

Muscle- Science Roundup

12 Recent Research Reports That Can Jump-Start Your Muscle Growth and Fat Loss

Compiled by **Steve Holman**

Photography by Michael Neveux

Another year's gone by, which means it's time for another blast of the hottest research that can help you get bigger and leaner. It's January 2006, the perfect time to look back at some of the key findings that we reported over the past year—stuff you may have missed. Most of the studies discussed here were reported by Jerry Brainum, *IRON MAN*'s most dedicated and reliable researcher. Good stuff to get you buff. Let's get to the info.



1) L-Carnitine Turns You Into a Mass Machine

Whether supplemental carnitine actually helps increase fat oxidation is a matter of debate, but the nutrient has other, lesser known features that can improve training efficiency.

Carnitine helps decrease lactate levels during intense exercise, which may lead to less fatigue and greater endurance. Several studies have shown that it promotes recovery after intense training. Subjects who took three grams of it daily for three weeks had less muscle soreness and lower levels of a muscle enzyme associated with muscle damage after their workouts. Scientists believe the effect occurs because carnitine promotes increased cellular membrane stabilization. It also helps lessen the effects of free radicals, by-products of oxygen metabolism that induce muscle inflammation and delay full muscular recovery.

Hard training tends to temporarily depress the immune system, so you are more vulnerable to infection. **Carnitine** appears to help stabilize and promote immune-system competence after training. It also helps promote the development of new red blood cells, which increases oxygen delivery to muscles.

Karlic, H., et al. (2004). Supplementation of **L-carnitine** in athletes: does it make sense? *Nutrition*. 20:709-15.

Conclusion:

Take two grams of **L-carnitine** after a workout, and you should get better recovery and less muscle soreness.

Carnitine helps decrease lactate levels during intense exercise, which may lead to less fatigue and greater endurance.

Carnitine also promotes immune-system competence after training.



Model: George Farah





Exercise is the catalyst. Growth occurs when you rest.



Model: Joe DeAngelis

2) Snooze or Lose Your Anabolic Edge

While exercise is the primary catalyst for muscle growth, the growth occurs when you're at rest. That's why adequate **recovery** is so vital to making muscular gains. The body secretes maximum levels of growth hormone during sleep, and studies also show that if you don't get enough sleep, your testosterone levels may plummet as much as 40 percent.

A new study using lab rats as subjects tested the hormonal effects of sleep deprivation. In previous studies animals deprived of sleep showed lower levels of thyroid hormones and a blunted immune response. Since the low thyroid output occurred in the hypothalamus, the researchers wanted to see how other hormones secreted in the same area of the brain were

Sleep deprivation can result in the suppression of a number of hormones, including anabolic ones.

affected by sleep.

They found that sleep deprivation resulted in a suppression of other hormones in the rats, including growth hormone, insulinlike **growth factor 1 (IGF-1)**, prolactin and leptin, while corticosterone, the rodent version of cortisol, was unaffected. That hormonal milieu tends to depress anabolic reactions in the body, boosting catabolic effects, including possible muscle loss. If your goal is to make any type of muscular progress, don't take sleep for granted.

On that note, wearing socks to bed may help. According to podiatrist Nicholas Romansky, as reported in *Bottom Line/Health*, wearing a clean pair of socks to bed can help you fall asleep faster because it stabilizes your core body temperature. Sock it to catabolism!

Also, research at Emory University School of Medicine in Atlanta found that sleep-deprived people may eat more, increasing their daily calorie intake up to 15 percent. So socking your feet at night may help your fat-loss efforts as well.

Everson, C.A., et al. (2004). Reductions in circulating anabolic hormones induced by sustained sleep deprivation in rats. *Am J Physiol Endocrinol Metab.* 286:E1060-E1070.

Conclusion:

Get restful, uninterrupted sleep to amplify anabolism and curtail catabolism. Wearing socks to bed may help.

The body won't use lower-body fat until nearly all its upper-body fat is oxidized through exercise and diet.



Doing higher reps, in the range of 15 and up, on lower-body training may increase blood flow, giving you greater mobilization of lower-body fat.

diseases offers little solace to definition-minded bodybuilders. The body won't use lower-body fat until nearly all its upper-body fat is oxidized through exercise and diet. So the ultimate answer to eliminating lower-body fat involves persistence and patience. Continuing to exercise and diet will eventually enable you to make progress in getting rid of it.

