched penis girth was similar (3.4 vs. 3.5 inches).

In both groups, penis length and girth were highly related. The study agreed with research on men from North America, showing that the foot-long club celebrated in porno movies is largely a myth. Few men are hung like racehorses. Male porno film stars with mutant dicks have given inferiority complexes to a whole generation of young men raised on adult films. *(Journal Sexual Medicine, 6: 2305-2310, 2009)* ■

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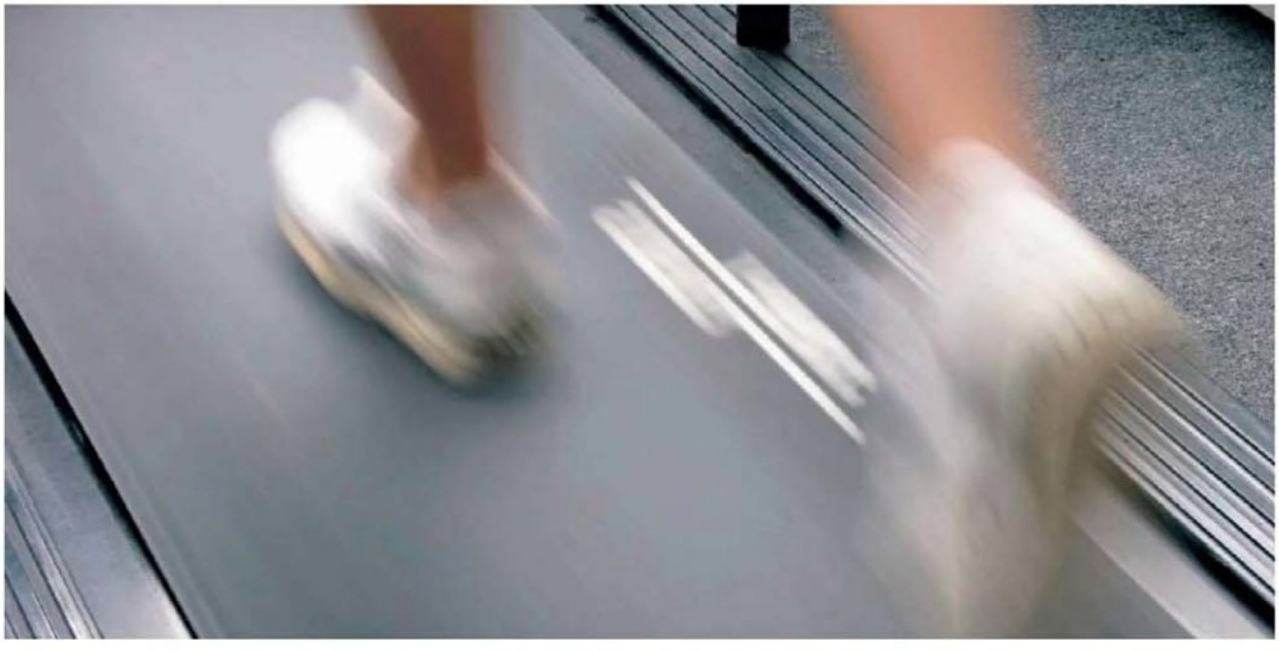
By Thomas Fahey, Ed.D.

EXERCISE INTENSITY AND BURNING FAT

You've Gotta Move It to Lose It



Sixty percent of men are overweight, and most will remain that way because they don't have the willpower or knowledge needed to lose bodyweight. That's understandable, because we live in a no-fault society that makes it easy not to take responsibility for anything. It's painless to blame an expanding midsection and gigantic butt on genetics, time restraints, and hectic schedules with no time to exercise and eat right. Also, guys hear so much conflicting information about diet and exercise that it's difficult to know what to do. The fact is, however, is that obesity is not inevitable— millions of people face challenges, yet manage to stay lean and fit.

Some experts think the obesity epidemic is unsolvable, and that America is destined to drown in its own fat. That's a copout. We have not always been a nation of fatties, and people in many countries around the world are still largely lean and fit. A new spectator sport in some countries is to go to the airport and count the number of fat Americans getting off airplanes. Don't be imprisoned by excess fat. Exercise vigorously and watch what you eat, and in six months you can have a lean, ripped physique.

How Much Exercise for Weight Loss?

In 1996, the U.S. Surgeon General's office recommended that people exercise moderately for 30 minutes, preferably every day of the week. Acceptable activities included mowing the lawn, waxing the car, walking from the car to the supermarket and gardening. This was a far cry from past recommendations that asked people to exercise 20-60 minutes, three to five times a week, at 60-85 percent of maximum effort!

Why did the Surgeon General's report recommend less intense exercise than before? They sold out! Only 12 percent of Americans followed vigorous exercise programs. Rather than tell the truth about how much exercise people really need, they reduced the exercise recommendations so more people would exercise. They reasoned that getting many people in the country to do some moderate-intensity exercise was better than a small group of people exercising intensely.

What's happened since the 1996 Surgeon General's exercise report? Obesity rates skyrocketed and people are no more active than they were then. In some states, obesity rates have climbed more than 100 percent in only three

years. To make matters worse, people no longer had to feel guilty about not exercising vigorously because the Surgeon General's office told them it was OK not to. In separate reports, the U.S. National Academy of Sciences and the World Health Organization recognized that exercising moderately for 30 minutes a day will not help people lose weight, let alone make them look lean and fit. So, each group recommended that people exercise 60 minutes or more per day.

Americans do not want to be fat. The mega sales of books such as *The South Beach Diet* and the success of television shows such as "The Biggest Loser" shows that Americans want to be healthy looking and have nice-looking bodies. Unfortunately, most of us aren't willing to work hard enough to achieve these goals.

So here's the defining question: If you are overweight, do you want to stay that way, or are you willing to do the work it takes to create a new you?

Myths and Realities

Elegant studies by Dr. George Brooks at the University of California, Berkeley, showed that the body uses mainly fats for fuel at rest and low exercise intensities. Above 65 percent of maximum effort, the body switches abruptly to carbohydrates and uses much less fat. The rate of fat breakdown in fat cells also decreases with increasing exercise intensity. The best method for losing weight through exercise looks like a no-brainer: Train at low exercise intensity because you'll use fat as fuel. The studies suggest that the longer you exercise, the more fat you use as fuel and the more body fat you'll lose. Exercise equipment manufacturers have taken note of these studies and have included so-called 'fat-burning zones' programmed into treadmill workouts that have people exercising at 30-60 percent of maximum effort.

The real answer to the question of how to lose fat through exercise is not so obvious. True, you use more fat as fuel when you exercise moderately. But you lose more body fat when you exercise intensely during a 24-hour period because you use more fat for fuel and increase metabolism (increase calorie use) more *after* exercise. Also, you burn more calories during the exercise itself. *The total daily energy use is more important for fat loss than the kinds of fuels used during exercise.*

You lose fat by using more calories than you take in. You will burn many more calories training intensely than exercising slowly. The body does not metabolize fats by themselves. Rather, fat use is integrated with carbohydrate and protein metabolism. Even if you use more fat during exercise, fuel storage balances itself out according to energy balance— calories in versus calories out. Intense exercise causes you to burn more calories and fat after the exercise is over. So, when trying to lose fat, work harder and burn more calories.

Also, intense exercise builds muscle tissue, particularly if you include weight training in your program. Muscle uses more calories than any other tissue in the body. So, the more muscle you have, the more calories— and fat— you will use.

As stated, intense exercise increases fat use after the exercise is over. You use the readily-available carbs during intense exercise, then switch to fats during recovery. The body uses more fats as fuel after an intense workout than after an easy one. Intense exercise increases post-exercise metabolism more than light exercise. Run for an hour at 70-80 percent of maximum effort and you get an extra post-exercise calorie-burning bonus of nearly 100 calories!

What the Research Tells Us

Guys are much more sophisticated about new weight-loss programs than they used to be. They are less apt to fall for dramatic weight-loss claims made by supermarket tabloids. The fact that exercising intensely will help you lose fat faster than any other weight-loss plan is supported by studies on animals and humans. →

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The benefits of intense exercise have been supported by a series of studies conducted for more than 10 years at Laval University in Canada. These results suggest people who train intensely have more muscle and less fat than those who exercise at lower intensities. People exercising more intensely in these studies lost much more body fat, even though they exercised for less time than a moderate-intensely training group.

Researchers from Duke University led by Dr. Cris Slentz found similar results in a study published in January, 2004. This eight-month study showed that people could lose weight through exercise alone— without dieting (the average energy intake was slightly more than 2,000 calories per day). People who exercised intensely lost much more fat than those who trained moderately. However, even moderate intensity exercise caused some fat loss.

A notable exception to these findings was a study published in the prestigious *Journal of the American Medical Association* in September, 2003, by researchers from the University of Pittsburgh, led by Dr. John Jakicic. They found that exercise duration or intensity had no effect on weight loss in obese subject. Moderate exercise was just as effective as intense or long-duration exercise. The major problem with the study was that the workouts were not supervised. Many people, particularly those who are severely overweight, feel uncomfortable training intensely unless they are closely supervised. Also, the study didn't measure changes in body fat, only weight and body mass index (determines if weight is proportional to height).

You use more fat as fuel when you exercise slowly, but you lose more body fat when exercising intensely. High-intensity training, particularly when using interval training (bouts of intense exercise interrupted by rest), increases release of fat from fat cells, fat use for fuel and metabolic rate after exercise more than low- or moderate-intensity exercise, so you lose more body fat. Also, high-intensity exercise decreases appetite more than moderate or low-intensity exercises. You're interested in the bottom line: Does the program help you lose fat and make you look lean? Overwhelmingly, research studies show that intense exercise is best for losing fat.

Losing Body Fat with High-Intensity Exercise

Train intensely, combining cardio, interval training and weight training, and you will lose weight and keep it off. Combine your program with a well-balanced diet. Do not follow a strict low-carbohydrate diet, such as the Atkins or South Beach diets. They may not provide the carbs you need to train intensely. With this program, you won't have to worry about excess carbs: You will metabolize them rapidly during exercise and then chip away at your body fat for the rest of the day. As with any exercise program, begin conservatively and progress gradually. Below are some important principles for getting the most from an intense workout program.

- **Do 60-90 minutes of cardio at 60-85 percent of maximum effort, three to five days per week.** This will burn about 500-1,000 calories a day, which is enough to get rid of about a pound of fat per week if you train five days per week. That doesn't sound like a lot, but you will lose fat and not muscle. What's more, you will lose weight and it will stay off. Add a sensible diet to the equation and you will rid your body of excess fat before you know it.
- **Include interval training in your workout.** Interval training includes intense running (sprinting) interrupted by periods of rest or light exercise. If training on gym equipment, such as a treadmill or elliptical trainer, exercise intensely for one minute at near-maximum intensity, rest for one minute, then repeat six to 20 times (depending on your fitness level). If training on an outdoor running track, begin by sprinting the straightaways and walking the turns. As you increase fitness, increase the distance of your sprints to 200 meters and then 400 meters. (Rest one to five minutes between sprints). You will notice rapid increases in fitness and fat loss with this kind of training.
- **Train with weights at least two days per week.** Weight training increases muscle mass that will give you a higher metabolic rate. More muscle mass means you burn more calories during the day. Also, you'll look lean and fit if you have more muscle. Train hard!
- **Stretch after you workout, when the muscles are warm.** Maintaining flexibility will help you prevent injury and maintain normal range of motion in the joints. Stretch after exercise during the cool-down period rather than before.
- **Eat a well-balanced diet.** Your diet should contain a variety of foods. Include wholesome foods, such as fruits, vegetables, lean meats, whole grains, monounsaturated oils, nuts and fish. Avoid simple sugars and saturated and trans fats. A diet that's high in protein and fats and low in carbohydrates is not appropriate for this kind of exercise, because you need carbs to train intensely. Low-carb diets work well for people who want to lose weight but are only moderately active.
- **Back off if you get injured.** Intense training greatly increases the risk of overuse injuries. People who train intensely ride a thin edge between peak performance and injury because they push hard all the time. Back off on the program when your knees, Achilles tendons, hips, or back hurt. Take a few days off and then begin again at a lower intensity.

Train Intensely and Lose Weight Fast

You can lose weight and look fit and healthy if you're willing to pay the price. Losing 10, 20, 30 pounds or more is no problem if you follow a few basic principles and stick with the program. More importantly, you can maintain your new weight. If you start today, one year from now there will be a new you. You will be thinner, healthier, and you will look terrific. The ball is in your court. So, promise to make fitness and diet a priority in your life and you will achieve the kind of body you want.

High-Intensity Exercise for Fast Fat Loss

Build up to this program; begin with walking and light weight training if you haven't been exercising. Increase the volume and intensity of your program gradually.

MONDAY

• ***Cardio*** (track or treadmill running, cycling, elliptical trainer, etc.) 60-90 minutes at 60-85 percent of maximum effort.

TUESDAY

• ***Weight Training*** (1-3 sets of 10 repetitions for 8-10 exercises, emphasizing the major muscle groups of the body).

WEDNESDAY

• ***Interval Training*** (six 200-meter sprints at 90 percent of maximum effort, resting three minutes between sprints; or 10 one-minute sprints on an elliptical trainer, with one minute rest between intervals).

• ***Cardio,*** 45 minutes at 60-85 percent of maximum effort.

THURSDAY: ***Rest***

FRIDAY

• ***Weight Training*** (1-3 sets of 10 repetitions for 8-10 exercises, emphasizing the major muscle groups of the body).

• ***Cardio,*** 45 minutes at 60-85 percent of maximum effort.

SATURDAY

• ***Interval Training*** (six 200-meter sprints at 90 percent of maximum effort, resting three minutes between sprints; or 10 one-minute sprints on an elliptical trainer, with one minute rest between intervals).

• ***Cardio,*** 45 minutes at 60-85 percent of maximum effort.

SUNDAY: **Rest** ■

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OLYMPIC GOLD

TRAIN WITH THE GREATEST ATHLETE IN THE WORLD, BRYAN CLAY 2008 GOLD MEDAL DECATHLON CHAMPION

By Thomas Fahey, Ed.D., Photography by Per Bernal

What do Muhammad Ali, Babe Ruth, Michael Jordan, Tiger Woods, and Bryan Clay have in common? All appeared on the Wheaties box. The short list of people who appeared on the famous cereal box are the very best athletes in history. As winner of the Olympic gold medal in the decathlon at the Bejing Olympics in 2008, Bryan Clay earned the reigning title of 'World's Greatest Athlete.'

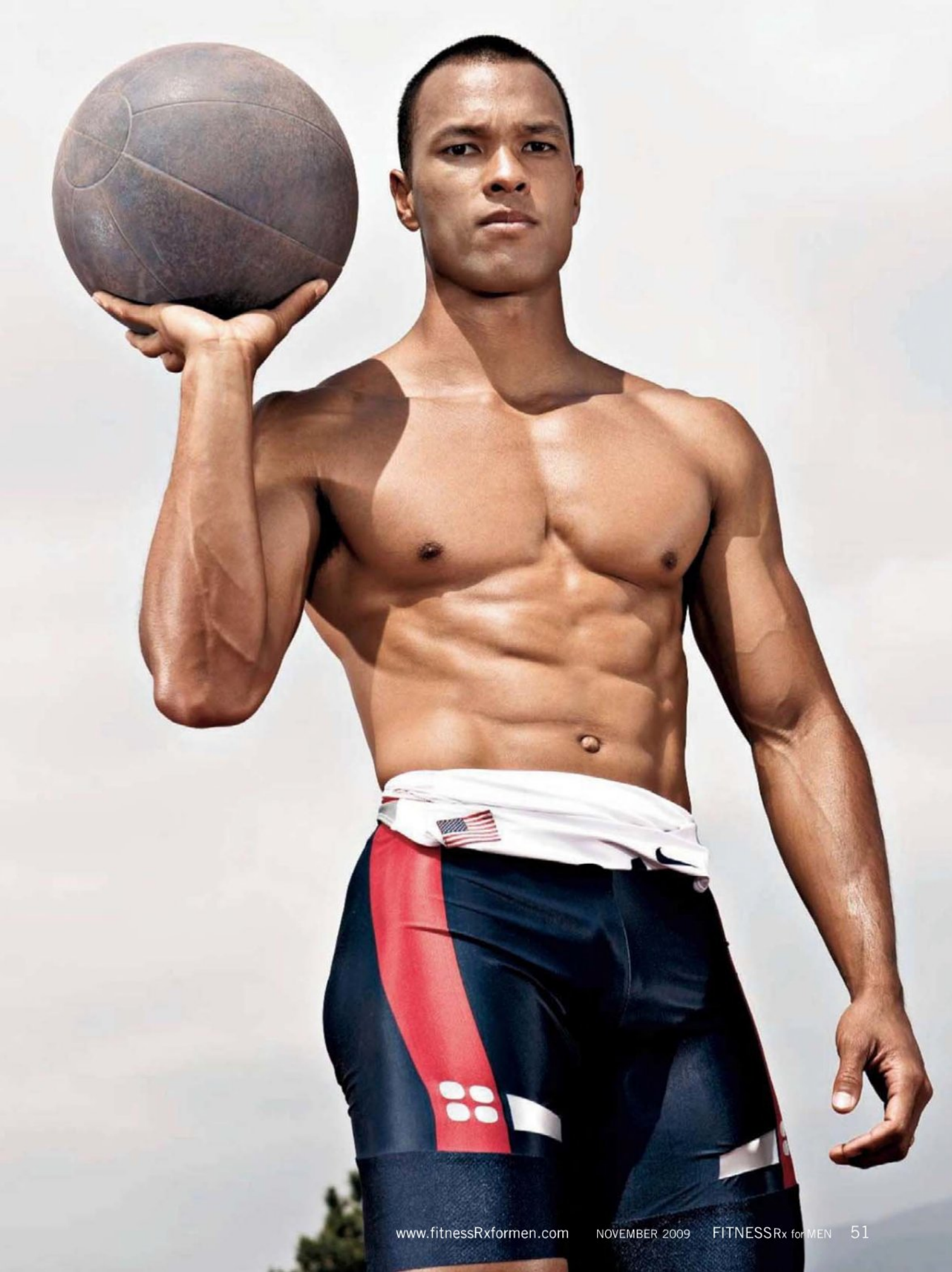
Bryan Clay typifies the Olympic ideal in dedication, determination, self-sacrifice, and physical excellence. He is a man on a mission: in an interview with *FitnessRx for Men,* Bryan said, "My goal is to set a world record every time I set foot on the track. I am going to win the World indoor multi-event championship in Doha, Qatar in March 2010 and plan to win a medal at the 2012 Olympics in London."

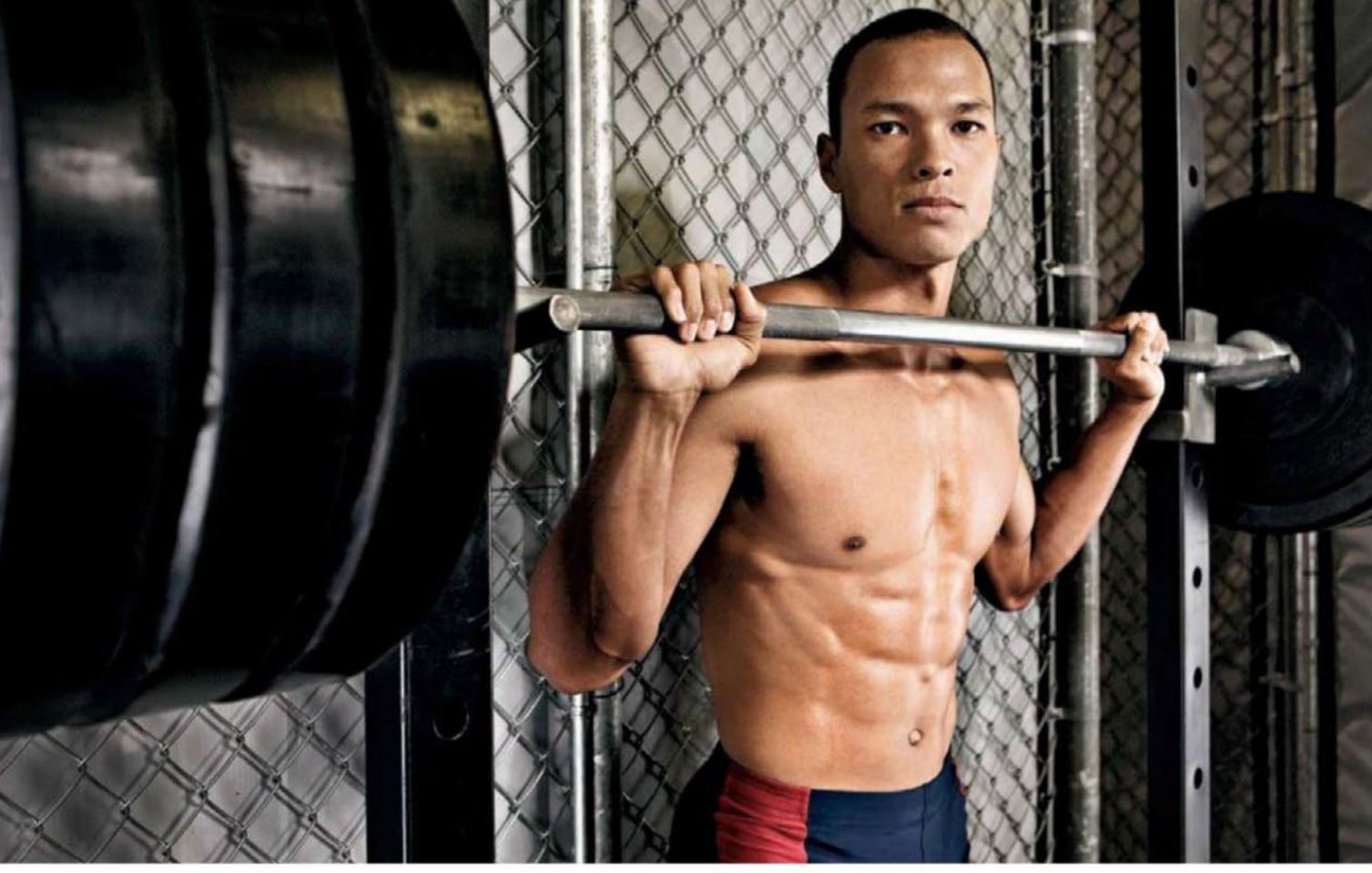
Bryan is not blowing smoke about the world record. He would score 9,333 points if he could match his personal bests in each event in the decathlon— a whopping 307 points better than the current world record of 9,026 points set by Roman Šebrle of the Czech Republic in 2001 (see table). He has a burning desire to make Olympic history by becoming the first man to win medals in three straight Olympic decathlons, which would overshadow Olympic immortals such as Jim Thorpe, Bob Mathias, Daley Thompson, Bruce Jenner, and Dan O'Brien.

While few people have Bryan's physical talents, we can learn from his functional training methods and mental approach to training, competition, and life. "Great decathletes have the physical capacity to do all the events. I don't do conditioning exercises for specific events such as the discus or pole vault. Rather, I train for strength, power, and speed that can transfer to all the events of the decathlon. Consequently, my workouts are appropriate for anyone trying to achieve all-around peak fitness.

My training program develops well-rounded fitness that gives me the capacity to excel at the varied events of the decathlon and direct every ounce of power in my body to achieve peak performance. I use any technique that will improve my ability as an athlete, including traditional weight training, sprinting, plyometrics, and medicine ball exercises."

Practicing technical events such as the discus, pole vault,





javelin, and hurdles is a critical part of decathlon training but unnecessary for people trying to attain peak power fitness. Bryan Clay's decathlon conditioning techniques can help anyone get stronger, faster, leaner, and more powerful. His methods will help you become more athletic and get better at any sport. His mental approach to training and sports will help you develop the discipline that will take you to the next level in physical fitness and carry over to your daily life.

Bryan Clay is the best of the best. He possesses a unique combination of genetics, mental toughness, power, strength, endurance, and speed that the average person could never approach. While most of us will never win Olympic gold in the decathlon, we can use many of Bryan's training methods to improve physical fitness and use his mental approach to the sport to reach new levels in performance. You might not perform like Bryan Clay, but you can use his training techniques to increase physical fitness and athleticism and improve your psychological approach to exercise and sports.

BRIAN CLAY'S OLYMPIC DECATHLON TRAINING SECRETS

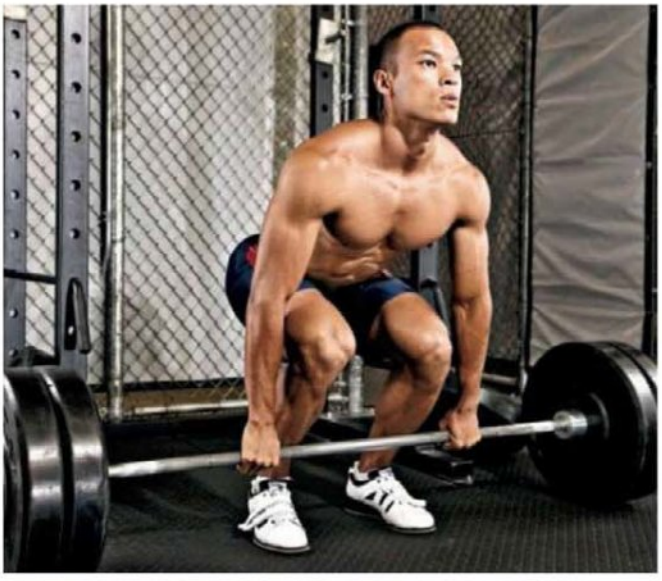
Bryan could win almost every event at a typical college track meet. He is only 5'11" and 185 pounds— yet throws the discus, shot put, and javelin as far as college throwers weighing 50 to 100 pounds more than him, and high jumps like guys 6'6" inches tall. He produces world-class performances in the long jump and sprints and does a decent job running the 1,500 meters. His strongest events are the 100-meter sprint, long jump, 110-meter hurdles, shot put, and discus, but his technique is excellent in all the events. How does he do it?

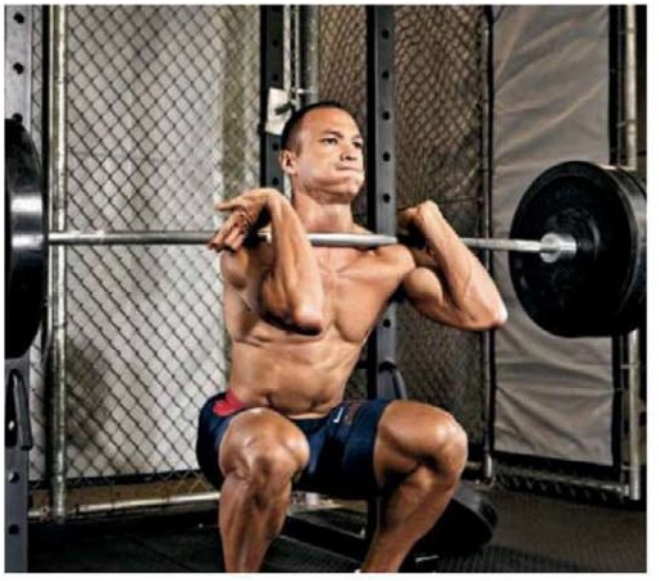
Basic Strength: Bryan is stronger than most decathletes. He puts in a lot of time in the weight room, developing basic strength in traditional lifts such as back squats, front squats, deadlifts, cleans, jerks, and snatches. Good strength serves as the foundation for power. Sports scientists have found a high relationship between raw strength and power in movements such as sprinting, jumping, and throwing. He tries to push the weights explosively, even when doing heavy singles, doubles, and triple repetition sets (maximum lifts).

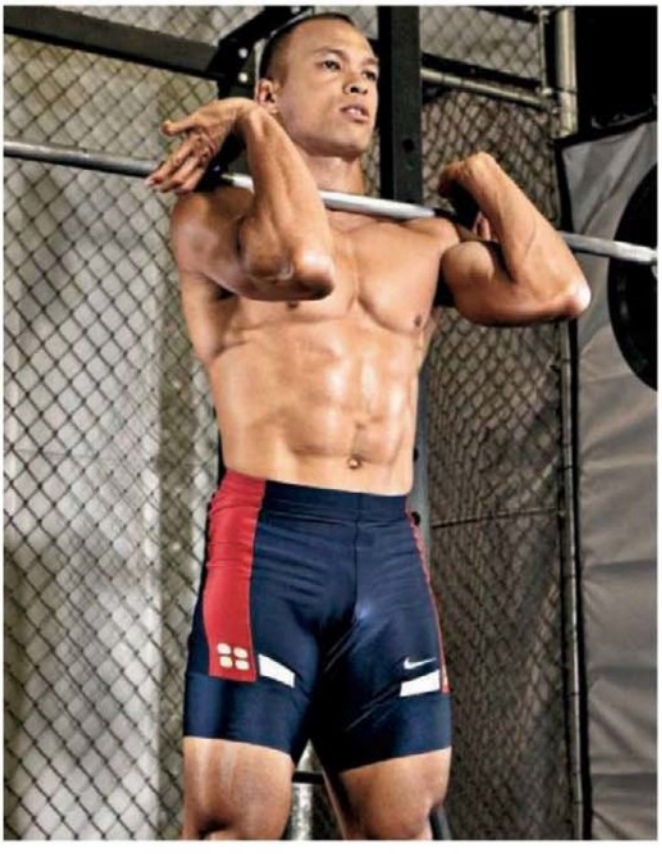
Your program should include basic free-weight lifts such as back squats, front squats, cleans, and deadlifts. These will build strength that will serve as the foundation of a functionally fit body. Train with weights 2-3 days per week. Always train explosively, even when using heavy weights.

Speed and Power: Bryan builds speed and power systematically. He does a variety of speed-power exercises that include medicine ball rebound training, interval training, plyometrics (e.g., plyo box jumps and squat jumps), sprint overload training, sled-pulling, hill sprinting, and weight throwing. He changes his program throughout the year so that he builds all-round fitness for the diverse requirements of the decathlon.

Bryan said, "The other events suffer if I overemphasize one or two events over the others. I am stronger than most decathletes, so I enjoy lifting heavy weights. I have to fight this because I end up gaining too much bodyweight. I try to balance raw strength with speed and power so that







I do well in all the events."

In your program, do speed and power exercises 2-3 days per week. Coaches have developed hundreds of exercises to build speed and power. Don't try to do them all. Select a few and don't do too much volume. These exercises can cause severe injury and overtraining, particularly if you are unfit or do too much volume. Start off slowly and build up. Quality of training is more important than quantity.

Psychology of Training: Bryan has incredible focus and drive. He is extremely serious and passionate about training and competition and approaches the decathlon with the precision and excellence of a brain surgeon. He is a master technician and approaches the decathlon meticulously.

It has been said that 90 percent of success in life is showing up. Bryan has taken this maxim to extremes. He weight trains from 7 to 9 a.m.; visits with his wife and children from 9 to 10 a.m.; and then trains for his events from 11 a.m. to 3 p.m. He spends hours watching videos of great athletes in each of the 10 events and compares them with videos of his own technique. He makes changes and then watches more videos. In short, he is extremely disciplined and systematic and believes strongly that there's no shortcut to success.

Follow Bryan's example and develop training discipline. Try not to miss workouts (unless you have the swine flu). Train intensely and resist the temptation to socialize in the weight room or on the track. Be disciplined enough to start again if you miss a few workouts due to work, boredom, or injury.

Maintain a training diary. This will make you accountable to yourself and help keep track of your workouts. Write out a workout schedule at least six weeks in advance and try to stick with it. Don't be afraid to change your program slightly by altering resistance, reps, sets, and rest to account for unexpected changes in fitness, injury, or overtraining. A structured training program will speed progress and help you train more systematically. Build rest days into your program, rather than resting when you don't feel like working out.

