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The Think Muscle Newsletter publishes the latest news and research on exercise physiology, dietary supplements, performance enhancement, lifestyle management, health & nutrition, and bodybuilding & fitness. The newsletter is dedicated to providing accurate and unbiased scientifically based information.

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Message from The Editor in Chief:

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Hello all!
We have so much great info in this issue! Lyle McDonald has just released his new book and we've got an exclusive sneak peek! The Blond Bomber Dave Draper has just released a great new book that you'll definitely want to check out, and there is a new newsletter coming out that reviews all the latest research on muscle growth and supplementation.

Lyle McDonald is a former Mesomorphosis feature writer and the author of "The ketogenic Diet: A Complete Guide fro the Dieter and Practitioner". His *NEW* book "Bromocriptine: A Special Report" is now available exclusively at www.QFAC.com . We are please to give you a special introduction to the book. Lyle once again, shows us that the weight loss industry is at least a decade behind the science.

Spring has finally sprung over hear in the Americas and tan lines are just around the bend. Or is your bend more of a bulge? If so, you should surf over to www.DaveDraper.com and check out Dave's new book, "Your Body Revival". It's a great book written for those who want to lose weight, but have tried and failed. It doesn't matter if you are a little or a lot overweight, this book speaks to you. Basic information you need to hear regularly, odd information you might not have heard before, considered or applied, and encouragement you never get enough of is elegantly bound in the pages. Motivation comes abundantly in the form of heartening real-life vignettes as well as some mild karate chops. It's classic Draper.

The interest in HST and HSN has been so overwhelming that we have decided to create an additional newsletter focused on the research fueling the progression of training techniques and supplementation. It's a free newsletter of course provided as a service for our readers. It is called the Hypertrophy-Specific Report and you can sign up to receive it on ThinkMuscle. Just click the 'Sign up" button on the pop-up window or use the Sign Up button on the home page and put a check in the Hypertrophy-Specific Report box. You can also sign up from the HST website. Just click the big ThinkMuscle button on the HSN home page.

HSN is giving away cash! That's right, the HS:Street Team is now forming. What is the Hypertrophy-Specific Street Team? The HS:Street Team is a way for me to give back to those who, out of the generosity of their hearts, have supported me by spreading the word about ThinkMuscle, HST, and now HSN. Those who become members of the HS:Street Team, will receive any number of gifts and special values (yes, even cash!) for their efforts to spread the word about HSN/HST. Sign up for the HS:Street Team where you sign up for the Newsletters, or simply click HERE.

Good news for those of you who have been asking for wider availability of HSN pre and post workout proteins. They will *soon* be available at Netrition. They are also currently available to Canadian readers at Renegade Nutrition and for our Japanese readers at Body Plus. If you are a distributor or retail owner and would like to carry HSN products, please send an email to sales@hypertrophy-specific.com and we'll hook you up.

Until next time,

-bryan

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Bromocriptine: A Special Report

by Lyle McDonald

Chapter 1: Defining the Problem

I always seem to start out these projects with a chapter on defining the problem. I'm not entirely sure if it's for the reader's benefit or my own. Either way it serves the same purpose. I try to solve body problems by first defining what those problems are, then figuring out what's causing the problems, and finally seeing if they can be fixed in any effective fashion. This booklet will follow that pattern.

So let's define the problem very succinctly: Your body hates you. Yeah, I said this in the foreword but it bears repeating. It's become one of my more common catch-phrases and I am quite serious about it. Actually, that sentence has it backwards. Your body loves you and wants to keep you alive; what it thinks is the right thing to do to keep you alive is generally contrary to your goals of less weight/fat and more muscle. Let me shorten the problem even more: dieting sucks. That's the real issue and topic of this book. Anyone who's tried to lose weight/fat (there is a difference) and failed, knows this to be true. Gaining weight is pretty easy for most folks, just eat and enjoy. Losing it is the real hassle. Sure, a genetically lucky few can do it without much effort but they aren't the ones reading this book. There are good biological reasons for this discrepancy that you'll learn about in the next chapter. I'm fascinated with dieting and fat loss. I have been since the start of my career. It's the psychological profile that comes along with being a former fat kid. I've done/read most of the diets out there, tried all of the supplements, even a couple of the drugs. All this was in the quest to be lean and stay there. "Why?", you ask. I'll be honest: I want to fix myself. It's the same reason that nutcases become psychologists and fat girls become dietitians. They want to fix themselves, too. It's a common affliction. My friend Bryan Haycock, who has always wanted to be huge, has dedicated most of his time to studying muscular growth physiology for the same reason. He wants to be huge, so he researches muscle growth ; I want to be lean so I research fat loss. He and I make a very good team, especially when you throw in our endocrinology-obsessed buddy, Elzi Volk. The three of us have most of it covered.