For those in a hurry, some evidence shows that using an alpha-2 adrenergic blocker can also help bodybuilders tap into lower-body fat stores. The fat cells in the lower body, unlike those in the upper body, have a preponderance of alpha-2 adrenergic cell receptors. (Upper-body fat cells have a preponderance of beta-adrenergic cell receptors, which permit more rapid release of fat.)

One natural alpha-adrenergic blocker is yohimbe at a dose of 0.2 milligrams per kilogram (2.2 pounds) of bodyweight. It must be taken on an empty stomach, however, since any release of insulin totally negates yohimbe's fat-mobilizing effects.

From a training standpoint, if your goal is increased definition, it may be a good idea to use higher reps, in the range of 15 and up, for lower-body training. That may increase blood flow, giving you greater mobilization of lower-body fat.

Tan, G.D., et al. (2004). Upper- and lower-body adipose tissue function: A direct comparison of fat mobilization in humans. *Obesity Res.* 12:114-118.

3) Burn Blubber Down Below With Blood Flow

A new study pinpoints the differences in fat mobilization between upper- and lower-body fat. British and French scientists teamed to come up with a technique for measuring direct fat use, and they applied the new technique to upper- and lower-body fat release in six lean male subjects aged 22 to 43.

They found that gluteal fat tissue shows a 67 percent lower level of blood flow than upper-body fat. It also has an 87 percent lower rate of activity of hormone-sensitive lipase,

an enzyme that catalyzes fat release from fat cells, than abdominal-fat cells.

One theory is that the body stores fat in the lower body to protect against high levels of free fatty acids in the blood, a condition that interferes with glucose uptake in cells. That, in turn, leads to insulin resistance and the diseases linked to it, such as diabetes and cardiovascular disease. The body shuttles excess fatty acids directly to lower-body fat stores, where they're "locked in," which buffers the effect of high levels of fat in the blood.

The fact that lower-body fat may protect against potentially deadly

Conclusion:

Doing higher reps on leg exercises can help you burn lower-body fat faster. A yohimbe supplement may accelerate the process, but be sure to take it on an empty stomach.

Model: Federica Belli

4) Volume Down to T Up

How does exercise affect the 24-hour secretion of testosterone? To find out, researchers followed eight men who completed three training sessions separated by at least a month. The subjects were assigned to a nonexercising control group, a moderate-volume group that did 25 sets total and a high-volume group that did 50 sets per workout. The actual workouts consisted of squats, bench presses, leg presses and lat pulldowns done for five to 10 reps per set, with the subjects getting 90 to 120 seconds' rest between sets. The researchers measured the men's testosterone levels every hour for 24 hours after each session.

The high-volume group trained for an average of two hours per session and showed a marked suppression of testosterone over 24 hours.

The moderate-volume group trained for one hour and showed no adverse effects on testosterone. Apparently, there's a threshold of training beyond which testosterone levels drop precipitously. In practical terms, that means that those who advocate marathon workouts are probably wasting their time.

Alemanly, J.A., et al. (2004). 24-hour serum testosterone concentrations following acute moderate and high-volume resistance exercise. *Med Sci Sports Exerc.* 36:S238.

Conclusion:

Limit your workouts to no more than about 25 work sets, to be completed in around an hour. [Note: Most of the training programs in *IRON MAN's* publications, including *10-Week Size Surge* and *Train, Eat, Grow*, adhere to that rule.]



Model: Lee Priest

Training too long can blunt testosterone.

IN THE SUPREME COURT OF THE STATE OF NEW YORK COUNTY OF NEW YORK

ERIC AYALA, THOMAS HANNON, LOUIS SILVERSMITH and LOUIS SPITALE, individually and on behalf of all others similarly situated,

Index No, 02/126276

Plaintiffs,

vs.

NATROL, INC. and PROLAB NUTRITION, INC.

Defendant.