Bryan is confident about his ability. During my interview with him, he very matter-of-factly said that he was going to win the World Indoor Championship in Qatar in March, break the world record, and win an Olympic medal in London in 2012. His attitude is typical of great Olympic champions. In the Olympics or World Championships, many athletes hope they are going to win; the champion knows he's going to win. Bryan did not come across conceited or arrogant. He has a deep belief in his abilities and isn't ashamed to say so.

You will become confident in your abilities as you achieve success. You don't have to win a gold medal in the decathlon to taste success. Winning is a personal thing. Success might be losing 10 pounds, running faster, or lifting more weight. Achieving even small successes is the greatest feeling in the world.

Meeting a series of short-term goals builds confidence. If you want to lose 50 pounds, ask the question: "When am I going to lose 2 pounds?" If you bench press 200 pounds and want to bench 300, when are you going to bench press 210 pounds? Yard-by-yard is hard; inch-by-inch is a cinch!

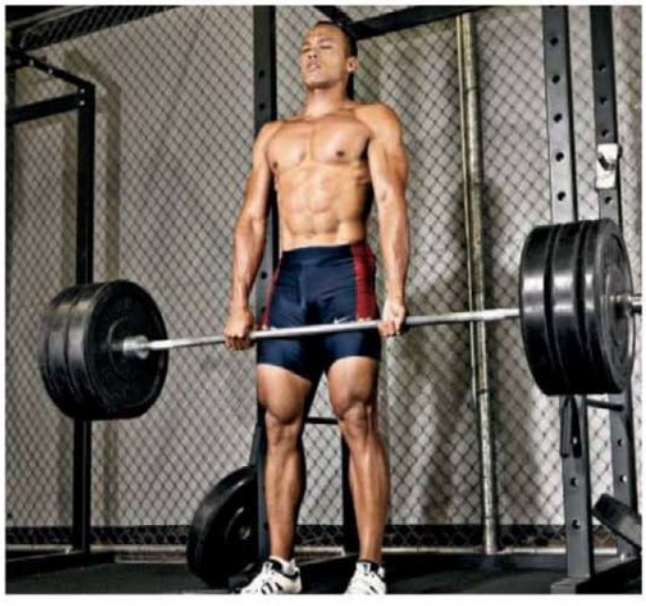
Experience and preparation are the keys to genuine self-confidence. Experienced athletes like Bryan Clay put training and sports in their proper perspective. He knows his capabilities and is able to deal with the pain of training and injury. Success is a natural extension of experience and thorough preparation. Bryan extends his self-confidence into his performances— and wins because of it.

THE OLYMPIC DECATHLON WORKOUT: APPLYING DECATHLON TRAINING METHODS TO YOUR FITNESS PROGRAM

The decathlon includes 10 high-power events that require fitness, strength, speed, and endurance. Most people don't have the desire, time, motivation, or skill to learn these technical events. However, people who seek optimal performance and superior levels of conditioning can develop well-rounded, functional fitness using decathlon training methods that will prepare them for almost any physical challenge.

This workout is an example of a decathlon training program that has been adapted for people who don't compete in the event. Follow this program for only a few months and you will be amazed at how fast you develop a lean, toned, functionally fit body. This workout requires commitment and discipline. It will improve fitness for sports and prepare you for recreational activities such as skiing, hiking, and climbing.

Combining the physical and psychological approaches of Bryan Clay will give you the look and feel of a trained decathlete. *The Olympic Decathlon Workout* includes weight training on Monday and Friday and power, speed, and endurance exercises on Tuesdays, Wednesdays, and Thursdays. Rest on Saturday and Sunday. Feel free to change the program structure to accommodate your schedule, but do not eliminate the rest days.



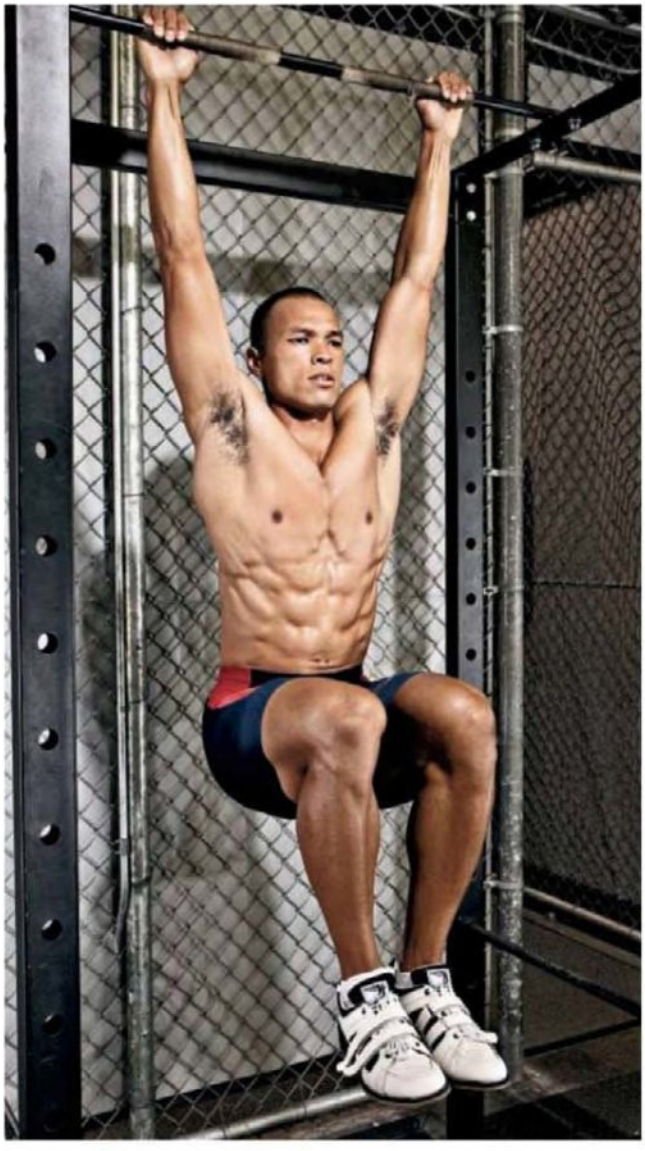
Weight Training: Monday and Friday

This workout combines high- and moderate-intensity weight training exercises that include kettlebell swings, front squats, cleans, deadlifts, pull-ups, kettlebell clean and press, back squats, and hanging leg lifts. The exercises, sets, and reps vary each day. Lift as much weight as you can while doing the exercises. Use proper form and try to complete the assigned sets and reps for each exercise. Warm-up before you begin exercising, by walking or jogging slowly on a treadmill for several minutes, performing gentle range-of-motion exercises, or lifting light weights. Don't stretch until after the workout. Cut back on sets and reps if the workout is beyond your current fitness level.

Kettlebell swings: Use a 16 kg kettlebell— larger if you are fit and strong. Stand a foot or so behind the kettlebell, sit back, and grasp the handle with both hands. With your weight on your heels, swing the kettlebell backward so that it pendulates (rocks back) fairly close to your groin. Drive the hips forward and contract the quads, glutes, pelvic floor, and abdominal muscles, which causes a rapid acceleration of the kettlebell upward toward the shoulders.

Exhale sharply (but not fully) at the top of the swing, to accentuate the bracing motions of the major muscles in the core and lower body. Keeping the spine in an upright neutral position (i.e., maintaining the natural spinal curve), let the kettlebell accelerate downward as you flex your hips, bend your knees, and maintain straight arms. Do 2 sets of 20 reps, resting one minute between sets.

Cleans: Place the bar on the floor in front of your shins. Keep your feet approximately shoulder-width apart. Use a pronated grip (palms toward the body) and grasp the bar with your hands at shoulder-width and squat with your hips flexed; keep your arms and back straight and your head in a neutral position. Pull the weight up past your knees to your chest while your hips drive forward (extend) and shoulders move upward. After pulling the weight as high as you can, bend the knees suddenly and catch the bar on your chest at



a level just above your collarbone, with elbows out and bar resting on the ends of your fingers.

Stand up straight with the bar at chest level. Re-grasp the bar and return it to the starting position. The main power for this exercise should come from your hips and legs. Think of the middle phase of the lift as a vertical jump. This makes you drive up the weight with your legs, rather than your arms. Do 3 sets of 5 reps at 65 percent effort on Monday and 3 sets of 5 reps at 80 percent effort on Friday.

Deadlifts: This exercise involves lifting a weight from the floor to waist level. Grip the barbell with a deadlift grip (one palm in, one palm out), squat down with your hips back (flexed) and weight on your heels, and arms straight; lift the weight by driving your hips forward and extending your knees with your back straight until you can stand upright with your shoulders back. Return the weight to the starting position by flexing (bending) your hips and keeping your back straight. Hinge at the hips and not at the back during this exercise. Do 3 sets of 5 reps at 80 percent effort with a 3-minute rest between sets.

Pull-ups: Hang from a bar with hands placed shoulder-width apart and palms facing away from your body. Pull up explosively (without swinging your legs) until your chin goes over the bar. Do 2 sets of 5-10 reps, resting 3 minutes between sets. Add weight (hang weight plate from a chain wrapped around a weight belt) when you can do 10 reps easily. If you can't do 10 pull-ups, use a spotter or pull-up assist machine and build up gradually until you can do the full workout.

Kettlebell clean and press: Grasp the handle, using a pistol grip (handle perpendicular to the body) and do not bend at the wrist. Lift and swing the kettlebell backward, with hips flexed, knees bent, and spine upright (maintaining the natural spinal curves). Keeping the elbow close to the body, drive the hips forward and contract the quadriceps, glutes, pelvic floor and abdominal muscles to initiate an upward movement of the kettlebell. 'Cheat curl' the kettlebell to shoulder level as you snap your hips at the top of the movement.

Pause in the clean (rack) position, with quads contracted and spine in a tight, neutral position. Keeping your shoulder down, press the kettlebell overhead and lock out

your elbow completely. Lower the kettlebell to your chest and then swing it between your legs as described previously (maintaining a neutral spine) and repeat the exercise. Do 3 sets of 10 reps with a 1-minute rest between sets.

Front squats: Stand with your feet slightly wider than shoulder-width apart and toes pointed slightly outward. Rest the bar on the upper part of your chest, holding the bar on the ends of your fingers, and hold your elbows up. Keep your head in a neutral position, chest out, shoulder blades squeezed together, and back straight and tight.

Squat down (under control) until your thighs are approximately parallel with the floor and your butt is about 1" lower than the knees. Let your legs spread naturally during the motion; think of squatting between your legs. Drive upward toward the standing position, keeping your back in a fixed position throughout the exercise, elbows up, and hinge at the hips, rather than the back. A general strategy for this lift is to go down slowly and up quickly and explosively. Do 3 sets of 10 reps at 60-70 percent maximum effort (i.e., weight).

Hanging leg lifts: Hang from a pull-up bar. Lift your knees in front of you until your thighs are parallel with the floor; hold the position; lower your legs to the starting position under control. You can also do this exercise with straight legs, provided you have strong ab muscles and don't have back pain. Do 2 sets of 10 reps with a 1-minute rest between sets.

Power, Speed, and Endurance Training: Tuesday, Wednesday, and Thursday

These exercises develop power, speed, and muscle endurance. Exercises include sprint starts, medicine ball exercises, standing long jumps, plyo box jumping, stadium stairs, sprints, and jogging. Except for jogging, do the functional training exercises as explosively as you can while maintaining good technique.

Explosive Exercises: Tuesday and Thursday

Warm-up: Jog 400 meters (one lap around a standard track) to warm up.

Sprints: 4 laps; sprint straight-aways and walk the turns. Don't sprint at 100 percent effort until you are conditioned. Start off with gentle strides and build up gradually to full-effort sprints. Begin with 2 laps (four 100-meter sprints) and progress to 4 laps (eight 100-meter sprints).

Sprint Starts: Use starting blocks if possible. You can also do starts on a flat track without blocks or on a grass field. Begin with 3 sprint starts and progress to 10 starts, as you increase fitness. After a few weeks, have someone time your starts to gauge progress.

"On your marks" position: Your feet are staggered 10 to 14 inches apart, with your front foot placed approximately 20 inches from the starting line. Your strongest leg should be in the forward position in the blocks. Try to relax in this position.

"Set" position: Raise your back and hips. Your front leg bends about 90° and your rear leg 120°. Your back is flat, and your hips are slightly higher than your shoulders. Contact the

ground with your fingertips, which raise your shoulders as high as possible. Don't put too much weight on your fingertips.

"Go": Raise your shoulders to direct force with your front driving leg through the length of your body. Drive the front leg fully so your body forms a straight line from your hip to your heel. Push your rear foot hard against the block or ground as you drive your knee forward. As you drive forward, the arm on the side of the front foot drives straight forward, while the rear foot arm drives straight backward. Both arms are bent approximately 90° to 110°. Try to extend fully with your hips and knees and use your arms dynamically during the driving phases of the movement. After the start, run as fast as possible for 5 strides.

Medicine Ball Throws: Do these exercises with a medicine ball, shot, or heavy stone (5-30 pounds).

Overhead Throw: Stand with your back to the direction of the throw, holding the ball in both hands with your knees bent, hips flexed, arms straight, and spine neutral. Throw the ball over your head and behind you as far as possible. Extend fully with the ankles, knees, hips, and arms and jump from the ground as you throw the ball. Take 10 throws, resting 30 seconds between each repetition.

Underhand throw: Stand facing the direction of the throw, holding the ball in both hands with your knees bent, hips flexed, arms straight, and spine neutral. Extend fully with the ankles, knees, hips, and arms and jump from the ground as you throw the ball. Take 10 throws, resting 30 seconds between each repetition.

Standing long jumps: Do this exercise into a long jump pit, on the grass, or gym floor. Stand with your feet shoulder-width apart and toes just behind the starting (scratch) line. Bend your knees and bring your hands below your waist, then 'explode' forward as far as you can during the jump. Try to extend fully with your ankles, knees, hips, and arms before you land. Do 10 repetitions with 30 seconds rest between jumps.

Plyo box jumps (24" box, bench or stadium bleachers): Stand facing a 24" plyo box. Jump onto the box and then back to the starting position. Do this movement as quickly as you can, while maintaining control. Do 2 sets of 10 reps with 60 seconds rest between sets. Make sure you are jumping on a stable surface to avoid injury.

Stadium Stairs: Sets and reps for this exercise are difficult to gauge because of differences in stadium sizes. Run up stadium stairs or a flight of stairs as fast as you can, pumping your arms and legs as you run. Walk down the stairs. Run stadium stairs for 10 minutes.

Jogging: Jog one mile at a comfortable pace.

PUTTING IT ALL TOGETHER

Bryan Clay is the world's greatest athlete. You can use his physical and mental approaches to training to increase fitness, improve self-discipline, and improve health. This program is fun and exciting and will give you a taste of what Bryan Clay goes through to prepare for the Olympics.

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THE OLYMPIC DECATHLON HIGH PERFORMANCE WORKOUT

This workout includes a combination of weight training exercises and whole body functional exercises that build strength, power, speed, and endurance. It will build fitness, while improving muscle tone and cutting fat. This workout is only a sample of some of Bryan Clay's favorite exercises. For variety, use the training principles outlined in this article and choose other exercises when designing your program. Always warm-up before training and cool-down when you are finished. Adjust number of exercises, sets, reps, and rest intervals according to you fitness and health (e.g., injuries, illnesses, training status).

Monday: Weight Training (train explosively)

Kettlebell swings (16 kg kettlebell): 2 sets of 20 reps, 1-minute rest between sets

Cleans: 3 sets of 5 reps, 65 percent effort, 1-minute rest between sets

Deadlifts: 3 sets of 5 reps, 80 percent effort, 3-minute rest between sets

Pull-ups: 2 sets of 5-10 reps, 3-minute rest between sets

Kettlebell clean and presses (16 kg kettlebell or whatever you can handle): 2 sets of 10 reps, 1-minute rest between sets

Front squats: 3 sets of 10 reps at 60-70 percent effort, 2-minute rest between sets

Hanging leg lifts: 2 sets of 10 reps, 1-minute rest between sets

Tuesday: Power, Speed, and Endurance Training

Warm-up: jog 400-meters (once around the track)

Sprints: 4 laps; sprint straight-a-way and walk the turns

Sprint starts: 10 reps; rest 30-60 seconds between sets

Overhead throws: 10 reps, 30 seconds between throws

Underhand throws: 10 reps, 30 seconds between throws

Standing long jumps: 10 reps, 30 seconds between jumps

Plyo box jumps: 2 sets of 10 reps, 1-minute rest between sets

Stadium stairs: 10 minutes; sprint up and walk down

Jogging: 1 mile

Wednesday: Active rest (jogging)

Jogging: 1 mile

Thursday: Power, Speed, and Endurance Training

Warm-up: jog 400-meters (once around the track)

Sprints: 4 laps; sprint straight-a-ways and walk the turns

BRYAN CLAY'S PERSONAL BEST AND OLYMPIC GOLD MEDAL PERFORMANCES IN DECATHLON EVENTS

Event	Personal Bests During a Decathlon	Decathlon Performances at 2008 Olympics
100 meters	10.36 seconds	10.44 seconds
Long jump	8.06 meters (26 feet 5 inches)	7.78 meters (25 feet 6 inches)
Shot put	16.27 meters (53 feet 4 inches)	16.27 meters (53 feet 4 inches)
High jump	2.10 meters (6 feet 10 inches)	1.99 meters (6 feet 6 inches)
400m	47.78 seconds	48.92 seconds
110m hurdles	13.74 seconds	13.93 seconds
Discus throw	55.87 meters (183 feet 3 inches)	53.79 meters (176 feet 5 inches)
Pole vault	5.15 meters (16 feet 10 inches)	5.00 meters (16 feet 4 inches)
Javelin throw	72.00 meters (236 feet 2 inches)	70.97 meters (232 feet 10 inches)
1500m	4 minutes 39 seconds	5 minutes 6.59 seconds
Total points	9333	8791
World Record (points)	9026	

Sprint starts: 10 reps; rest 30-60 seconds between sets

Overhead throws: 10 reps, 30 seconds between throws

Underhand throws: 10 reps, 30 seconds between throws

Standing long jumps: 10 reps, 30 seconds between jumps

Plyo box jumps: 3 sets of 10 reps, 1-minute rest between sets

Stadium stairs: 10 minutes; sprint up and walk down

Jogging: Jog 1 mile

Friday: Weight Training (train explosively)

Kettlebell swings (16 kg kettlebell): 2 sets of 20 reps, 1-minute rest between sets

Cleans: 3 sets of 5 reps, 80 percent effort, and 3-minute rest between sets

Pull-ups: 2 sets of 5-10 reps, 3-minute rest between sets

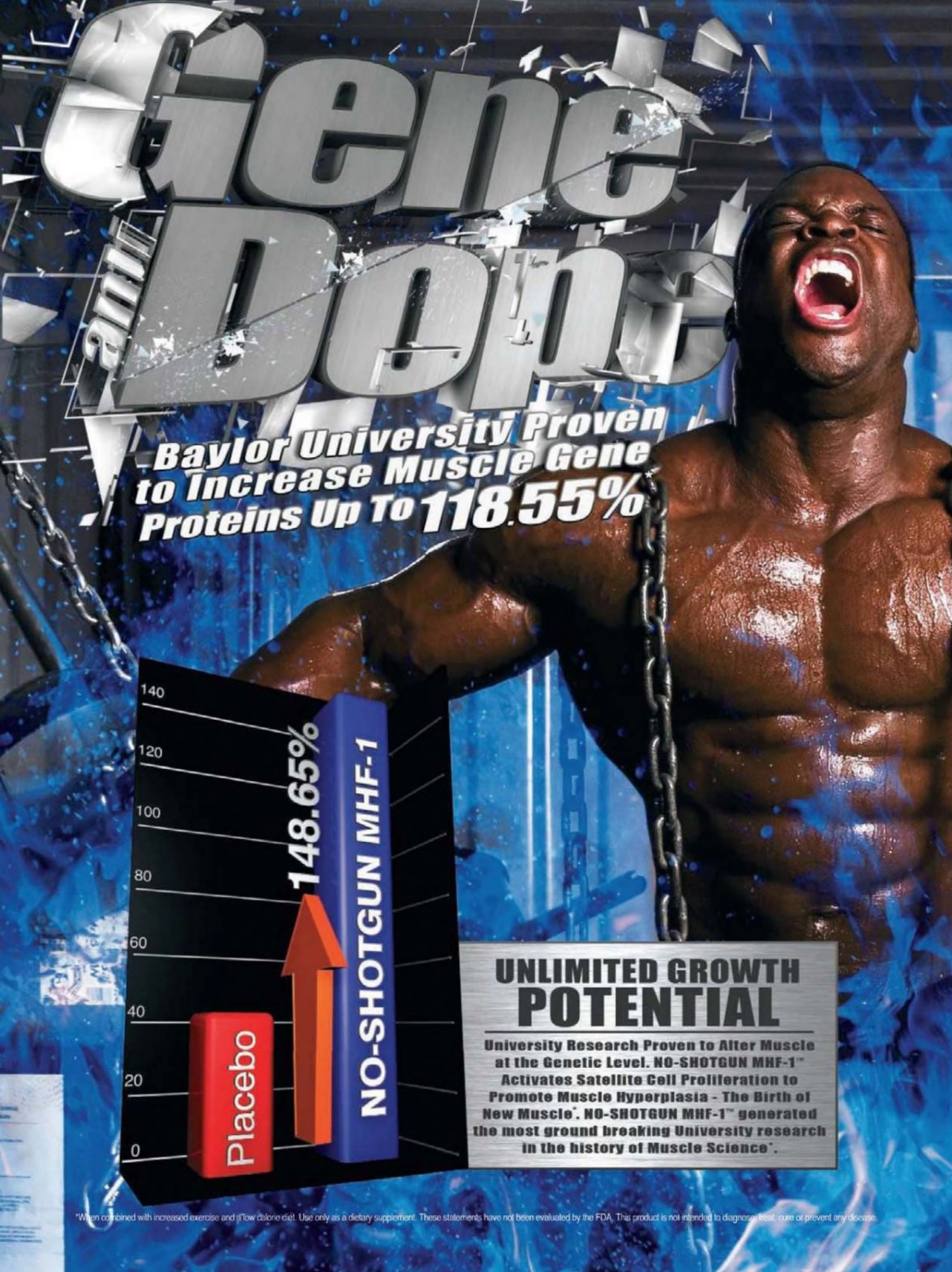
Kettlebell clean and press: 3 sets of 10 reps, 1-minute rest between sets

Back squats: 3 sets of 6 reps at 80 percent effort, 2-minute rest between

Hanging leg lifts: 2 sets of 10 reps, 1-minute rest between sets

Saturday: Rest

Sunday: Rest



*When combined with increased exercise and a low calorie diet. Use only as a dietary supplement. These statements have not been evaluated by the FDA. This product is not intended to diagnose, treat, cure or prevent any disease.

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75
50
25
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Muscle MRF-4 70.91%
Muscle Myf5 54.38%
Muscle Myogenin 71.17%
Myofibrillar Protein 33.11%
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EXOTIC FRUIT FLAVOR
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INCREASE MUSCLE GENE PROTEINS UP TO 118.55%
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OPTIMUM PERFORMANCE WORKOUT

BUILD MUSCLE, LOSE FAT, AND INCREASE POWER AND STRENGTH

By Thomas Fahey, Ed.D.

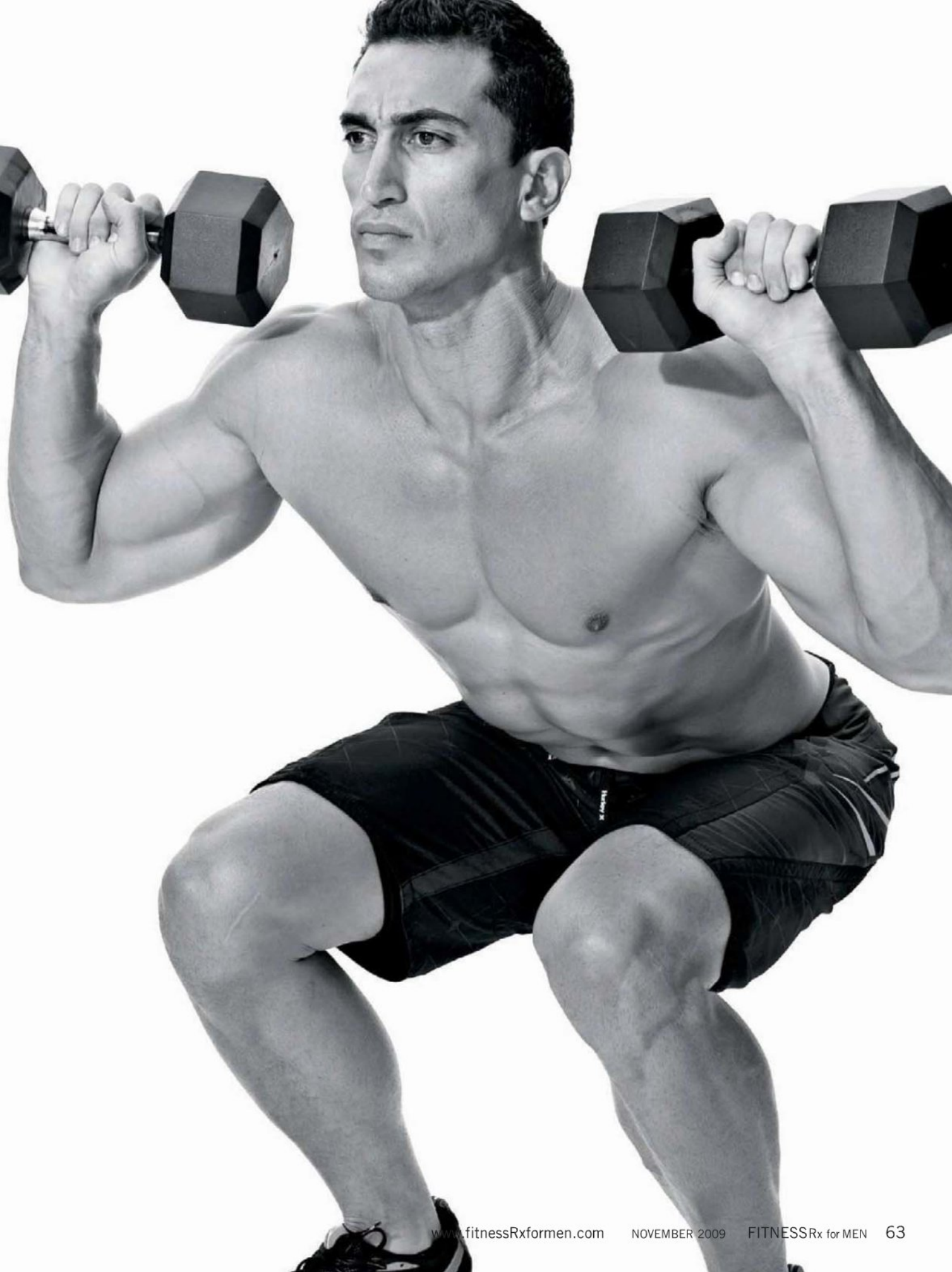
Catherine the Great, the Empress of Russia in the late 1700s, was known for her love of wild sex and lavish lifestyle. Catherine was first-cabin all the way and had little patience for bad news. During a tour of the country, her Minister of the Interior, Grigory Potemkin, built elaborate but fake villages along her route to make her think the country was prosperous and that the people loved her. Today, a Potemkin village describes something that appears significant and impressive but lacks substance. It is similar to 'all hat, no cattle,' 'all lime and salt, no tequila,' or 'all missile, no warhead.' Many men are Potemkin villages: they look athletic and fit, but lack power and coordination when they run, throw a punch, play basketball, ski, or hit a golf ball.

Looking good is important, but it comes with the expectation that you can 'kick ass and take names.' Few things are more pathetic than seeing a guy who looks like he plays running-back for the Dallas Cowboys but runs and throws a football like a Dallas Cowboy cheerleader. It's important to build a body that makes you look like a Greek god, but you should also perform like one.

Peak performance requires a combination of strength, power, cardiovascular endurance, agility, and muscle endurance. Most guys build fitness through weight machine exercises and low-intensity aerobics. Typical programs include plenty of curls, bench presses, sit-ups and slow jogging. Training tempos are slow, particularly when using heavy weights. While this approach builds some fitness and improves appearance, it develops little power, speed, or functional fitness for optimal performance.

The *Optimum Performance Workout* will turn you into a powerful dynamo who is strong, fast, and lean. Most workouts focus on muscles. This training program emphasizes neuromuscular fitness that will help you run faster, jump higher, hike longer, and drive a golf ball further. This high-power exercise program will convert you from a fat-storer to a fat-*burner*. It is not for wimps, but is worth the effort, if you want to move to the next level.

You *can* develop power, speed, and functional fitness! This article presents scientific breakthroughs in sports medicine that will give you powerful muscles and an athletic-looking body. High-speed training is a new, revolutionary, scientifically-based training method that increases muscle strength and power, accelerates fat loss, and build fitness for sports and daily activities. In just 10 weeks, you will see measurable changes in fitness that will astound you.



THE NEED FOR SPEED

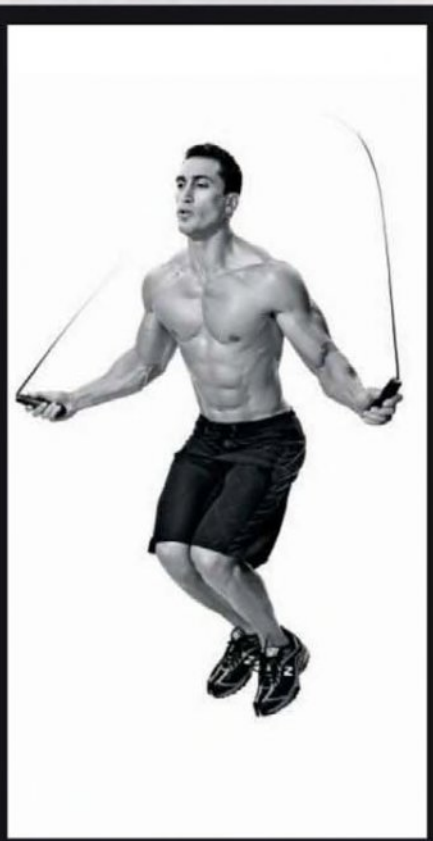
Workout crazes come and go. Most have little or no scientific justification, but many bring results anyway. The question is, do the results reflect your efforts, and do the programs help you reach your goals? Muscles are highly adaptable, so almost any program that stresses the muscles will cause some improvements in muscle tone, strength, and shape. Often, hard work in the health club does not produce enough results to justify the effort. High-speed training brings rapid results, and we have the science to prove it.

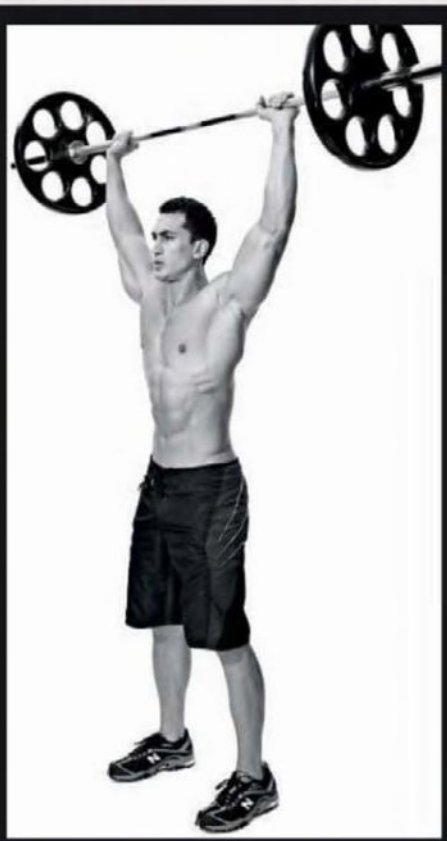
Speed and explosiveness are the keys to building powerful muscles and functional fitness. Many personal trainers and coaches teach people to lift using slow, controlled motions during weight training. They believe that they can build greater explosiveness by lifting progressively heavier weights. While this approach is fine for overloading the muscles, it does little to build speed and develop the link between the nervous system and muscles that is essential for fast, powerful movements. Traditional slow speed workouts don't develop fast-twitch muscle fibers that increase the strength, power, and speed in the large muscles of the body. The *Optimum Performance Workout* uses a combination of high-stress weight training exercises to build strength and explosive movements, to build power. It also turns on hormone systems that trigger muscle protein synthesis and promote fat loss instead of fat storage.