Even at 10% bodyfat, I'm not happy. I know I'm lean, healthy, all of that. My doctor is thrilled and thinks I'm nuts to want to be leaner. So does my mom. They may not be

wrong. But at 10% bodyfat, I'm simply not satisfied. The more athletic readers know what I'm talking about. Other readers may just think I'm nuts and obsessive. They may not be wrong either.

Losing weight/keeping it off

As most people (well, the honest ones anyhow) will tell you, losing weight or fat isn't fundamentally that hard. I'll tell you that too. No magic diet is needed and even fat folks can lose weight: just diet and exercise. It's keeping it off for any decent period of time that is the hard part. Even a 5 to 10 pound weight loss in obese folks improves health indices, but keeping even that off for more than a little while is pretty rare.
Folks who want to get really lean without using drugs have to contend with muscle loss, crashing hormones and other problems. This is a problem I've been looking at for years and there are few real or good solutions. Most are just stopgaps or kludge fixes, nothing very permanent beyond 'Deal with it'. Drugs are the exception; drugs work wonderfully and solve many, many problems.

That's the problem, what's the goal?

So, we ask, what are we trying to accomplish exactly, in solving the problem described above. For the average person, losing weight and keeping it off without hunger and recidivism would be the goal. Fairly simple, really, but most people still fail miserably at it. For the obsessed like me, the ultimate goal would be losing all the fat you want without your body screwing you on the way down. In both cases, it'd be ideal if you could lose fat weight with no muscle loss, no metabolic slowdown, no crashing hormones, and no runaway appetite. If you could stay leaner without much effort that would be great too. If you're an athlete, being able to gain muscle without getting (too) fat would also be ideal. It's not as simple as it sounds and most solutions to date have been only marginally successful, except for drugs of course. Drugs work great because they allow us to step outside of our normal physiology. Most of the dietary supplement strategies are aimed at correcting part of this problem; most try to mimic drugs and some actually succeed. Did I mention that drugs work great? Prohormones, anti-catabolics, fat-burners, appetite suppressants, protein powder, etc. are all attempts to fix some part of the overall metabolically screwed up picture. As most know, they only work to a small degree.

Even the weight loss drugs introduced by the pharmaceutical industry have only been marginally successful. They are either appetite suppressants (such as Fen/Phen or Meridia) which stop working after a while (but see chapter 8 for a possible solution), thermogenics which have side effects, or compounds which impair fat absorption (such as Orlistat, and runaway diarrhea is the price you have to pay). A small weight loss occurs, maybe 5-10%, but that's about it. They are all ultimately sort of kludge fixes, which aren't addressing the real problem (hint: it's in the brain).

Drug-using bodybuilders/athletes don't have this problem, since they are replacing their body's normal hormones with drugs. Steroids, thyroid medication, injectable growth hormone, cortisol blockers, appetite suppressants, that's just a partial list of the chemical warfare that occurs in elite bodybuilding and athletics. Drugs allow those folks to do

things that aren't 'normal' relative to human physiology. Drugs also make natural folks expect a lot more than is realistically possible; they wish they could pull off the magical body transformations without drugs, but they find out the hard way that it can't be done. Drugs can also come at a high cost: financial, legal, and possibly health-wise. This booklet is about fixing part of the problems. I don't claim to have the complete answer...yet. But as research builds up and we figure out what's causing the problem, we are getting closer to the answer. The drug bromocriptine, a very old drug with several uses totally unrelated to body composition, turns out to solve many of the problems that I talked about above. I'll present the data and mechanism soon. In addition, it's very safe at the doses needed, fairly inexpensive, legal, and not too hard to come by. So it meets my criteria for a good drug. Before you get the wrong idea, this booklet isn't only aimed at the psychos like me, who want to maintain single digit bodyfat year round without all of the associated problems. The data I'm going to present turn out to apply to dieters in general, because the mechanisms at the heart of the problem are the same.