SUMMARY NOTICE OF PENDENCY OF CLASS ACTION AND OF SETTLEMENT OF CLAIMS

TO: Purchasers of Androabolic, 19Norandrostenedione/5Androstenediol, Andro 19 Norandrostenedione Caps, Andro 4 Androstenediol 100mg Caps, Androsten Tribulus Caps, Andro Cyclo 4 Androdiol, Androstenedione 100mg Caps, Chrysin-Andro-Tribulus Caps, 19-Nor-4-Androstenediol and 5-Androstenediol (together, the "Andro Products")

A class action lawsuit has been filed against Natrol, Inc. and ProLab Nutrition, Inc. (collectively, "Natrol") challenging Natrol's marketing and sale of Andro Products. Natrol has vigorously denied any wrongdoing or liability but solely to avoid the further cost of litigation and to minimize disruption and inconvenience caused by this and related suits, it has agreed to a settlement. A nationwide settlement with Natrol totaling \$5 million in cash, discount cards and coupons has been preliminarily approved by the Court. The proposed settlement is a compromise of disputed claims and does not mean that Natrol or anyone else is guilty of the claims brought by the Plaintiffs. By preliminarily approving the Settlement, the Court has not made any determination that, if disputed, the class would be properly certified or that the Plaintiffs' claims against Natrol have any merit. The Settlement Agreement also resolves, and, upon payment of all commitments in accordance with the Settlement Agreement, Plaintiffs and the Class shall release Natrol and other parties from any and all claims by Plaintiffs and the Class for costs and attorneys' fees, including but not limited to expert witness fees, claims for costs, and attorneys' fees incurred in connection with the negotiation, execution, implementation, and administration of the Settlement Agreement; provided, however, that if Plaintiffs or the Class are required to take legal action to enforce the terms of the Settlement Agreement, then the costs and fees for such legal action shall not be included in the Release.

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a distributor or wholesale purchaser of an Andro Product, or if you timely elect to exclude yourself from the class.

If you are within this group of class members and do not elect to exclude yourself from the class, your claims against Natrol for the marketing, labeling and/or sale of Andro Products will be resolved as part of this settlement and will be ultimately barred. It is therefore important for you to review the complete notice and to submit a claim form as described below.

The Court will hold a hearing in Courtroom 438, New York County Supreme Court, 60 Centre Street, New York, New York at 9:30 a.m., on the 21st day of October, 2005 ("Final Hearing"), to determine whether, as recommended by Class Counsel, the class representatives and Natrol, it should approve the proposed settlement. Objections to the proposed settlement or the amount of attorneys' fees requested by Class Counsel, or requests to be excluded from the Class must be filed by October 13, 2005. Claims must be filed by April 21, 2006. Delay in filing the claim form, objections or exclusion notice may result in the loss of benefits or rights to which you might otherwise be entitled.

Full copies of the Notice of Pendency of Class Action, Settlement Agreement, Claim Form, and Exclusion Notice, which describe the method by which the cash funds, discount cards and coupons will be distributed, eligibility requirements, and the action that must be taken by eligible persons to obtain a share of the proceeds, to object to the settlement, or to be excluded from the class, are available at www.prolab.com/androsettlement.html and from Andro Class Action Settlement c/o Complete Claim Solutions, Inc., PO Box 24674, West Palm Beach, FL 33416. You may also call **1-800-930-0057** with any questions.

Dated: September 7, 2005



5) Time Your Creatine for Big-Time Mass

Many bodybuilders wonder about the best time to take **creatine**. Taking it before a workout may increase the muscles' energetic efficiency and act as a buffer that limits the accumulation of metabolic waste products. That would lead to increased energy and less fatigue during intense training. The greater blood flow resulting from exercise, however, also causes greater uptake of **creatine** into muscle. The scientists who con-

ducted a recent study aren't sure whether the gains in muscle thickness that their subjects experienced while taking **creatine** after exercise came from water retention in the muscle or actual protein synthesis. If the latter proves true, the best time to take **creatine** would be, obviously, following a workout.

Chilbeck, P.D., et al. (2004). Effect of **creatine** ingestion after exercise on muscle thickness in males and females. *Med Sci Sports Exerc.* 36:1781-88.

Conclusion:

You may want to take half your **creatine** before—or during—your

The greater blood flow resulting from exercise causes greater uptake of creatine into muscle, but taking it after training may beef up muscle fibers.

workout and the other half after. That way you get the buffering as well as the muscle-thickness effects.



Creatine may act as a buffer during training, enabling you to get more reps.