Studies by researchers from Canada and Brazil showed that explosive training activates more muscle than slow training and triggers rapid improvements in strength and power. Brazilian scientists found that power training (lifting weights at fast speeds) is an effective method for increasing muscle mass, strength, and power. They compared traditional tempo training (2-3 seconds concentric (push); 2-3 seconds eccentric (recover) with power training (1 second concentric; 2-3 seconds eccentric). Increases in muscle power were 3-4 times greater in the power group than the traditionally-trained group. Increases in muscle mass and strength were also better in the power-training group.

Canadian researchers, led by Tim Shepstone, found that high-speed training increased muscle cross-sectional area and the size of fast-twitch motor units (muscle fibers and their nerves) better than slow-speed training. High-speed explosive training promoted muscle protein synthesis and caused larger increases in muscle mass and strength than traditional speed training.

An effective weight-training program should create high levels of muscle tension. High speed, explosive training overloads the fibers and creates more muscle tension than any other form of training, yet few people incorporate it into their exercise programs. High-speed training can cause injury if you progress too rapidly. Start off with light weights and progress slowly. Also, incorporate all the elements of a healthy lifestyle that promote physical fitness, including healthy diet, stress management, adequate sleep, and a sensible exercise program that doesn't promote overtraining. High-speed explosive training is a scientific breakthrough that will bring rapid results and help you achieve optimum performance.





EXPLOSIVE TRAINING TURNS ON YOUR INNER FAT-BURNER

How many times have you seen men who exercise regularly yet still have fat guts? Pretty common, huh? Developing six-pack abs is very difficult because biology works against you. Most men are apples— they store fat in the abdomen. High-calorie fast food diets, high-sugar soft drinks, and physical inactivity promote abdominal fat deposition. Male genes are programmed to store excess calories as abdominal fat. Once stored, the newly stored fat is hard to lose, because the fat control systems try to maintain it for emergencies.

Stress hormones such as epinephrine and growth hormone stimulate fat breakdown. They work by triggering hormone-sensitive lipase (HSL), an enzyme that helps release fat from fat cells and determines your capacity to lose weight and fat. You must activate HSL to lose abdominal fat. Over a 24-hour period, intense exercise results in more fat mobilization than sub-maximal intensity exercise.

You can fight metabolic evolution by turning on your nervous system to trigger fat release. The nervous system sends a steady stream of impulses to the tissues that help control metabolism and the rate you burn calories. This process works very much like the idle setting on a car— the higher the idle, the more gas the car uses. In your body, the higher the setting of your nervous system, the more calories and fat you metabolize every day.

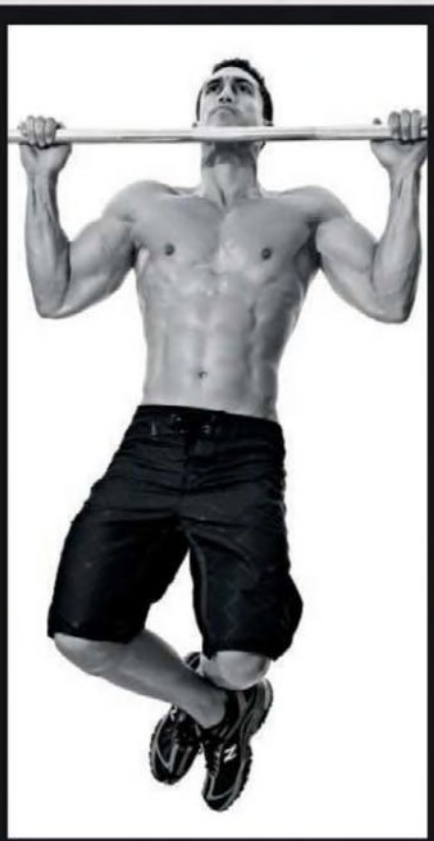
A University of Colorado study found that these nervous signals are lower in sedentary people or those who exercise at moderate intensities. Increasing growth hormone and adrenaline release are the keys to reducing stubborn fat stores. The best way to do this is with a 'shock and awe' exercise program that activates fat-burning hormones through interval training, high-intensity weight training, and high-velocity weight training.

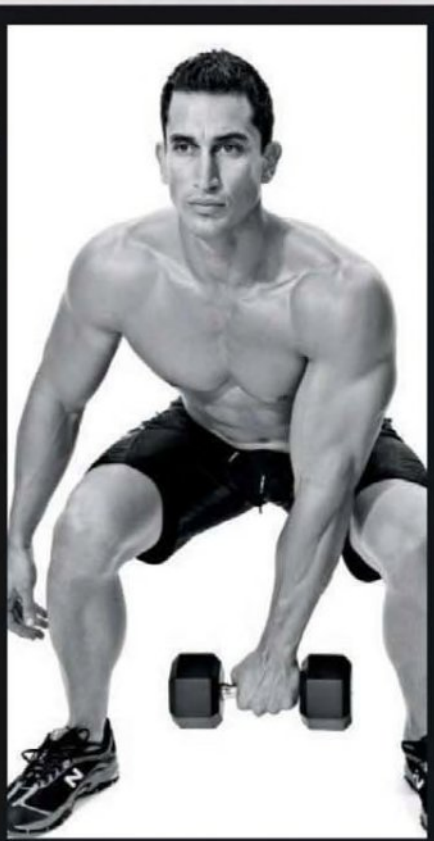
You can increase fat use with high-intensity interval training and explosive weight training. Ball State University scientists, led by Scott Mezzetti, showed that high-velocity weight training burned 12 percent more calories than training more slowly. They concluded that explosive muscle contractions increase the intensity and caloric cost of a workout.

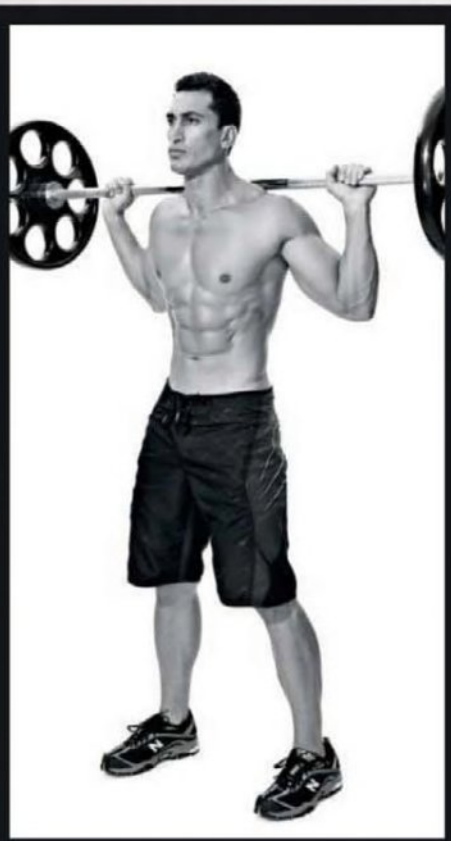
Using the same weight, attempting to do an exercise explosively activates larger muscle-nerve units than doing it more slowly. Explosive weight training 'turns on the nervous system,' which increases growth hormone and adrenaline release and burns more fat. Combining explosive weight training with high- and moderate-intensity aerobics increases calorie use and promotes weight loss in hard-to-reach lower body fat stores.

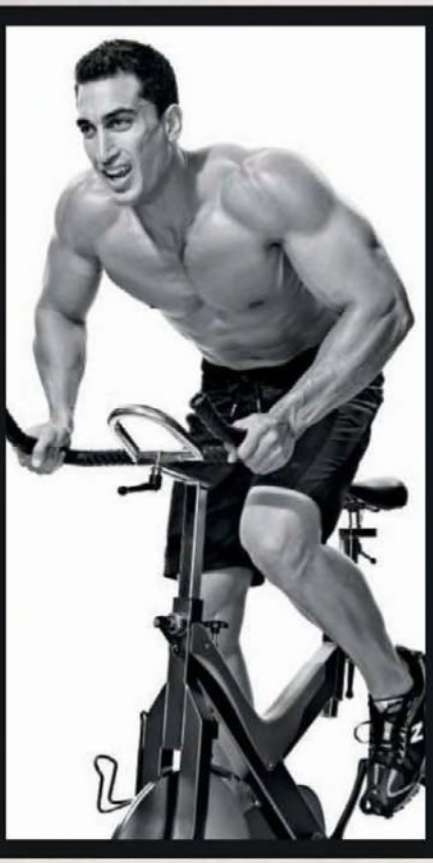
Muscle is one of the most metabolically-active tissues in the body. The more muscle you have, the more calories you use during the day and night. Muscle is also important for using calories during and after exercise. Building muscle mass is an important way to increase metabolism, burn more calories, and lose fat. Intense weight training builds muscle and cuts fat. Since muscle is more dense than fat, your body looks toned and buff.

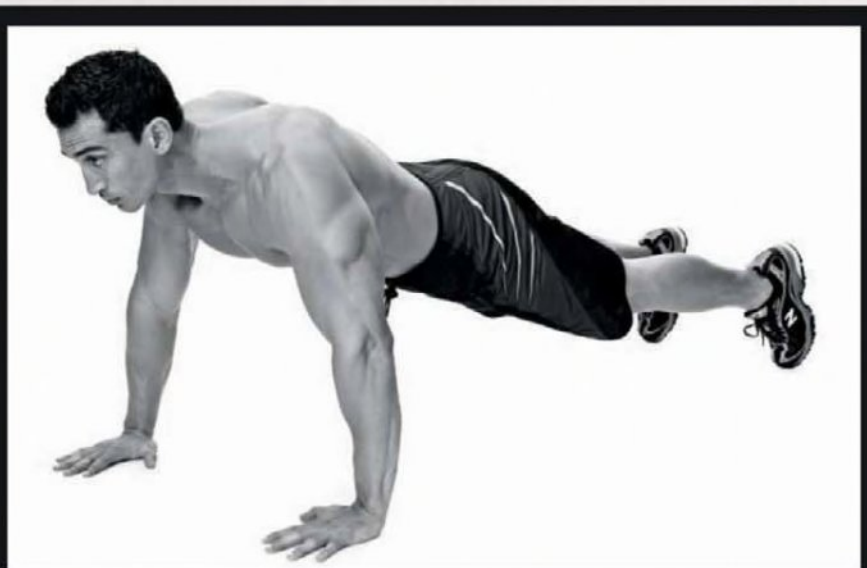
Lifting weights will increase muscle mass and burn more calories. Don't be a wimp. Train intensely and explosively during each set and repetition. This will build metabolically-active muscles that











will help you burn more calories and fat. Hard work will bring you closer to your goal.

THE OPTIMUM PERFORMANCE WORKOUT

The training program includes high-intensity weight training, explosive exercises, high-intensity interval training, and aerobics. The explosive weight training program includes traditional exercises, such as squats and bench presses, each followed immediately by high-speed power exercises.

East German and Soviet coaches developed the technique of pairing muscle overload exercises with unloaded explosive exercises (e.g., plyo box jumps, Marine push-ups, rope skipping) in the 1970s. Do each pair of exercises without rest; rest two minutes; do the next pair of exercises, etc. Do this workout two times per week. On two other days per week, do a high-intensity interval training workout. We have described a sample program and included exercise instructions. Warm up for at least two minutes before doing any of these workouts.

THE OPTIMUM PERFORMANCE WORKOUT EXERCISES

For the weight training exercises, choose a weight that you can lift for 6-8 reps with some difficulty. Do 6 reps for each exercise as fast and explosively as possible, followed immediately by the plyometric or speed exercises, also done at maximum speed. For example, the first set of exercises involves heavy squats, followed immediately by maximum-intensity rope skipping for 1 minute. Rest for 2 minutes, then do the next pair of exercises. Perform each exercise rapidly and explosively, while maintaining good form and posture. Do the *Optimum Performance Workout* 2 times per week (e.g., Monday and Friday).

EXERCISES (SETS X REPETITIONS): DO THE FOLLOWING CIRCUIT 1-3 TIMES.

Squats (1 X 6; max weight; lift weight as fast as you can)
Rope skipping (1 minute)
2-minute rest

Dumbbell front squats (1 X 6; max weight; lift weight as fast as you can)
High knee, fast arms (30-60 seconds, max effort)
2-minute rest

Bench press (1 X 6; max weight; lift weight as fast as you can)
Marine (clap) push-ups (1 X 10 as fast as possible)
2-minute rest

Standing press (1 X 6; max weight; lift weight as fast as you can)
Plyo box jumps (1 X 10; jump as fast as you can)
2-minute rest

Pull-ups (1 X 6; with weights if possible; do exercise explosively)
Kettlebell swings (1 X 10)
2-minute rest

Bicycle exercise (1 X 10; do exercise explosively while maintaining a neutral spine)
2-minute rest before repeating circuit
(if appropriate for your fitness level)

HIGH-INTENSITY INTERVAL TRAINING

High-intensity interval training (HIT) involves performing repeated exercise bouts at set distances or times at maximum effort. This type of exercise helps you move faster by training the nervous system to react more quickly, increasing the heart's ability to pump blood and boosting metabolic capacity. HIT stimulates the release of epinephrine and growth hormone, which are important for promoting fat-burning. Practice HIT two days per week.

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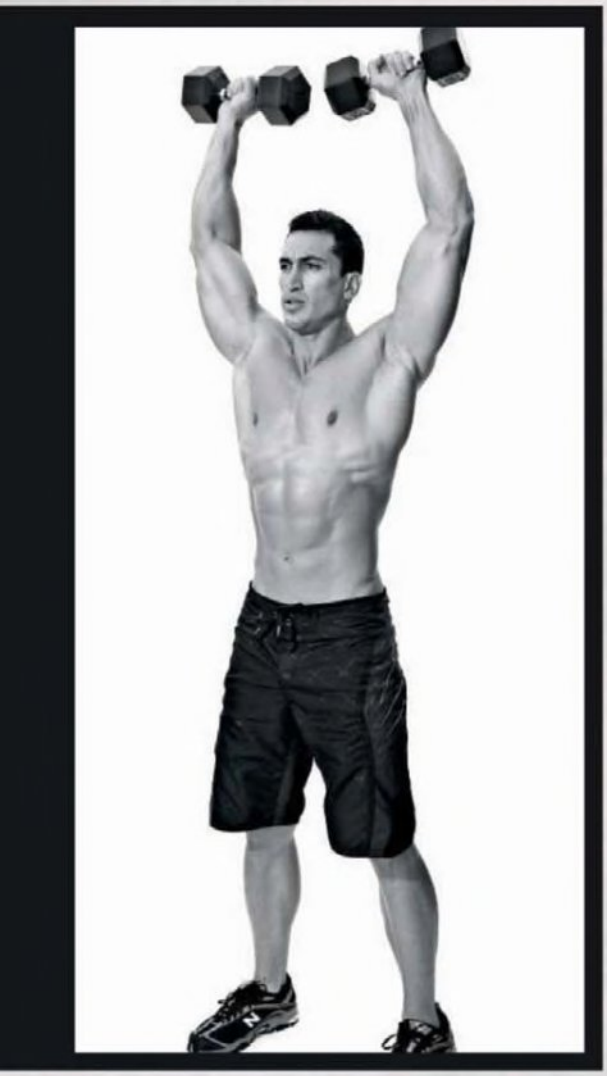


The treadmill is the best exercise machine for building aerobic capacity and burning fat. HIT on the treadmill involves running or walking for 30 to 60 seconds at maximum effort followed by slow walking or rest. Increase the exercise intensity by walking or running faster and raising the treadmill grade. Use the built-in programmer— if available— because it will automatically change the speed and elevation of the treadmill during the workout. You can substitute sprints on a running track, elliptical trainer, or stationary bike for variety.

HIT TREADMILL WALKING PROGRAM

Getting in shape for the HIT treadmill walking program: Begin by walking at a brisk pace that you can manage easily. For example, set the treadmill speed at 3 mph and the elevation at a 0 percent grade and walk for 2 minutes. Then, raise the elevation to 10 percent and walk for 1 minute. Return to a 0 percent grade and walk for another minute. Alternate between walking at a 0 percent or 10 percent grade each minute for a total of 10 minutes. Gradually increase the time and intensity of exercise. Begin the HIT walking program when you can walk briskly for 20-60 minutes without stopping.

The HIT walking program involves walking repeated high-speed intervals for 60 seconds at 100 percent of maximal effort with 4 minutes rest between exercises (complete rest or slow walking). Adjust the speed and elevation of the treadmill to achieve maximum exercise intensity.

HIT TREADMILL RUNNING PROGRAM

Getting in shape for the HIT treadmill running program: Run on the treadmill for 30-45 seconds, and then walk for 30-60 seconds. Gradually, increase running time and decrease walking time until you can run continuously for 20-30 minutes without rest. Try to run at a fast pace. You can begin the HIT treadmill running program immediately if you have been running regularly.

AEROBICS: TREADMILL WALKING OR RUNNING

Aerobics are important for losing gut fat. Walk or run on the treadmill for 30 to 60 minutes, 2 to 4 times per week. Exercise at a pace you can comfortably carry on a conversation or train at your target heart rate. Heart rate is a good measure of exercise intensity.

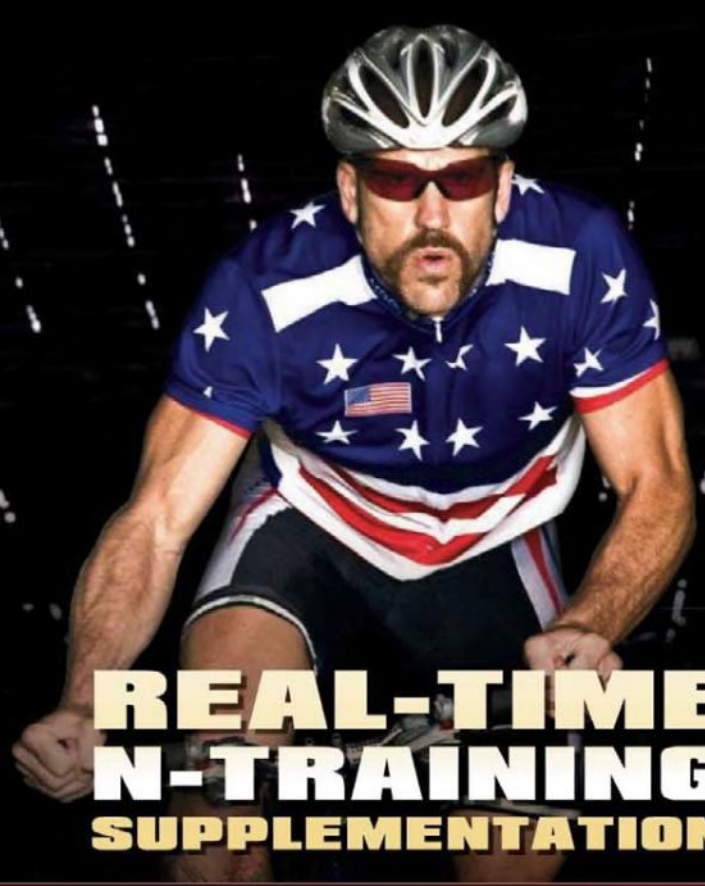
Determining your target heart rate: First, estimate your maximum heart rate by subtracting your age from 220. For example, the predicted maximum heart rate for a 20-year-old is 200 beats per minute (220-20 = 200). Try to exercise between 60 to 90 percent of maximum heart rate. This range of heart rates, called the target heart rate zone, corresponds to an increased metabolic rate that produces positive changes in fitness. Calculate target heart rate range by multiplying the maximum heart rate first by 0.6 and then by 0.9. These two heart rates represent the upper and lower limits of the ideal exercise intensity. Exercise heart rates vary greatly, so use this as a general guide.

EXPLOSIVE TRAINING: THE KEY TO OPTIMAL PERFORMANCE

Olympic power athletes have known about explosive training for decades, but scientists have only studied it for less than 10 years. Men around the world have discovered that it works. This program will give you a more powerful, functionally fit body faster than you thought possible.

HIT TREADMILL WALKING	Time for each interval	Exercise intensity	Repetitions	Rest between intervals
	60 seconds (adjust speed or grade for maximum effort)	100 percent maximum effort	8-12 repetitions	4 minutes light exercise or rest between repetitions

HIT TREADMILL RUNNING	Time for each interval	Exercise intensity	Repetitions	Rest between intervals
	30-45 seconds (adjust speed or grade for maximum effort)	100 percent maximum effort	6-10 repetitions	4 minutes slow walking or rest between repetitions



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DESCRIPTION OF EXERCISES

SQUATS: Choose a weight that you can squat for 8 reps with difficulty (i.e., 8-RM). Place the bar on a squat rack. Facing the rack, place the bar on your shoulders and grasp it with your palms facing forward. Stand and take a step back and align your feet slightly wider than shoulder width apart with toes pointed outward at a 45-degree angle. Squat down until your thighs are parallel with the floor. During the exercise, hinge at the hips, drive your thighs to the sides, keep your weight on your heels and chest out, and maintain a neutral spine and head. When you reach parallel, drive forward with your hips, keep your chest out, and continue maintaining a neutral spine and head. Do this exercise as fast and explosively as you can during the active (pushing) phase of the lift, while maintaining good technique. After completing this exercise, immediately begin the rope skipping exercise.

ROPE SKIPPING: Use a good quality jump rope that is appropriate for your height. Skip rope as fast as you can for one minute. If you lose tempo, begin skipping immediately until you've completed one minute of the exercise. Rest two minutes before beginning dumbbell front squats.

DUMBBELL FRONT SQUATS: Use the heaviest dumbbells you can, while maintaining good form. Holding a dumbbell in each hand at shoulder level, stand with your feet placed slightly wider than shoulder width apart with toes pointed outward at a 45-degree angle. Squat down until your thighs are parallel with the floor. During the exercise, hinge at the hips, drive your thighs to the sides, keep your weight on your heels, and maintain a neutral spine and head. When you reach parallel, drive forward explosively with your hips, keep your chest out, and continue maintaining a neutral spine and head. Do 6 reps of this exercise as fast and explosively as you can during the pushing phase of the lift, while maintaining good technique. After completing this exercise, immediately begin the high knee, fast arms exercise.

HIGH KNEE, FAST ARMS (SPRINTING IN PLACE): Sprint in place as fast as possible, lifting your knees as much as you can and driving your arms forward and backward rapidly. Rest two minutes before beginning the bench press.

BENCH PRESS: Choose a weight that you can bench press for 8 reps with difficulty (i.e., 8-RM). Lie on your back on the bench with feet planted firmly on the ground; grasp the bar with hands spaced shoulder width apart and begin the exercise with the bar over your chest with elbows extended fully. Lower the bar to your chest (bottom of the breast bone) under control and then press the bar upward explosively in a straight line until your elbows are almost fully extended. Do 6 reps of this exercise as fast and explosively as you can during the pushing phase of the lift, while maintaining good technique. After completing this exercise, immediately begin the Marine push-ups exercise.

MARINE PUSH-UPS: From a standard or modified push-up position, push up forcefully, extending your elbows fully until your hands leave the ground. Clap your hands together and then quickly return to the starting position. Do 10 repetitions of this exercise. Rest 2 minutes before beginning the standing press exercise.

STANDING PRESS: Choose a weight that you can press for 8 reps with difficulty (i.e., 8-RM). Start with a bar on a rack and grasp it with your hands shoulder width apart. Stand with the bar on the upper part of your chest and press it overhead explosively as possible. Lower the bar under control to your chest and repeat until you complete 6 reps and immediately do 10 plyo box jumps.

PLYO BOX JUMPS (24-inch box, bench, or step): Stand in front of the box. Jump onto the box and then back to the starting position. Do this movement as quickly as you can, while maintaining control. Perform 10 repetitions of this exercise at maximum speed. Rest two-minutes before beginning the pull-ups.

PULL-UPS: Hang from a horizontal bar with your arms extended fully and feet free from the floor. Use an overhand grip (palms facing away from the body). Pull your body upward explosively until your chin clears the bar and then lower your body under control to a full-hang starting position. Do the exercise for 6 reps, smoothly and without jerking. Use a spotter or assist machine if you can't do 6 reps. Hang weights from your belt if you need more resistance. After completing this exercise, immediately begin kettlebell swings.

KETTLEBELL SWINGS (use a dumbbell if you don't have a kettlebell): Most men should start with a 35-pound kettlebell, but you can use sizes between 18-70 pounds, depending on your strength and fitness. Begin by holding the kettlebell in both hands with palms facing toward you, in a standing position with knees bent, feet placed slightly more than shoulder width apart, hips flexed, back straight, chest out, and head in a neutral position. Holding the kettlebell at knee level, swing the weight to a horizontal position by initiating the motion with the hips, thighs, and abs (tighten the quads, glutes, and ab muscles as hard as you can), keeping your arm straight and relaxed during the movement. Let the weight swing back between your legs in a "football hiking motion" and then repeat the exercise. During the movement, hinge at the hips and not at the spine. Perform 10 repetitions of this exercise. Rest two minutes before beginning the bicycle exercise.

BICYCLE EXERCISE: Lie flat on the floor on your lower back with your hands beside your head. Bring your knees toward your chest to about a 45 degree angle and make a bicycle pedaling motion with your legs, touching your left elbow to your right knee, then your right elbow to your left knee. Do 10 repetitions as rapidly and explosively as you can, while maintaining good technique. Rest 2 minutes before repeating the circuit (if appropriate for your level of physical fitness).

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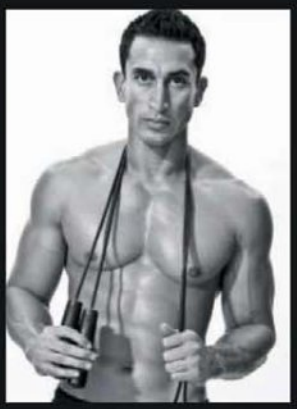

OPTIMUM PERFORMANCE WORKOUT PROGRAM

MONDAY: Exercises (Sets X Repetitions): Do the following circuit 1-3 times.

SQUATS (1 X 6; max weight; lift weight as fast as you can)
Rope skipping (1 minute)
2-minute rest

DUMBBELL FRONT SQUATS (1 X 6; max weight; lift weight as fast as you can)
High knee, fast arms (30-60 seconds, max effort)
2-minute rest

BENCH PRESS (1 X 6; max weight; lift weight as fast as you can)
Marine (clap) push-ups (1 X 10 as fast as possible)
2-minute rest

STANDING PRESS (1 X 6; max weight; lift weight as fast as you can)
Plyo box jumps (1 X 10; jump as fast as you can)
2-minute rest

PULL-UPS (1 X 6; with weights if possible; do exercise explosively)
Kettlebell swings (1 X 10)
2 minute rest
Bicycle exercise (1X10; do exercise explosively while maintaining a neutral spine)
2 minute rest before repeating circuit (if appropriate for your fitness level)

Aerobics: 30-60 minutes of treadmill walking or running at moderate intensity.

TUESDAY: High Intensity Interval Training (HIT; treadmill walking or running)

WEDNESDAY: Rest

	TIME FOR EACH INTERVAL	EXERCISE INTENSITY	REPETITIONS	REST BETWEEN INTERVALS
HIT Treadmill Walking	60 seconds (adjust speed or grade for maximum effort)	100 percent maximum effort	8-12 repetitions	4 minutes light exercise or rest between repetitions
HIT Treadmill Running	30-45 seconds (adjust speed or grade for maximum effort)	100 percent maximum effort	6-10 repetitions	4 minutes slow walking or rest between repetitions

THURSDAY: Same workout as Tuesday

FRIDAY: Same workout as Monday

SATURDAY: Rest or aerobics

SUNDAY: Rest or aerobics

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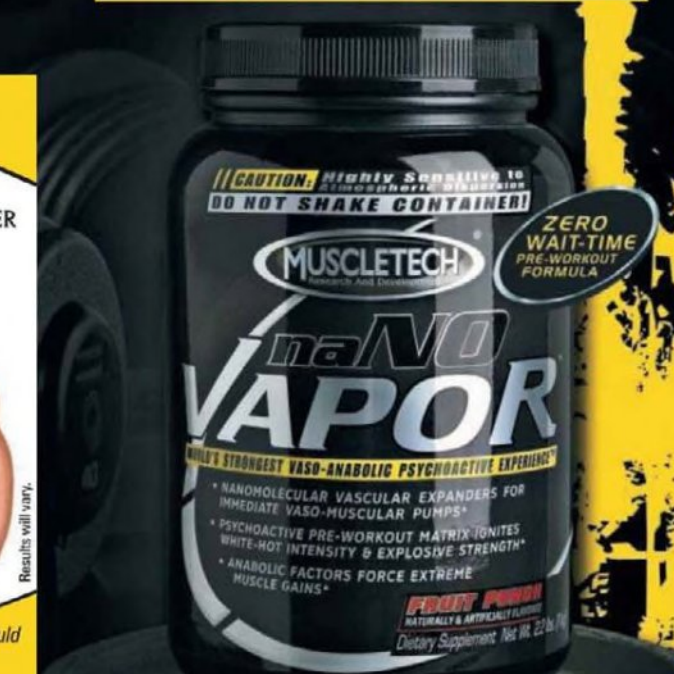

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OPTIMUM PERFORMANCE DIET

THE NEW WAY TO STAY HEALTHY, BUILD MUSCLE, BURN FAT, ENHANCE ENERGY AND RECOVERY

By Dan Gwartney, M.D.

Being an athlete, a true athlete, is a rarity in today's culture. This is particularly true past one's academic career. In fact, for many, sports participation ends prior to junior high; high school and college athletes comprise just a minor percentage of the general student body. In the 'real world,' social, work, and financial obligations are not forgiving of the time demands of practice/training/competition; the alien concepts of discipline and dedication are viewed as obsession; and the cost of equipment, supplies, and travel are considered frivolous.

Ironically, interest in sports remains high throughout a person's life, extending well beyond an individual's period of participation. Globally, top viewer ratings are held by sports events, such as the Olympic Games, Super Bowl, and World Cup.[1,2] Fans strongly identify with their favored teams and players, as evidenced by an increase in deaths and heart attacks after critical home team losses, and a reduction following major wins.[3]

Not surprisingly, one of the still under-recognized marketing phenomena is the growth of fantasy sports leagues. As a long-term fantasy football enthusiast and non-staff member of the footballguys.com StreetTeam, I can personally attest to the breadth and depth of interest that captivates serious FFers. Of course, if one limits his/her sports preparation to mock drafts and waiver wire action, good health remains a fantasy.

There are many adults, including a surprisingly high number of those who with no sports background, who turn to exercise or recreational sports as an emotional outlet; means of socializing; pursuit of achieving tangible goals; or opportunity to improve one's health, physical ability, social status and attractiveness. Within this ill-defined group, there are driven individuals who approach training, lifestyle, and nutrition with zeal equal to or greater than professional athletes whose careers are dependent upon their competitive abilities.

It is generally easy to spot these recreational elite. They are the people who seem standoffish in the gym, avoiding the lurking chat-traps that will embrace any opportunity to take a 10-minute break between sets to discuss current events. Even if they are not involved in an organized sport, they still wear the team uniform of

PER BERNAL PHOTO

sweat. They don't talk about their goals— they achieve them.

