myoblast.wordpress.com

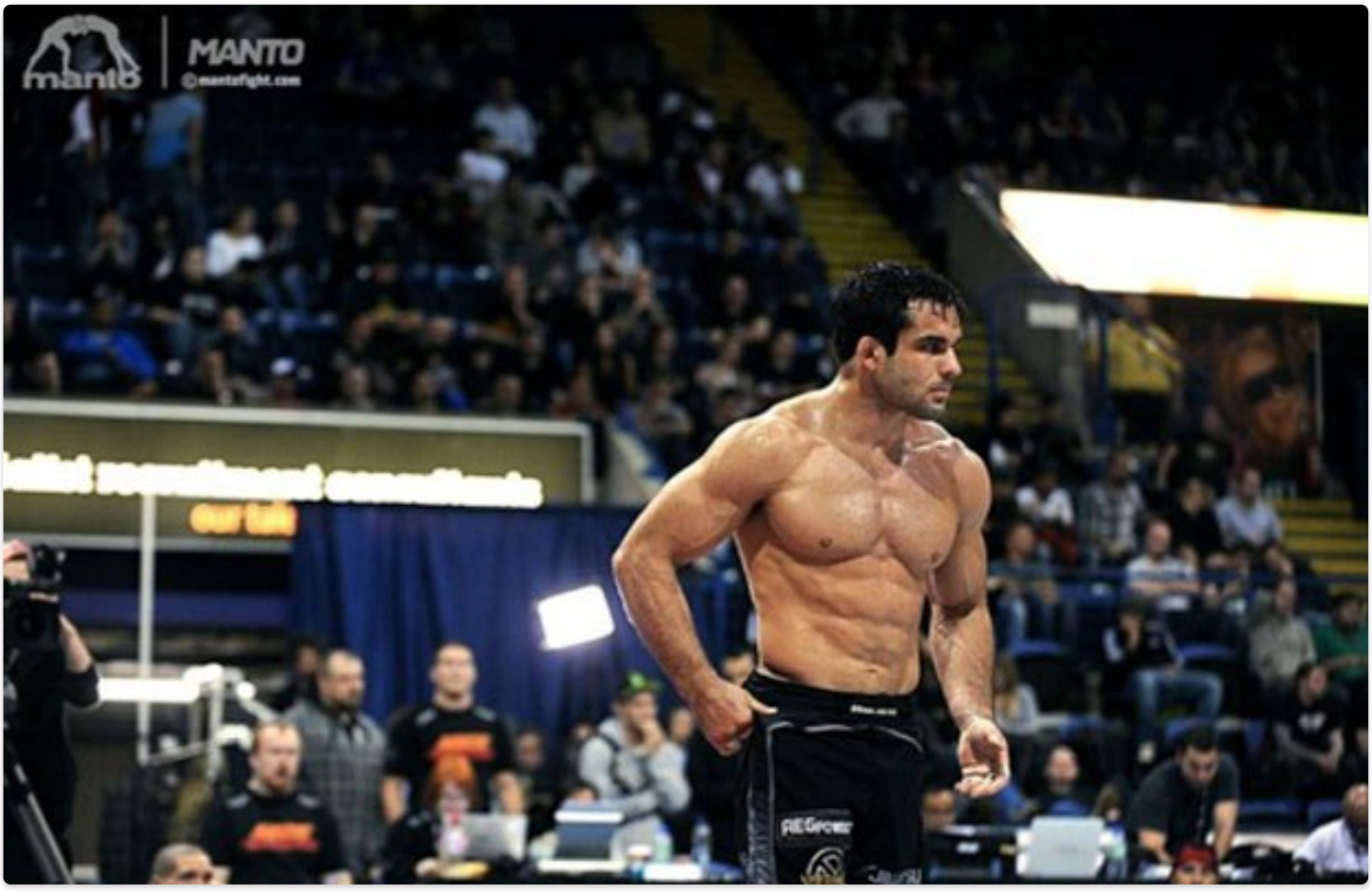
Selected Information on Nutrition and Physical Conditioning

Menu

TAG ARCHIVES: DIET

The Pablo Popovitch Diet

Leave a reply



(...)

Protein and Carbohydrates:

Our body produces different types of enzymes to digest protein and carbohydrates; The Popovitch diet follows the simple concept that you should not eat complex carbohydrates with protein on the same meal. By mixing carbohydrates w/ protein you are making your body work extra harder to digest wherever you eat.

Here is the breakdown:

Protein with Salad: 3:00 hours to digest
Carbohydrates w/vegetable or salad: 1 hour 40 minutes to digest
Fruits: 15 minutes to digest
Fruits and Carbohydrates: 1 hour 40 Minutes
Fruits and Protein: 3:00 hours to digest
Fruits should be eaten by themselves, wait 15 minutes and you can have your carbohydrates or protein.

Protein + Carbohydrates: 7 – 10 hours to digest

To make your metabolism work faster you need to eat every 3 hours on small portions. The only problem is if you mix carbohydrates with Animal protein (fish, chicken, steak, pork) it will take longer than 3 hours to digest. Making your body work extra hard and resulting in fatigue, sleepiness.
Also at night I follow the simple rule of never eating animal protein, complex carbohydrates are great at night, and it helps you sleep. The only protein I use at night is in the form of protein shakes, it is pre digested and very different from eating regular protein. Animal protein should be consumed at lunch time with a salad.