Go for the burn to enhance **growth hormone** release.



Model: King Kamali

6) More Pain, Better Gain

A study presented at the NSCA conference by researchers from the University of Connecticut examined whether taking short rests between sets influences the release of **growth hormone** during exercise. The subjects included 10 bodybuilders with at least four years of training experience and 10 untrained but physically active men. The bodybuilders had previously trained on programs that featured short rests between sets.

For the study both groups did six sets of 10 reps on the squat, resting two minutes between sets.

Both the trained and untrained men had similar resting **GH** levels,

The ability to train at a higher level of lactic acid release appears to enable more-experienced bodybuilders to produce a superior GH response to exercise.

and both groups showed a significant rise in the hormone after the workout. The trained men, however, produced more lactic acid, which stimulates **GH** release during exercise. The ability to train at a higher level of lactic acid release appears to enable more-experienced bodybuilders to produce a superior **GH** response to exercise.

Conclusion:

Rep through the burn to up your **growth hormone** levels. Set-extending techniques like **XReps** can help. Remember, **growth hormone** amplifies other anabolic hormones, like testosterone.

7) De-Catabolize Your Cardio

It stands to reason that if branched-chain amino acids have anabolic properties, they're an effective supplement for those engaged in weight training. A study presented at the National Strength and Conditioning Association's annual conference examined the relationship of BCAA intake to muscle gains. Six healthy, untrained men took either BCAA supplements or a placebo. Both groups took the supplements for three weeks, followed by another week of supplement use combined with intense weight-training sessions.

The men using BCAAs had lower levels of the enzyme creatine kinase, which is associated with muscle damage during exercise, and lower levels of cortisol, the body's primary catabolic hormone. They also had consistently higher testosterone levels than the subjects in the placebo group.

BCAA oxidation in muscle is activated by fatty acid oxidation. So when you do exercise that uses fat as an energy source, the fat released promotes the burning of BCAAs. That implies that BCAAs taken before you do aerobics will exert a sparing action on muscle protein, something that would be particularly helpful during periods of calorie restriction. The precise dosage of BCAAs for that purpose isn't established, but good results have been obtained with five grams taken prior to exercise.

One thing to keep in mind when supplementing is that you must maintain a certain ratio of the three BCAAs. Research shows that it's best to replicate the ratio of leucine, isoleucine and valine found natu-

Taking branched-chain amino acids before doing cardio may help prevent muscle breakdown.



Model: Dan Decker

The men using BCAAs had lower levels of cortisol, the body's primary catabolic hormone, and higher testosterone levels.

rally in animal protein sources: 2-to-1-to-1. Taking excessive amounts of a single BCAA, such as leucine, activates enzymes that degrade the other BCAAs, leading to a possible amino acid imbalance.

Conclusion:

Use branched-chain amino acids before you do cardio and even before your weight-training workouts to derail catabolic effects.



Train with weights first; then do your cardio.



Elevated free-fatty-acid levels induced by cardio work promote the release of somatostatin, a protein that opposes GH release.

Goto, K., et al. (2005). Prior endurance exercise attenuates **growth hormone** response to subsequent resistance exercise. *Eur J Appl Physiol.* 94:333-338.

Conclusion:

If you're after more muscle, it's just plain dumb to do an extended aerobics session before an intense weight workout. Not only do you deplete limited energy stores (glycogen), but you also block **GH** release during the workout. Save the aerobics for afterward.

Model: Tamer Elshahhat

8) Cardio Time: Before or After?

A recent study turned up another reason not to do aerobics before a weight workout. Ten men did low-intensity cycling for an hour, then a weight workout. On another day the same men did only a five-minute-warmup cycling session before their workout. When they did an hour of aerobics first, their **growth hormone** response to the weight session was nil. Other hormones, such as **cortisol** and testosterone, weren't affected by the aerobics, however. That's the good news, since it shows that moderate aerobic work doesn't negatively affect hormones related to muscle growth.

Still, doing the aerobics first did

blunt **growth hormone** release. What is it about aerobics that would do that?

Aerobic exercise uses greater amounts of fat as fuel, especially as the exercise continues beyond 30 minutes. That elevates levels of free fatty acids in the blood, which, like elevated blood glucose levels, blunts the release of **GH**. Elevated free-fatty-acid levels also promote the release of somatostatin, a protein produced in the brain's hypothalamus that opposes **GH** release.