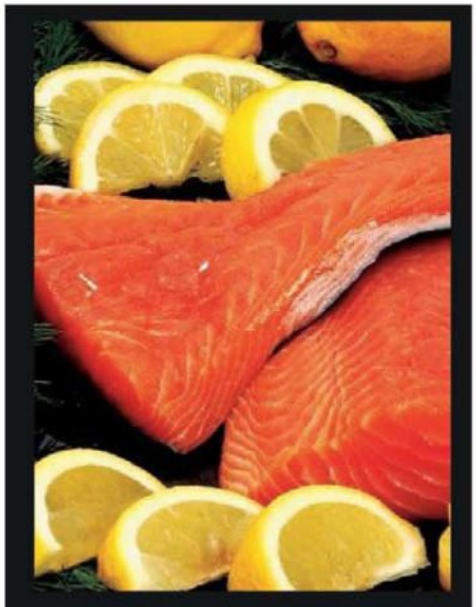
All serious athletes approach every aspect of life with awareness as to how it may impact performance and progress, positively or negatively. This is particularly true of their approach to diet.

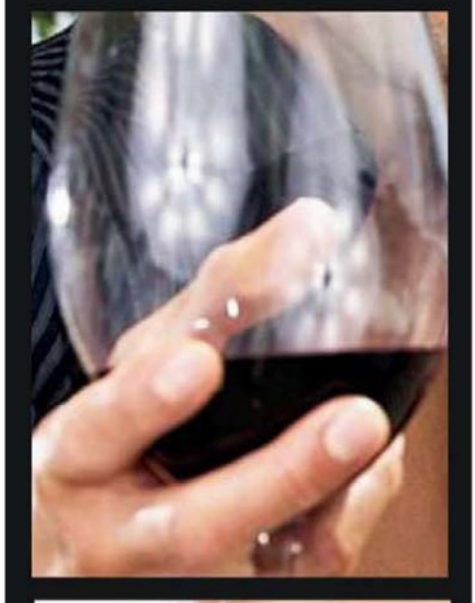
KEYSTONE TO SUCCESS

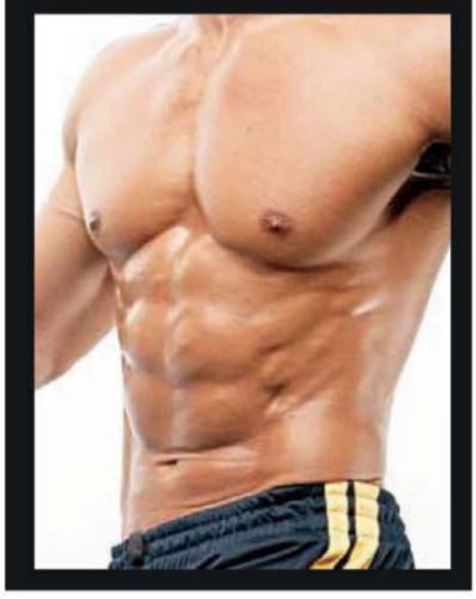
In health and weight management, diet is the keystone to success. In fact, most people in the general public find their goals are easily met through simple changes in the diet and effortless leisure activity. For the athlete, the diet must do more than merely support basic metabolic functions; it needs to be tailored to meet the goals of the athlete. These dietary needs are as varied as the individuals, depending upon: the sport or activity of choice, baseline level of performance, intensity and style of training, amount of rest and sleep, additional activity (e.g., job-related), and many other factors. Obviously, a desk-bound powerlifter competing in the super-heavy weight class will eat differently than an endurance runner who earns a living as a bicycle courier.

Putting aside the unique demands of specific individuals or sports, the generalized objectives of the diet are to: provide for baseline health; meet energy requirements; support tissue repair; and promote neuromuscular growth and adaptation.

In my experience, many athletes tend to overtrain and undereat as they become more focused upon meeting a performance deadline (e.g., competition, season opener, attempt at a personal record, etc.). The combination of physical and psychological stress often leads to impaired performance, disappointment, and even injury.[4] This often happens because athletes forget the primary purpose of the diet— to provide for baseline health. It is vital that an athlete never forget optimum performance is dependent upon absolute health. The optimum performance diet is based upon a healthy diet, first and foremost.







Many of us grew up learning the food pyramid, a triangular shaped diagram that dictated a dependence upon grains, then fruits and vegetables, with lessening dependence upon dairy choices, meats, and finally, oils. There has been criticism of the food pyramid for decades. There have been claims of favoring politically-affluent grain producers that have been directed at the U.S. Department of Agriculture— but to my knowledge, these have not been substantiated.[5] However, a more objective analysis of healthy eating has been developed over decades, following approximately a quarter-million health professionals.

EAT, DRINK— AND BE HEALTHY!

Harvard University professor Walter Willet, M.D., Ph.D., author of *Eat, Drink, and Be Healthy*, found that adaptations of the Mediterranean diet are optimal for reducing the risk of premature death and chronic disease.[6] Willet is clear to avoid use of the term 'Mediterranean' diet, as he believes that clouds choices to a culturally and geographically specific set of food options.[7] Instead, he believes people need to seek out abundant fruits, vegetables, whole grains, and vegetable oils, with optional servings of poultry and fish. While that doesn't sound so different, it places the emphasis on fruits and vegetables, as opposed to grains, and does not direct people away from healthy fats (oils).

Other nutrition experts hold similar positions, focusing upon sound and healthy diets as the core to performance. Mark Tarnopolsky, M.D., Ph.D., and colleague Stuart Phillips, Ph.D., of McMasters University, dispute the value of recovery drinks and high-protein intake. Both advocates of fruit and fruit juices, these gentlemen and other colleagues mentioned in an article published in *The New York Times* question the need for high-protein intake or post-exercise feeding.[8] They postulate that intakes as low as 10-20 grams of protein is sufficient for maintaining muscle mass, and that 1 gram

of carbohydrate per kilogram of bodyweight will fuel the body. It should be clear that these men may have an endurance bias, being competitive trail runners, triathletes, etc. Many would challenge these statements, especially for those involved in power sports.

It has been noted that a post-exercise window exists that allows for greater intake of sugar and amino acids.[9] Some doubt that the window has any practical value in humans, while others are certain that taking advantage of that time to replenish glycogen or maximize the combined anabolic effects of feeding and exercise will lead to performance enhancement.[10-13] This window may be an example of the difference between high-intensity and/or high-volume athletes and weekend warriors. In order to truly make a difference in muscle glycogen, one needs to first deplete glycogen stores to low levels. Amino acids only get incorporated into contractile protein in muscle if there is a strong, multi-pathway, anabolic signal. Failure to reach those levels result in a person merely consuming more calories.

The 'average Joe,' sipping his exercise drink or high-calorie smoothie, might be doing more harm than good. It is critical to understand the needs of the individual involved when directing sports or performance nutrition. Even Tour de France cyclists need not binge on carbohydrates every day; it may be essential to the grueling demands of the event or their training, but during low-intensity recovery days, it is unnecessary and offers no benefit.

FUEL FOR LIFE

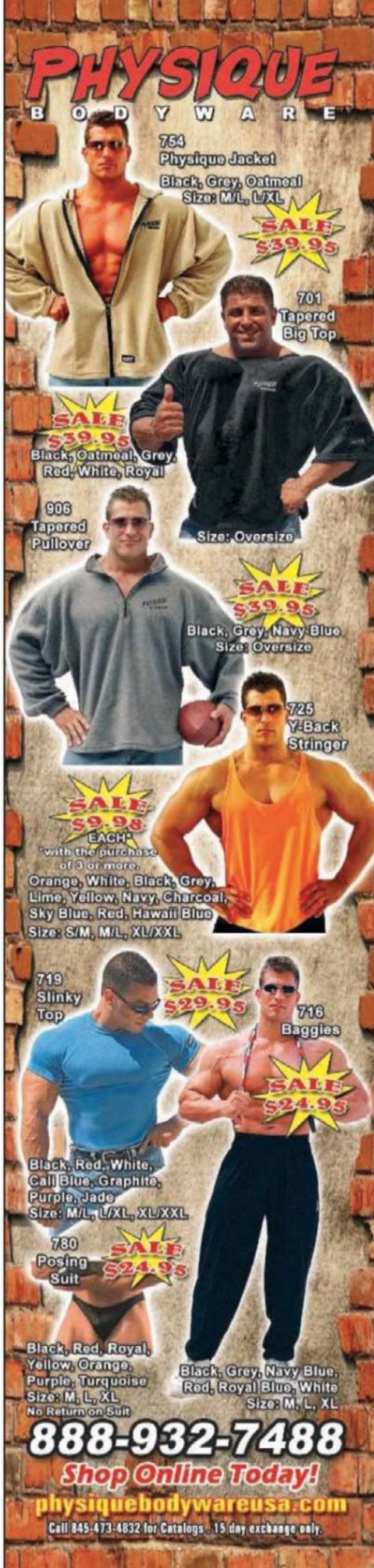
Many people live long, healthy lives focusing on no more than three hots and a cot. Athletes are not satisfied with physical achievements that climax with making it to the office coffee pot first. Regardless whether one is a sprinter, powerlifter, endurance athlete or boxer, the engine will not run if there is no 'gasoline.' For humans, energy is derived from food. Athletes involved in explosive power movements are heavily dependent upon anaerobic force generation. Anaerobic refers to ultra-quick chemical reactions that generate energy for muscle contractions without utilizing oxygen. Quick-burning energy is derived from sugars (carbohydrates) and the phosphocreatine system.

Athletes involved in long-duration, low-intensity exercise rely upon aerobic cellular metabolism. Aerobic energy generation provides energy with a slower burn, but lasts much longer. Aerobic energy is generated in the mitochondria (tiny compartments in each cell), burning fatty acids, and the breakdown products of sugars and certain amino acids. It is like comparing a firecracker to a candle. One is explosive and releases all its energy at once; the other is controlled and releases a very limited amount of energy over the course of hours.

Very few athletes are exclusively anaerobic or aerobic, though most rely upon one or the other predominantly— think of boxers fighting 12 rounds, battles that last nearly an hour, but are decided by brief flurries of punches; football players crossing 100-yard-long fields repeatedly, three yards at a time; triathletes sprinting at the end of events that last the better part of a day. More than once, an athlete has experienced a downward spiral in performance, focusing on eating to support either anaerobic or aerobic function exclusively. This is most common during the media blitzes that publicize extreme diets.

TO CARB OR NOT TO CARB

Many athletes went on diets that were nearly fat-free during the 1980s.[14,15] Though the body is capable of generating certain fats, even on restricted diets, there is a select group of fatty acids that are considered essential, as the body cannot produce them in sufficient amounts to support cytokine signaling or structural needs. Further, soaring insulin spikes accompanying frequent carbohydrate feedings tend to reduce the availability of stored fat for energy.[16] Even when sugar stores are at their highest, they are insufficient to provide for energy needs for prolonged periods. Fatty acids are essential if one is performing any action that



lasts longer than seconds. The body burns most dietary fats well, but oleic acid found in olive oil may be more readily available, according to limited research.[17]

During the 1990s, low-carbohydrate diets became the rage, with many athletes testing the Atkins diet principles, keeping carbohydrates so low as to induce ketogenesis. Team trainers and nutritionists have been nearly universal in advising against following ketogenic diets during training and competition. Not only has decreased physical performance been noted, but also mental fatigue and faltering concentration.[18,19] The brain is critically dependent upon free sugar as an energy source. When an athlete is already bordering on hypoglycemia (low blood sugar), and active muscle begins to hoard circulating glucose (sugar), mental and emotional functions begin to suffer.

Occasionally, this lack of focus has resulted in injuries or accidents that have caused athletes to miss critical practice time or competition. Moderation will rarely lead a person astray, and this is true in planning a performance diet as well. When an athlete is attempting to maximize physical performance, it is critical that balance is maintained. Certainly, function may dictate a focus on one type of macronutrient, but one must never forget that the body is an interactive system. Any deficiency may eventually manifest itself through injury, fatigue, or poor performance.

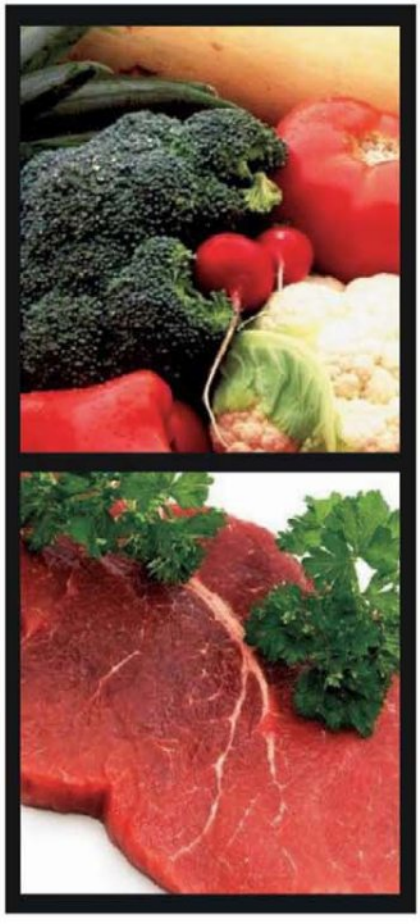
VEGGING OUT?

Food is not just energy; it is the building blocks for repairing and growing muscle, bone, connective tissue, etc. One group that often suffers, particularly in power sports, is vegetarians/vegans. Acknowledging the legitimacy of the philosophical arguments supporting these diets, as well as certain health benefits noted in vegetarian populations, it has shown itself to be detrimental to building lean mass and recovering from catabolic training sessions.[20]

Vegetarians rely upon plant sources for most, if not all, of their nutrition. This places them at risk for relative deficiencies in certain amino acids, fatty acids, and other meat-based bioactives, such as creatine. While there have been successful vegetarian/vegan athletes at the top levels of sport, they are concentrated in activities that rely more upon endurance and benefit from low body mass. Though there may be an exception I am unaware of, the thought of an elite vegetarian sprinter, shot-putter, powerlifter, or other strength athlete is nearly inconceivable.

In the optimum performance diet, a component of the protein needs to be sourced from lean meats to adequately provide for branched-chain amino acids, creatine, arachidonic acid, heme iron, and other nutrients. Supplemental protein can be selected from soy, legumes, milk protein concentrates (e.g., whey, casein), wheat, pea, or other sources.

Certain animal products do not fall within religious allowances. Due to the many variant restrictions, it is up to each individual to determine what is acceptable to his/her cultural or religious edicts. In addition to providing the building blocks for the 'meat' of the muscle, components of animal protein also support anabolic functions, hormonal release, and tissue response; saturated fat, a nutritional 'whipping boy,' blamed for every cardiovascular and cancer-related death by the media and many health professionals.[21]



MICRONUTRIENT COMPOUNDS

One last thing to consider is micronutrient compounds. There are a number of compounds that are involved in promoting the efficiency of nerve transmission, hormone response, inflammation and repair, antioxidant protection, etc. In addition to certain amino acids, which would be provided for in most protein sources, examples include molecules such as choline, B vitamins, minerals, etc. There is no one 'wonder food.' Thus, it is strongly advised to seek a variety of foods so that opportunities to consume sufficient quantities from this limitless category are exploited to the fullest. Colorful fruits, sea-based foods, fermented beverages (e.g., wine, beer), yogurts, and other unprocessed foods are vital to optimum health, optimum performance.

TRACKING PROGRESS

From all of the preceding, one might be led to believe that an optimum performance diet is going to be expensive, tedious, and require daily trips to every exotic food mart in a metropolitan area. Too often, well-laid diet plans fail because of relevant issues, such as complexity or cost. Feeding, while it should be a conscious act, should not become the focus of one's life. Too often, athletes succumb to the intense pressures of competition and develop eating disorders that complicate their health for years.[22]

All of the above is information and opinion; though (hopefully) interesting and informative, the take-home message needs to be practical and applicable. Here are the 'pearls.'

First, every person is unique to a degree. These recommendations are guidelines that need to be modified to accommodate the differences among people and across changing

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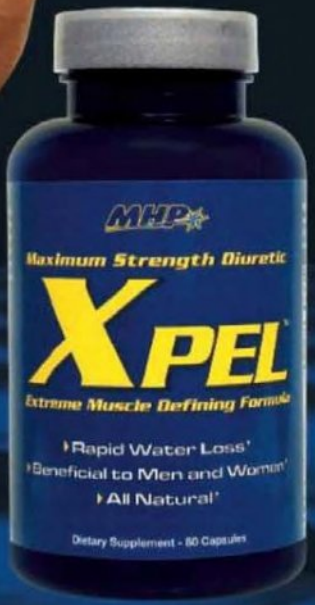

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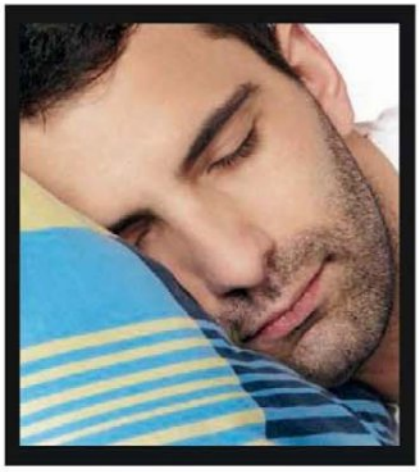

demands and environments. It is important to keep a log; otherwise one will never know if a diet, exercise routine, etc., is working. If a plan is being followed and the results do not arrive, be prepared to seek out help or get advice before a season is wasted.

Second, every blueprint gets modified when the house is getting built. No matter how expert a guru is, it is the responsibility of the athlete to track and log his/her own progress and response. Some people don't tolerate large meals, others get tired below a certain carbohydrate threshold, etc.

Third, nobody trains at maximal load or intensity all year long. It is important to adapt to changes caused by illness, schedule, weather, etc. The nutritional needs of the athlete are as dynamic as his/her life.

Fourth, people like the mantra, "I am a machine," but we are not; we are human. Every now and then, even the most disciplined and focused athlete needs a break or to enjoy life or training. Activity-wise, this may happen with cross-training, vacations, or mock competitions. The dietary equivalent is an occasional break. The term 'cheat meal' should be avoided, as it suggests it is not part of a program.

GIVE IT A REST!

I followed one elite lifter for a month, who was actually backsliding, despite following an incredibly well-organized meal and training program. After a few days of evaluation, and getting to know the individual, I asked him why he wanted my opinion. His comment was that I made him laugh and reminded him of the days he really enjoyed lifting. He was burned out.

The following day, I told him to leave his gym bag at home, change into street clothes and grab a meal. Not pre-cardio, breakfast 1, breakfast 2, pre-workout, post-workout, snack mandatory, dinner, snack optional, or pre-sleep meal; just go get something to eat. He had two double cheeseburgers, fries, and a diet soda, missing a workout and three or four scheduled meals before he felt like eating again. He went to sleep after two PB&J sandwiches and a granola/berry yogurt parfait that his wife brought back from McDonalds.®

The next day, he attacked the weights, and hit a personal record in his older bench shirt. He was happy to get back into his diet and training program, but recognized that every now and then, he needed to break loose. A team jersey should not feel like a prison-orange jumpsuit. You are pursuing your goals, not fulfilling a sentence.

The optimum performance diet includes a healthy base, one that would likely receive the approval of Willet, Tarnopolsky, et al. However, the demands of the general athlete go beyond simply living. It is important to note that this is a general diet plan that assumes the athlete is in a sport that involves components of power and endurance. Food choices will be included that provide for the availability of macro- and micronutrients that may benefit the unique needs of athletes. Lastly, it should encourage eating patterns that will avoid the pitfalls and traps of overeating, binge eating, eating disorders, and undereating.

The optimum diet encourages frequent eating, but not the all-day foraging that causes many athletes to be viewed as weird. The foods listed and portions can be changed some to accommodate preferences or individual needs, but significant variations become a different plan.

SAMPLE OPTIMUM PERFORMANCE DAILY MEAL PLAN

Subject: Twenty-eight-year-old male running back (HB), NFL; season. Starting bodyweight = 232 pounds, body fat acceptable.

Baseline needs: 2,600 kcal, 35/30/35 macronutrient ratio (carbohydrate/protein/fat by calorie).

Active energy expenditure (high volume "burst-pattern"): 550-1,200 kcal; marginal expenditure 400-1,000 kcal.

Goals: Maintain lean mass, prevent catabolic loss, restore glycogen stores, protect against overreaching and injury, monitor for electrolyte imbalances.

Design: Three meals, two training-oriented feedings, late 'chill meal.'

Notes: Practice times variable, mandating flexible time, prefers simple morning meals, housekeeper prepares midday meal and preps next day breakfast when not eating at team facility, dining out many nights, no evidence of alcohol abuse or excess. Reports high-carbohydrate breakfast makes him sluggish and bloated; regular bowel habits. Admits he will drive-thru fast food for two cheeseburgers on occasion. Regular sleep patterns, sleep duration variable between seven and nine hours. Team staff has granted approval of plan.

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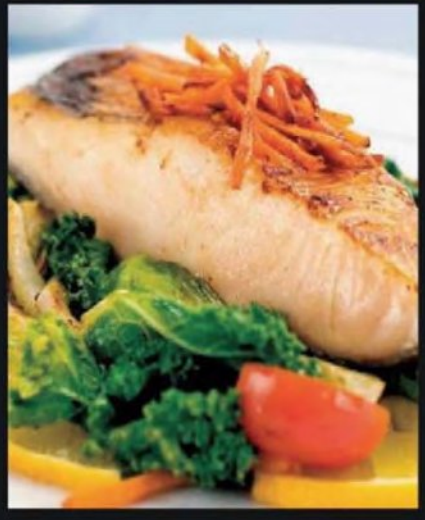

**Supplements not covered as part of Optimum Performance Diet; water intake is encouraged with each meal limited to tolerance; hydration monitored by training staff; soda is discouraged.*

Meal 1: Two 2-egg omelets with minimal cheese and only one yolk each; inclusions to taste, commonly includes sun-dried tomato, jalapeño, spinach; half-melon; two slices of whole-grain toast with olive oil; pomegranate juice . ~950 kcal

Pre-weight training: (minimum 45-minute latency to gym) 8-oz. yogurt parfait topped with granola and fruit/berry of choice. ~450 kcal

Post-weight training: (provided at practice facility) Berry/banana/flax seed/wheat germ smoothie, fortified with 40 grams milk-base protein. ~500 kcal

**On non-weight training days, yogurt parfait is consumed but smoothie is optional. If smoothie not consumed, meal 2 is consumed earlier.*

Meal 2: (at least 30 minutes prior to practice; prefer longer, but time constraints acknowledged) ½ rotisserie chicken; sugar snap peas; rice pilaf; marinated squash; beverage of choice. ~800-1200 kcal

Meal 3: Two salmon filets; collard greens in vinegar; pasta salad with olive oil; two glasses merlot. ~850 kcal (Note: third filet and/or sweet potato may be added, if weight begins to decrease.)

'Chill meal': (consumed if hungry or feeling stressed— avoid if weight exceeds 240 pounds) Macaroni & cheese with peas (a childhood staple); milk. ~800 kcal

**May also eat foil-packed tuna meals, limited to one.*

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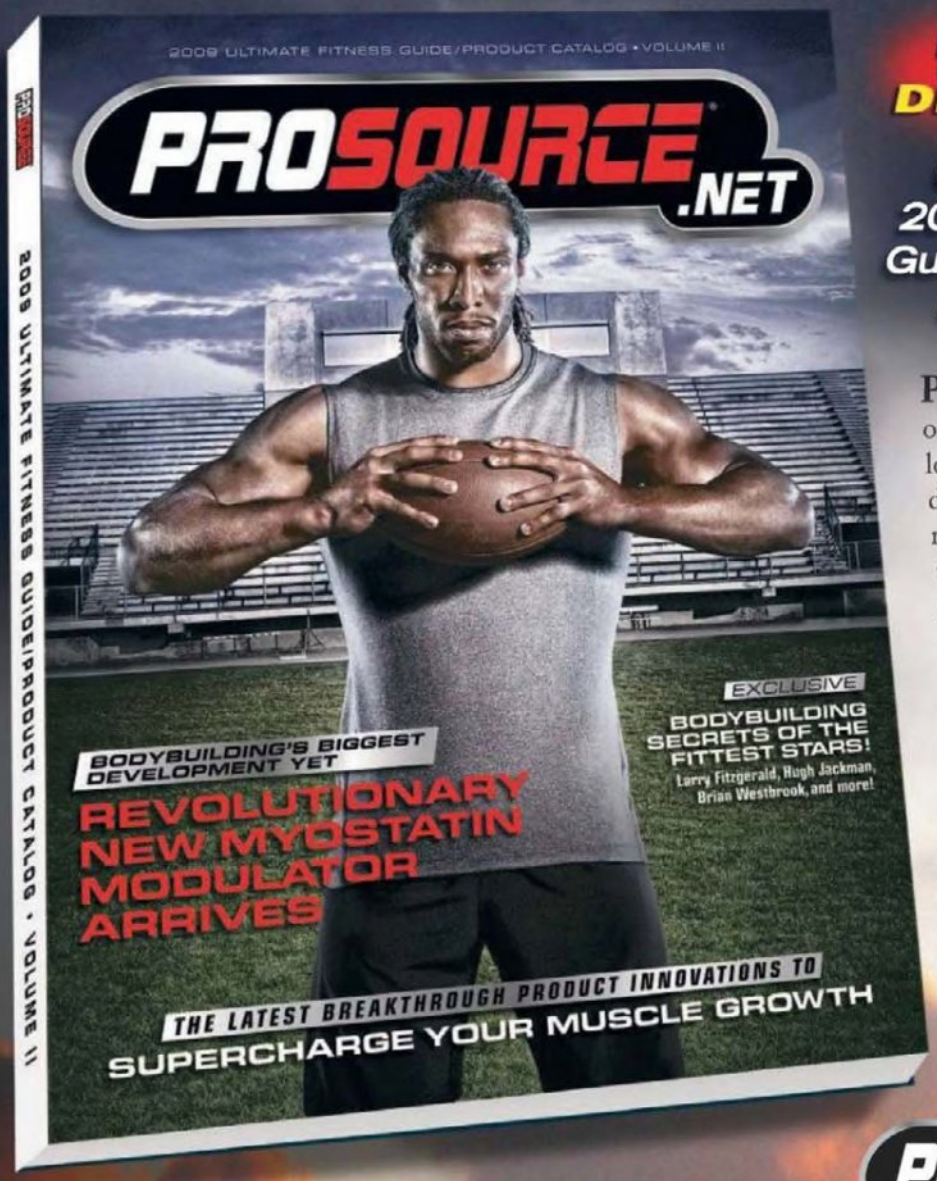

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REST AND RECOVERY
FOR OPTIMUM PERFORMANCE

By George L. Redmon, Ph.D., N.D.

> "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."
>
> ~Lee Labrada

When you consider the statement above by one of bodybuilding's most accomplished participants, it implies that to reach your full growth potential, you need to also be doing something that is just as important— if not *more* important— than working out. In fact, according to Lee Labrada, "Recuperation is the factor with the biggest, most significant potential to help one reach the next level of muscular size and strength."

Conversely, what the scientific literature tells us now is that if you don't get adequate rest coupled with enough sleep, your body doesn't fully recover from daily workouts. This aspect of non-adaptation, due to the micro-muscle damage and resulting inflammation followed by inadequate healing time, leads to what researchers refer to as being in a 'perpetual under-recuperative state.'

To stimulate, build and repair muscle, you need to take a much more proactive approach toward recuperation. For example, after a workout, the body's ability to bounce back from the inflammatory stress response can take up to 72 hours. That's three days. In response to the time it takes to heal and readjust, this could take up to six weeks, depending on the extent of an injury.

It is the state of constant *under-recovering* from your workouts and/or injury that will limit your ability to build muscle and invariably lead to the development of other catabolic (muscle-wasting) factors. Additionally, without a well-planned recovery program, you will not only comprise your growth potential— you could also be compromising your overall health by overtaxing your system and perpetuating uncontrolled oxidative stress.

So instead of your driving force being no pain, no gain— let it be no *rest*, no gain!

Sleep Growth and Repair

There are two different stages of sleep, each having unique characteristics. The first stage of sleep is known as non-REM sleep, also referred to as 'deep' and or 'slow-wave' sleep. During this sleep cycle, the entire body is relaxed, cerebral cortex activity is diminished as well as the heart rate, blood pressure and respiratory rate. During this sleep period, the body's use of energy also decreases by about 20 percent.

The second phase of sleep is call REM or 'rapid eye-movement' sleep, due to the fact that the eyelids tend to quiver. In this stage of sleep, breathing may become rapid and irregular. The heart rate and blood pressure sometimes rise during this stage of sleep. Studies indicate that the brain is very active during this time and that at this stage of sleep, dreaming occurs. More stimulation and generally interruptions (noise, etc.) are needed to awake someone from REM sleep.

Nature At Work: Do Not Disturb

As you are undoubtedly aware, it is the REM stage of sleep that your body relies on heavily to do most of its internal repair work. This is why it is very important to get your full 8 hours of sleep consistently. As you sleep, your body goes through a defined period of growth and repair (anabolism) during the early stages of sleep. Afterward, the body shifts into a period of muscle protein breakdown (catabolism). This part of the equation you want to disrupt, while enhancing the anabolic stage. As you can see, biologically, poor sleep management can sidetrack and/or derail much of your hard physical work.

Sleep Deprivation and Catabolism

According to scientists at the Sleep and Circulation Research Center in Sydney, Australia, sleep is associated with a number of endocrine changes, including changes in insulin's actions. Chronic sleep restriction can alter daytime glucose control and increase appetite. This can lead to decreased metabolism of fat, resulting in increased fat storage. Short sleep duration is also associated with reduced leptin and elevated ghrelin activity.

As a point of reference, leptin is a protein made up of 167 different amino acids. Produced in fat cells, leptin's activity within fat cells is directly proportional to the amount of fat developed by the body. This is due to the fact that leptin acts on key receptors in the hypothalamus in the brain. By regulating the actions of these receptors, leptin:

1. Inhibits the effects of a substance known as neuropeptide Y, an amino acid that encourages storage of ingested food as fat.

2. Diminishes the activity of anandamide, a compound made from phospholipids (fat derivates). Anandamides are known to bind to the same brain receptors as THC (delta-9-tetahydrocannabinol), the active compound found in marijuana. When leptin activity is reduced and anandamide activity becomes erratic, this can cause binge eating.

3. Enhances the metabolism of a-MSH, a receptor in the brain that is responsible for appetite suppression. Dysfunction of this receptor can also lead to uncontrolled food intake, obesity and less fat-burning.

Note: The appetite-suppressant leptin, made from fat cells, has in many circles turned out to be a bust, mainly because the majority of obese patients are resistant to its thermogenic effects. By getting enough sleep and staying lean and mean, you have the ability to naturally make all the leptin you need to burn unwanted body fat. ➛

The Ghrelin Connection

Ghrelin is a pre-prohormone that is manufactured by cells called P/D1 that line the stomach. Ghrelin turns on the hunger switch and dramatically alters energy metabolism, causing weight gain and increased fat storage.

Note: In a recent study looking at triggers that elevate ghrelin activity, researchers reported that protein intake could promote a rapid decline of up to 70 percent of ghrelin circulating in the blood.

Other Catabolic Aspects of Sleep Deprivation

The following list represents some other catabolic responses as a direct result of not getting adequate amounts of rest and sleep.

- Decreased growth hormone output.
- Increased muscle fatigue.
- Loss of stamina.
- Depression; loss of mental focus.
- Increased susceptibility to injury.
- Increased fat storage.
- Elevated cortisol levels and muscle-wasting.
- Decreased immune function.
- Reduced thyroid-stimulating hormone (TSH) output.
- Increased insulin sensitivity.

Getting Ready For Midnight Mass

As nightfall approaches, a small gland located between the eyes (the pineal gland) begins to produce the hormone melatonin. Melatonin is the hormone that induces sleep as nightfall approaches. As morning approaches and light hits the retina, neural impulses signal the pineal gland to reduce melatonin production. This hormone plays a key role in growth hormone stabilization and regulation of corticosteroids (stress hormones) that interfere with proper insulin function, thus promoting fat storage. In fact, researchers in Germany recently reported that supplementation of 3 milligrams of melatonin for four weeks significantly increased percentages of REM sleep.