Very important:

Salt – Can only be used on protein, mixing salt with carbohydrates will increase the water retention in your body.
Olive Oil – to be used on carbohydrates and salads (no dressings on salads)
Egg Whites – 2 times per week can substitute Protein Shake in the morning
Cheese – Mozzarella cheese can be eaten 2x times per week, everything else is not recommended

Milk – Never (only babies should have milk)
Coffee – Morning only
Soda – Never

Best Times to have your Protein Shake

Morning

First thing in the morning – because your body has just gone through 8 hours (or however long you sleep for) of not having food – so the protein levels are way down.
30 minutes before bed

Before you go to sleep – this helps prevent the protein breakdown that naturally occurs when we sleep. If you are not trying to build muscle mass then this protein breakdown is fine. But if you are working out – you want to try to minimize any losses you suffer when you sleep and your protein metabolism slows down.
Before training (1 serving of muscle milk) 1 hour before
After hard training – (if you don't need to cut weight)
Endurox (perfect recovery drink post training Carbohydrates w/ Protein)
Drink plenty of water (2 gallons is what I recommended)

Example of my daily diet:

Morning (Carbohydrate w/Protein Shake)	Fruits (Banana, Pineapple, Plum, Apple) Green Tea Wheat Bread W/ Olive Oil Or Cereal/No milk Muscle Milk
(15 minutes before Lunch)	Fruit (Banana, Plum, Fig, Raspberry, Cherry, Apple)
Lunch (Protein + Salt and olive oil)	Protein (red or white meat) Salad or Vegetables Green Tea
(15 minutes before Snack)	Fruit (Banana, Plum, Fig, Raspberry, Cherry, Apple)
Afternoon Snack	Wheat Bread w/ Olive oil Green Tea (2 or 3 slices)
Dinner (Carbohydrates + no salt + Olive oil)	1st option Wheat Bread W/ Olive oil / Tomatoes 2nd option Sweet Potato soup, yucca W/ Olive oil 3rd Option Wheat Rice, Sweet Potato, Wheat Pasta, Yucca Green Vegetables (Broccoli, Spinach, cabbage) Green Tea
Before Bed (30 minutes)	Cashews No Salt or Natural Yogurt and Fruit or Muscle Milk Serving

(...)

Source / full article: http://www.bjjee.com/articles/the-pablo-popovitch-diet-a-simple-way-to-speed-up-your-metabolism/

This entry was posted in Nutrition and tagged diet, grappling, mma, Nutrition, Pablo Popovitch on June 3, 2016 by myoblast.

How Diet & Lifestyle Influence Aging & Brain Function

Leave a reply

This entry was posted in Nutrition and tagged aging, brain, diet, Rhonda Patrick on July 25, 2015 by myoblast.

The Pulse Feast, by Christian Thibaudeau

2 Replies

The Pulse Feast
Build muscle. Stay lean. Eat what you want. Finally.
by Christian Thibaudeau – 1/13/2011

Christian Thibaudeau has stumbled upon the Holy Grail of physique transformation: an eating strategy that allows him to gain muscle, remain abs-on-display lean, and do it all without having to worry about food.

But it's not what you think. Like the old story of the blind men in the room with the elephant, we've discovered parts of this strategy before. But now someone has finally put them together into a simple plan that works shockingly well.

Oh, and you get to pig out at night. Bonus.

It's the Next Big Thing in muscle-building nutritional science:

The Pulse Feast.

– Chris Shugart

The Problem: If There's Food Around, I Eat It!

Being a former fat guy, I've been fascinated with dieting all my life. I've always had a love/hate relationship with food, and I'm always looking for ways to get lean and stay happy at the same time. And that last bit is important.

You see, when I was training for bodybuilding purposes, I used the six-meals-a-day, low-carb approach, and it really did get me super lean. But I had two problems eating that way. Even though it got me lean, I felt like crap all the time. I wanted to kill everybody, and I had no social life. All the pleasure of life was robbed from me.

The second problem was that after the bodybuilding contest I'd rebound and balloon way up. Even though I knew better, I was a yo-yo dieter.

The problem I had eating the traditional bodybuilding way – six to eight small meals per day – is that my psychological profile leans toward binge eating. I can force myself not to eat for two or three days, no problem. As long as I don't start eating, I don't have the psychological need to eat.

Once food enters my mouth, however – whether it's because of a neurological reaction or a hormonal one (because I produce too much insulin) – I simply can't stop eating. If there's food around, I'll definitely eat it.

Eating six small meals a day was like being teased by a beautiful woman, six times a

day, and not being able to touch her. I was always suffering. It made me angry about food and angry about life.

It got so bad, to avoid falling off the wagon I'd literally keep no food in my house. I'd actually go to the grocery store six times per day and shop for each meal individually! What else could I do? If I had kept six meals in my house, all at one time, I would've gobbled up all of those groceries in one sitting.

As you can see, it was impossible for me to eat six small meals a day and stay sane. I'd lose body fat, but feel miserable. So I started to look for ways to remain lean while still enjoying life.

Let's face it, it's one thing to get super lean for one week out of the year and it's another to stay reasonably lean all year around. Personally, I'd much rather be at 8% body fat all year and be happy than to be miserable getting to 4% for one month only to rebound to 14% for the rest of the year. I had to find a solution!

My Experiments

Experiment 1: Ripped, But Losing Muscle

The first eating strategy that appealed to me was Ori Hofmekler's Warrior Diet, which I first read about here at T NATION. The basic idea was to fast all day (eat no food), then eat a lot in the evening.

It appealed to me because it seemed like the ultimate solution: I could eat whatever I wanted and still stay lean. The diet just fit my psychological profile. I didn't need to eat for 18 hours, so it was actually pretty easy for me to do.

I started that diet right after a bodybuilding contest. I wanted to stay in contest shape and yet binge all I wanted. That diet allowed me to do that, to an extent. I stayed very lean, had a lot of energy, but I did lose some muscle mass.

The plan fit my needs at the time, but I knew that slowly losing muscle wasn't what I wanted to do for long.