If you do your aerobics first, you may blunt growth hormone release.



Forskolin may boost fat loss and increase testosterone release.



Muscle Growth and Fat Loss

Model: Jorge Betancourt

9) Fat-Burning Firepower Without Ephedrine

Forskolin differs from ephedrine in that it doesn't interact with beta-receptors in fat cells, so it has none of the stimulation effect associated with ephedrine. In effect, **forskolin** is a biochemical short-cut as far as fat release is concerned.

Several studies have shown significant fat-loss effects with human subjects who took a forskolin-based supplement. Unfortunately, they were sponsored by the company that holds the **forskolin** use patent, Sabina Corporation. While such sponsorship may not negate the results of the studies, it does engender a degree of skepticism, since Sabina has much to gain financially from them.

Some critics have noted that the mechanism through which **forskolin** works, activating cyclic AMP, can have far-reaching effects throughout the body. But toxicity studies have shown no serious side effects or any adverse changes in cardiovascular function. If anything, **forskolin** appears to lower blood pressure and increase beneficial high-density lipoprotein, or HDL.

The most recent study found an additional bonus. Thirty subjects were divided into a **forskolin** group and a placebo group for a 12-week experiment. Those in the first group took a supplement containing 250 milligrams of 10 percent **forskolin** extract twice daily.

Forskolin produced a significant improvement in fat loss compared to what subjects experienced with the placebo, but those in the **forskolin** group also showed a significant increase in free testosterone, the active form of the hormone. Total T levels remained unchanged, but the elevated free-testosterone levels may be a bonus from using **forskolin**.

Godard, M.P., et al. (2005). Body composition and hormon-

al adaptations associated with **forskolin** consumption in overweight and obese males. *Med Sci Sports Exer.* 37:S39.

Conclusion:

Taking 250 milligrams of 10 percent **forskolin** extract twice daily may supercharge your fat-burning efforts—and your muscle-building results—thanks to elevated free-testosterone levels.

Forskolin differs from ephedrine in that it doesn't interact with beta-receptors in fat, so it has none of ephedrine's stimulation effects.

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Jay Cutler, IFBB Pro & Arnold Classic Champion

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Bodybuilding has big anti-aging benefits.

Muscle Growth and Fat Loss

Model: Lee Apperson

10) Anti-Aging Ammo

A new study by a group of researchers from the Mayo Clinic examined the effects of aging on muscle in 146 healthy men and women, aged 18 to 89. The primary finding was that muscle aging is caused by cumulative damage to muscle DNA, which is required to replicate muscle cells. When DNA is damaged, the cells don't repair themselves correctly and eventually die. On a grand scale, that means a gradual loss of muscle with each passing year.

The researchers also found that the DNA in muscle mitochondria, where energy is produced in cells, reduces with age. Having fewer mitochondria means less production of adenosine triphosphate (ATP), the source of cellular energy. Without adequate ATP the cell's "housekeeping" functions shut down, and the cell dies. The loss of muscle mitochondrial DNA leads to such symptoms as age-related weakness, loss of muscle mass and related diseases, such as insulin resistance, diabetes and heart disease.

Thanks to this study, scientists now know exactly how the process of muscle aging begins and can design therapies to block it. What causes the loss of muscle and mitochondrial DNA is long-term, out-of-control oxidation. Mitochondria are highly prone to oxidation because ATP production releases a lot of oxygen in the cell. That promotes the activity of free radicals, by-products of oxygen metabolism that are the destructive elements in oxidative reactions.

As people age, the built-in antioxidant systems of the body, such as the superoxide dismutase system of enzymes, begin to falter. That sets the stage for the degenerative aspects of oxidation in cells. In fact, how those effects work is a major theory of the aging process. It's especially troublesome in people who don't exercise, as exercise promotes the body's built-in antioxidant system. Some scientists think that may be the main value of exercise in helping to forestall the aging process and the degeneration of brain and body.

The scientists who found this elemental cause of muscle aging suggest that the process begins at age 30. The same is true of such other conditions as osteoporosis, a bone-wasting disease more common in women than in men, which begins at about age 30 but doesn't usually become apparent until after age 60. By then, however, the damage is extensive, resulting in fragile bones and hip fractures.