Sleep: Manipulating This Anabolic Frontier

As an astute weight trainer and fitness-conscious reader of FitnessRx for Men, you are undoubtedly eating five to eight small meals daily. You also probably have a post-nutritional program in place and are planning to rest up for your next workout session. However, many active men aren't prepared to go head-to-head with the impending catabolism that occurs during sleep.

There is now an overwhelming body of evidence that confirms that several natural supplements can help stimulate growth, repair muscle tissue as well as modulate fat-burning activities during sleep. The key muscle-building hormone— growth hormone (GH)— is secreted during sleep, and with the assistance of the following supplements you can help stimulate GH production. This will help your body maintain what could be referred to as a state of *internal anabolic equilibrium.*

In other words, these supplements can help counteract or minimize much of the catabolic destruction that goes on when you finally hit the sack, as those two-to-four-hour feeding times come to a streaking halt. So utilize these GH releasers judiciously and in some cases synergistically (two or more together in combination), to help keep those growth and repair mechanisms running at full throttle, even at rest. The following list represents some of the most well-known products that have the ability to help counteract catabolic processes that occur during sleep.

Saving Muscle At Bedtime

ARGININE. Best known today for its ability to boost immunity, healing and recovery. Arginine works by suppressing the activity of somatostatin, a hormone in the brain that halts GH secretion.

Suggested dose: 3 to 5 grams at bedtime.

GABA. The amino acid gamma-aminobutyric acid is considered to be a powerful neurotransmitter which transmits nerve impulses. GABA is highly concentrated in the hypothalamus and helps regulate sleep cycles and the pituitary gland, which is the gland that releases GH. Researchers at the First Medical Clinic at the University of Milan recently reported that GABA increased blood levels of GH by 5½ percent after 90 minutes of intake.

Suggested dose: 500 milligrams to 1 gram.

SLEEP MANAGEMENT SHOULD NOT BE AN AFTERTHOUGHT IN REFERENCE TO YOUR EXERCISE ROUTINE. IT'S MORE THAN A FINAL FRONTIER YOU NEED TO CONQUER WHEN THE TIME ARISES; IT IS THE FIRST ONE AND PARADOXICALLY, THE MOST IMPORTANT ONE— IN WHICH YOU ARE DOING NOTHING BUT LYING DOWN ON THE JOB!

GLUTAMINE. The most abundant amino acid found on skeletal muscle, and a powerful recovery agent that boosts immunity. Current data indicates that 2 grams of glutamine is effective in raising growth-hormone levels more than four times that of base levels, versus a placebo. Glutamine also preserves muscle mass and prevents muscle acidosis to boot, which increases muscle wasting and fatigue.

MELATONIN. As mentioned earlier, melatonin

Photo: Per Bernal

induces sleep and has anti-aging properties. Its ability to stimulate GH production at sleep has been well-documented. Recently reporting in the *Journal of the International Society of Sports Nutrition*, researchers looking at melatonin and heavy resistance training found that 5.0 milligrams in both males and females increased serum GH levels, while lowering SST (somatostatin) levels, the compound that blocks the release of GH. Additionally, researchers at the Medical College of Wisconsin reported that melatonin given to men with low levels of GH reduced fat levels by 14 percent, with a 9 percent increase in lean tissue development.

TRYPTOPHAN. Tryptophan is best known as an agent that promotes sleep and relaxation. It also has powerful GH-releasing capabilities. This nutrient is converted to serotonin, the brain chemical that causes GH release. Studies indicate that 5 to 7 grams causes elevation of serum GH between 30-90 minutes after supplementation, before going to sleep.

Stimulating The Natural Growth Hormone Within

While the above supplements can be great aids at bedtime, the following protocols can also help along the way:

- Consume low-glycemic foods like pasta or oatmeal before workouts.
- Reduce carb intake before bedtime.
- Maintain a balance of carbs, protein and fats during feeding times.
- Consume five to seven small meals daily.
- Utilize powerlifts like squats and deadlifts.
- Train in short, intense bursts two to three times daily versus long, 2-hour workouts.
- Aerobic exercise encourages GH release and can keep plasma GH levels elevated for 2 hours after stopping.

Some Anti-Catabolic Facts to Ponder

- Each part of your body that you exercise needs a minimum of 24-48 hours of rest. And in some cases, five to seven days to re-adapt from exercise-induced micro-trauma to muscle tissue.
- Each muscle group should be worked vigorously only once each week, to ensure that full recovery occurs.
- Don't train a muscle group if it's still sore from the last session.
- Limit workouts per week to three to four, and shoot for 1-hour sessions.
- Being awake for a 24-hour period has the same effect as a blood alcohol content of 0.096, a level above the legal driving limit in many states. Get your rest.
- Make sure you sleep comfortably through the night, at least 8 full hours.
- Neither the mind nor the body shuts down during sleep.
- Don't exercise before going to bed.
- Reduce stressful episodes before bedtime.
- Establish a bedtime routine (glass of warm milk, biofeedback exercises, meditation).

NOTE: Sleep specialists suggest a 1-hour window that supports the time you need to wind down. Studies indicate that individuals who are relaxed before bedtime with the methods listed above demonstrate brain wave activity that is comparable to early phases of sleep.

- Avoid alcohol, caffeine and other fluids before bedtime to limit bathroom trips, and consider ingesting some casein protein before bedtime to minimize muscle protein breakdown.

Last Words

Based on an overwhelming body of evidence, sleep management should not be an afterthought in reference to your exercise routine. It's more than a final frontier you need to conquer when the time arises; it is the *first* one

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and paradoxically, the most important one— in which you are doing nothing but lying down on the job! ■

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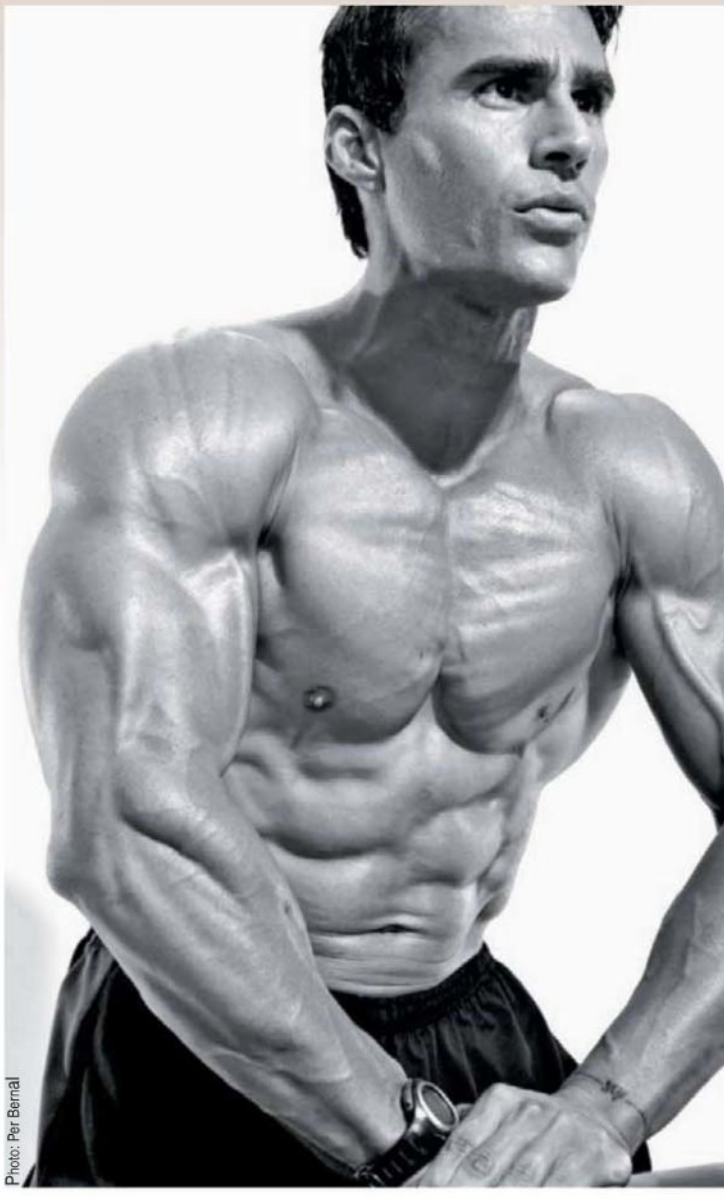

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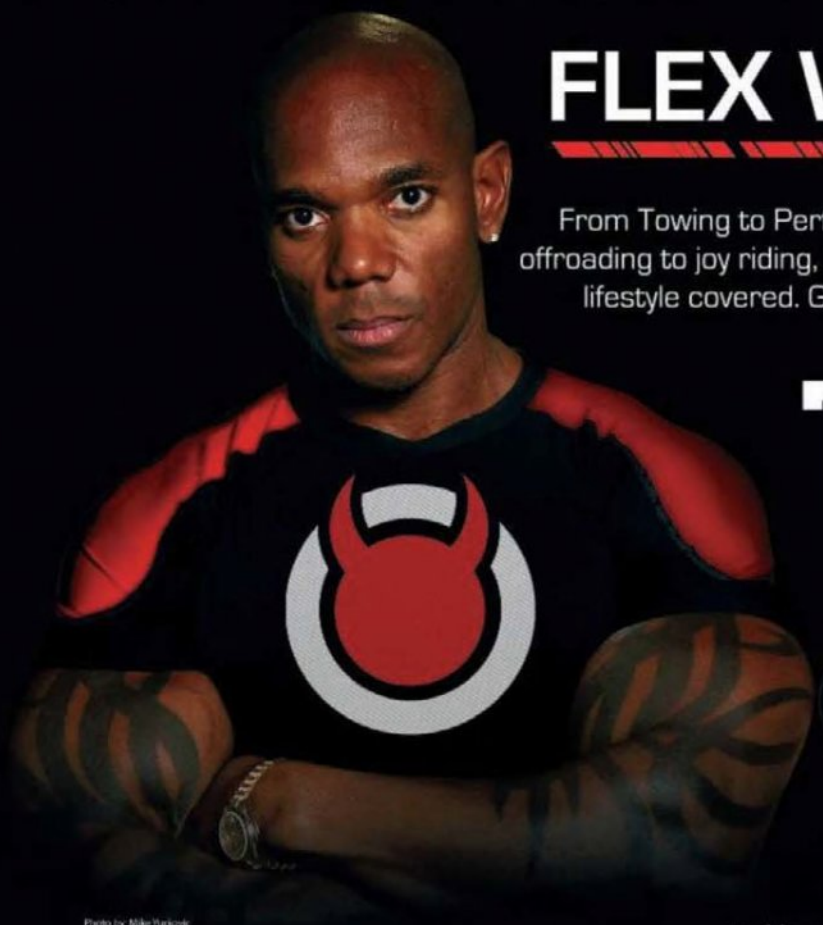

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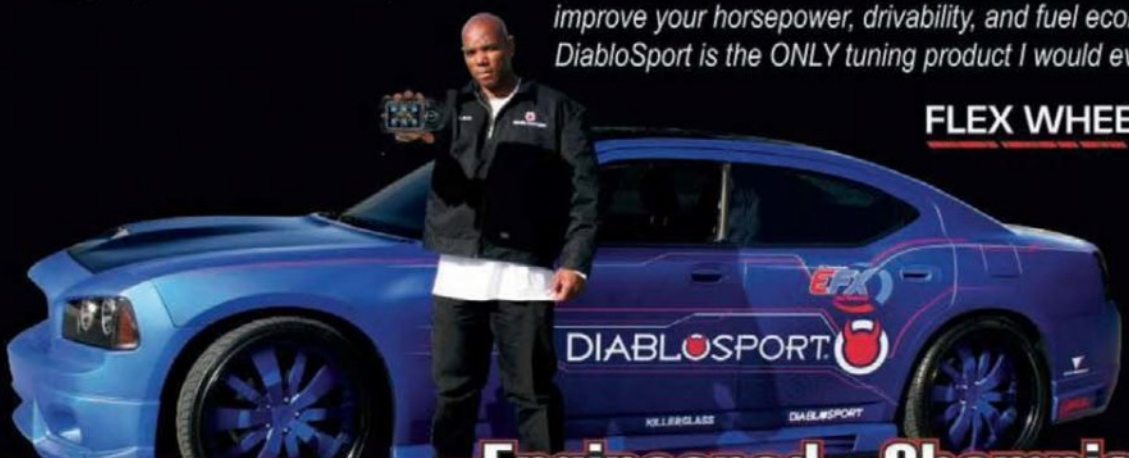

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OPTIMUM PERFORMANCE SUPPLEMENT PROGRAM

By Jose Antonio, Ph.D., FISSN

Let's face it, most of us exercise like maniacs, eat cleaner than a cloistered nun, and take supplements to enhance our appearance. And as a side benefit, we can perform the daily tasks of life better as well as any athletic activity we chose. In fact, the proper use of sports supplements is perhaps one of the most efficient ways of improving performance and looks. What follows is a treatise on which supplements to use and how best to use them.

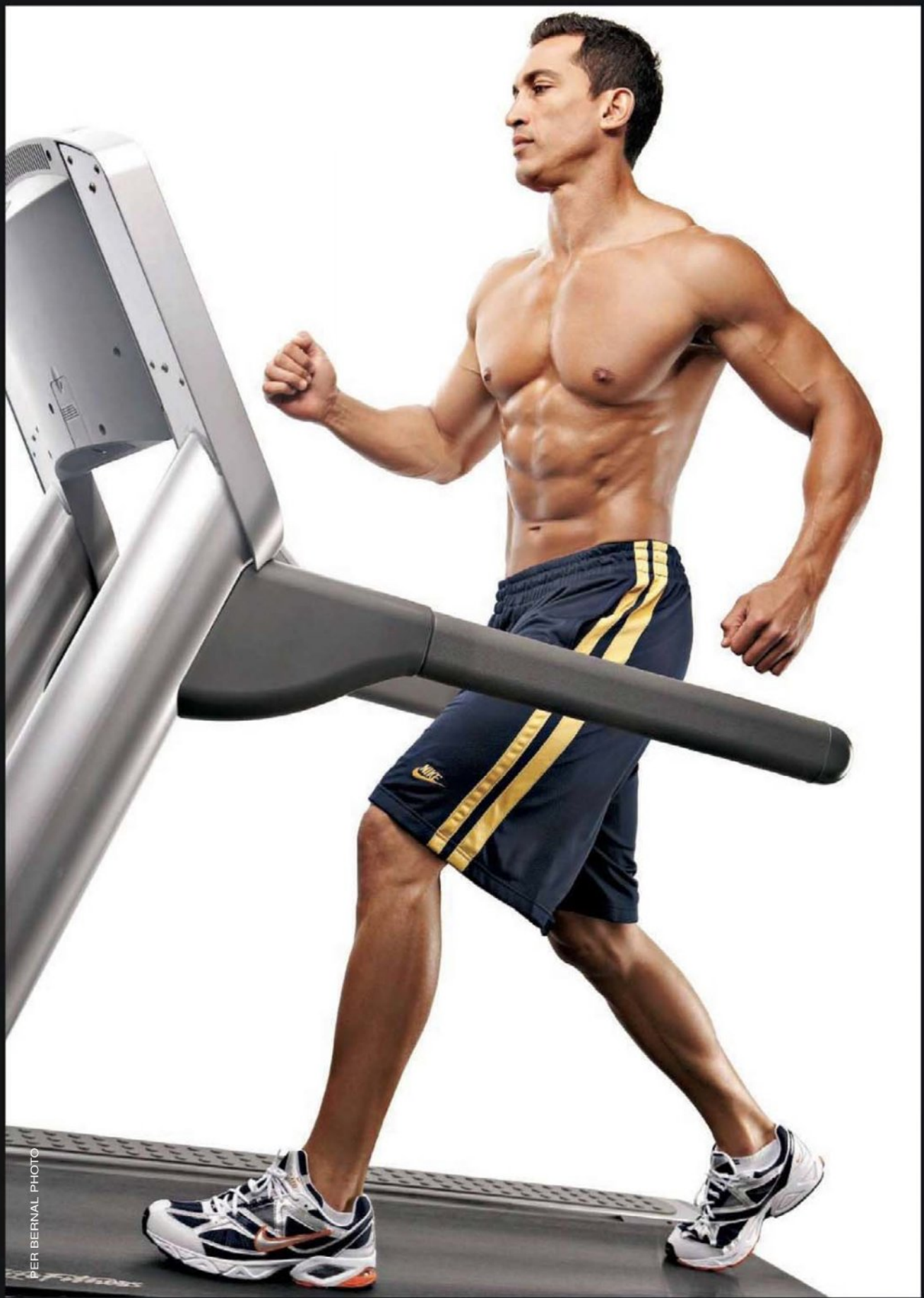
Keep in mind that due to individual differences, some folks will respond quite favorably, whereas others may not respond at all (to certain supplements). Either way, the only sample size that matters is you and it is best that you experiment with different supplement strategies, to see which fits you the very best.

BETA-ALANINE

Perhaps the 'newest' comer in the list of effective supplements, beta-alanine supplementation has been shown to increase muscle levels of carnosine (beta-alanyl-l-histidine) both the soleus, a 'slow' muscle (+47 percent) and gastrocnemius, a predominantly 'fast' muscle (+37 percent). By doing this, you have less fatigue over the course of repeated bouts of exhaustive exercise.[1]

One of the more exciting findings was discovered by researchers at the University of Oklahoma. According to lead investigator Abbie Smith, M.S., CSCS, CISSN, "Supplementing with beta-alanine at 6.4 grams per day for 28 days can help you to train at higher intensities for longer periods of time, ultimately improving both strength and endurance performance. More interesting, beta-alanine supplementation, when combined with training, has been shown to increase lean body mass and help reduce muscle soreness."

In this study, they evaluated the effects of combining beta-alanine supplementation with high-intensity interval training (HIIT) on endurance performance and aerobic metabolism in recreationally-



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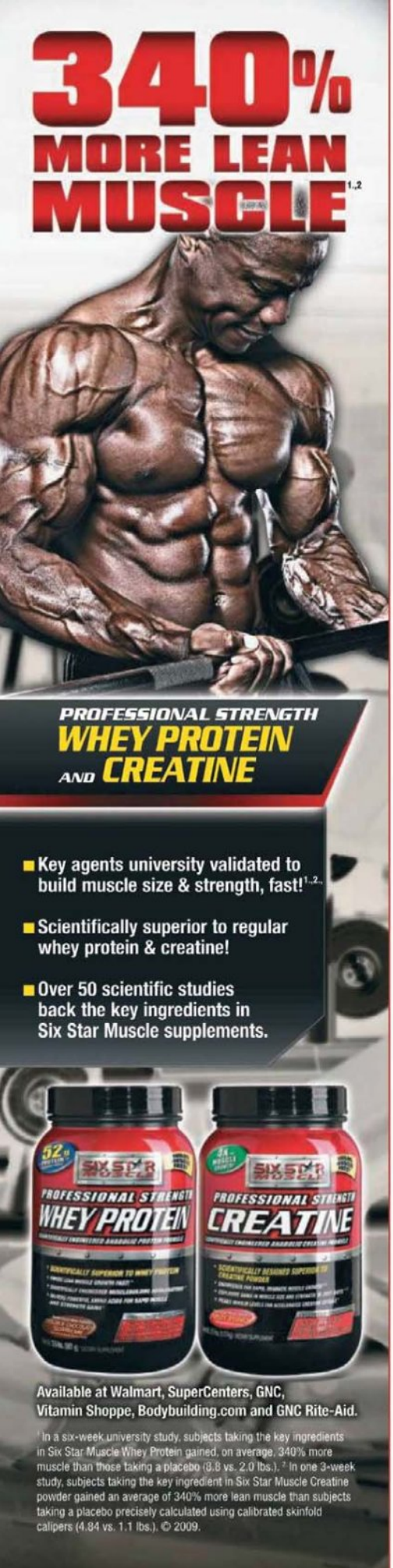

active college-aged men. In double-blind fashion, all subjects were randomly assigned into a placebo (PL— 16.5 grams dextrose powder per packet; n = 18) or beta-alanine (BA— 1.5 grams beta-alanine, plus 15 grams dextrose powder per packet; n = 18) group.

This was the first investigation to look at a 'stack' of dextrose and beta-alanine. Not only did performance improve, but lean body mass increased in the beta-alanine group after the second three weeks of training.[2]

Take-home message: Based on the available evidence, I'd suggest a daily dose of 3-6 grams of beta-alanine if your goal is to enhance performance, particularly in anaerobic events. And perhaps you'll gain some muscle to boot!

CAFFEINE

Do I even have to tell you how much we love our caffeinated beverages?! Heck, over 110 million Americans reach for a cup of caffeine-filled java first thing each morning. Caffeine itself has a track record for safety and efficacy that is older than the Great Pyramid of Giza! For instance, caffeine consumption at a dose of 2 and 3 mg/kg bodyweight has been shown to enhance performance.[3] That's not too shabby. That's equal to about 136 mg of caffeine for a 150-pound individual. That's about one-and-one-third cups of coffee.

When you look at the data using higher doses, you can get some pretty dramatic effects. For instance, a dose of 6 mg per kg bodyweight of caffeine enhanced performance probably due to a greater reliance on fat metabolism.[4] Also, caffeine ingestion 60 minutes before exercise can enhance repeated sprint running performance and isn't detrimental to reaction times.[5]

One of the big myths about caffeine is that it is a dehydrating agent. Untrue. The science shows that caffeine may increase urine flow and sweat electrolyte excretion, but these effects are not enough to affect dehydration or blood electrolyte levels when exercising for 120 minutes in a hot environment.[6]

Take-home message: a minimum dose of 2 mg of caffeine per kg bodyweight is needed for a performance-enhancing effect. And don't worry about dehydration, because it isn't an issue with caffeine consumption.

CREATINE

There is no better supplement for producing gains in lean mass, strength and power than creatine. According to a leading muscle physiologist, Darryn Willoughby, Ph.D., FISSN, "Creatine supplementation has been shown in a number of scientific studies to be safe by having no detrimental effects of serum clinical chemistry markers indicative of renal and hepatic function and general markers of systemic physiology. In addition, creatine has been shown to significantly enhance muscle power and strength, and to increase muscle mass through increases in skeletal muscle gene expression and protein synthesis."

To translate, this stuff is as revolutionary to the world of sports as the air conditioner was to folks in the equator. The studies on creatine are too numerous to mention. There are literally hundreds of them. Here are a few very interesting and recently published studies.

One group of scientists studied the effects of creatine supplementation on muscle proteins and force recovery after eccentrically-induced muscle damage in healthy individuals. They found a significant improvement in the rate of recovery of knee extensor muscle function after creatine supplementation following injury.[7] Another study found increases in vertical jump height, bench press strength and leg press strength.[8]

What about the oft-asked question of whether you need to load creatine? This depends on a few things. If you are currently taking a maintenance dose of creatine (3-6 grams daily) then clearly, loading is as useful as giving cotton candy to the fat man at the circus. However, if you are currently not supplementing with creatine and you need to get performance-enhancing effects fast, then loading may actually be warranted.

In one investigation, trained men were randomly assigned to a creatine or a placebo group. The creatine supplementation group consumed 20 grams of creatine per day (4 doses of 5 grams per day); the study found that a five-day crea-

KENYATTA WILSON
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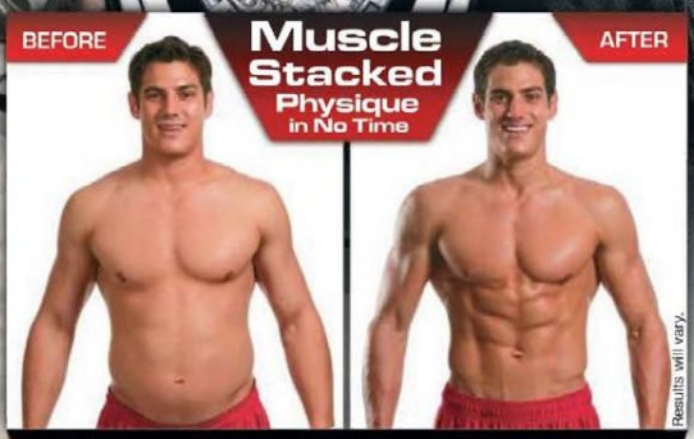

Geoff Ward transformed his body and revealed a ton of ultra-ripped muscle fast using Six Star Muscle Whey Protein and Creatine. In only 11 weeks he got in the best shape of his life.

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Geoff Ward also used other Six Star Muscle supplements and has been remunerated. †In a six-week study, subjects taking the key ingredients in Professional Strength Whey Protein gained, on average, 340 percent more muscle than subjects using a placebo (8.8 vs. 2.0 lbs.). ‡In a three-week study, subjects using the key ingredient in Professional Strength Creatine powder gained an average of 4 times the lean mass compared to the placebo group precisely calculated using calibrated skinfold calipers (4.84 vs. 1.1 lbs.). © 2009.

tine loading regimen coupled with resistance training resulted in significant improvements in both average anaerobic power, as measured by the 30-second Wingate test (not a fun test) and back-squat strength compared with just training alone. However, two days of supplementation was not sufficient to produce similar performance gains. Therefore, it is best to still do a five-day loading regimen for enhanced strength and power.[9]

Take home message: if you chose to load, consume 20 grams of creatine per day for at least five days. However, a maintenance dose of 3-6 grams daily is sufficient to promote an ergogenic effect.

PERFORMANCE FATS

In a 36-week study of obese postmenopausal women with type 2 diabetes, they received SAF (safflower oil) or CLA (8 grams oil per day) during two 16-week diet periods separated by a four-week washout period. Supplementation with CLA reduced body mass index (BMI) and total adipose mass without altering lean mass.

The effect of CLA in lowering BMI was found during the last eight weeks of each 16-week diet period. Moreover, SAF had no effect on BMI or total adipose mass but reduced trunk adipose mass and increased lean mass. SAF also significantly lowered fasting glucose. Thus, supplementation with CLA and SAF exerted different effects on BMI, total and trunk adipose mass, and lean tissue mass in obese postmenopausal women with type 2 diabetes.

What's the solution? Take both![10] And then you have the omega-3 fats, which I count as my favorite type of fat. Consuming omega-3 fats can be effective in lessening delayed-onset muscle soreness.[11] Also, fish oil supplements and regular exercise both reduce body fat and improve cardiovascular and metabolic health.[12]

Take home message: consume fatty fish at least three times per week. But if you're not a fish eater, consume at least 1-2 grams of omega-3s and 3 grams or so of CLA.

POLYPHENOLS

There are many novel plant-derived dietary supplements, which have been shown to improve health and even enhance exercise performance. In fact, two weeks of supplementation with 1,000 mg of quercetin, a flavonoid found in fruits and vegetables,[13] combined with 120 mg of epigallocatechin 3-gallate (EGCG), 400 mg of isoquercetin, and 400 mg of eicosapentaenoic acid and docosahexaenoic acid (Q-EGCG) was effective in countering inflammation after three days of heavy exertion in trained cyclists.[14] Also, supplementation with vitamins and quercetin significantly improved high-intensity cycling performance through enhancement of power output.[15]

Another plant-derived supplement, cherry softgels, was found to confer protective effects on oxidative stress, inflammation, range of motion, contractile force and perceived pain according to a study presented at the 2009 American College of Sports Medicine conference.

Take home message: consuming any of the plant-derived supplements (i.e., the polyphenols) will likely help your health and in some cases, exercise performance.

POST-WORKOUT SUPPLEMENTATION

Perhaps the most convenient and feasible supplement strategy, post-workout supplementation has proven time and time again to be effective in expediting recovery and enhancing lean body mass. According to one of the leading personal trainers in the country, Juan Carlos Santana, CSCS of the Institute of Human Performance, "I have all my athletes use a nutrient timing strategy." According to one study, "The timing of nutritional supplementation may be more important than the absolute daily intake of supplements."[16] And perhaps the best supplements for this are proteins derived from milk, especially whey protein.

One study looked at the potential for a hydrolysate (WPI(HD)) of whey protein isolate (WPI) to speed recovery following eccentric exercise and found that it was quite useful for assisting athletes to recover from fatiguing eccentric (i.e., the negative contraction) exercise.[17] This study examined 10 weeks of resistance training and the ingestion of supplemental protein and amino acids on muscle performance and markers of muscle anabolism.

Nineteen untrained males were randomly assigned to supplement groups ingesting either 20 grams protein (14 grams whey and casein protein, 6 grams free amino acids) or 20 grams dextrose placebo one hour before and after exercise for a total of 40 grams per day. Participants exercised four times per week, using 3 sets of 6-8 reps at 85-90 percent of the 1 rep maximum. Data were analyzed with two-way ANOVA ($p < 0.05$).

Also, a protein supplement (14 grams whey and casein protein, 6 grams free amino acids) consumed one hour before and immediately after weight training was found to promote greater increases in total body mass, fat-free mass, thigh mass, muscle strength, serum IGF-1, IGF-1 mRNA, MHC I and IIa expression, and myofibrillar protein, compared to an isocaloric carbohydrate drink.[18]

Bottom line: consume a protein-based supplement immediately after training. And to get the best results, consume some also right before and sip on a shake during training (if feasible).

Take home message: anyone who exercises must consume a protein-based post-workout shake! No excuses.

PROTEIN

In my book, it looks like whey is still the preeminent protein of choice. A recent study had three groups of healthy young men perform a bout of single-leg resistance exercise followed by the consumption of a drink containing an equivalent content of essential amino acids (10 grams) as either whey hydrolysate, micellar casein, or soy protein isolate. So they actually controlled for the total of essential amino acids; they found that stimulating muscle protein synthesis is greater after whey hydrolysate or soy protein consumption than casein, both at rest and after resistance exercise.[19]

Another study confirmed that when strength changes were expressed relative to bodyweight, the whey isolate group supplementation achieved significantly greater improvements in strength, compared to the casein.[20] But is it the essential amino acids in whey that make it so anabolic? Or put another way, are you just 'wasting' half of the whey

protein you consume because 50 percent of it is nonessential amino acids?

Scientists recently discovered that whey protein ingestion improves skeletal muscle protein gain through mechanisms that go beyond the EAA content.[21] Or put another way, the 'nonessential' amino acid component of whey does have a benefit vis-à-vis muscle hypertrophy.

Take home message: it is hard to eat 'too much' protein. There are so many benefits to protein, especially whey, that it would behoove all active individuals to consume 1 gram of protein daily per pound of bodyweight.

ANTIOXIDANTS

There are a myriad of antioxidants (i.e., substances that can fight the damaging effects of oxidation in our tissues) that you can choose from in the supplement arsenal. For example, N-acetylcysteine (NAC) supports glutathione homeostasis in exercising humans and may delay muscle fatigue during repetitive handgrip exercise.[22] Also, an acute dose of NAC reduces respiratory muscle fatigue during heavy exercise.[23]

Another popular antioxidant (ubiquinol + L-carnitine) can cause a significant reduction in the pro-inflammatory cytokines.[24] And perhaps one of the more versatile antioxidants (alpha-lipoic acid) has been shown to diminish oxidative damage.[25]

In a study that will soon be published in the *Journal of Strength and Conditioning Research*, scientists concluded that CoQ10 may show performance-enhancing effects during repeated bouts of supramaximal exercises and CoQ10 might be used as an ergogenic aid.

Take home message: certain antioxidants such as NAC, CoQ10, and ubiquinol should be part of your supplement arsenal.

However, not all studies show positive results. Recently, scientists looked at the effect of four weeks of antioxidant (AOX) supplementation on exercise-induced lipid peroxidation, muscle damage, and inflammation in kayakers. Volunteers were randomly assigned to receive a placebo (PLA) or an AOX capsule (AOX; 272 mg of alpha-tocopherol, 400 mg of vitamin C, 30 mg of beta-carotene, 2 mg of lutein, 400 mug of selenium, 30 mg of zinc, and 600 mg of magnesium). Blood samples were collected at rest and 15 minutes after a 1,000-m kayak race, both before and after the supplementation period.