Losing 10 pounds and keeping it off long term is essentially the same as dieting to 'normal' bodyfat levels (11-18% in men, 21-28% in women) or getting even leaner. All three situations come with the same basic problems: hunger, metabolic slowdown, impaired fat burning, crashing hormones, all of which derail your efforts. The difference is merely one of degree: the person dieting to 'normal' isn't as badly off as someone dieting to 6% bodyfat. Since all of these problems ultimately stem from the same place (the brain, as it turns out) they end up having the same basic fix.

Defining the problem, part 1

Ok, so the statement that dieting sucks doesn't really tell you much. Let's define the problem in a bit more detail. A quick look at the dieting literature shows an exceptionally poor rate of success. Depending on which data you believe, anywhere from 90% on up of dieters will gain back all of the lost weight within a few years. Some have even concluded that it's not worth attempting weight loss since nearly everyone fails.

As I mentioned above, losing the weight/fat ultimately isn't the problem, keeping it off in the long-term is. Current research is focusing more on how to keep the weight off, since losing it isn't fundamentally that difficult. Eat less, exercise, weight usually comes off. Keeping it off long-term, there's the real problem, and it's where most people fail. There are many, many reasons for this of course, some physiological, some psychological. Changing long-term eating and behavior patterns is difficult, that's part of the psychology. And nobody really likes restriction even if it's self-imposed. Both cause anxiety which humans don't really like, so we revert to old habits. Physiologically, dieting and weight/fat loss cause a decrease in metabolic rate and energy/activity levels, along with a decrease in fat burning. Fat storage enzymes are increased as well, which means that the dieter's body is just waiting to start storing fat again. When (not if) the diet is broken, the pounds come back on, frequently with a little bit extra stored for good measure.

The small percentage of dieters that do succeed long-term tend to show characteristic changes in things such as eating habits, exercise habits, regular self-monitoring to stay on the bandwagon and others. They make the changes and maintain them long term. They have to restrict calories to some degree for the rest of their lives to maintain the weight/fat loss. I suspect they're a little bit hungry and unhappy most of the time. Since nobody likes restriction or hunger, most people go back to old eating habits and gain all the weight back. An ideal solution would fix this problem.

Defining the problem, part 2

It's convenient for weight loss 'experts' to blame weight loss failures on willpower but that turns out to be a very simplistic (and not entirely correct) explanation. Quite literally, the brains of these individuals are the problem. Essentially, their brains 'want' that person to be fatter and are sending powerful appetite simulating signals to get those people to eat. That's on top of the other metabolic derangements, such as slowed metabolic rate and decreased fat burning, along with increased fat storage capacity, that occur.

Dieting athletes and bodybuilders have a slightly different set of problems although they turn out to be related in terms of the mechanism involved. Psychologically, the problems are less since most athletes equate suffering with progress in the first place, which is both good and bad. On the one hand, most athletes don't whine about being hungry or changing their habits, that's part of the price for playing. On the other, many confuse working harder with working smarter. What they lack in finesse, they make up for with pigheaded stubbornness.

The real problems for this group are physiological. Without drugs (euphemistically referred to as 'props' or 'gear' in the subculture), natural athletes lose muscle mass at an alarming rate and have totally screwed-up hormone levels when they get very lean. Staying there, except for the genetically lean, is nearly impossible, as is making any real gains in muscle mass without gaining the bodyfat back.

Getting lean beyond a certain point, in the range of 10-12% bodyfat for men and maybe 18-20% bodyfat for women, causes levels of testosterone, growth hormone, thyroid and the other 'good' hormones to crash. Levels of the 'bad' hormones such as cortisol skyrocket. Appetite soars through the roof. Muscle loss accelerates and getting rid of that last little bit of fat is a total pain as the body fights to keep you alive. For bodybuilders who only have to be lean for one day (contest day), it's no big deal. But stories of folks ballooning up after the contest are rampant. The physiology coupled with months of deprivation can lead to month long binges. As you might imagine, fat storage takes off.