Can exercise block the loss of mitochondrial DNA in muscle? The Mayo researchers didn't get to that question, but common sense and observation of people who stay active and continue to exercise as they age indicate that it probably helps.

Also, taking in nutrients that protect the vulnerable mitochondrial DNA from oxidation, such as coenzyme Q10, lipoic acid and acetyl **L-carnitine**, can help. Research conducted at the University of California, Berkeley, showed that intake of those nutrients led to complete regeneration of muscle mitochondria and protected

Scientists who discovered the cause of muscle aging suggest that the process begins at age 30.

against further damage. Typical doses would be 30 to 60 milligrams a day of CoQ10, 200 milligrams of lipoic acid and 1,000 milligrams of acetyl **L-carnitine**.

Short, K.R., et al. (2005). Decline in skeletal muscle mitochondrial function with aging in humans. *Proc Natl Acad Sci.* 102(15):5618-23.

Conclusion:

Keep exercising as you age to curtail cell degeneration. Also take antioxidants every day; for example, 30 to 60 milligrams a day of CoQ10, 200 milligrams of lipoic acid and 1,000 milligrams of acetyl L-carnitine. *(continued on page 150)*

Specific nutrients can work in tandem with exercise as an anti-aging smart bomb.



Model: John Hansen

(continued from page 143)



Model: Peter Putman

Compound exercises can increase testosterone, and so can the new aromatase inhibitors. Would you believe more than 200 percent?

11) Torrential T Time

If you look at the advertisements for estrogen suppressors, or aromatase inhibitors, you'll note that the main benefit touted for them is their ability to increase natural testosterone levels. The health benefits of controlling estrogen are rarely mentioned. The question is, Do those supplements work?

The initial answer comes from two recently published studies. The first examined the effects of two unnamed but naturally occurring aromatase inhibitors in 15 men, aged 21 to 71, over a 28-day period. The subjects' average age was 39,

and none of them had taken any type of **testosterone-boosting supplements** or medications in the three months prior to the study. The aromatase inhibitors were combined in one capsule, taken as three single caps once daily.

Total testosterone increased 145 percent, 183 percent, 232 percent and 240 percent over the first four weeks of the study.

After 10 days total and free testosterone increased by 244 percent and 358 percent from baseline levels. At the 28-day mark total testosterone had jumped to 314 percent above baseline, while free levels increased to 492 percent. Estrogen, meanwhile, was undetectable in 10 out of 15 subjects by the 10th day. By the 28th day it was undetectable in 13 out of 15 subjects. No significant alterations in lipid, liver or other blood chemistry values occurred in the men while they were using the supplement.

The second study was sponsored by a company that advertises and sells products in this magazine. Normally, that sponsorship would

raise some degree of skepticism, since the company has something to gain from favorable study results. The scientific protocols used were up to par, however, and there's no reason to suspect any rigging. Besides, someone has to pay for such studies, and no drug company would, since it's a natural product; it does have a use patent.

The study featured five men, average age 31, who took four capsules of the aromatase-inhibiting supplement before bed for 28 days. As in the first study, using the supplement significantly increased both total and free testosterone. Total test increased 145 percent, 183 percent, 232 percent and 240 percent over the first four weeks of the study. Free test likewise increased from baseline levels—300 percent, 402 percent, 511 percent and 528 percent—during that time. Even so, no significant conversion to estrogen occurred. Blood chemistry tests showed no adverse changes, nor

were any other side effects observed.

Some might complain that the small experimental sample—only five subjects—calls the study's validity into question. On the other hand, it was just a look-see trial to determine whether OTC estrogen inhibitors might be effective. The dramatic results would tempt many to use the supplement year-round, but even the manufacturer advises using it for no longer than eight weeks, then stopping use altogether.

Advice like that makes sense from a health-and-performance perspective because estrogen may have cardiovascular benefits for men, such as helping maintain vital HDL levels. It may also help maintain the androgen receptors without which testosterone is worthless. Plus it has a relationship with growth hormone and insulin-like growth factor 1 (IGF-1); women release greater levels of

growth hormone during exercise because of their higher estrogen counts. Indeed, some studies suggest that estrogen protects against excessive muscle breakdown during exercise.