Interestingly, AOX supplementation did not offer protection against exercise-induced lipid peroxidation and inflammation, and may actually hinder the recovery of muscle damage.[26] So, perhaps it is this particular combination of antioxidants that doesn't work well. Either way, this is one area of scientific research that needs more 'massaging.'

Jose Antonio, Ph.D., is vice president of the National Strength and Conditioning Association. He has a Ph.D. in muscle physiology and is chief executive of the International Society of Sports Nutrition.

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I trained long & hard, did everything I was told, but did not see my desired results; I became frustrated, both physically and mentally.

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If you just want to use the "basics" like protein, creatine, NO, multi's, etc that's cool - But fair warning if you decide to go that route: **You'll have a basic, average physique - *at best.***

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When is the last time a world-class champion relied on just the basics? Let's be totally honest here, to get the kind of physique that will turn heads, you need something **so strong, so potent** – they'll wonder if you're on the sauce…

Chances are you're *not* making the progress that you'd like. You can either sit there and do the same thing you've been doing (and get the same *lackluster* results) or you can take action now and refuse to settle for mediocrity. The choice is *yours*…

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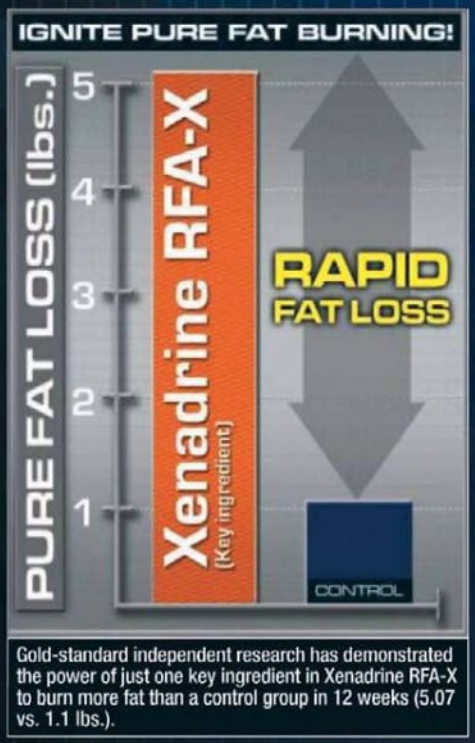

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OPTIMUM PERFORMER

DARA TORRES

FitnesssRx *Women's Athlete of the Year*

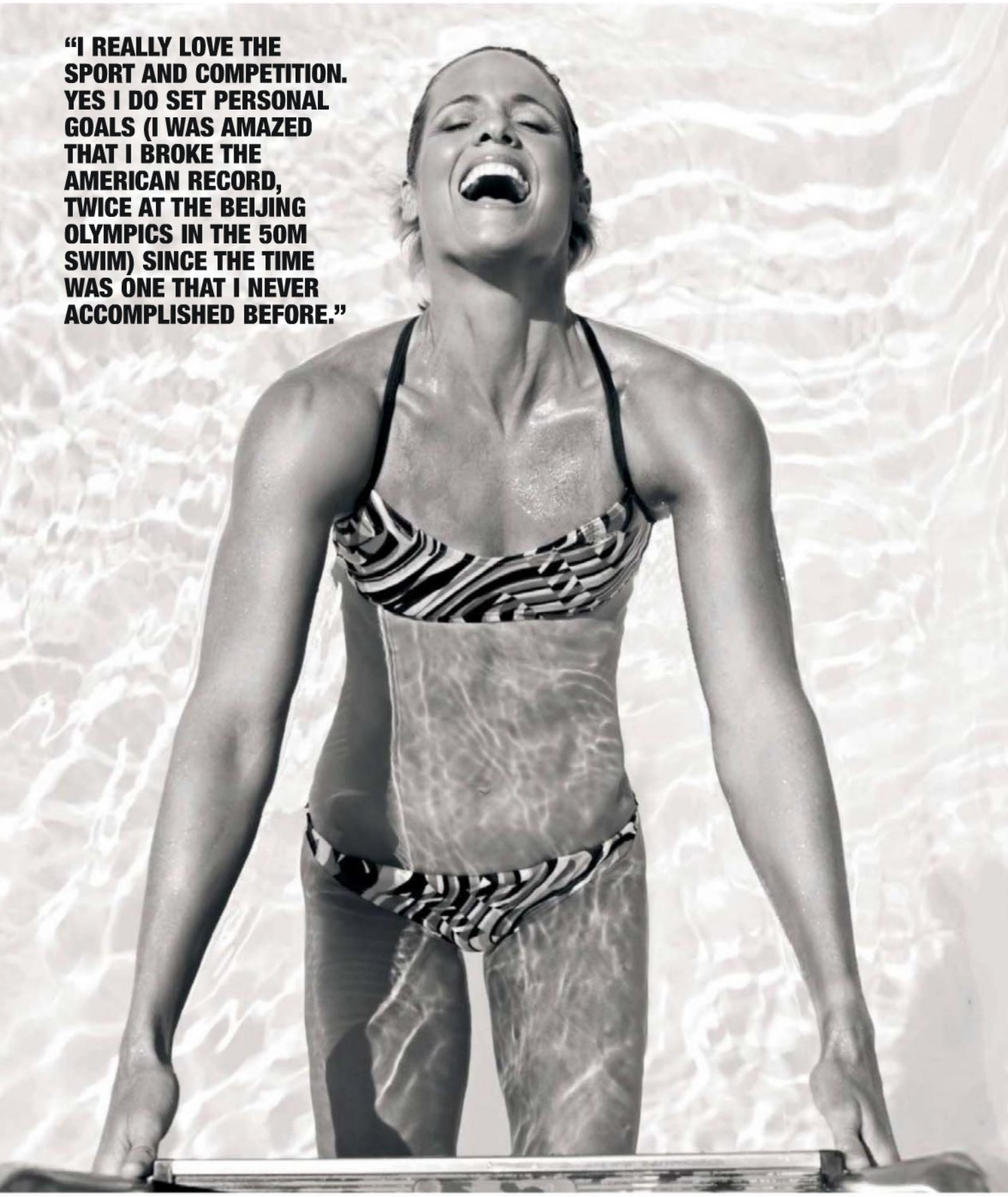
In order to fully grasp the marvel that is Dara, and to understand why she has been chosen as a FitnessRx Women's Athlete of the Year, one needs to reflect on the accomplishments of this superachiever. As the first U.S. swimmer to compete in five Olympic Games, Dara set three World records and won nine Olympic medals, four of them gold. In the Sydney Olympic Games alone, after a seven-year break from competitive swimming, Dara won gold in the 400m freestyle and 400m MR and bronze in the 50m freestyle, 100m freestyle, and the 100m butterfly. After the 2000 Olympics, Dara retired again to start a family, but dove right back into swimming in the 2006 Masters Nationals, where she broke a world record— just three weeks after her daughter's birth.

Dara lets nothing stop her— not even a silly thing like age. In her inspiring new book, *Age is Just a Number*, Dara proves that there are no limits to what can be achieved. In August 2007, Dara won another National title and broke her own seven-year American Record in the 50 Freestyle— and this accomplishment led Dara to believe that she could compete in the 2008 Beijing Olympics. Dara won three medals at the summer Olympics, leaving her with 12 Olympic medals and countless admirers and fans.

At the age of 46, in the year 2012, Dara will make another determined 'Go for the Gold'— and it is certain that she will uphold her status as a shining example of someone who goes over and above the ordinary— and attains the extraordinary. Dara is a great role model and inspiration to women worldwide, as someone who has succeeded in becoming the best she can possibly be.

PER BERNAL PHOTO

"THE TITLE AND IMPETUS FOR MY BOOK WAS REALLY BORNE OUT OF THE BEIJING OLYMPIC EXPERIENCE. I ASKED MYSELF, 'WHY PUT A LIMIT ON MYSELF DUE TO A NUMBER?'"


"I REALLY LOVE THE SPORT AND COMPETITION. YES I DO SET PERSONAL GOALS (I WAS AMAZED THAT I BROKE THE AMERICAN RECORD, TWICE AT THE BEIJING OLYMPICS IN THE 50M SWIM) SINCE THE TIME WAS ONE THAT I NEVER ACCOMPLISHED BEFORE."

"THE WORKOUTS I DO ARE HARD AND INTENSE, YET I MAINTAIN A LEAN BODY AND AM NOT MUSCULAR. I ONLY DO THREE OR FOUR SPECIFIC MUSCLE GROUP EXERCISES IN A WORKOUT. EVERYTHING ELSE I DO IS BALANCE WORK, STRETCHING AND THE LIKE. I HAVE BEFRIENDED THE BOSU BALL. FOR ME, I TARGET TRAIN TO SUPPLEMENT MY POOL WORKOUTS WITH A SPECIFIC GOAL IN MIND."

"I LOST

"After seeing an ad for the LIPO-6X, I decided to give it a try. At the start of my transformation, I weighed 244 lbs. and was 22 percent body fat. I took it for only 12 weeks while eating more healthy and working out on a regular basis. Before starting the LIPO-6X I could never have imagined the rapid change in life I was about to experience. The results have been staggering as I now weigh 198 lbs. and my body fat is at 4 percent! I've now decided to enter my first bodybuilding competition. LIPO-6X has not only improved my physique, but my way of life."

Ryan Stewart

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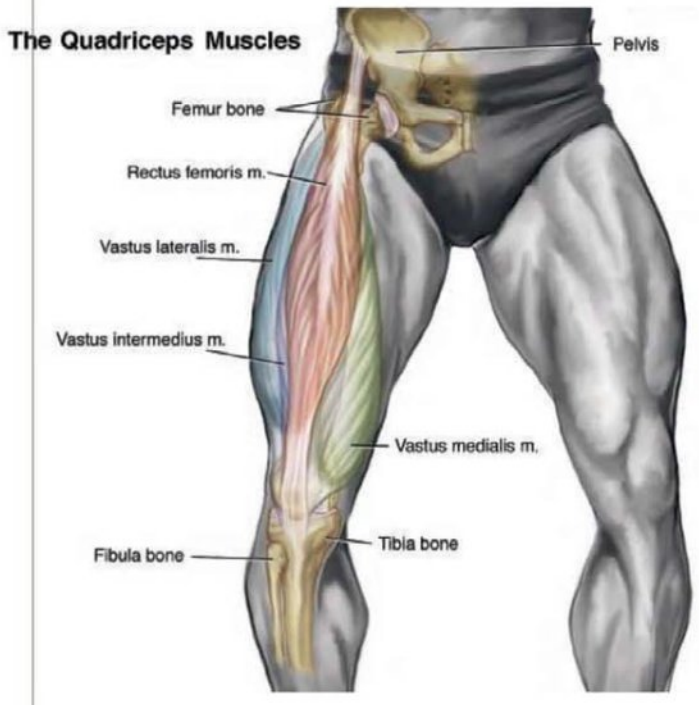
VITAMIN WORLD

By Stephen E. Alway, PhD., FACSM
Illustrations By William Ph.D. Hamilton, CMI

STRONG & POWERFUL THIGHS BEGIN WITH SQUATS



The evolution of modern weight-training equipment and gyms has created a paradox. On one hand, it's allowed us to move quickly and easily from one exercise to another; the machines have eliminated the tedious task of breaking the bar down after the exercise. However, excessive use of the machines, especially for the lower body, robs the gym rat of a structural mass base from which to refine for competitive purposes. Muscular thighs with definition emanating from every fiber aren't built on leg extensions alone. Rather, some form of barbell squats is the best strategy to obtain sculpted thighs.

Squats add to the mass and depth of the anterior thigh muscles. In addition, the gluteal muscles, smaller hip muscles, lower and middle back, hamstrings and even the calves are all activated to some extent during this exercise. Does this mean that to have great thighs you must possess a sadistic gene that pushes you through the pain barrier toward exhaustion on every set? Probably not, but gut-busting work is necessary to maximally enlarge the thighs and there's no better exercise than barbell squats.

Structure and Function

Even though the squat involves many muscles, the intent of this article is to focus on the muscles of the anterior thigh, which together are called the **quadriceps femoris** muscle group. The quadriceps femoris ("quads") is a group of four muscles covering the anterior and lateral parts of the femur bone of the thigh. The three *vasti* muscles take their origin from the respective part of the femur; the **vastus lateralis** muscle from the lateral part of the femur; the **vastus medialis** from the medial part of the femur; and the **vastus intermedius** from the central, anterior part of the femur.

As a result, the vastus lateralis muscle is positioned on the lateral (outer) part of the thigh and the vastus medialis covers the medial (inner) part of the thigh. The vastus intermedius is located intermediate and deep to the vastus lateralis and the vastus medialis muscles. The tendon from the vastus lateralis combines with the tendons from the other two vasti muscles and the tendon of the *rectus femoris* to form the quadriceps tendon. The quadriceps tendon attaches to the patella (kneecap) and continues inferiorly (toward the foot) from the patella, where it's called the patellar ligament. The patellar ligament inserts into the tibial tuberosity, a bumpy portion on the tibia bone of the lower leg.

The **rectus femoris** (rectus=straight) is the fourth muscle in the quadriceps group. Unlike the vasti muscles, it begins on the hipbones at the iliac crest and above the socket where the head of the femur sits (acetabulum) in the hip. Its fibers run straight down from the hip to the knee. The tendon of the rectus femoris joins the tendons from the three vasti muscles to attach to the patella. Together, the three vasti and the rectus femoris muscles form the only real manner we have for extending the leg at the knee. The rectus femoris is much weaker when the hip is flexed (e.g., seated position, such as during leg extensions).

Barbell Squats in a Power Rack

1. Position your squat bar on the support bar in a power rack. The bar should be about mid-chest level when you're facing it. Warm your knees up with lighter weights in the early sets and save the heavy stuff for the final three or four sets. Set the height of the lower safety bar of the power rack about two inches lower than the bottom position of your squat.

2. You may find that the heavy barbell will be very uncomfortable (even painful) as it rests on your upper trapezius and this will detract from your ability to concentrate on your quadriceps muscles. Most gyms have a bar

pad you can wrap around the middle sections of the bar before setting up for the squat. Alternatively, you can wrap the center of the bar with a towel, or place the towel across your upper trapezius so the bar will rest on the towel. If you wrap the bar, be certain it won't loosen during your set.

3. Grip the bar firmly with a wide grip. Place your head under the bar and bend your knees slightly. Position the wrapped bar high across your shoulders and the upper trapezius muscles (but not on your neck).

4. Keep your head up and tighten your back. Place your feet about shoulder-width apart. Lift the bar from its starting position on the power rack (don't jerk the bar) by extending (straightening) your knees. Make sure you have full control of the weight before moving into position.

5. Take one step backward, just enough to clear the upper rack supports, so you won't hit it during the exercise. Place your feet a little wider than shoulder width with your toes pointed slightly outward. Keep your head up and your back straight and tight, but maintain its natural curves. Again, make sure you're in control of the weight, not the reverse, before beginning the squat.

6. Control the weight as you slowly lower your buttocks toward the floor by allowing your knees to flex. Continue squatting downward until the tops of your thighs are parallel to the floor, or when your knee angle has reached 90 degrees.

7. The lowest safety bar on your squat rack should've been set so it doesn't contact the barbell at the bottom of the squat. Nevertheless, it should be high enough to "catch" the bar without excessive knee flexion if, for some reason, you fail during the set. It's best to have a spotter to help you on the heavy sets, but even spotters can mess up. Therefore, it's important to have properly positioned the lowest safety bar of the power rack before beginning your set.

8. Never bounce into or out of the bottom position. Such sloppy lifting will only result in knee injuries, not giant thighs. After you've reached the bottom, stand up in a smooth, fluid movement. Stop just short of fully locking out your knees, thereby maintaining the tension on the anterior thigh muscles. Keep your back tight and flat and your head up on the way up and on the way down.

Important Tips

All four quadriceps muscles are strongly activated during the ascent. However, the relative degree of muscle activity differs among these muscles. The tension in the vasti muscles diminishes as you approach the top portion of the lift (with knees straightened). Conversely, the rectus femoris is less active at the bottom (flexed knee and flexed hip position), but becomes more activated when the hip and knee are being extended. Since the gluteus maximus muscle is such a strong extensor of the hip, it's very active during the ascent of the squat. The hamstring muscles can also be activated, particularly since they also act to extend the hip. The erector spinae muscles achieve a moderate isometric contraction during the lift to keep the back flat.

By keeping your head up when squatting, you'll ensure your back is straight and flat. Excessive forward flexion of the torso will allow you to lift a little more weight, but it's done with the back extensors and gluteal muscles rather than your quadriceps. Bending forward also increases the risk of lower back injury. While a little hip flexion is reasonable during squatting, this shouldn't be excessive. After all, you're not trying to be a powerlifter.

Some preferential muscle development in one or both of these areas is possible with squats, but the very similar anatomical positioning makes such specialization difficult. For example, if you bring both feet close together with toes pointing slightly inward (thus, a medial rotation of the hips, which brings the knees close together), the vastus lateralis will achieve a slightly greater

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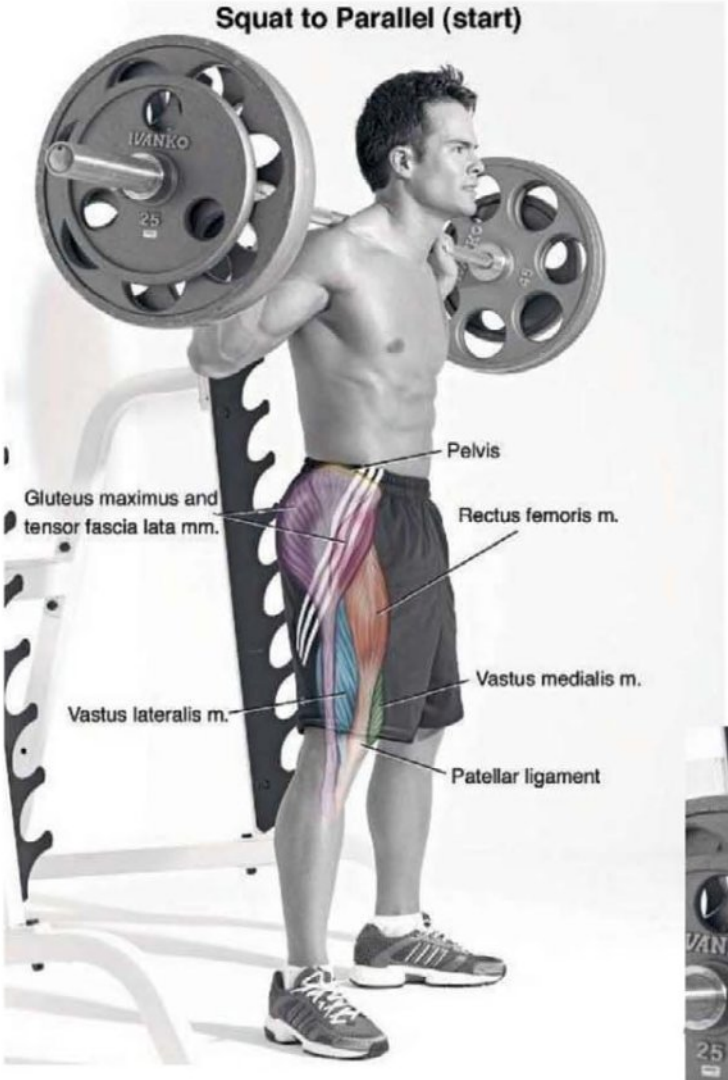

activation because of an increased stretch on this muscle during contraction. This will accentuate the lateral "sweep" in your thighs. A wider foot placement and especially pointing the toes outward (lateral rotation of the knee and hip) will increase the preferential contractile activity of the vastus medialis, thereby accentuating the "teardrop" above the medial side of the knee. Because the rectus femoris and vastus intermedius insert in the middle of the patella, variation in foot stance will have no effect on the activation of these muscles.

Often, good weight trainers can approach leg training thinking they can only be successful if they're crawling out of the gym after the squats are completed. Usually, this defeatist philosophy results from improper exercise form (e.g., bending forward, lifting too much weight, lack of concentrating on the quadriceps). Sure, you must train heavy, but you must also feel the weight and concentrate on your quadriceps during the exercise. It's not necessary to start with the mindset that squats should be so exhausting that the cardiology team must be notified at the end of your sets. Rather, think "quads" during your squats, but don't focus on exhaustion. This will result in an immediate difference in your squats and a huge difference in approaching giant size and the responsiveness of your quads. ■

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By Thomas Fahey, Ed.D.

CORE MYTHS:

Can Developing Abs Actually *Hurt* Your Back?

The Safest and Best Exercises!

The traditional road to building 'six-pack' abs was simple: lose fat and do hundreds of sit-ups and leg raises. This was a practical approach that worked. For decades, it served as the foundation for abdominal development in top fitness models, bodybuilders, and athletes.

These exercises can destroy your back! They cause tremendous loads on the spine that can injure and rupture spinal disks and give you a lifetime of back pain. Also, they isolate only a few 'look good' muscles and do a poor job of building functional fitness in core muscles that link the upper and lower body.

Recent studies found that many popular, traditional exercises such as sit-ups damage the spine. As alternatives, spine-saving exercises build the core muscles without causing back pain. They tone muscles without damaging the fragile spinal disks and will give you a lean, rock-hard midsection and functionally strong core muscles that work together flawlessly and maintain a pain-free spine that will last a lifetime.

Core fitness is the key to an athletic, manly physique that will turn heads— and functional whole-body strength and power. The core includes the muscles and connective tissue in the thorax, or central part of the body. Powerful, fit core muscles look lean and project the image of a warrior. They allow you to transfer force from strong lower-body muscles to flexible, elastic upper-body muscles so that you can serve a volleyball, hit a golf ball, or roll a bowling ball with power and accuracy.

Hundreds of exercises build the core. This article will describe four. These simple exercises will build core muscle fitness without damaging the spine. Do them at least five days a week and you will have a lean, functionally fit, studly midsection.

The Core: The Key to a Sexy-Looking, Functionally Fit Body

The 29 core muscles in the torso provide a stable midsection that is vital to all motions and postures. The core muscles stabilize the spine and help transfer force between the lower and upper body. They stabilize the midsection when you sit, stand, reach, walk, jump, twist, squat, throw, or bend. The muscles on the front, back, and sides of the trunk support the spine when you sit in a chair, and fix the midsection as you use your legs to stand up. When hitting a forehand in tennis or batting a softball, most of the force is transferred from the legs, across the core, to the arms. Strong core muscles make movements more forceful and preserve a healthy spine so you don't get back pain.

The torso region needs stability to transmit forces between the upper and lower body. During any dynamic movement, such as hitting a tennis ball or picking up a bag of groceries, the core produces force in some muscles, reduces force in others, and stabilizes the midsection. When specific core muscles are weak or tired, the nervous system steps in and uses other muscles to produce movement. This causes abnormal stresses on the joints, loads sensitive spinal disks, decreases power, and increases the risk of injury.

The core maintains body control by keeping the body mass over its base of support during dynamic movements. Core support works much like a camping tent. The spine is like the pole holding up the tent and the muscles are like the ropes that stabilize the pole. The tent is most stable when all the ropes are tight and adjusted at the same tension. The tent will fall over in a stiff wind if the ropes are loose or if one rope is tighter than the others. The core muscles lie in layers— some are deep and some are superficial— which increases central body stabilization. The 'layer effect' works much like the layers of plywood to increase strength and stability. The entire core is strongest and provides the most support when all of its elements are fit and strong.

Core muscle endurance is more important than strength for stabilizing the spine and thorax. Muscles with good endurance are able to hold the spine in place and serve as a stable platform for large body movements. You lose stability as individual muscles fatigue, which places abnormally high stresses on other muscles.

The core muscles support the spine and promote movement best when they are equally fit and developed. Other muscles must take over if even one of the core muscles is fatigued and not doing its job. For example, weakness in the transverse abdominis— a deep muscle in the abdomen— decreases pressure inside the abdomen when you move, which creates an unstable spine and stresses muscles and joints in the upper and lower body (the knee or shoulder, for example).

An essential principle of core training is to *train movements— not muscles*. Core training teaches the muscles to work together. Muscles don't work in isolation. Rather, they help each other: while some shorten to cause movement, others contract and hold to provide stability, lengthen to brake the movement, or send signals to the brain about the movements and positions of the muscles and bones (proprioception). Core muscles work together to support the midsection and provide a platform of support for movements such as jumping, throwing, and changing directions rapidly. The ideal exercise program helps the muscles in the pelvis, lower back, hips and abdomen to work in harmony to provide smooth pain-free movement.

The core helps control the center of gravity, which is the point where your weight is balanced in all directions. Strong, fit core muscles help you balance and move effortlessly and fluidly. Build core-balancing capacity using static postures (e.g., planks, side-bridges) and dynamic exercise (e.g., unsupported weight-training exercises such as kettlebell swings). Dynamic core training prepares your body for unexpected movements that are often implicated in knee and ankle injuries. It also fine-tunes 'neuromuscular control' that allows you to turn muscles on and off quickly as needed when playing soccer, running for a bus, or hitting a golf ball.

Beyond Sit-ups

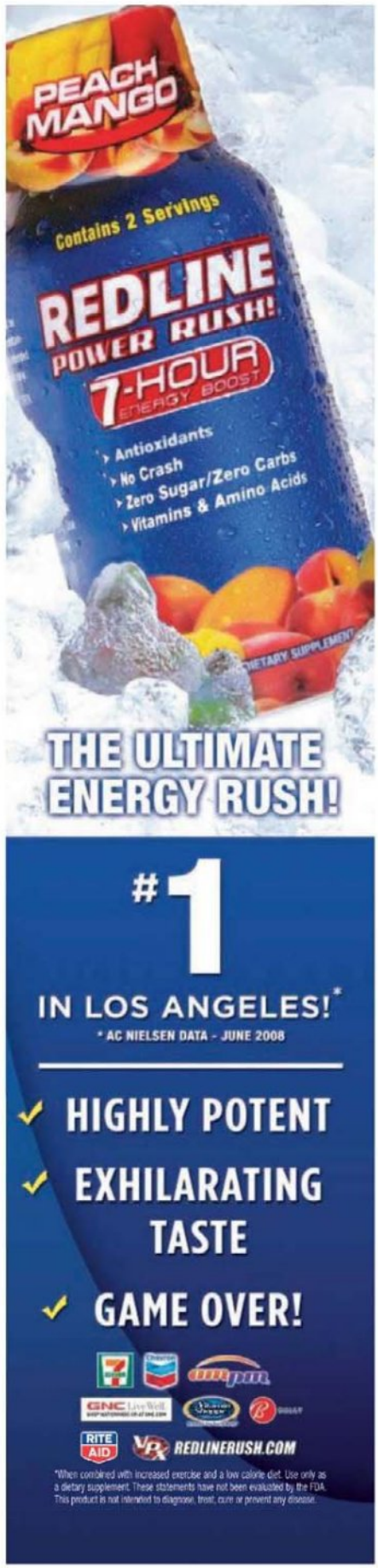
Until recently, most personal trainers and coaches thought that sit-ups were the key to a fit, flat midsection. Sure, you had to lose fat around the middle to bring out the muscles underneath, but sit-ups were the key. They have been the mainstay of abdominal exercise for more than 100 years. That's changed— not only are sit-ups *not* the best ab exercise, they are dangerous. Do enough of them and you will probably be a candidate for back surgery.

The best strategy for building a rock-hard midsection is to develop all the muscles of the core— the abs, back, side stabilizers, and hips. Build these muscles as a unit so they learn to work together, and you will look lean, athletic and become a functionally-fit stud muffin— and have a healthy back and core that will make you feel and look great.

Serious weight trainers try to isolate muscles to make them grow. Isolation is a great way to build individual muscles, but can lead to imbalances that can make your body look funny. Worse, imbalances put abnormal stresses on your spine that can cause injuries throughout your body. All the muscles create a link between joints that scientists call the kinetic chain. What this means is that every joint movement depends on other joints in the body to provide stabilization or assist in the movement. The key to these linked movements is the midsection— the ab muscles, deep side stabilizing muscles, and spinal extensor muscles. Build this core and you can have washboard abs that look good and contribute to whole-body power.

Dr. Stuart McGill, from the University of Waterloo in Canada, is the leading expert in the world on spinal biomechanics and back pain. His extensive research on the spine has provided valuable information about how to develop the muscles of the abdomen, back, hips, and legs, and how to prevent back pain. Dr. McGill said that when choosing core exercises— particularly abdominal exercises— consider the load on the spine. While sit-ups may be excellent for developing the abdominal muscles, they increase the risk of back injury.

Dr. McGill's research showed that stressing the back repeatedly lowers its tol-



erance to injury. The upper limit of back compression for preventing back injury is 3,300 Newtons (N). A Newton is a measure of force. One bent-knee sit-up creates 3,350 N, while straight-leg sit-ups create a whopping 3,506 N— greater than the maximum level set by researchers for predicting work-related back injuries. Curl-ups— one of the major exercises in our ab/core program— created only 1,991 N of spinal compression and side-bridges (a great exercise for your obliques and quadratus lumborum— muscles on the sides of your abs) created 2,585 N.

Part of our preoccupation with sit-ups comes from a misunderstanding of the role of the abdominal muscles in movement. The torso region needs stability to transmit force between the upper and lower body. The main function of the rectus abdominis— the long, wide muscle in the front of the abdomen— is not to shorten and flex the trunk. Rather, it is an important stabilizer and force transmitter. This is suggested by the structure of the muscle: tendons break the muscle into four portions, which give the well-developed rectus a 'six-pack' appearance. The muscle is designed to transmit stresses around the spine, which increases the efficiency of the obliques— the muscles on the sides of the abdomen. The rectus abdominis and the underlying transverse abdominis are more important as spinal stabilizers than as major muscles in trunk movement.

The 'Basic Four' Core Training Program

The 'Basic Four' exercise program builds core fitness without injuring the spine. Always use good form when doing these exercises. You can do other core exercises if you want, but start with the 'Basic Four' and do them five to seven days per week. The exercises include:

1. Curl-ups: 2 sets of 20 repetitions; 1-minute rest between sets.
2. Side-bridges: 2 sets of 10 repetitions (each side), holding each rep for 5 seconds; 1-minute rest between sets.
3. Bird-dogs: 2 sets of 10 repetitions (each side), holding each rep for 5 seconds.
4. Kettlebell Swings: 2 sets of 20 repetitions; 2-minute rest between sets.

The 'Basic Four' Core Training Program is a simple, comprehensive workout that will develop core fitness quickly and safely. Curl-ups isolate the rectus abdominis muscle (six-pack muscle) without overloading the spine. Side-bridges improve the fitness of the obliques and quadratus lumborum muscles on the sides of your torso. Bird-dogs work the back-support muscles, while maintaining a neutral spine. The kettlebell swing is a terrific whole-body exercise that works the core muscles as well as muscles in the upper and lower body.

Combine the core program with cardiovascular exercise. A proven method for relieving back pain is fast walking using a vigorous arm swing. Start with fast walking if your core muscles are weak or you have back pain. After you get in shape, integrate other exercises, such as jogging, cycling, treadmill, elliptical training, and stair-climbing. Cardio will make your midsection look better and help provide a functionally fit and pain-free spine.

Many activities build core strength, including kettlebells, yoga, Pilates, Tai Chi, plyometrics, Swiss and BOSU ball training, medicine ball exercises, functional training machines (Life Fitness, Cybex), and standing dumbbell and barbell exercises. Some of these exercises put too much stress on the spine, so they are unacceptable. For example, straight-leg and bent-knee sit-ups work the abdominal muscles better than almost any other exercise, but they place too much stress on the spine, so they are unsafe for most people. The best core exercises maintain a neutral spine and most movements occur at the hip rather than the back.

Your center of power lies in the core. You will see results quickly with the basic core workout presented in this article. Many people get rid of back pain and move more easily after doing the basic core exercises (curl-ups, side-bridges, bird-dogs, kettlebell swings) after only a few workout sessions. Build and stabilize your core muscles using safe exercises and you'll have a fit, athletic look that will turn heads. Even better, you'll be healthier and will greatly decrease your risk of injury.