As it turns out, nearly all of the problems I described above are being controlled by the same basic systems and they turn out to be mostly in the brain. Appetite, hormones, the psychological drive for food, fat burning, etc. all under control of the same basic systems at a fundamental level. And it's your brain that is screwing you over. This is why the idea of "Just try harder" doesn't get very far. Your brain, which is feeding your urges

about behavior, food, etc. is fighting against you. Did I mention that your body hates you? It does and, eventually, it's going to win.

The brain and setpoint

In the last five years or so, obesity research has exploded into a whole new realm. Rather than focusing on idiotic topics such as "Why fiber is good for weight loss" the current focus is on the biological mechanisms that drive eating behavior, maintain bodyweight at certain levels, and control the partitioning of calories (where they go after you eat them). It's been suggested for decades (since at least the 50's) that the body tries to maintain some type of 'setpoint' level of bodyweight or bodyfat and will try to maintain that level. While that's a little bit simplistic, it turns out to be more true than not.

Simply put (the details are coming later), the brain has sort of a preconceived notion of how fat it wants you to be, a setpoint as it were. A great deal of this 'setpoint' is imprinted at a very early age (1). Like when you're in the womb and the first few months of life early. Quite literally, what your mom did while she was pregnant is affecting you now. If she was obese (or, as it turns out, undernourished), you're more likely to be overweight and have trouble losing and keeping weight and fat off. You probably have more fat cells than you'd otherwise have, as well as a brain that 'wants' you to be fat. Other aspects of your physiology, such as hormonal axes, may also be imprinted while you're in the womb (2). This probably contributes to the problems folks have losing fat as well. So if you have problems with losing fat or with your hormone levels, just blame your mom. She should appreciate that.

In addition to your early childhood, what you did during puberty as well as what you do as an adult can affect setpoint. It looks like overeating for long periods of time or staying fat long enough can cause setpoint to go up (above where it was when you were born). Contrary to popular belief, you can also add fat cells if you stay fat/overeat for extended periods, and this may affect setpoint as well as your propensity to put fat back on after you diet. Pregnancy appears to raise setpoint a bit in women too. It's bringing setpoint back down that's the problem. The whole setpoint concent is pretty easy to demonstrate in animals, although harder to measure in humans. You can breed rats who will avidly defend a given setpoint. By defend I mean this: when you overfeed them, their metabolic rate increases, they become more active, and they will automatically decrease food intake. This brings them back to their setpoint level where everything normalizes again. In contrast, when you underfeed them their metabolic rate decreases, they decrease their activity, and increase food intake (3), which brings them back to their setpoint again. They make a useful model because scientists can biopsy their little rat brains and see what's happening chemically and figure out what's driving the process.

When they are below their setpoint, their little rat brains undergo characteristic changes that cause things to occur: slowed metabolic rate, hunger, etc. Once bodyfat increases, their brains think everything is normal, and brain chemicals normalize.

You can also breed rats with a high setpoint to begin with. If you maintain them at a bodyweight that's lower than their setpoint, even if they aren't actively dieting, their

brains and the rest of their rat physiology will show the same changes as if they were starving. As soon as you fatten them up to their setpoint, their brains go 'Aahhh' and everything becomes normal, at which point they start to defend that setpoint. A fed rat brain is a happy rat brain, or something like that. Humans show some of the same tendencies as the rats mentioned, and the same basic neurochemistry too. The big difference is that we appear to defend against underfeeding a whole lot better than against overfeeding. That is, overfeed someone and you generally don't see major increases in metabolic rate or decreases in hunger. There are exceptions, people who burn off extra calories through fidgeting and other activities; they tend to stay very lean and have trouble gaining weight (4). They also have appetites that shut off readily when they overeat. They are not most people and we hate them. The only pleasure we might derive in this regards is knowing that they will be the first to die if a famine ever comes. In most people, when you overfeed, metabolic rate goes up a little and hunger decreases a little, if at all. Excess calories are stored as fat with excellent efficiency in most people except those lucky suckers who burn the majority off (4). To get far ahead of myself, these lucky folks will likely turn out to be very leptin sensitive, a topic that will make sense in a few chapters. Everyone else will be found to be suffering from some degree of leptin resistance.