Experiment 2: Lean With Muscle Retention

I tried several different strategies to improve the basic fast-then-feast idea. I used BCAAs throughout the day to avoid being catabolic. I still didn't gain muscle mass, but the addition of BCAAs seemed to prevent muscle loss, plus my strength stayed up.

This new strategy was better than the original plan, it worked, but it had its limitations. Muscle retention was great, but that still wasn't good enough. I wanted to gain muscle.

Experiment 3: Shredded With Muscle Gains!

Not long after, I read about casein hydrolysate. This, I thought, could be the way to build muscle mass while staying lean. All I'd have to do is use casein hydrolysate pulses throughout the day.

The problem? At that time there wasn't a casein hydrolysate product available. Great theory, I thought, but I couldn't try it.

Fast forward… Tim Patterson sends me an experimental formula that contained an advanced version of casein hydrolysate that hadn't been released yet to the public – a formula that eventually became known as Anaconda. I started pulsing it in during the day, then feasting at night. Using Anaconda that way gave me a tremendous amount of creatine, more than I needed, but it was giving me the casein hydrolysate I'd been wanting.

That was the first time I was able to eat what I wanted, stay lean, and actually gain strength and gain muscle.

MAG-10 was the precise component of the Anaconda formula that I really wanted for this eating strategy. I mentioned this to Tim Patterson and he quickly produced MAG-10 as a standalone formula, specifically for the purpose of pulsing throughout the day.

With the specialized formula of MAG-10 now available as a standalone supplement, I was able to finalize the plan, something I started thinking of as the Pulse Feast.

In the last year, I've been using various MAG-10 pulsing strategies during the day and only eating one big meal at the end of the day. This is how I eat just about every day, and the results are better than I ever expected – and I feel great!

Perfect Metabolic Efficiency

The Pulse Feast strategy – two large MAG-10 pulses during the day, one big meal in the evening – in addition to stimulating anabolic physiology, makes you metabolically efficient. And with continued use, you'll be able to gain muscle and strength, stay lean, stay sane, and stop having to obsess about food.

Most people don't really want to step on a bodybuilding stage. But almost everybody wants to look lean and not feel bad trying to get and stay lean. They also want to have the energy and mental focus to go out and play sports or participate in whatever athletic activities they want. And with this plan you can have it all, without revolving your whole schedule around your diet.

No more packing Tupperware containers everywhere you go or freak out if you can't eat solid food every three hours.

Have a couple of MAG-10 pulses during the day and eat pretty much what you want at night. It's simple, it's stress-free, and it's the most effective strategy I've ever used for building muscle and getting lean.

Let's break it down.

Phase 1: Morning and Afternoon Pulses

From the time you get up in the morning until around 7:00 PM, you're going to have two large pulses of MAG-10, which equates to one pulse in the morning and one pulse four or five hours later.

Each pulse consists of 3 scoops of MAG-10 in 900 ml (~30 oz) of water. This amounts to a little less fluid than a McDonald's large drink, so no one should have trouble drinking that amount.

These two pulses are in addition to your peri-workout nutrition protocol. So on workout days, you're getting a third giant pulse of anabolic ingredients from your workout nutrition. In my case, for my workout drink, I mix together MAG-10, ANACONDA, and SURGE Workout Fuel.

We've really given this dosing protocol a lot of consideration. Tim Patterson, Dr. Tim Ziegenfuss, and I collectively have reviewed all the available science literature, discussed this at length with various researchers, and experimented with all the variables.

In conclusion, the science matches my own personal experience – that in addition to peri-workout nutrition, a schedule of two large pulses of MAG-10, separated by four or five hours, works best. Here's why:

The goal is to flood the bloodstream with massive amounts of the tripeptides and amino acids contained in MAG-10, drive those nutrients out of circulating blood and into muscle and other target tissues, and then return the bloodstream back to its normal baseline state at least an hour before the next pulse.

To keep the body responding maximally to the effects of pulsing, you have to have periods where the bloodstream is "resting" at its amino-acid baseline. And with the large pulses, the two-dose protocol provides just enough time to make it all work.

In other words, pulsing with large doses requires more clearance time, and there's just enough time to fit in two pulses and still get in another large pulse during a workout.

From my experience, this protocol produces the maximum anabolic benefit while, at the same time, keeping the body highly sensitized to the effects.
Here's exactly what I do:

I usually workout about 5:00 PM, so I'll have one pulse of MAG-10 shortly after I get up in the morning, and another pulse early afternoon. At 5:00, when I work out, for my peri-workout protocol, I use two scoops of Anaconda, two scoops of MAG-10, and one scoop of Surge Workout Fuel.

Phase 2: Feast!

After 7:00 PM, the feasting begins. There are, however, a few rules depending on your goals:

Goal: Get Lean or Stay Lean

If your main goal is single-digit body fat, then you're evening feast is one meal. While you can literally eat all you want, for ultimate leanness your feast will be a little more structured.

Start your feast with a focus on animal-derived foods and veggies. In other words, start with protein (meat, fish, eggs etc.), then add in some vegetables, and if you still want to eat after that, have fruit.

Rule of thumb: The fatter you are, the more restrictive you need to be with the food choices. Have your feast, but watch the carbs.

Goal: "Maintain" Current Condition

I don't like the term "maintenance." Even when I'm not specifically trying to get super lean or gain a lot of muscle mass in a hurry, I'm still striving to improve.

Let's call that "maintenance" for the sake of simplicity. This is actually where you'll be for most of your year. I use this strategy for about 80% of the year myself.

When maintaining, you basically just eat what you want during a pre-set period of feasting. I prefer 7 PM to 11 PM. Again, start with your protein and veggies and eat your fill, but then have pasta, grains, or even dessert if you want it.

Goal: Muscle Mass

If your main goal is lean weight gain and muscle mass, increase carbs and overall food intake during your evening feasting hours. You still need to begin your feasting with protein, but after that you'll have more leeway than the guy whose goal is to remain very lean.