Exercise Descriptions

Curl-ups: Lie on your back with your right knee bent, right foot flat on the floor, and left leg extended. Place your hands across your chest. Contract your rectus abdominis (front abdominal muscle), drawing your breastbone downward. Try not to lift your neck or shoulders, and maintain a neutral spine; let the ab muscles do the work. Begin with one set of 10 reps and increase to 2 sets of 20 reps as fitness increases.

Side-bridges: Lie on your side and support your body between your forearm and knees. Hold your spine in a neutral position (normal curves)— avoid letting your back sag during the exercise. Do this exercise on your left and right sides (10 reps on your left side, followed by 10 reps on your right). Build up to 2 sets of 10 reps, holding each side-bridge for 5 seconds. Rest 1 minute between sets. As you increase fitness, support your weight between your forearm and feet.

Bird-dogs: Balance on your hands and knees. Lift your right leg and left arm, and extend your leg to the rear, and reach to the front with your arm and hold for 5 seconds. Don't arch your back during this exercise. Return to the starting position by sweeping your knee close to the ground. Repeat this exercise with the opposite arm and leg. Build up to 2 sets of 10 repetitions, holding each bird-dog for 5 seconds. Rest 1 minute between sets.

Kettlebell Swings: Beginners should start with an 18-pound kettlebell. Begin by holding the kettlebell in both hands with palms facing toward you, in a standing position with knees bent, feet placed slightly more than shoulder-width apart, hips flexed, back straight, chest out, and head in a neutral position. Holding the kettlebell at knee level, swing the weight to a horizontal position by initiating the motion with the hips, thighs, and abs (tighten the quads, glutes, and ab muscles as hard as you can), keeping your arms straight and relaxed during the movement. Let the weight swing back between your legs in a 'football hiking' motion, and then repeat the exercise. During the movement, hinge at the hips and not at the spine.

The Core Muscle Strength & Stability Test

This test measures endurance of many of the core muscles.

- Have a partner time the test or place a stopwatch on the ground where you can see it easily. Your score is determined by your time (see chart). You have good core fitness if you can complete the test. If you cannot complete the entire test, keep track of your points. Take the test at least once a month to measure your progress.
- Begin in a plank position and progress to as many levels as you can. You score 70 points if you can do all eight levels. ➔

The 'Basic Four' Core Training Program

This is a good basic exercise program for busy guys on the go who want to build a strong and healthy core and general fitness. Do the 'Basic Four' Core Training Program five to seven days per week. Modify the program if it is too difficult at first. Increase the repetitions and sets until you can do the entire program. Do this program at least 1 hour after getting out of bed.

DAY	WORKOUT
Monday	• Curl-ups: 2 sets of 20 reps; rest 1 minute between sets.
• Side-bridges:	2 sets of 10 reps (each side), holding each rep for 5 seconds; rest 1 minute between sets.
• Bird-dogs:	2 sets of 10 reps (each side), holding each rep for 5 seconds.
• Kettlebell Swings:	2 sets of 20 reps; rest 2 minutes between sets.
• Cardio:	walk briskly with vigorous arm swing for 30-90 minutes.
Tuesday	• Curl-ups: 2 sets of 20 reps; rest 1 minute between sets.
• Side-bridges:	2 sets of 10 reps (each side), holding each rep for 5 seconds; rest 1 minute between sets.
• Bird-dogs:	2 sets of 10 reps (each side), holding each rep for 5 seconds.
• Kettlebell Swings:	2 sets of 20 reps; rest 2 minutes between sets.
• Cardio:	walk briskly with vigorous arm swing for 30-90 minutes.
Wednesday	Rest
Thursday	• Curl-ups: 2 sets of 20 reps; rest 1 minute between sets.
• Side-bridges:	2 sets of 10 reps (each side), holding each rep for 5 seconds; rest 1 minute between sets.
• Bird-dogs:	2 sets of 10 reps (each side), holding each rep for 5 seconds.
• Kettlebell swings:	2 sets of 20 reps; rest 2 minutes between sets.
• Cardio:	walk briskly with vigorous arm swing for 30-90 minutes.
Friday	• Curl-ups: 2 sets of 20 reps; rest 1 minute between sets.
• Side-bridges:	2 sets of 10 reps (each side), holding each rep for 5 seconds; rest 1 minute between sets.
• Bird-dogs:	2 sets of 10 reps (each side), holding each rep for 5 seconds.
• Kettlebell Swings:	2 sets of 20 reps; rest 2 minutes between sets.
• Cardio:	walk briskly with vigorous arm swing for 30-90 minutes.
Saturday	• Curl-ups: 2 sets of 20 reps; rest 1 minute between sets.
• Side-bridges:	2 sets of 10 reps (each side), holding each rep for 5 seconds; rest 1 minute between sets.
• Bird-dogs:	2 sets of 10 reps (each side), holding each rep for 5 seconds.
• Kettlebell swings:	2 sets of 20 reps; rest 2 minutes between sets.
• Cardio:	walk briskly with vigorous arm swing for 30-90 minutes.
Sunday	Rest

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THE CORE MUSCLE STRENGTH & STABILITY TEST CONT.

Level	Cumulative Points		Your Score
1	10	Hold the basic plank position for 60 seconds.	
2	15	Lift your right arm off the ground and hold this position for 15 seconds.	
3	20	Return your right arm to the ground, lift the left arm off the ground and hold this position for 15 seconds.	
4	25	Return your left arm to the ground, lift the right leg off the ground and hold this position for 15 seconds.	
5	30	Return your right leg to the ground, lift your left leg off the ground and hold this position for 15 seconds.	
6	40	Lift your left leg and right arm off the ground and hold this position for 15 seconds.	
7	50	Return your left leg and right arm to the ground, lift your right leg and left arm off the ground, and hold this position for 15 seconds.	
8	70	Return to the basic plank position, and hold this position for 30 seconds.	

Source: Modified from Brian Mackenzie, Sports Coach, www.brianmac.demon.co.uk

Core Exercise Facts and Recommendations

- Take the Core Muscle Strength & Stability Test once a month to measure progress.

- Practice the basic core exercises (curl-ups, side-bridges, bird-dogs, kettlebell swings) five to seven days per week. These exercises develop muscle endurance rather than strength, so you can practice them more often than traditional weight-training exercises.

- Train movements— not muscle.

- Do most core exercises on a solid surface. Most studies found that exercising on unstable surfaces (i.e., Swiss or BOSU balls) is less effective for loading the core muscles than training on solid surfaces. However, instability training adds variety to your program, so it has some value.

- Training on unstable surfaces increases the load on the spine. Build fitness in your core support muscles before incorporating exercise ball training into your program.

- Muscle endurance is more important than strength in determining core stability. Don't concentrate on core muscle strength and power until those muscles have good endurance.

- Don't do core training first thing in the morning. The water content of the spinal disks remains high for at least 45 minutes after getting out of bed. Also, don't do any high-force exercise after sitting for prolonged periods. Prolonged lying or sitting increases the risk of injury to the disks.

- Avoid full-flexion exercises (bend over at the waist toward the knees), such as sit-ups and trunk-flexion machines. Also, avoid forceful motions in the trunk to the ends of the range of motion. It takes very little stress to rupture spinal disks when the trunk is in full flexion.

- When beginning a program, learn to handle your bodyweight before using resistance. For example, if you can't squat properly without weight, you may get injured if you squat using weight.

- Cardio exercise, particularly fast walking with full arm swing, is important for building core muscles and reducing fat around the abdomen.

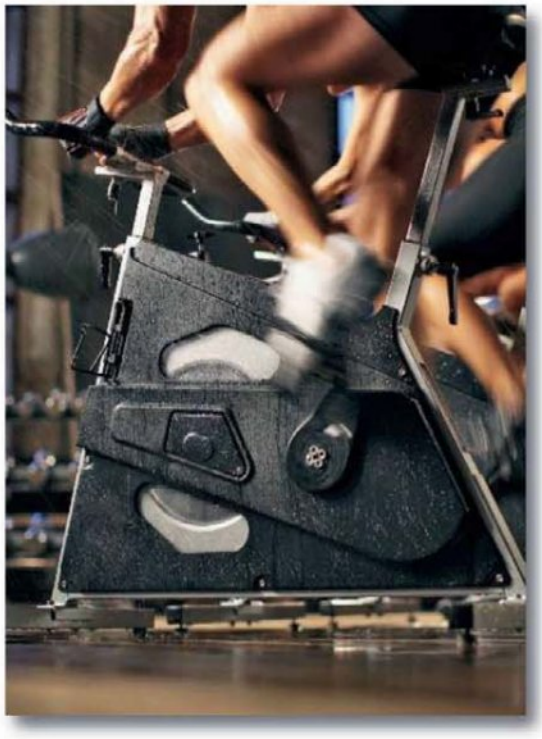
- Avoid using exercise machines that restrict motion and support the body, because they interfere with motor control necessary for smooth movements and preventing injury. Core training should emphasize whole-body motions rather than isolating muscles and joints.

- Tense (brace) your core muscles, particularly the abdominals, when lifting weights or performing total-body movements in sports such as softball, tennis, or golf. This involves squeezing and tensing your core muscles during exercises, which protects the spine. Breathe normally when bracing the core. Do not suck in your gut (called hallowing) because this decreases the broad abdominal base that supports the spine.

- Use good form when doing exercises. Muscle fatigue destabilizes the spine and can lead to injury. ■

By Butch Peterson

Why HIIT Is a Hit!



Burn More Fat With Less Time in the Gym

If you are like most guys, you want to get the most out of the short amount of time you have in the gym. And you want results. Fast. You hit the cardio room to cut the fat and improve your athletic performance, not to hang out and socialize. You are the kind of guy who wants to get in, get out, and get the most bang for your buck! If this is you, we've got something for ya. It's called High Intensity Interval Training (HIIT)— *and it ain't no walk in the park.*

HIIT: The Alternative to Painfully Dull 'Fat-burning' Workouts

You may have heard that the only way to get rid of that extra beer gut that blocks your hidden six-pack involves hours of slogging about on the treadmill or stationary bike at 60 percent effort. You know what I'm talking about— the cardio sessions you hate most— the dreaded 'fat-burning' workouts that are about as exciting as folding laundry or sitting through a Meg Ryan romantic comedy.

Good news! You don't have to go into cardio coma anymore. Instead of the long slog, you can do a series of short, intense, cardio intervals, with similar results. HIIT sessions may vary from 15-60 minutes filled with bursts of maximum effort, followed by medium intensity, and POW! You are out the door!

It's pretty simple, really. HIIT sessions generally follow the 2:1 work-to-rest ratio. For example, in a running workout, a HIIT session may involve a series of 30-second sprints separated by 60-second 'rest' periods of easy jogging. All you need is a stopwatch.

The Science

Long aerobic workouts have long been touted as the best method to reduce fat, as fatty-acid consumption usually occurs after at least 30 minutes of training. The concept of HIIT somewhat runs counter to that theory, but has nonetheless been shown to burn fat quite effectively. There may be a number of factors that contribute to this, including an increase in RMR, and possibly other physiological effects.

A study by Gibala et al. demonstrated that doing 2.5 hours of HIIT produced similar biochemical muscle improvements as performing 10.5 hours of endurance training. Endurance performance also improved in similar fashion. That's less than one-quarter of the time for the same result! And after the HIIT, fat-burning continues. According to a study by King, HIIT increases the resting metabolic rate (RMR) for the following 24 hours, due to excess post-exercise oxygen consumption. King also discovered that the high-intensity bouts also may improve VO_2 max more effectively than traditional, long, aerobic 'fat-burning' workouts.

The Benefits

HIIT can also be a fast track to improving athletic performance— or in other words, getting out of the 'rut.' Some well-trained athletes can feel like they have reached a 'plateau' in their results, and improvements in performance can become difficult to attain. Often these athletes can become frustrated because even when they work out more, it just seems to do no good. Research has shown that HIIT may be a way to break out of this performance 'rut.'

In a study by Driller, well-trained rowers went 8.2 seconds faster in a 2,000-meter sprint, following a four-week regimen of HIIT. That's a 2 percent improvement after just seven HIIT sessions. Driller's interval training involved eight sprint sessions of 2.5 minutes each with differing rest periods in between.

There are more health benefits than just looking better and improving performance. Recently, it has been shown that two weeks of HIIT can substantially improve insulin action in young healthy men. HIIT may therefore represent a viable method for prevention of type 2 diabetes.

You Get the Idea!

Crank up the intensity, rest, repeat, get out. HIIT will cut fat, improve performance, help prevent type 2 diabetes, and get you out of the long 'fat-burning' cardio bouts that can bog you down. HIIT is an excellent way to maximize your workout, if you are limited on time. Many fitness experts have made this methodology a cornerstone of their routines for these reasons.

How To Do It:

For best results, research suggests seven sessions of HIIT over a two-week period. One day HIIT, the next day off. The days off can be spent in the weight room, or you can double up on HIIT and weights on the same day— but it is best to spread the workouts apart (e.g., HIIT in the morning, weights in the evening).

Start a HIIT session with a typical warm-up session to get your blood flowing and prepare your body for the extreme effort. After a warm-up, do six to 10 reps of high-intensity, separated by medium-intensity exercise, and ending with a period of cool-down exercise. The high-intensity exercise should be done at near-maximum intensity. The medium exercise should be about half-maximum intensity. The number of repetitions and length of each depends on the exercise. The goal is to do at least six cycles, and to have the entire HIIT session last at least 15 minutes and not more than 20.

Example HIIT Workouts

30-SECOND TREADMILL BLASTS (*A half-minute never felt so long!*)

Beginner: Seven 30-second sprints with 90-second medium effort 'rest' periods between sprints (approx. 15 minutes total)

Intermediate: Nine 30-second sprints with 60-second medium effort 'rest' periods between sprints (approx. 15 minutes total)

Advanced: Twelve 30-second sprints with 30-second medium effort 'rest' periods between sprints (approx. 15 minutes total)

Sprint like you mean it! Go fast enough that you feel like you will almost collapse in the last few seconds of the sprint. Everything in your body should be burning. If you are fit and are not getting to this point in the sprint intervals, don't save yourself for later, give it all up front, go harder and then try and survive through the rest of the workout. ➝

HIIT SPRINT CYCLE STATIONARY BIKE WORKOUT

We put our crack FitnessRx team of workout buffs together to come up with a hardcore HIIT workout for a spin or stationary bike. The result: The HIIT Sprint Cycle. We tried to put everything together in one powerful punch and mix efforts like a mash-up DJ in a Las Vegas nightclub. So grab a stopwatch and give it a shot. Let us know what you think.

RUNNING TIME (MINUTES)	TASK	RESISTANCE*	CADENCE**	INTERVAL DURATION (MINUTES)
0-5	Sitting warm up	Easy free spin	Slow	5
5-10	**Standing warm-up: Strong, consistent jog.**	**Medium**	**Medium**	**5**
10-12	Recovery spin	Easy free spin	Slow	2
12-13	**Seated sprint**	**Low**	**Very Fast**	**1**
13-15	Recovery spin	Easy free spin	Slow	2
15-17	**Standing sprint**	**Medium**	**Fast**	**2**
17-19	Recovery spin	Easy free spin	Slow	2
19-22	**Seated sprint**	**Low**	**Fast**	**3**
22-24	Recovery spin	Easy free spin	Slow	2
24-28	**Sprint cycle: Four 20-second sprints with 40-second recovery between each sprint. First two sprints seated. Second two out of the saddle**	**Hard for sprint, easy spinning for recovery**	**Fast for 20 second sprint, slow for 40 second recovery**	**4**
28-30	Recovery spin	Easy free spin	Slow	2
30-35	**Sprint cycle: Five 20-second sprints with 40-second recovery between each sprint. First two sprints seated. Second three out of the saddle**	**Hard for sprint, easy spinning for recovery**	**Fast**	**5**
35-37	Recovery spin	Easy free spin	Slow	2
37-41	**Sprint cycle: Four 20-second sprints with 40-second recovery between each sprint. First two sprints seated. Second two out of the saddle**	**Hard for sprint, easy spinning for recovery**	**Fast for 20 second sprint, slow for 40 second recovery**	**4**
41-43	Recovery spin	Easy free spin	Slow	2
43-46	**Seated sprint**	**Low**	**Fast**	**3**
46-48	Recovery spin	Easy free spin	Slow	2
48-50	**Standing sprint**	**Medium**	**Fast**	**2**
50-52	Recovery spin	Easy free spin	Slow	2
52-53	**Seated Sprint**	**Low**	**Very Fast**	**1**
53-60	Recovery spin	Easy free spin	Slow	7

* The resistance of most indoor stationary bikes is usually adjusted by a dial that acts like a brake on the flywheel. The more you turn the dial, the more difficult it is to pedal. This workout is customized to anyone who wants to burn calories comfortably, because each suggested resistance setting (easy, medium, hard) is determined by the individual. Your perceived level of resistance will increase with your experience.

** The speed that you spin the pedals is called cadence. During a workout, you can increase or decrease the cadence, depending on the required task. You can spin the pedals around as fast as an egg-beater, or grind the pedals as slowly as a cement mixer. Keep in mind that a very high cadence will often fire up the cardiovascular system just as much as grinding against heavy resistance. So even if you don't think you are working hard enough, your heart is still burning calories. Like the resistance setting, cadence is customized to the user because each suggested cadence (slow, fast, very fast) is determined by the individual. Your perceived cadence speed will increase with your experience. ■

CADENCE:

Slow	40-90 RPM
Medium	90-140 RPM
Fast	140+ RPM
Very Fast	Your legs are pumping faster than the pistons of a formula-one racecar.

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OVERTRAINING & OVERREACHING

How to Prevent Burnout

Weight train long enough and eventually it happens to everyone— burnout. You find you're experiencing session after session of disappointing workouts that become the complete antithesis of what's intended. Rather than building muscle and lifting spirits, your workouts add a new ache and loss of gains— proving beyond a shadow of doubt that you're actually weaker. Day by day the numbers drop, until you realize you're the physical equivalent of a stock market crash.

Many people find themselves trapped in the quicksand-like experience of being 'overtrained,' but either enter a frantic mindset of training even harder (worsening the condition) or become depressed, losing self-esteem and interest in training altogether. Often the overtrainer exists in a state of heightened frenzy, until finally succumbing to the perpetual stress through injury or illness. The overtrainer may eventually find his way back to the gym or exit the fitness lifestyle, seeking fulfillment at the end of the clicker and prime time television.

Pushing Beyond One's Limits?

Nearly every athlete and fitness enthusiast has used the term 'overtained' to describe himself at some point in time, but sports science and physiologists know extremely little about the condition. In fact, a recent review has even raised the question as to whether overtraining actually exists.[1] The lack of credible data makes it maddeningly difficult for those facing the inevitable plateau (or worse) to determine what causes a sudden reversal in their progress. As important as it is to determine the cause of overtraining, for those stuck in the proverbial rut, correcting the situation is even more important.

Observant readers may have noticed the quotes placed around the term 'overtrained.' This is because there's a more correct term for what most people experience. The confusion caused by improper terminology is one of the contributing factors in the lack of scientific answers to the question of how to avoid or get out of burnout.

Technically speaking, athletes (including noncompetitive fitness enthusiasts who train for health or personal goals) must train beyond the level of their current capabilities in order to improve. In the weight room, it does little good to walk in every Monday and bench 225 for three sets of 10. To gain muscle strength or size, a progressive, incremental increase in training must occur— in other words, you have to program your workouts so you become able to lift more weight for more reps. This is accomplished by a variety of methods, but the most successful programs force the athlete to progress a little more than he believes possible on a regular basis. This might involve the use of forced reps, eccentric sets or more elaborate training methods, which force the body to respond by increasing the abilities or strength of the athlete.

However, constantly pushing beyond one's natural limits creates the risk of overdoing it. While injuries are a major concern, overdoing it also taxes the body beyond its ability to recover. Experiencing minor fatigue and short-term reductions in performance, after really pushing oneself is normal, and with adequate rest, the body should super-compensate (rebuild beyond the abilities that existed before the greater demands). This cycle of overtaxing the body, followed by super-compensating after adequate rest, is the basis for

most training programs. However, when the training demands increase out-of-proportion to the allowed rest, the body may not be able to recover to evenly compensate (return to the original level of ability), let alone super-compensate. This may lead to the familiar state, commonly called 'overtrained.'

In fact, being *truly overtrained* appears to be relatively common, as it's defined by the sports scientists.[2] Yet, the signs and symptoms of being overtrained are encountered more frequently than would be expected. This is because the basic conditions that lead to overtraining are the same used to promote super-compensation— the difference being the results. Remember, to super-compensate, one basically overworks a muscle and then allows it to recover in the hopes that the training, in combination with proper diet and rest, will cause the body to super-compensate.

Super-compensation is considered a positive adaptation to training. However, two things can happen with this simple equation that could cause the athlete to have a negative adaptation to the training ('overtrain'): the level of training demands may be too excessive and/or the rest may be inadequate. When this happens, the athlete may experience signs and symptoms of overtraining, including: fatigue, performance decline and mood disturbances.[3]

WHEN THE TRAINING DEMANDS INCREASE OUT-OF-PROPORTION TO THE ALLOWED REST, THE BODY MAY NOT BE ABLE TO RECOVER OR EVEN COMPENSATE (RETURN TO THE ORIGINAL LEVEL OF ABILITY), LET ALONE SUPER-COMPENSATE. THIS MAY LEAD TO THE FAMILIAR STATE, COMMONLY CALLED 'OVERTRAINED.'

Fatigue versus Overtraining

In order to understand when one is merely fatigued from working hard versus risking lasting performance (decreased strength or lost muscle mass), it's important to understand the continuum used by sports scientists. Appropriate training typically requires less than two weeks for recovery and often leads to performance increases (super-compensation). Though fatigue and weakness may be experienced in the short term, typically there aren't any negative mood disturbances.[4] So, while hardworking athletes will occasionally overdo it and require a break from high-demand training, the recovery is fairly quick and there's no associated moodiness.

When athletes are seriously pushed past their limits and/or not allowed sufficient time to recover, the decline in performance becomes more serious and the amount of rest needed to return to 'normal' is longer— between two to four weeks. Mood disturbances aren't uncommon and some may experience injuries or be more susceptible to infections (such as colds). This state is called *overreaching* and represents what most people commonly think of when they refer to being overtrained.[5] If the athlete is allowed to reduce his training demands and receives adequate rest, this often passes without much consequence. However, it's vital to spot these signs immediately and intervene, to prevent the decline from progressing to the more chronic stage of *overtraining*.

Overtraining shares the same signs and symptoms as overreaching, so far as the research has been able to determine, but differs in that even with reduced training and increased rest, the performance decline persists for weeks to months.[5] Obviously, for a person who identifies closely with his level of fitness or competitiveness, this could precipitate a very negative emotional response. Mood disturbances may be seen in overtrained individuals with injuries, and illness being reported in many cases.[4] Overtrained individuals often exacerbate (worsen) the condition by working harder when they see their performance decline, increasing their training demands in the hopes that the body might respond positively. Unfortunately, it's like beating a dead horse.[6] On the other end of the extreme, some individuals may become so demoralized by their performance that they lose interest in training altogether and abandon all fitness pursuits.

It's interesting to note in the science literature that there's no accepted diagnostic marker for overreaching or overtraining.[1] This means one can't check blood markers, hormone levels or urine samples to monitor if one's training is appropriate or at risk. There have been many markers suggested by a number of papers, but unfortunately, most of the same markers are present in appropriately-trained athletes as well. The three tests that seemed to be of significant value are: urinary catecholamines (metabolites of adrenalin), serum glutamine and mood, as measured by the profile of mood states (POMS) questionnaire.[7-9] One difficulty with these measures is that it works best if a baseline value is obtained to look for the trend, rather than absolute glutamine or catecholamine levels.[1]

Though it remains difficult to determine exactly who's overtrained and when it occurs, there are signs that predictably lead up to the condition. Noted researcher H. Selye states that "Stress shows itself as a specific syndrome, yet is non-specifically induced..."[10] Many experts believe, "[Overtraining] is felt to be the result of an accumulation of stressors that exceed an athlete's finite resistance capacity."[1] Interestingly, these stressors aren't only

physical, but may be social, emotional or mental as well. In addition to high-demand training and inadequate rest, the list of potential stressors includes: frequent competition, monotonous training, psychosocial stressors, illness/infection and heavy travel schedules.[11] Common sense would dictate that inadequate nutrition and recreational drug use should also be listed.

How Much is Too Much?

Knowing now what overreaching and overtraining are, how does that aid in avoiding or recovering from the conditions? The most basic step is to track performance. Without knowing from day-to-day or week-to-week what is 'normal,' it's impossible to note when performance begins to suffer. So, those who truly want long-term success must begin by planning and documenting performance. Are improvements being seen? When do they stop? How much is too much when it comes to training?

Knowing the performance standards, one can then monitor the simple equation of training and rest. Training demands can become greater by increasing training volume or intensity. Training volume, in the simplest terms, is the number of sets performed during a weight-training session. Obviously, a 20-set training session is much more demanding than six to 12 sets. Demands are also related to the amount of effort put into each set. Sets of 10 at 60 percent of 1 RM (one-rep max) are fairly easy, but a set of 10 at 75 percent of 1 RM certainly taxes the system more. Both methods are used, in addition to changing exercise routines, to induce muscle response (increases in size and strength).

The other side of the equation is rest. Most people train each body part one or two times a week, allowing the muscle groups to recover between sessions. Those who have trained the same muscle group daily rapidly discover that the response is quite negative, with tendon strain, muscle soreness and resulting weakness. Even whole-body rest is necessary, as seven days a week of intense training, even when divided between body parts, is too much. This is why many laborers who are employed in physically demanding jobs can't train well. It's also why strength coaches frown upon, or even forbid, strength training during the competitive season for athletes.

Most strength coaches employ a periodization approach to training, pushing an athlete hard for one to three weeks, followed by a week of relative rest (training at a lower volume and intensity). Over time, the athlete responds with progressive increases in strength. This exemplifies the value of tracking performance and adapting to the response. Considering that the stressors that may lead to overtraining include many issues that aren't directly related to training, it's important to watch carefully when life conditions change (upcoming wedding, relationship difficulties, financial trouble, etc.). Even though it sounds like voodoo, incorporating some form of stress management into your daily schedule may actually offer training benefits. Whether it's

relaxing music, meditation or even just a peaceful stroll around a lake, finding a way to de-stress is important. Further, a regular sleep schedule is also necessary, as disrupted sleep patterns lead to all sorts of metabolic misfortunes.[13]

Dietary Guidelines

Aside from monitoring training and rest, it may be of value to consider some basic dietary guidelines as well, especially if recovery seems delayed or there's an unexplained decrease in performance.

Glycogen is the storage form of carbohydrates. Glycogen is stored in muscles and the liver, providing much of the energy that's used during weight training. The popularity of low-carb diets, zero-calorie sweeteners and hypocaloric dieting for fat loss all contribute to the possibility that athletes aren't replenishing glycogen stores between workout sessions— and may be at a perpetual disadvantage at the beginning of each training session. Consuming a high-glycemic post-workout shake, with whey protein and dextrose, will ensure that glycogen stores are replenished during this crucial time period.[14,15]

In addition to glycogen stores, the amino acid pool (nutrients that form protein) of muscle is also depleted with intense exercise. Many studies have proven the value of consuming a high-protein shake immediately post-workout for maintaining muscle strength during high-volume training.[16] Additionally, consuming a small portion of branched-chain amino acids, particularly leucine, shortly before training, appears to offer even greater benefit.[17]

Glutamine is a very important amino acid for muscle cell metabolism and the immune system and serves as a gluconeogenic substrate for the liver (or it can be turned into sugar during periods with low blood sugar). As was noted earlier, its levels in the blood are noted to drop consistently in overtrained individuals.[18] Supplementing with glutamine during periods of intense training may protect against this happening.

Another amino acid that has been suggested to protect against the oxidative damage created by exercise is L-cysteine, a sulfur-containing amino acid involved in the antioxidant process, which protects cells from free radical damage. Supplementing with L-cysteine has been shown to decrease certain forms of cell damage during forced exercise.[19] The addition of reasonable levels of other antioxidants would likely be of additional value, including vitamins C and E, as well as lipoic acid.

Though it's often forgotten due to its familiarity, creatine supplementation during high-frequency training appears to protect against losses of strength or power in conditions that would otherwise induce overreaching.[20]

Surprisingly, there's not much evidence that hormonal levels change in overreaching or overtraining. One well-regarded study suggests that overtrained individuals experience a hypothalamic impairment, meaning that the body doesn't monitor certain hormones correctly.[21] Interestingly,

it's cortisol (the catabolic steroid) and growth hormone (GH) that appear to be most affected. Testosterone levels appear to decline during overreaching, though there are conflicting reports in the literature.[22]

There's no defined protocol treating this set of symptoms, but it's possible that the use of pregnenolone (a precursor to DHEA) may aid in maintaining both cortisol and testosterone. Pregnenolone is enzymatically converted into cortisol in the adrenal glands and it appears to promote the release of gonadotropin-releasing hormones from the hypothalamus.[23] Zinc supplementation is promoted to aid in maintaining testosterone levels during high-demand training, but this has been disputed.[24] Arginine, another amino acid, plays a role in GH release, but there's no research available to determine whether it would prevent or treat the hormonal disturbance that occurs during overtraining.[25]

Allowing the Body to Recover

Overtraining exists in every gym and nearly everyone will experience it at some point in his training career. Knowing it's related to the balance between training and recovery supports the concept of varying training volume and intensity on a regular basis. Monitoring your workouts is vital, as recognizing the decline in performance is the first level of defense against overtraining. If fatigue and a performance decline persist for more than two weeks, despite increasing rest, then overreaching has set in. Rather than pushing harder, it's important to allow the body to recover. Adding a high-glycemic, whey protein and carb shake will help replenish muscle glycogen and amino acid pools. Antioxidants, glutamine and possibly a few other supplements may aid in recovery, but the most important ingredients to the recovery recipe are time and attention. Hopefully, the experience will provide guidelines for the future as to how much is too much. This topic can't be overstressed, as the competitive and demanding nature of most fitness-oriented men often places them at risk for overtraining. ■

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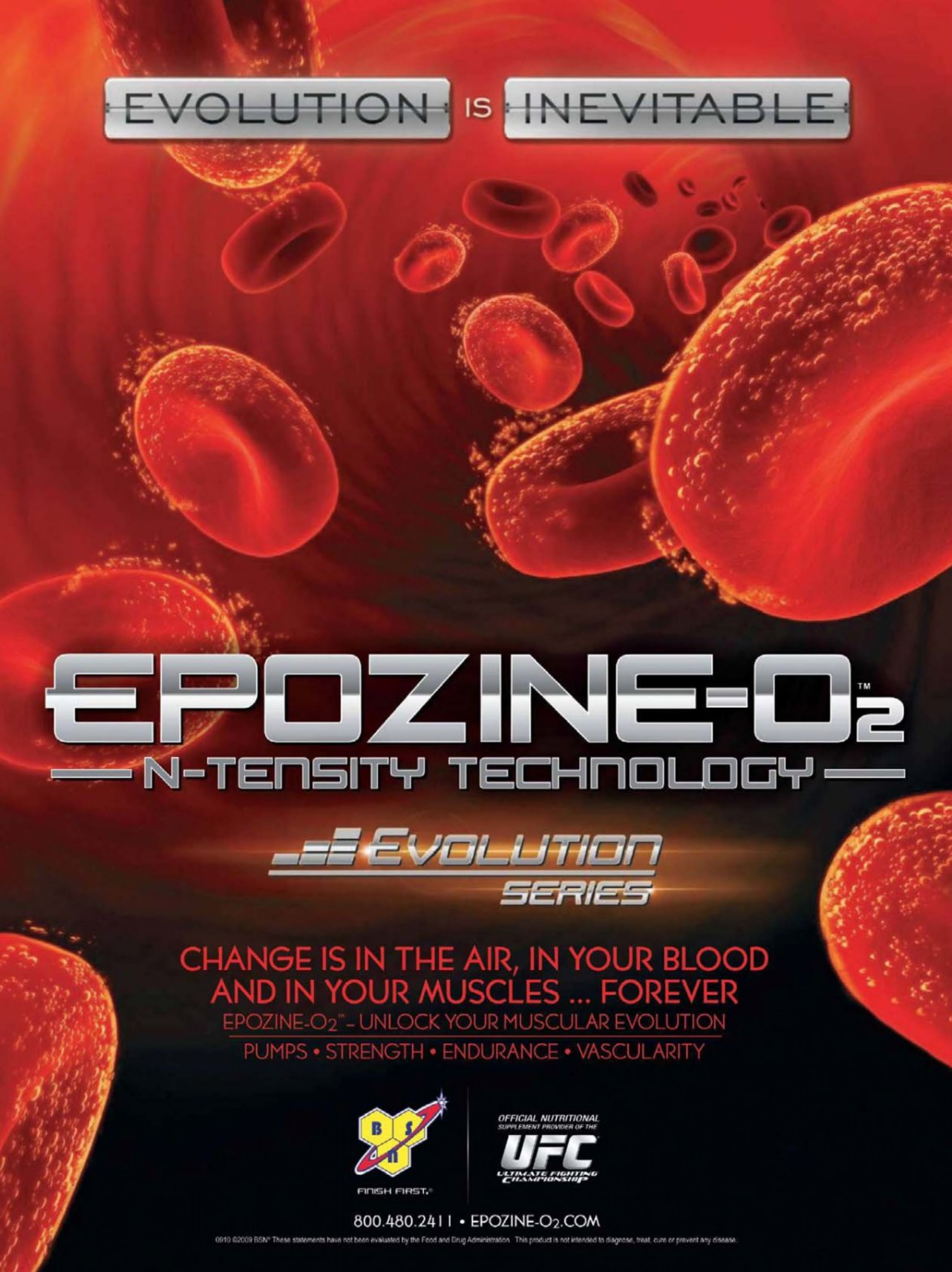
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VIAGRA: WHAT'S GOOD FOR SEX IS NOT NECESSARILY GOOD FOR EXERCISE PERFORMANCE

Viagra, Cialis, and Levitra are the anabolic steroids of sexual Olympians, but rumors that the drugs improve performance in baseball players, runners, and cyclists is little more than urban legend. Last year before the Olympics in Beijing, the media created a baseless stir that the anti-erection drugs were the next generation of performance-enhancers. Scandal-mongering sound byte artists riding on the hoopla of Olympic TV coverage charged that legions of athletes in baseball and football and Olympic sports took Viagra to boost endurance and physical performance. The World Anti-Doping Association (WADA) considered banning Viagra and similar drugs before the Beijing Olympics, but backed off because there was no evidence that they provided a competitive advantage.