It's when you underfeed people that the problems start: hunger soars, metabolic rate and hormones crash, fat burning slows down, muscle loss goes up, everything I mentioned up above happens. Your body hates you and defends better against underfeeding than it does against overfeeding. This actually makes good evolutionary sense.

What does evolution have to do with it?

Now you're wondering about that last sentence, how did being fat and defending against underfeeding/starvation make good evolutionary sense? Even if you weren't wondering, I'm going to tell you. I have to justify the cost of this booklet somehow.

During most of our evolution, being fat up to a point was actually beneficial, because it helped us to survive when food was unavailable. In ancient times, that was usually about half of the year. People would typically fatten up during the summer when food was available, to ensure that they could survive the winter when food wasn't around. The increased bodyfat would give them the stored energy to get through the winter on top of helping to keep them warm. It's only in recent times where being fat is a health risk, mainly because people get fat, and stay fat for extended periods. The normal starvation period that we evolved on, which leaned us out for half of every year, doesn't occur anymore. Modern life is one long fattening cycle (readers who are powerlifters can think of it as one long bulking cycle).

In contrast, being skinny meant that you tended to die when food wasn't available because you starved to death that much sooner. The folks who could best deal with starvation, by slowing metabolic rate and all the rest, survived, and we carry their genes (5). This is called the Thrifty Gene hypothesis, in case you care.

To your body, dieting is fundamentally identical to starvation, it differs only in extremity. In both cases, you're eating less than your body needs and, in both cases, your body adapts pretty much the same. That is, your body doesn't 'know' that you're only dieting for 8 weeks to look good in a bathing suit. If only 'knows' that you're eating less, and adapts accordingly. You'll find out how it 'knows' in the next chapter. While I'm on the topic, a little more bad news for female readers. We've known for years that women have a harder time losing and keeping off weight, no matter what they do. In addition to having a lower metabolic rate overall, women's bodies generally adapt faster and harder to caloric restriction or exercise than men's bodies do (6). To put it in the above terms, their bodies appear to defend against weight loss even moreso than men's do. Oh yeah, they also don't burn off excess calories as well with overfeeding (4). As my friend Elzi Volk says "When it comes to fat loss, women are screwed."

Again, this makes evolutionary sense. Since women were ultimately responsible for the survival of the human race (since they give birth to and take care of the children), the ones who could stay alive the longest during the winter famine were the ones who passed on their genes (7). This is the reason that women have a much harder time losing fat (and keeping it off) than men. The exact mechanisms by which women's bodies are able to do this are still under study. Figuring out what is the problem with women and fat loss and fixing it is one of my next projects. For now, just accept that it sucks to be female if you want to lose fat. You can do it, but it's harder.

Summing up

So, the basic problem is this: Your body appears to have a set idea of how fat it 'wants' you to be. That's your 'setpoint' and how high or low it is depends on what your mom did when she was pregnant, what you did during puberty, and what you've done as an adult. This causes your brain to set things up to try and keep you at that weight, more or less. To a degree, it can adapt metabolism, etc. up and down in response to over-and under-feeding respectively.

But, in general, for clear evolutionary reasons, your body works far harder against you when you underfeed than when you overfeed. Essentially, your body wants to keep you at a certain level of bodyfat which is usually higher than you want, because it thinks that the next famine could be around the corner. If food becomes unavailable tomorrow, you'll live longer if you're fatter. In a few thousand years, once our bodies have figured out that famines aren't coming, maybe our genetics will adapt. Until then, metabolic slowdown and all the rest is the price to pay for dieting.

In addition, in response to that famine, your body has an extremely well developed way of keeping you alive, slowing metabolic rate, making you less active so that you burn less calories, making you hungry as hell so you'll go look for what food might be available, decreasing fat burning, and many others. All are aimed at helping you to survive until food becomes available. And, as far as your body is concerned, dieting is really no different than starvation. The only real difference is one of extreme, eating something versus eating nothing. In both cases, your body 'knows' that you're eating less than you should, and it adapts accordingly.