The Psychology of Nutrient Partitioning

I believe that the psychological state you're in when you eat affects nutrient partitioning. If you're stressed out, or you have a negative opinion about your food,

then you may store more of it as fat.

The Pulse Feast is a stress-free method of eating. You don't have to feel guilty about pigging out because pigging out is part of the plan. It's required.

This may be related to the thrifty-gene hypothesis. The body is built to work in high-activity, low-food intake followed by low-activity, high-food intake cycles. In other words, fasting and feasting.

When you're in high-activity mode, you're not in a state to properly ingest and store nutrients as useable energy – you're not as efficient. If you're stressed out – psychologically or physically – you won't be as efficient with your eating.

On this plan, you're going to enjoy your meal because you know your body is primed to use the nutrients. You've just fasted for 18 hours along with anabolic pulses, so you're not going to get fat. That lack of stress and worry will contribute to the positive effect of the strategy. You can enjoy your meal, have no stress or guilt, and get better body composition results.

The Pulse Feast Induction Phase

If you've been reading bodybuilding and fitness magazines for the last 20 years, then you've been trained to eat food every three hours. But this is a psychological need, not a physical need. What I've discovered for myself is that this is a bad habit, not a necessity for muscle growth or high-performance training.

To help you break the habit, you could do a traditional Pulse Fast before beginning your Pulse Feast. The Pulse Fast, in short, is a 36-hour fast where you ingest mainly MAG-10 pulses plus some peri-workout nutrition.

The Pulse Fast will set your body up for a powerful metabolic rebound, priming it for muscle gain rather than fat storage. What's more, it'll show you that you don't have to be eating all day to be growing. And you don't have to panic about "going catabolic" if you don't have a mouthful of chicken and rice every minute of the day.

I'd recommend at least a few non-consecutive days of Pulse Fasting under your belt

before adopting the Pulse Feast strategy.

Pulse Feast Summary

Stimulates and fuels anabolic physiology for maximum lean body-mass gains while, at the same time, preventing fat gain.

Drives nutrients into muscle and shuts down fat storage.

Improves the digestive system, making it more efficient at breaking down food and utilizing the nutrients.

Removes the stress and guilt from eating.

Frees up your mornings and afternoons – no more packing food everywhere you go or panicking when you can't eat every two or three hours.

Makes eating fun and pleasurable again, and it does so at the time of the day when you have more freedom to relax, prepare good foods, and enjoy them with your family and friends.

Trains your body to become more metabolically efficient so when you do eat "normally," like while on vacation, you won't balloon up.

Pulse Feast Dosing Example Schedule

Pulse Feast Schedule

Time	Evening Workout	Mid-Morning Workout	Early Morning Workout	Day Off
7:00 AM	Pulse	Pulse	Workout	Pulse
8:00 AM				
9:00 AM				
10:00 AM				

11:00 AM		Workout	Pulse	Pulse
12:00 PM	Pulse			
1:00 PM				
2:00 PM				
3:00 PM		Pulse	Pulse	Pulse
4:00 PM				
5:00 PM	Workout			
6:00 PM				
7:00 PM	Feast	Feast	Feast	Feast

Mixing Instructions

Each pulse consists of three scoops of MAG-10 in 900 ml of cold water (~30 oz). I recommend preparing both doses the night before or first thing in the morning. The easiest thing to do is mix everything in a 2,000 ml Nalgene bottle and keep it in the refrigerator.

Daily Drink Preparation

INGREDIENTS	AMOUNT
MAG-10®	6 scoops
Cold water	1,800 ml
Pulse (dose)	900 ml
Pulses / bottle	2

It's Simple and Highly Effective

Pulse with MAG-10 during the day, and eat what you want at night.

Less stress, less body fat, more muscle.

What more could you ask for?

Source: http://www.t-nation.com/free_online_article/most_recent/the_pulse_feast

This entry was posted in Nutrition and tagged diet, Nutrition, pulse feast, Thibaudeau, warrior diet on July 15, 2011 by myoblast.

Why Diets Fail – Scott Abel, Kevin Weiss

Leave a reply

This entry was posted in Nutrition and tagged diet, fail, Kevin Weiss, Scott Abel on July 15, 2011 by myoblast.

The Power Of A Refeed And Leptin! – By: Shannon Clark

Leave a reply

The Power Of A Refeed And Leptin!
By: Shannon Clark

The power of a refeed can help improve your situation especially if you have low leptin levels and a slower metabolism. Learn more about both right here and see if you can't get your metabolism back up to speed.

Been dieting for a while and not seeing any results? Feel like your starving all the time

but meanwhile fat loss is a foreign word to you. If you are finding yourself in this situation, you are likely suffering the consequences of low leptin levels.

Leptin

Leptin, part of the cytokine family, is synthesized primarily by your adipose tissue, with a small contribution coming from the skeletal muscles and brain. The synthesis rate of leptin is mostly controlled by both numbers of body fat cells as well as size of your current bodyfat cells.

Leptin's main function in the body is to play a significant role in regulating both hunger, food intake and energy expenditure. As leptin levels fall, the greater your cravings become for all those wonderful foods that you used to eat when you weren't dieting.

So if you are experiencing more intense cravings on a daily basis, take some relief in knowing that this is actually your body responding to a physiological signal, not just your mind playing nasty games with you and making your life miserable.

Along with hunger pangs, leptin also signifies a slowing metabolism. Whenever you are on a hypocalorie diet for an extended period of time, your body will begin to slow its metabolic functions in an effort to 'make due' with the amount of fuel that it is being given. Know what this means for you? Little or no fat loss. Not a good situation.