What started this craziness, and what do firm erections have to do with exercise performance? Viagra improves blood flow to tissues throughout the body—not just the penis. Muscles need plenty of blood to remove wastes and deliver energy, oxygen, and hormones. Increased muscle blood flow could speed the delivery of key amino acids to the muscles, which would promote muscle protein synthesis and growth. It seems reasonable that Viagra could boost performance and that athletes might take it.

A Stanford University study by Ann Friedlander and colleagues, published in 2006, triggered speculation that Viagra improved athletic performance. They found that Viagra improved cardiovascular capacity during exercise on a stationary bike at a simulated altitude of 12,710 feet but not at sea level. Viagra increased cardiac output (blood pumped by the heart per minute), stroke volume (blood pumped by the heart per heartbeat), and oxygen saturation (percentage of red blood cells carrying oxygen). Cycling performance at altitude improved by 15 percent. The drug increased exercise capacity by reducing blood pressure in the lungs, which increases at high altitude. Not all subjects benefited from the drug— there were responders and non-responders.

Other studies showed that Viagra improved exercise capacity in people suffering from lung disease and heart failure. The fact that Viagra only worked in some people above 12,000 feet altitude and didn't work at sea level except in people with serious heart or lung disease somehow got lost in the shuffle.

Viagra Has Exercise-Like Effects on Metabolism

Viagra (sildenafil) is one of three FDA-approved, erection-promoting drugs called PDE-5 inhibitors that also include tadalafil (Cialis) and vardenafil (Levitra). They work by inhibiting the PDE-5 enzyme, which then increases the concentration of a chemical called nitric oxide that promotes blood flow to the penis and other tissues throughout the body. Blood vessels, smooth muscle, skeletal muscle, blood platelets, and lung tissue contain this enzyme.

Exercise and PDE-5 inhibitors have similar effects. Both benefit metabolic health, which improves the way the body uses fuels such as blood sugar. While no study found that the drugs improve exercise capacity in healthy athletes at sea level, regular use of the drugs have wide-ranging effects on the heart and blood vessels, hormones, and cell health. These drugs decrease:

- Whole body blood pressure
- Blood pressure and air resistance in the lungs
- Cell and blood vessel inflammation and oxidative stress

They increase:

- Blood flow in the heart (coronary arteries)
- The function of the cells lining the blood vessels and

the release of nitric oxide, which are critical to blood flow control

- Testosterone formation
- Rate of wound healing

These changes do not cause dramatic short-term changes in exercise performance, but have long-term positive effects on health. Viagra not only compensates for poor blood flow to the penis, it conditions the blood vessels and metabolism in ways similar to exercise training. These effects cause subtle, long-term changes in fitness and health.

One of Viagra's most important non-sexual effects might be its influence in decreasing chronic inflammation— a long-term, unorganized, destructive process that causes cell and tissue damage throughout the body. Chronic inflammation is linked to degenerative diseases such as coronary artery disease, cancer, arthritis; premature death from all causes, and immune system over-reaction in allergy and autoimmune diseases.

Most people have experienced the redness, swelling, and tenderness that occur after a sprained ankle or pulled muscle. That's inflammation. The injured tissue attracts white blood cells and plasma proteins that promote repair. The tissues release inflammatory chemicals, such as prostaglandins and histamine, which cause increased blood flow and swelling. The clinical signs of inflammation include redness, increased temperature, swelling, pain, and loss of function.

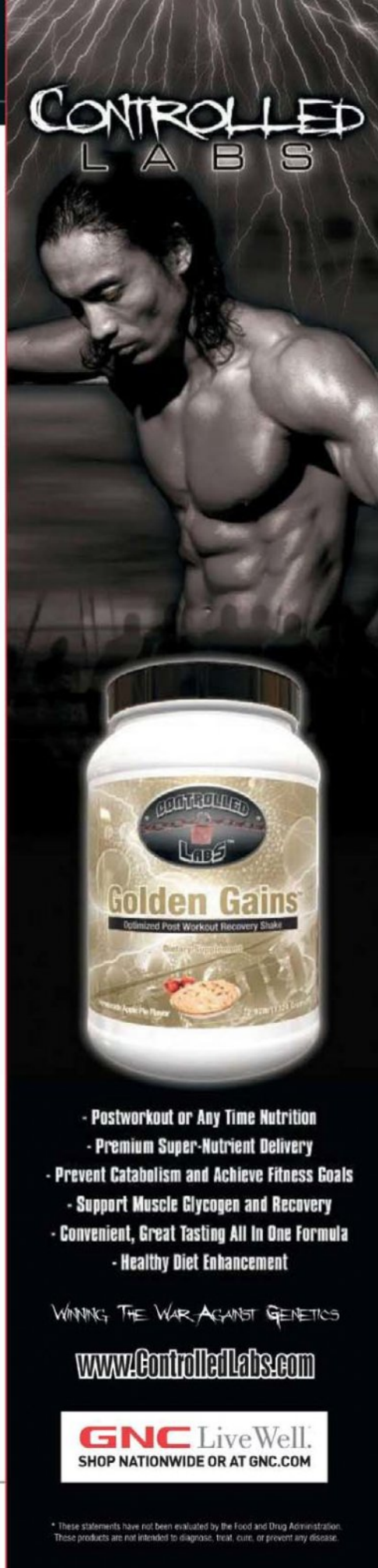
Cells and tissues can develop chronic (long-term) inflammation from poor diet, excess body fat, high blood pressure, high blood sugar, and chemical toxins. Chronic inflammation is linked to premature death from all causes, heart attack, stroke, and cancer.

Inflammation causes DNA destruction that limits lifespan, prevents cell repair, and promotes cancer. DNA is the cellular blueprint that allows the cells to repair and replace themselves after exercise, trauma, and disease. Damage to the DNA leads to a gradual deterioration in the capacity of the body to repair it. Since 2007, at least 11 studies found that Viagra improved factors linked to whole-body inflammation, including wound healing, lung obstruction and mucus production, protection of heart cells, improved intestinal health following high-dose non-steroidal anti-inflammatory medication damage (e.g., Advil, Aleve), and enhanced nerve and cell membrane health.

Exercise and Viagra have similar effects on blood vessel health and blood flow control. Physical inactivity, diets high in saturated and trans-fats and simple sugars, and reduced muscle mass impair the ability of insulin receptors to regulate carbohydrates, amino acids (building blocks of proteins), and fats. Insulin sensitivity enhances the health of the endothelium, the cells that line the blood vessels. These cells release nitric oxide (NO) that opens blood vessels in tissues throughout the body.

Long-term use of Viagra has training-like effects on the endothelium, which increases its capacity to release NO. While the Viagra-induced improvements in blood flow control might be greater in men suffering from poor metabolic health, they might also promote blood flow in the muscles and nervous systems in physically fit adults. Viagra doesn't appear to increase endurance performance following short-term use, but it might have long-term health benefits in physically active men.

Long-term use of Viagra might also benefit metabolic capacity by enhancing blood sugar control and increasing testosterone levels. Scientists from Vanderbilt University School of Medicine found that the drug helped restore energy balance and boosted insulin metabolism in mice fed high-fat diets (compared to a placebo). The animals showed lower blood sugar and insulin levels and improved blood sugar regulation after a high-carbohydrate meal. They also lost bodyweight and fat mass



during the 12-week study. In humans, long-term use of Viagra increased nitric oxide release, which has strong links to insulin metabolism.

Viagra boosts testosterone production, which is a critical hormone for increasing muscle mass, strength, and aggressiveness— all critical for physically active men. Testosterone is linked to sexual arousal and performance. Middle-aged men who take testosterone supplements improve sex drive, capacity for erections, self-confidence, and aggressiveness.

Italian researchers found that total and free testosterone levels increased by 50 percent in men treated for erectile dysfunction with Cialis or Viagra. It's not clear whether these drugs increased testosterone directly or if they increased it indirectly through increased sexual activity. Frequency of sexual intercourse was greatest in men who took Cialis, which makes it the preferred drug for men in stable relationships. Men who had the most sex also had the highest testosterone levels.

Factors affecting testosterone include psychological health, diet, exercise, and sexual activity. Men who have a lot of sex are happier, more confident, and have better functioning sex organs than men who don't. The sex organs— like your muscles— function best when you use them, so Viagra might give them a boost. We don't know if Viagra increases testosterone levels in healthy, fit men.

Long-term use of Viagra might also increase muscle strength, power, and size by triggering biochemical pathways that increase protein synthesis and prevent protein breakdown in muscle cells. As discussed, Viagra increases nitric oxide (NO) release by the blood vessels. NO helps turn on protein synthesis in muscles, particularly when the fibers are under tension or stretch. NO also triggers the formation of satellite cells that add mass to the muscle fibers. To date, no study has shown that Viagra and similar drugs have steroid-like effects in athletes, but we can infer from biochemical studies that they might.

Viagra can help make you a sexual Olympian, provided that you have game, good hygiene, and a reasonably firm body. It definitely won't get you a spot on the Yankee's roster or the Olympic team if you don't have the talent. To date, no study has found that Viagra improves exercise capacity at sea level. However, long-term use of the drug might promote muscle protein synthesis and improve metabolic fitness enough to have a small effect on endurance or strength.

Viagra and similar drugs have side effects, such as headache, dizziness, nausea, mild face flushing, and nasal stuffiness. They might also cause visual and hearing impairment in some men, so don't use them without following the advice of a physician. We need more studies before we can adequately assess the effects of these drugs on health, exercise capacity, and performance. ■

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By Dan Gwartney, M.D.

THE BEST AND WORST FOODS FOR ALTERING TESTOSTERONE

Dietary strategies to promote natural testosterone production may seem meaningless to some people— those who do not go the 'natural' route to add muscle. Such strategies pretty much are meaningless, if androgen levels are controlled via chemical augmentation, rather than by the innate feedback system. The body monitors testosterone levels and adjusts production of the hormone within the testes by altering output of stimulatory hormones released from the hypothalamus and pituitary (glands in the brain). If the circulating (blood) testosterone concentration is low, the hypothalamus detects this and signals the pituitary gland to release a hormone that stimulates the testes called LH.

LH travels through the blood to the testes and drives testosterone production to increase output. As testosterone concentration rises in the blood, the hypothalamus detects the elevation and reduces the pituitary's demand.[1] In the case of a person using artificial means, androgen levels are kept higher than the cut-off chronically, so the testes do not need to function (relative to producing testosterone) and atrophy (shrivel) as they do not receive a LH signal from the pituitary. However, when the cycle is finished, close attention needs to be paid to promoting the restoration of natural testosterone production.

Of course, the system is not as simple as one switch that is either 'off' or 'on.' In an anabolic, natural environment, a person's testosterone concentration is affected by conditions such as sleep, physical demand, available rest, amount and quality of food, and presence of certain nutrients.[2,3] While there is no scientific evidence that any one food or even the most selective diet will make a difference in regard to testosterone level and subsequent muscle growth over time (since no one has ever studied the demographics of strength and muscularity), the discriminating fitness enthusiast will pay close attention to what he/she consumes. After all, it does no good to struggle to build muscle in the gym if a fad-diet lifestyle is sabotaging the anabolic response. Also, informal observations are fairly convincing in suggesting that vegans have a difficult time putting on muscle and the chronically undernourished live on the threshold of catabolism.

Before plunging into the buffet of knowledge ahead, this does not imply that other hormones that are modulated by the diet are not equally important. For the sake of clarity and brevity, this article will focus solely on the testosterone-diet associations.

Testosterone is a cholesterol-based chemical and many industrial sources (pharmaceutical companies) synthesize testosterone using steroid-ring precursors. However, testosterone is not created from dietary cholesterol in the body to a great degree. The starting chemical for endogenous production (natural testosterone production) appears to be acetyl-CoA, which is produced as sugar (glucose) and burned for calories. The body produces sugar in times of need, so even if one is on a strict ketogenic diet, acetyl-CoA should still be available. Acetyl-CoA goes through a series of reactions to become a molecule called hydroxymethylglutary-CoA, or HMG-CoA.[4] Fortunately for the ketogenic dieters, HMG-CoA is also produced during ketogenesis, so the starting blocks for steroid production are well-provided.

HMG-CoA is then shuttled into another series of reac-

tions to form squalene. A key reaction responsible for changing HMG-CoA is called the rate-limiting step. It is like the slowest walker on a prison chain gang. No matter how fast the rest of the crew is, they cannot move faster than the slowest moving prisoner. The top-selling cholesterol-lowering drugs, called statins (e.g., Lipitor®), work by making the slowest, rate-limiting reaction move even slower.[5] Ironically, dietitians and drug companies worked for years on limiting dietary cholesterol, but it is the body's own cholesterol-making machinery that is the cause of most cholesterol-related health problems.

Squalene is converted to a primitive steroid called lanosterol; this is the steroid equivalent of a cave man. Lanosterol is finally processed to form cholesterol; cholesterol can be processed to the more readily-recognized steroid hormones, such as: testosterone, androstenedione, DHEA, estradiol, progesterone, cotisol, etc.[6] It is difficult to keep track of the number of chemical reactions involved, but it is a complicated process.

Making Testosterone Is Not Simple

This very brief introduction into steroidogenesis is provided to illustrate that the body doesn't make testosterone simply, and there really is no way to directly consume something that will directly convert into testosterone— at least not a food product. This revelation will likely disappoint fans of Rocky Mountain oysters and participants at Testicle Festival eating contests. Certainly, several products have been introduced into the sports nutrition market that are steroid precursors, or prohormones. However, these are not chemicals that are common in the food chain and some are thinly-veiled drugs.

The reactions in creating a steroid backbone (let alone the specific androgens, estrogens, glucocorticoids, etc.) require a great deal of energy. Additionally, the processes are predominantly oxidizing reactions. The pressure in Western society has long been to promote antioxidant consumption. Antioxidants suppress oxidizing reactions; this is beneficial in many situations, as free radicals can damage structural proteins in the cell or the DNA. However, the body burns calories and generates biomolecules through oxidizing reactions as well, so the question must be asked, "Can you have too much of a good thing (antioxidants)?" In exploring this many, many years ago, I learned of reductive stress, but it appears to be a neglected area of research.

The foods that promote testosterone production primarily offer certain minerals which help form the metalloproteins and metalloenzymes involved in the chemical reactions to create cholesterol and eventually testosterone.[7,8] Additionally, B vitamins are important co-factors (helpers); total calories and protein quality is also important.[8] The most commonly referred foods that promote testosterone production are oysters, eggs, beef, garlic, and broccoli. These foods are high in zinc, cholesterol, B vitamins, and arachidonic acid (AA).

Arachidonic acid is a fatty acid that sits in the membrane of cells lining the Leydig cells of the testes (the actual site of testosterone production from cholesterol). Under the influence of LH from the pituitary, released when testosterone levels are registered as being low, enzymes pull AA from the membrane and form messenger chemicals that go to the nucleus (the control center of the cell where the DNA is located) and turn on the production of StAR (steroidogenic acute regulatory protein).[9] Interestingly, AA can go down three pathways in the Leydig cell; two promote StAR production, but the third suppresses it.

This third pathway is the cyclo-oxygenase pathway, and research into promoting testosterone production via cyclo-oxygenase 2 inhibition is under way.[10] Many people are familiar with Celebrex®, a drug used to treat the symptoms of arthritis, this is a cyclo-oxygenase 2 inhibitor. At this time, only animal studies have been performed to investigate the effect of Celebrex® on testicular function. Some protection of steroidogenesis during inflammatory challenge has been recorded, but no real increase in baseline testosterone production.[11]

Another common drug class, the statins (e.g. Lipitor®), may reduce testosterone by reducing the available pool of cholesterol to use in steroidogenesis. Data are conflicting at this time, but it appears that while total testosterone may be reduced, bioavailable testosterone is not affected.[12,13] Men started on statins who experience symptoms of androgen deficiency may wish to be more diligent in monitoring testosterone concentrations through their physicians.

Foods That Lower Testosterone

The dietary attention really needs to be paid to foods that may lower testosterone production— either through antioxidant suppression of the oxidizing reactions, promoting the conversion of testosterone to estrogen, or by acting as an estrogen directly. Research has shown that several foods, many of which are increasing in popularity in the U.S., suppress testosterone production. Some of this data is based on test-tube experiments, others from animal studies and the majority of the remainder from epidemiologic studies (observing trends in large groups).

Green tea— a beverage so healthy that the only worries are about the water added to the tea bags— or is there more to consider? Green tea is full of antioxidants, leading to the health claims about promoting health and prolonging life. Yet, recall that testosterone production is dependent upon oxidizing reactions. Recently studies looking at the effect of green tea, specifically the polyphenol compounds (antioxidant), on testosterone levels have reveal a dark side to green tea— at least for the muscle-building athlete.

Green tea has been shown in the lab to inhibit certain effects of testosterones, apparently by inhibiting the conversion of testosterone to the more potent androgen, DHT.[14,15] Green tea, specifically EGCG, may also affect aromatase— the enzyme that converts testosterone to estr-

gen; in some studies aromatase is suppressed, in others it is increased.[16,17] Animal studies and epidemiologic studies have shown that green tea consumption is associated with lower androgen and estrogen levels in Asians.[18] Green tea appears to be protective against cancers that respond to sex hormones (prostate, breast).[19]

Yet, what about testosterone? If estrogen and DHT are lower because testosterone is not being converted into those metabolites, then testosterone levels should be higher. However, tissue studies suggest otherwise. Rats treated with green tea had a much lower response to hCG, the hormone used to stimulate testosterone at the end of an anabolic steroid cycle.[20] Interestingly, when the tissue cultures were provided with androstenedione, the steroid that immediately precedes testosterone in the natural production sequence, normal testosterone response to hCG was seen. This suggests that the inhibition of green tea occurs earlier in the steroid production sequence and may affect other steroid classes.

Another Asian staple that has entered Western diets is soy. Soy is a protein-rich vegetable that also contains other bioactive components. Among these are genistein and isoflavones. Soy intake has also been shown to decrease testosterone, making the use of it as the primary protein source of questionable value for male athletes—but this has been challenged.[21,22] Available soy products include protein powders and ready-to-drink shakes. A number of products contain soy protein to attract female members of the gym, as the isoflavones have estrogenic-support properties.

Food Restriction and Testosterone

Another diet trend, also supported by observations of Asian societies, is food restriction. Certain communities in Japan are known for their longevity; often attributed to green tea, low saturated fat, soy and other habits, the basis for much of this longevity is life-long caloric restriction.[23,24] These people consume less than the maintenance calories daily, much less than the average American. Caloric restriction has been shown to prolong life in lab rats. Yet, this same life-extending diet also suppresses testes function, resulting in lower testosterone.

Remember, the body does not want to support any more muscle than it uses because muscle uses energy, and the body is designed to preserve calories to survive winters/famine/etc. Even short-term fasting suppresses testosterone levels. Men fasting for three and one-half days saw a 30-50 percent decrease in testosterone, which was due to changes in the pituitary signal, rather than the testes function.[25] It is important to realize that supporting testosterone function is more than offering the building blocks used by the testes.

A final example of the need for a suitable diet was demonstrated in a study looking at wrestlers who lost weight rapidly to meet the weight restrictions of their class. During a two- to three-week training regimen, wrestlers' average testosterone concentration dropped approximately 30 percent.[26] An earlier study even demonstrated that during a two-day tournament, resting testosterone concentration dropped.[27]

The body needs to know that the environment is safe for adding on metabolically-demanding tissue, such as muscle. This includes consuming sufficient calories to avoid muscle wasting, eating a quality diet including animal-based protein, focusing on foods that are high in zinc and B vitamins. Men striving to lose weight, consuming soy-based foods and drinking green tea should be aware that one consequence is a probable reduction in testosterone concentration that will make building and maintaining muscle much more difficult.

Of course, it is unwise to overdo any diet, as obesity is not the goal of most readers and the increase in adipose tissue will lead to elevations in estrogens. Further, the health benefits of green tea and soy, possibly flaxseed as well, need to be weighed against sports or physique goals. ■

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Week 4	1/cap/day/am	2 caps/day/pm			2/caps/day	1 scoop/day/AM or preworkout
Week 5		2 caps/day/pm	2 caps/day/am		2/caps/day	1 scoop/day/AM or preworkout
Week 6		2 caps/day/pm	2 caps/day/am		2/caps/day	1 scoop/day/AM or preworkout
Week 7			2 caps/day/am	2/tabs/day/pm	2/caps/day	1 scoop/day/AM or preworkout
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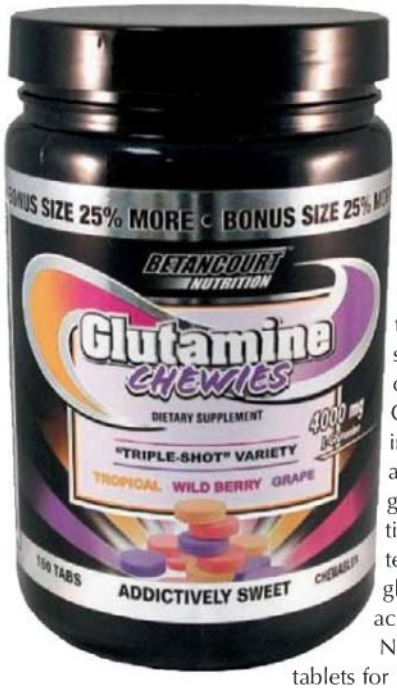

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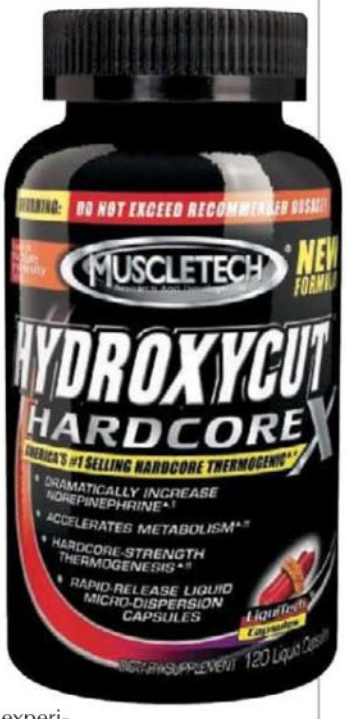

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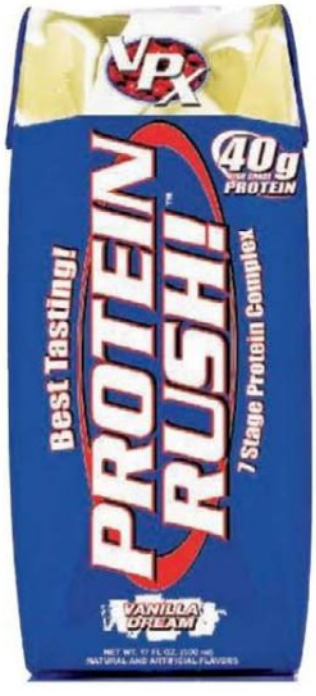

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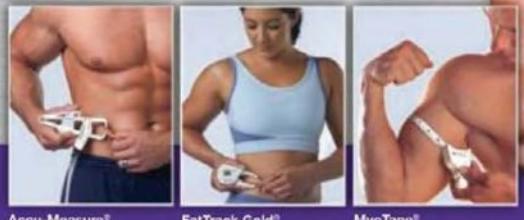

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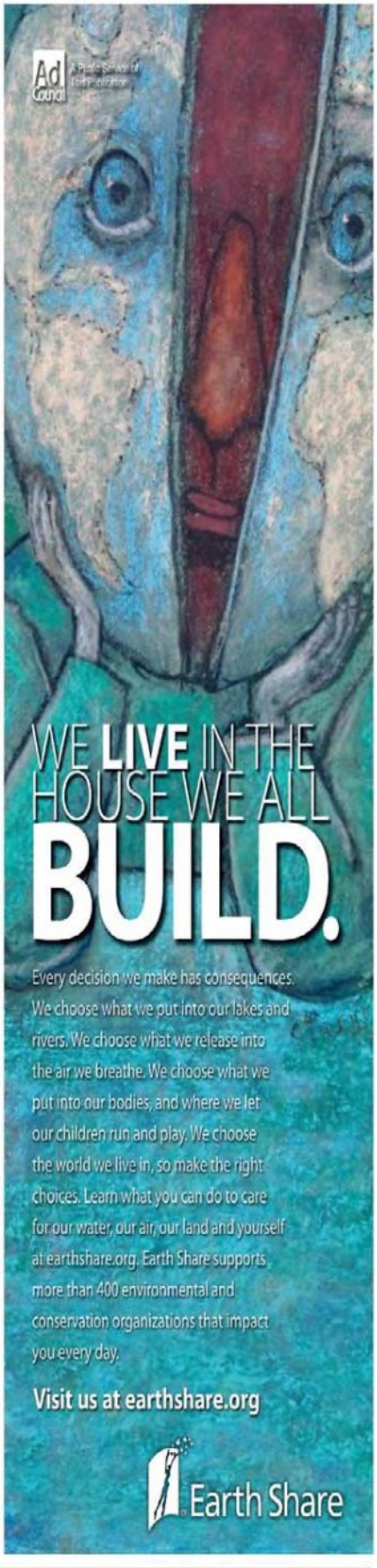
Week 4 - 3 Tablets/day
Week 5 - 4 Tablet/day
Week 6 - 4 Tablets/day
Week 7 - 3 Tablets/day
Week 8 - 3 Tablet/day
Week 9 - 2 Tablet/day



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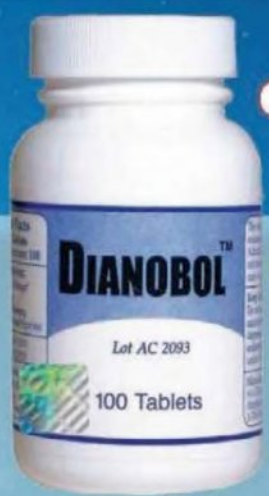

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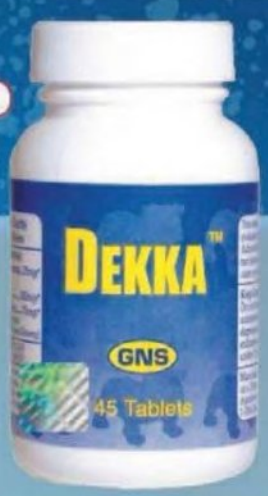

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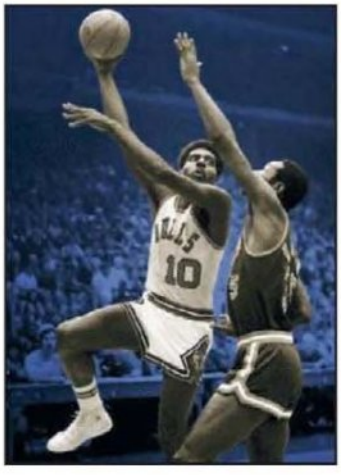

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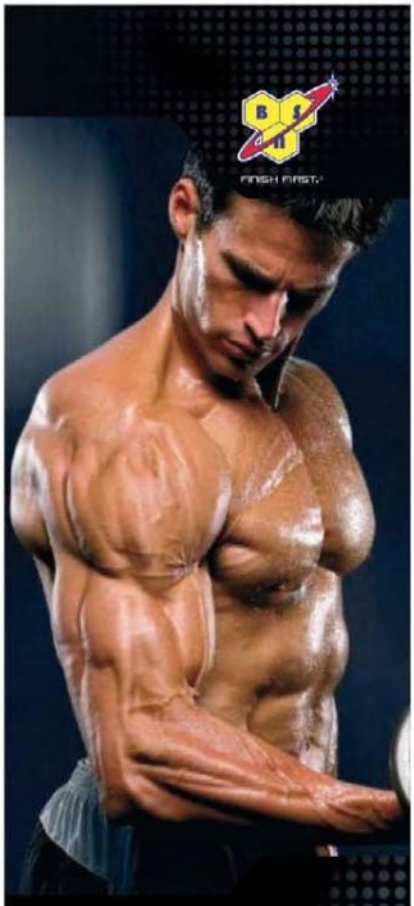

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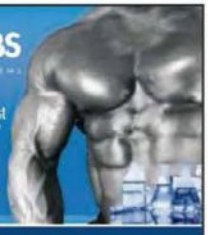

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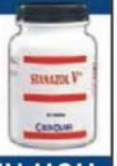

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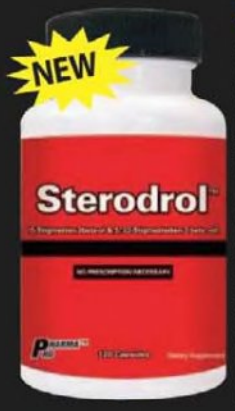

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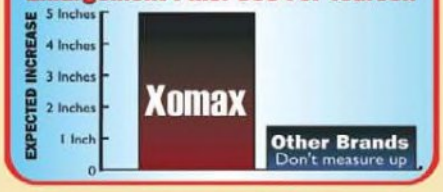

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Q. Are the results permanent?
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Q. How much growth can I realistically expect?
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Q. Is Xomax natural?
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Q. What makes Xomax the #1 natural penis enhancement formula?
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