So how do we fix it? The first step to solving that problem is to figure out how the body is performing this trick, the mechanism: knowing you're starving and adapting. Then we see if we can do anything about it, which is where Bromocriptine comes in…

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Fiber Types, Training, and Hypertrophy

From the Hypertrophy-Specific Training series.

by Bryan Haycock
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The issue of fiber type that continues to resurface in the discussion of different training methods. Some people insist that in order grow to get maximum growth, muscles must be trained according to fiber "types". A look at what determines a fiber's "type" should help clear up the issue and help you make a decision as to its relevance to training specifically for muscle *growth*.

"Fiber types" and how they are classified.

Muscle fibers were first classified according to their "function". Fast-twitch and Slow-twitch are the two basic types. It was later discovered that the twitch (twitch =

contraction) characteristics were the result of different kinds of contractile proteins. Some proteins were good at contracting quickly, and were also dependant on “fast oxidative” pathways (ATP, and fast glycolytic pathways). The other type, slow-twitch, has contractile proteins that were different than those in fast-twitch fibers, and were dependant on “slow oxidative” pathways (beta-oxidation, fatty acid oxidation).

The two distinct metabolic profiles of fast- and slow-twitch fibers, give them distinct fatigue profiles. Fast-twitch fibers fatigue rapidly because their fuel source, ATP, is depleted rapidly. I use the term "depleted" loosely. Slow-twitch fibers fatigue slowly because their fuel source (fatty acids) take a long time to deplete.

There is another factor in the fatigability of fast- and slow-twitch fibers. The amount of power they are able to generate. Because fast-twitch fibers contract quickly, they are able to produce more “power” than slow-twitch. So fast twitch fibers use their available more quickly because the “motor-units” are larger. A motor-unit is a group of fibers connected to a single motor neuron. Keep in mind that power is a function of work over time.

The purpose of each different type of fiber?
Fast-twitch fibers are used to move your body mass quickly. This is important for running, jumping, and reflex movements (e.g. pulling your hand away from a hot stove). This requires short burst of relatively high force (but with low precision). Slow-twitch fibers are used to support the body posturally. This requires long/sustained contractions of relatively low force (but with high precision).

You will find a high proportion of slow-twitch muscle in the calves, and trunk (spine) and in the forearm predominantly. This makes sense when you think about it. Your calves, which contain your toe and foot muscles, are constantly working to balance your body while standing and walking. They are contracting constantly when you are standing. Your trunk muscles hold you upright when you are standing or sitting unsupported. Your forearms house your finger and hand muscles. These are used to hold things. Holding requires constant contraction of your finger muscles.

Isolating fiber types in training.
Forget about the notion of isolating fiber types while training for hypertrophy. You can’t isolate fiber types per se when lifting a weight sufficiently heavy to cause muscle growth. Let me explain. Your brain activates muscle fibers in a specific sequence and manner based on the kind of movement it desires. This progressive activation of muscle fibers is called *recruitment*. Small “motor units” (motor neuron-muscle fiber unit with a low threshold of activation) are activated first to produce precise movements. These small motor units use slow-twitch fibers.

If activation of the inductive small motor units is insufficient to produce the desired movement, the brain activates progressively larger and higher threshold motor units. These larger motor units involve fast twitch fibers.

So, slow-twitch fibers are recruited first, followed by fast twitch fibers, based on the needed amount of strength (force or power). Because of this recruitment pattern, you could theoretically isolate small slow-twitch fibers, but you couldn't isolate fast twitch fibers because your brain activates slow-twitch first during *any* contraction. The greater the force of contraction, the greater the number of fast twitch fibers will be activated, but only after all slow twitch-fibers are activated.

So picture in your mind a dial that goes from 0 – 11. The numbers indicate how much force you want the muscle to generate, 0 being none and 11 being maximum intensity contraction. ON the dial, going from 1-5 the body will activate an increasing number of small motor units (slow twitch fibers) until it has activated them all. From 5-11, the small motor units will remain activated, but the body will add to them, large motor units (fast twitch fibers) until the desired muscular force is achieved. You progressively fine motor control as the amount of force goes up. This is a manifestation of the recruitment pattern just described.