Raising Leptin Levels:

So, your goal is to periodically kick your leptin levels back up so as to avoid the intense physical hunger and the slowed-to-a-crawl metabolism. Some people will chose to have cheat days in an effort to accomplish this goal, which is basically a meal or whole day of professed binging on everything in sight.

This may not be the best course of action however. Leptin is highly responsive to glucose metabolism so when doing a refeed, you will benefit much more if the majority of your excess calories are coming from good sources of carbohydrates that will turn into glucose. When done this way, leptin levels will show a significant rise over if you had eaten a surplus of calories coming from more protein, fat, or fructose.

Refeeding:

How much should you refeed yourself? This will depend on how long you have been dieting, how intense your diet is, and your current level of bodyfat. Those who are at a lower level of bodyfat will need to refeed more often than those who aren't. Similarly, the more extreme the diet being followed, the more intense the refeed.

Basically this has to do with how low leptin levels are. The lower the levels, the more calories above maintenance you will be needed to bring them back up.

Usually, a refeed should consist of 20-50% more calories than required for maintenance for 12 hours to two days. The higher you decide to bring your calories, the shorter period of time you will want to refeed for. If your leptin levels have almost dropped of the earth, you will want to refeed for a full week, but keep your calories slightly more moderate.

The downside to a refeed is that sometimes you will have to accept a small amount of fat gain. But, looking on the bright side, when you go back to your diet, your metabolism will be humming again and you should jump start the fat loss process. In a few individuals, they will actually become leaner during the process; however this is not the norm.

You can include some of your more desired foods in the refeed, after all, this is partly to relieve you psychologically from the restraints you feel during the dieting process, however make sure the rest is coming from good sources.

Hormonal Profile:

Another advantage to increasing leptin levels is that it will promote a more positive hormonal profile. When dieting, males experience a decreased testosterone level, which I'm sure you know makes maintaining muscle mass particularly difficult.

When you increase leptin levels you will be increasing liver glycogen, which will drive up testosterone, along with growth hormone and t3 while reducing cortisol, the catabolic hormone. This will put you in a much better position to realize your fat loss goals then the stalled position you were in earlier.

Female Leptin Levels:

Females should take particular caution when dealing with leptin levels as a halt in reproduction hormones can occur when leptin gets low enough. This is shown through the stoppage of menstruation, commonly experienced by those in the bodybuilding/fitness realm.

This is very dangerous, as females who go long enough in this state risk a whole host of problems such as decreased bone mass and density along with a risk of osteoporosis. Therefore, women should be refeeding on a regular basis to ensure this does not become an issue.

Immune Function:

Another health benefit that comes out of a refeed is increased immune function. The longer and harder we diet, the more stress we place on our body and the more we risk getting an illness. Without adequate calories, the immune system cannot perform up to par and therefore cannot fight of invading organisms as well.

If you are finding that you are constantly getting sick and aren't really showing signs of getting better, this could be a good indication it's time for more calories.

Take It Easy:

One final note should be made that on the days of a refeed you should not increase your workout volume at all or else you will be partly defeating the purpose of this process. It may be psychologically tempting, you may think you should try and burn off all these extra calories, however by doing this you will just set yourself back further and won't accomplish much.

Try and take it easy and let your muscles suck up all these extra nutrients, storing them for later use and getting your metabolism back running.

Conclusion

When you see a drastic improvement the following week – once you resume your

training and diet plan – you will be convinced that refeeds aren't a scary thing and are absolutely necessary if you hope to achieve all your goals.

Reference:

1. Leptin: The Next Big Thing I. Par Deus.

Source: bodybuilding.com

This entry was posted in Endocrine system, Nutrition and tagged carbs, diet, fat, leptin, metabolism, refeed on August 30, 2010 by myoblast.

Insulin Sensitivity: Why You Can't Blast That Fat For Good! By: Paul Eastwood

3 Replies

Insulin Sensitivity:
Why You Can't Blast That Fat For Good!
By: Paul Eastwood

Have you ever wondered why, after all the exercise and healthy eating you do, you still can't shift that last bit of fat? You hit the gym four to five times a week or more, you even try to get a run in over the weekend and on top of this you're eating all the healthiest food you can find; despite this your still not super lean like you want to be. I have the answer to your nightmare – Insulin sensitivity.

Insulin sensitivity will eventually replace the term “weight loss” and “fat loss” as the new hot topic. Insulin has a powerful ability to prevent fat breakdown by its anabolic (rebuilding) properties.

Few health and fitness professionals know or understand Insulin sensitivity (IS) which is why its no wonder that the every day man or woman is finding weight and fat so difficult to lose; it’s incredibly hard to win against an obstacle you don’t know is there!

Let me explain Insulin’s role and how it’s sensitivity changes depending upon how close you are to your weight and fat loss goals.

Insulin Sensitivity:

You might remember the hormone Insulin from articles referring to muscle gains due to its anabolic properties. Well further research into Insulin action shows that these same anabolic tendencies also affect the fat cells1. What most people don’t realize is, Insulin also targets the fat, liver, and muscle cells when it is released1. This is not the only problem, though.

A review of the research tells us that IS is actually increased when you lower your weight or body fat percentage2,3,11. It’s also important to note that IS gets stronger the more you work out. The catabolic effect of exercise increases IS during a work out and for about 30-45 minutes post workout3.

This means as a healthy exercising individual you simply can’t eat the same amount of carbohydrate food that you did before and expect to keep getting better results.

It’s important to note that Insulin is sensitive to both carbohydrate and protein consumed, but not fat4. However, of all the food sources, it’s the higher carbohydrate meals that elevate Insulin levels the most after a meal5. (See diagram below and look at lunchtime reading.)