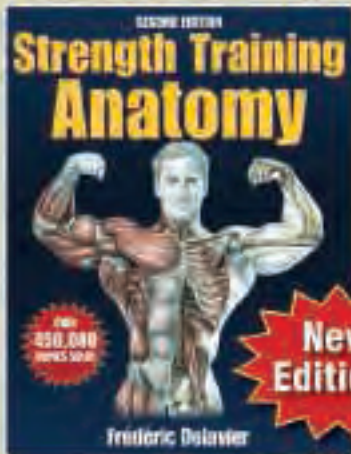
Trimmer, R. et al. (2005). Effects of two naturally occurring aromatase inhibitors on male hormonal and blood chemistry profiles. *J Int Soc Sports Nutr.* 2:14.

Ziegenfuss, T., et al. (2005). Safety and efficacy of a commercially available, naturally occurring aromatase inhibitor in healthy men. *J Int Soc Sports Nutr.* 2:28.

Conclusion:

If you're looking for optimal **testosterone** production, which is especially important for over-40 bodybuilders, you may want to try cycling some of the new aromatase inhibitors. One study shows free testosterone increases of more than 300 percent in four weeks. Very impressive!

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12) Turnaround TNT to Turn Up Muscle Gains

A recent study verifies the importance of turnaround, the point in an exercise at which you reverse the direction of the weight, such as at the bottom of an incline press—although the researchers seem to miss that result. Jose Antonio, Ph.D., discussed it in his Anabolic Drive column in the October '05 **IRON MAN**:

“Twelve 24-year-old subjects performed maximal resistive isokinetic

exercise with both arms for eight weeks, three days per week, during which they trained one arm at a fast velocity and the other at a slow velocity. Type 1 muscle fiber size increased in both cases. Type 2a and 2x muscle fiber increased in both arms, but the increases were greater in the fast-trained arm.

“The researchers concluded that training using fast (3.66 radians per second) lengthening contractions leads to greater hypertrophy (growth) and strength gains than slow (0.35 radians per second) lengthening contractions. The greater hypertrophy seen in the fast-trained arm may be related to a greater amount of protein remodeling.”

Why is the conclusion somewhat off the mark? Well, from the results it appears that training faster stimulated more muscle. But was the speed of movement really what triggered the extra growth or was it

The key fiber-activation point on the stroke is near the turnaround—the semistretched point.

max-force overload right at the semistretched position, the so-called turnaround point?

Realize that when you move fast, it takes more effort to stop the resistance and/or reverse it. In fact,

Partials done at the max-force point can produce bigger gains.



research indicates that when a trainee standing on force plates moves fast and uses momentum, the actual weight he has to reverse at the turnaround of a rep can be double or triple the poundage he's lifting. The reason? Gravity plus momentum. As the weight is quickly lowered and then heaved at the turnaround to reverse its direction, the force is multiplied two- to threefold.

How does that cause more mus-

cle growth? Excessive overload at the key hypertrophic point, the spot near the turnaround on the stroke—a.k.a. the semistretched point—where maximum force generation can occur.

When you move fast through the negative phase of the stroke, as in the study, it takes more effort to reverse or stop the poundage at that max-force point, so you achieve more target-muscle overload right at the muscle's sweet spot. (Imagine dropping a heavy weight through the eccentric phase of a leg curl and then stopping it right before your legs are straight—as opposed to lowering it slowly under control.)

Obviously, training fast is much more dangerous than using a slower, controlled cadence. Fast ballistic movements aren't recommended; instead, try power partials at the turnaround spot after you reach exhaustion on full-range reps. Those **X Reps**, as they are called, will extend your set, activate more muscle fibers and enhance GH release (as indicated in item 6 above). Performing **X Reps** and **X-Rep hybrid techniques**, like Double-X Overload, on stretch-position exercises may also trigger hyperplasia, or fiber splitting. [For more on that research and those techniques, visit www.BeyondX-Rep.com.]

Model: Jonathan Lawson and Steve Helman



Getting at more muscle fibers will build more mass fast.

Model: Jonathan Lawson

Conclusion:

Overload the turnaround point of your exercises to get a bigger mass X-plosion. **IM**

The Muscle-Building Truth Is Out There...

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