Fiber type and muscle hypertrophy

Both slow twitch and fast twitch fiber are able to hypertrophy when exposed to overload. In a study by Hortobagyi, muscle fiber size of the quadriceps were compared after 36 sessions (12 weeks) of maximal isokinetic concentric or eccentric leg extensions. Type I fiber areas did not change significantly, but type II fiber area increased approximately 10 times more in the eccentric than in the concentric group.

There is a tendency for fast twitch fibers to experience more damage from training, thus fast twitch fibers tend to hypertrophy "more readily" to heavy resistance exercise. Nevertheless, both fast and slow twitch fibers hypertrophy. If you look at a bodybuilder's cross section of muscle fibers, you will find both fiber types hypertrophied, this being due to the inclusion of both concentric and eccentric contractions under load.

In conclusion fibers are classified into two different types, fast and slow. The distinction between the two types of fibers is based on both their contractile properties, as well as their metabolic properties. Slow twitch fibers, associated with small motor units, are activated first when a effort is applied against an object. Once all small motor units have been activated large motor units, involving primarily fast twitch fibers are activated.

All exercises performed by a person trying to build muscle are, of necessity, performed using sufficient weight to activate all slow twitch fibers and most fast twitch fibers. Both slow and fast twitch fibers will then hypertrophy. Fast twitch fibers will hypertrophy first, and to a greater extent, due to their susceptibility to cellular micro-trauma during the eccentric portion of every rep.

When trying to grow muscle, it is worthless to try to adjust the program to “stimulate” or “isolate” any specific type of fiber. Recruitment patterns involved in lifting weights heavy enough to cause hypertrophy activate all fibers, both fast and slow.

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Reader Q&A

by Bryan Haycock

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Question:
I have read between your reports on the stimulus for hypertrophy as it relates to rest periods as well as Superslow's Ken Hutching's and must say I am confused. At this time I am of phase 3 of the HST program (5 reps) and enjoying it, however if Ken has a point it would really suit my life style, so I was willing to try Superslow and see what comes of it.

You Bryan, give all the research sources so you must be on the right track and as a scientist I respect that, however I'd like to know what should I use, and here there should be a rule or an absolute, is it 36 - 48 hrs. or 7 days, as I was thinking I was going to use somewher in between by training twice a week and then seeing what I get out of it? However I prefer to have the best info and use it as I have found out that it works best to use what really has been proven.

Can you elaborate on this one Bryan?

Cheers,

-F

Answer:

Hi F_,

Super Slow training dictates that you take 10 seconds to lift the weight, and an additional 10 seconds to lower the weight. This puts a tremendous drain on the central nervous system as well as the neuromuscular junction. In other words, it might be more appropriately named “Fatigue-Specific Exercise”. Because of the fatigue this type of exercise induces, he is correct in recommending that another Super Slow training session not take place again until the 4th day after the last workout. It takes at least that long to recoup your strength, so his recommendation is good. As you adapt to this type of contractions, you will inevitably get better and better at doing them. This is good! After all, why else do Super Slow exercise unless you want to get better at lifting weights super slow?

HST, unlike Super Slow, is only designed to induce muscle hypertrophy or growth. It is not intended to make your muscle more resistant to neuromuscular fatigue. So it is probably inappropriate to compare the two methods with the same measuring stick.

Back to your question, "recovery" can refer to several different things.

1) Structural Recovery - refers to the structural repair process of fixing physical microtrauma. The damaged cellular protein structures can take several days to be repaired and all evidence of damage removed. Even at the end of seven or so days after significant muscle damage from eccentric muscle actions, you may still see some small fibers still regenerating.

2) Metabolic recovery – This would relate to glycogen stores, ATP levels, etc. These absolutely require rest in order to return to baseline levels or higher. Glycogen replenishment is what the term “super-compensation” actually was intended to describe. Of course since then, it has been erroneously used to try to describe how muscle grows.

3) Neuromuscular Recovery - this can be “acute” recovery as in the necessary time to rest between sets. Or it can mean the days that it usually takes to regain baseline strength after fatiguing exercise. This is the type of recovery Super Slow pays special attention to.