Even though there are individual differences to IS levels depending upon your metabolic type, the evidence strongly suggests that the leaner and lighter you become the stronger your IS levels will be. This means carbohydrates (and protein to a lesser extent) are producing a bigger and more powerful anabolic effect the closer

you get to your weight loss/body fat goals.

Self-Preservation:

It seems the body has a way to protect the ever reducing mass of itself as it gets smaller and smaller by ramping up its IS. It also protects itself from too much exercise induced catabolism by making you more IS around your workouts. Why does the body do this, you might ask? This is a good question, but the body has a very good answer: protection and survival.

Imagine the scenario – a body that could just keep losing weight without any self checking system! "Heaven!" I hear you say, that is until you realize that this body would be in danger of wasting itself away. If your body was without any anabolic or rebuilding effect, critical tissues, such as connective ligaments and tendon absorption would occur, muscle wasting would be uncontrolled and shutting down of vital systems in the body would happen next.

If the body could be in a constant state of catabolism the body could break itself down into an unrecoverable state! Constant catabolism isn't just limited to energy sources either, being dangerously low on certain nutrients could mean you might leech them from an eye or a section of nerve tissue or other vital organs and body parts.

There is more and more evidence to suggest the body already performs such processes as these as we see osteoporosis and varying degree's of vision in people as well as an array of bone and joint problems, to name but a few.

The evidence is out there to suggest the body leeches nutrients from other parts of itself if it is not obtained from the diet6,7,12. Without a rebuilding response from the body, it would be unable to get bigger and stronger or recover properly from exercise and stress. This is why Insulin is so important and so is a variable rate of IS.

Insulin's Role:

Insulin's role is protective of the whole so that body parts can rebuild and maintain integrity of internal systems as well as keep energy stores at an optimum and safe

level.

Insulin and IS is a very good protection system, but like all systems it can be manipulated, you just have to know how. IS is a pre-programmed mechanism responding to the amount and sweetness of the carbohydrates (carbs) that we eat.

Everybody has a unique set IS level which is governed by many internal factors that can be measured by determining your metabolic type4. Despite some people having a lower IS level and a slower Insulin response who are better adapted to eating carbs in their diet, there is still a vast majority of people out there struggling to get to their fat and weight loss goals from having high levels of IS and strong Insulin responses.

What this really means though, is not that our bodies have become stubborn fat burners, it's that even the healthiest of food available today is still a little too high in carbs for most of us. Your IS is really highlighting that your current food is still a bit too refined and sweet for your needs.

Carbohydrate Usage:

You can appreciate this a lot more when you realize that there are eight essential amino acids and eight essential fatty acids required for life. These same nutrients are used all over the body for normal and constant metabolic processes such as repair of hair, skin, bone, muscle, red blood cells. Fat is used for energy purposes, protein only in ketosis.

Compare this to carbs, which have a very limited role around the body, in fact it's only the brain that needs carbohydrates as a fuel source, most cellular processes are happy using fat. That's one of the reasons why we are designed to carry so much of it around with us.

Carbs do provide us with fiber and minuscule but essential amounts of vitamins and minerals which are very difficult to store (unless they're fat soluble), and if they're not used at that time, they are passed through the body very quickly6.

This means the main role of carbs is to top up the liver and muscles which are not as big a store as some people would realize. A closer look at the anatomy of a person

reveals that the human liver can hold approx 80-100g of carbohydrates and the muscles can only hold 1-2% of carbs by volume, known as glycogen.

Glycogen Storage

The exact amount of how much glycogen you can store is dependent upon how much muscle mass you have and how intense your training. Individuals need more carbs if they train at higher levels of intensity as the main fuel used is glucose. This is why there is a greater storage effect after this type of training, called supercompensation7.

It's a long conversion to find the muscle volume of a person and then work out 1-2% of that volume and finally convert that volume to mass. But if you take an average of 1.5% storage capacity for muscle glycogen and then work out a range of muscle mass (in this case men) from the literature at 38.4kg for distance runners and 58.7kg for bodybuilders8, then glycogen storage capacity is only 97-150g from my calculations.

Add on the liver store of 80-100g and you are looking at total capacity of 177 – 250g of carbohydrates that the body can realistically store (Women should use the small figure as an accurate reflection of what glycogen stores they can hold.). This is not a lot of carb intake per day if you consider we are, or should be, using fat as a fuel source for most of the day for most of our bodily processes and never get to a point of complete depletion.

Fat Usage:

I'm sure nobody really likes fat, but I have to say it's an incredibly powerful fuel source. Very little fat can provide energy for extensive periods. It is reported that 3% body fat is enough energy for someone to run 2 consecutive marathons together8.

Quite clearly we are built to run on fat and use carbs sparingly, otherwise our anatomy would be completely different and be built the other way around, meaning small fat deposits in our livers and muscles with plenty of carbs built around us.

A good analogy would be – why build a car with a tiny fuel tank? It would make sense to design a car with a much bigger fuel tank and a richer fuel supply that was at least twice the energy capacity of most fuel without any extra weight:

Fat = 9 Cals per gram, Carbs and Protein = 4.2 Cals per gram

A much more intelligent design would be to store the most potent fuel in an unlimited area and then add the idea of a turbo charger that could boost performance temporarily for stressful or strenuous circumstances for a perfectly designed machine. This smaller reserve for high octane fuel would be the intake for carbs which are limited to storage in the liver and muscles as they are required in the least amount, with the main fuel of fat stored all over.

Rethinking Your Diet:

A rethink of your diet might be in order if you do eat root vegetables and fruits whilst also consuming bread, dairy and/or cereals. Be weary of so called "healthy" fruit juices as these are really sugared water. This is also true of the new trendy flavored waters that you can buy these days, these products and most sauces are easy ways to alter your carb/fat/protein intake and can be a leading culprit in contributing to your weight and fat gain.

This is why "healthy" people are often "lean" people. I see evidence of this all the time with my own clients, not just in the research literature. I'm sure you have seen people who train all the time but don't control their diet very well, they try to think in terms of calories in versus calories out only, with little or no regard for the carbohydrate intake.

I have to say I don't see their bodies change a lot, where as there are other people who eat cleaner food, they eat some raw vegetables, they cook most of their food at home and avoid heavily processed foods with added chemicals including – colorings, preservatives, artificial flavors etc and there bodies reflect this. They don't come in the gym and have to workout hard, they are workingout smart using tighter control of their food.

We all know it's much easier to take the calories in during a blow out, than it is to work them off in the gym. In fact its practically impossible to get really lean and stay there

unless you're healthy first. Fitness will only work for so long before your body will be unable to maintain the exertion and catabolism induced.

Potential Hazards From Caloric Deficit:

If you do not provide your body with adequate nutritional support, you'll start witnessing sickness and run down symptoms from poor recovery from your training sessions. If you ignore this and continue, you will see problems with joints and bones or both and you may also start to see symptoms in the muscular and hormonal systems6,7,13.

This leeching of nutrients from other body parts or other systems will only serve to weaken the whole – You! This makes it harder and harder to have the energy to work out regularly and keep the body in a healthy state where all systems are working synergistically to utilize fat metabolism.

Stress hormones from a stressed system use more glucose than fat and increase the need for stimulants and sugars that are not going to serve you well in the long run due to your higher sugar diet and your Insulin response.

Leeching of nutrients is another good reason to clean up your diet and stick to vegetable and some fruit based carbs. Scavenging necessary ingredients from other body parts is not a long term survival method; we should be always aiming to eat foods that revitalize our bodies, rather than our mouths.

If the body is without certain nutrients it has to choose between switching off certain processes temporarily or leeching what's needed from somewhere else in the body. This would mean further catabolism/ breakdown when you are already in a catabolic state from dieting and training. This puts a lot of stress on the body by asking it to provide further breakdown in another area to sustain itself, which is just more stress added to the system.

Now it's easy to see why the body might prefer to go into a complex preservation mode and preferentially start storing more energy as fat and break down the muscles as it is trying to "save" itself rather than allowing constant catabolism.

Lack Of Need For Carbohydrates:

due to heavy brain activity during our sleep cycle. It was reported that only approx 27 – 30 grams of carbs overnight was used10. This is not a great deal of carbohydrate food when you consider what people regularly consume at the first meal of breakfast, never mind the rest of the day's intake.

Unless strenuous exercise or long periods of mental focus are applied you are simply not built to consume too much carbohydrate. Most people are simply burning a hole in their liver and muscles when they exercise by going hard and then replace it with their diet afterward. This means they are maintaining they're weight and fat loss at best!

These are the people who as soon as they stop exercising just balloon in size and weight as they can no longer store the carbs internally as we all know that once the liver and muscles reach full capacity the extra carbs are converted to fat. Unfortunately most carbohydrate foods we see are extremely low in nutrition, but their low cost and short preparation time make them very convenient to everyone.

Thus, avoiding these at all costs is a must if you're serious about getting the healthy body and lean definition you see in fitness magazines. Some fruits and all vegetables are a much better source of carbohydrates as they contain 1000's of nutrients and phytochemicals compared to breads, cereals and pasta11.

A study I read recently described an apple as having 10,000 to 15,000 nutrients contained within it versus virtually none in a doughnut11.

Taking a metabolic type assessment will help you sensibly reduce your carb intake and accurately determine which nutrients you need the most from the various fruits and vegetables as well as the sources that best suit your genetics for the 8 essential amino acids and 8 essential fatty acids that are vital to healthy functioning.

Bibliography:

1. http://en.wikipedia.org/wiki/Insulin
2. Age (Dordr). 2009 Nov 11. [Epub ahead of print] Fontana L, Klein S, Holloszy JO. Effects of long-term calorie restriction and endurance exercise on glucose tolerance,

insulin action, and adipokine production.
3. Gregory D. Cartee; Katsuhiko Funai; Exercise and Insulin: Convergence or Divergence at AS160 and TBC1D1? Exerc Sport Sci Rev. 2009;37(4):188-195.
4. http://en.wikipedia.org/wiki/Insulin#Synthesis.2C_physiological_effects.2C_and_degradation
5. http://upload.wikimedia.org/wikipedia/commons/9/92/Suckale08_fig3_glucose_insulin_day.jpg
6. William L. Wolcott & Trish Fahey. 2002. The metabolic typing diet: Broadway books
7. Price, Weston A. June 2003. Nutrition and Physical Degeneration. Keats Pub; 6th edition
8. Spenst LF, Martin AD, Drinkwater DT. Muscle mass of competitive male athletes. J Sports Sci. 1993 Feb;11(1):3-8.
9. Wardlow, G.M., and Insel, P.M. 1995. The water soluble vitamins. In: Perspectives in Nutrition. 3rd edition.
10. LM Burke, B Kiens, JL Ivy. 2004. Carbohydrates and fat for training and recovery. Journal of Sports Sciences
11. Paul Taylor. 2008. Food Comparison: Apple vs doughnut. ptonthenet.com content
12. Ferrannini E. Physiological and metabolic consequences of obesity. 1995 Sep;44(9 Suppl 3):15-7. Metabolism
13. The Truth about Junk Food & Fast Food, Clinical Nutrition – YouTube Lecture Series. http://www.youtube.com/watch?v=PDw_SFGCzGE&feature=related

Source: http://www.bodybuilding.com/fun/insulin-sensitivity-blast-fat-for-good.htm

This entry was posted in Endocrine system, Nutrition and tagged anabolic, carbs, diet, Eastwood, fat, fructose, glucose, glycogen, insulin, Mauro Di Pasquale, metabolic, Paul, sensitivity on August 14, 2010 by myoblast.