Now the reason HST calls for more frequent training is because the acute anabolic effects of training, such as increased protein synthesis, the release of muscle-specific IGF-1 from muscle cells, and other factors involved in modulation of short term protein synthesis, only last for 36-48 hours. This does not mean that the structural repairs to the tissue have been completed. Nor does it mean that metabolic or even neuromuscular recovery is complete. It doesn’t need to be.

Research has demonstrated that you can train a muscle before it is fully “recovered” and not inhibit its ability to continue to recover. See the references below (1-17). Experience tells us the same thing. So, HST uses this evidence and calls for repeated loading (training) every 48 hours or so to keep the anabolic activity of the muscle high, while

trying to stay slightly ahead of the structural recovery curve by constantly increasing the load each workout. Staying ahead of the structural recovery curve is really key to elicit real growth in a person who has lifted for quite a while. Of course, injuries can develop over time if care isn't taken to take time to heal, and prepare the tendons for repeated heavy bouts of lifting (SD and 15s serve this purpose in HST).

I hope this gives you a little more insight into why HST is put together like it is.

Either method you chose to employ, keep us filled in on your progress!

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Question:
Hi,

I'm sure you get this question a thousand times a day, but its time for summer and I'm desperate to get rid of the cottage cheese I seem to have developed on my legs. What kind of diet is most effective for losing cellulite [fat]?

Thanks,

D-

Answer:
Hi D-,
What people call "cellulite" is really just fat that is "diamond tucked" to your hips and thighs, so to speak. Although cellulite is just fat, it is a tiny bit more stubborn that fat on your waist.

The dimpled appearance of cellulite is caused by strands of connective tissue between your skin and the muscle beneath. As fat begins to accumulate under the skin, these strands will become stretched and cause dimples to appear on the skin, much like the diamond tucked upholstery on your couch or an antique chair, only not as attractive.

Any "diet" or eating plan that causes fewer calories to be eaten than are burned will shrink the fat under the skin, and reduce the appearance of those darned dimples.

For women, it is usually the fat on the hips and thighs that is *last* to budge. However, this fat is resistant to be broken down and shuttled out of the cells. This does not mean it won't burn off eventually, it only means you must stick to your particular program long enough for the "easy" fat stores to drop in order for the body to tap into the fat on hips and thighs as a backup! This will require patients and a long term plan. A plan that allows for periodic "breaks" in the number of calories.

The best way to diet long term, is to periodically increase calories, say every 6 weeks or so, for about a 2 week period. Be careful though. Most people take this opportunity to eat foods that are not on their diet. This is when the "break" turns into a binge. Instead, simply increase the portion size of each meal for 2 weeks. The extra calories will readjust the hormones in your body to allow fat to begin dropping again when the break is over.

One other note: Ephedrine and Caffeine are often used a fat loss aids. Keep in mind that these will work better for men than they do for most women. What seems to be the only equalizer is exercise. Exercise has an equally potent fat burning effect on women as it does on men. So when the weight loss stops, try increasing the exercise before you decrease the calories.

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Protein, Part 3 - Individual Amino Acid Requirements

by Lyle McDonald, CSCS

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Section 6: Determining AA requirements
Most methods of rating protein for adults are based on the assumption that the majority of incoming AAs are being used primarily for maintenance of existing tissue, not growth of new tissue. Obviously this assumption is incorrect for bodybuilders who are trying to synthesize new tissue, making most measures of protein quality (which are aimed at determining maintenance protein requirements) fairly irrelevant. This raises several important questions.

First and foremost, are there any differences in the AA profile required by bodybuilders than by sedentary individuals? A second, and related question, is whether it is sufficient for bodybuilders to simply consume more of the same AA profile which is required by sedentary individuals or should the additional protein have a different AA profile?

Unfortunately, both of these questions require examination of the changes in AA metabolism that occur during weight training, and very few studies are available. While numerous studies have examined the effects of endurance training and other forms of stress such as surgical trauma on AA metabolism, these models are inappropriate to apply directly to bodybuilding.

Full text:

http://www.thinkmuscle.com/articles/mcdonald/protein-03.htm

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We hope you have enjoyed the latest issue of the Think Muscle Newsletter. Suggestions? Comments? Questions? We'd love to hear them!

Best regards,

The Think Muscle Editorial Staff
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