Low-salt diet and stone formation

Leave a reply

Effects of a low-salt diet on idiopathic hypercalciuria in calcium-oxalate stone formers: a 3-mo randomized controlled trial Am J Clin Nutr 91: 565-570, 2010.

Antonio Nouvenne, Tiziana Meschi, Beatrice Prati, Angela Guerra, Franca Allegri, Giuseppe Vezzoli, Laura Soldati, Giovanni Gambaro, Umberto Maggiore and Loris Borghi.

"Background: A direct relation exists between sodium and calcium excretion, but randomized studies evaluating the sustained effect of a low-salt diet on idiopathic hypercalciuria, one of the main risk factors for calcium-oxalate stone formation, are still lacking. Objective: Our goal was to evaluate the effect of a low-salt diet on urinary calcium excretion in patients affected by idiopathic calcium nephrolithiasis. Design: Patients affected by idiopathic calcium stone disease and hypercalciuria (>300 mg Ca/d in men and >250 mg Ca/d in women) were randomly assigned to receive either water therapy alone (control diet) or water therapy and a low-salt diet (low-sodium diet) for 3 mo. Twenty-four-hour urine samples were obtained twice from all patients: one sample at baseline on a free diet and one sample after 3 mo of treatment. Results: A total of 210 patients were randomly assigned to receive a control diet (n = 102) or a low-sodium diet (n = 108); 13 patients (2 on the control diet, 11 on the low-sodium diet) withdrew from the trial. At the follow-up visit, patients on the low-sodium diet had lower urinary sodium (mean ± SD: 68 ± 43 mmol/d at 3 mo compared with 228 ± 57 mmol/d at baseline; P < 0.001). Concomitant with this change, they showed lower urinary calcium (271 ± 86 mg/d at 3 mo compared with 361 ± 129 mg/d on the control diet, P < 0.001) and lower oxalate excretion (28 ± 8 mg/d at 3 mo compared with 32 ± 10 mg/d on the control diet, P = 0.001). Urinary calcium was within the normal range in 61.9% of the patients on the low-salt diet and in 34.0% of those on the control diet (difference: +27.9%; 95% CI: +14.4%, +41.3%; P < 0.001). Conclusion:**A low-salt diet can reduce calcium excretion in hypercalciuric stone formers.**

Source: michaelgundill.com

This entry was posted in Nutrition and tagged calcium, diet, hypercalciuric, low, salt, stone on

February 22, 2010 by myoblast.

Protein Myths

Leave a reply

"**Exposing the Myths About Protein**
from the Hypertrophy-Specific Nutrition Series by Bryan Haycock, M. Sc.

Myth #1: High protein intakes will not affect muscle protein synthesis.
Fact: Greater availability of amino acids means more protein synthesis within muscle cells.1,2,3,4,5,6,7,8

I will concede that experiments have been performed that indicate that a lab animal can survive on a very limited protein intake assuming that fat and carbohydrate intake is adequate. Simply put, the body begins to reduce that amount of amino acid oxidation in order to spare nitrogen containing compounds. Yet can we really apply this kind of example to adult humans trying to build muscle? I think not.

When the body begins getting stingy with amino acids because of low protein intake, non essential functions, such as skeletal muscle protein synthesis, drop to minimal levels. Other functions within the body such as the immune system, which uses glutamine primarily of muscle origin for fuel, also begins to suffer.9 This cripples the body's ability to cope with the stress and tissue damage induced by intense training. Researchers even believe that currently recommended protein intakes may actually predispose people to illness because of the limited reserve of amino acids. Here's what they have to say about current recommendations for protein intake: "…It seems reasonable to conclude that the lowered rate of whole-body and perhaps muscle protein turnover that appears to occur in healthy adult subjects when intakes of indispensable amino acids approximate the current international figures, would probably diminish the individuals capacity to withstand successfully a major stressful stimulus. Again, for those reasons, we view the significant reduction in the rate of body protein turnover in healthy adults, which permits them to more closely approach

or even achieve amino acid balance at currently accepted amino acid requirement intakes, as an accommodation. Thus we further conclude that these international requirement intakes are probably not sufficient to maintain a desirable or adapted state."(Young VR., Marchini JS. Mechanisms and nutritional significance of metabolic responses to altered intakes of protein and amino acids, with reference to nutritional adaptation in humans. Am J Clin Nutr 1990;51:270-89) Emphasis added.

Research clearly shows that by increasing blood levels of amino acids you increase protein synthesis in skeletal muscle. It has also been shown that you can maintain a positive nitrogen balance for extended periods of time and that nitrogen accretion will tend to continue as long as protein intake is high.10 Clearly if you want to maximize your gains in the gym you've gotta get more protein than the average Joe.

Myth #2: You can only assimilate 30 grams of protein at one sitting.
Fact: The body has the ability to digest and assimilate much more than 30 grams of protein from a single meal.

Speaking of high intakes of protein, people have been perpetuating the myth that you can only assimilate ~30 grams of protein at a time, making protein meals any greater than a 6 oz. chicken breast a waste. This is anything but true. For example, the digestibility of meat (i.e. beef, poultry, pork and fish) is about 97% efficient. If you eat 25 grams of beef, you will absorb into the blood stream 97% of the protein in that piece of meat. If, on the other hand, you eat a 10 oz steak containing about 60 grams of protein, you will again digest and absorb 97% of the protein. If you could only assimilate 30 grams of protein at a time, why would researchers be using in excess of 40 grams of protein to stimulate muscle growth?1

Critics of high protein intakes may try to point out that increased protein intake only leads to increased protein oxidation. This is true, nevertheless, some researchers speculate that this increase in protein oxidation following high protein intakes may initiate something they call the "anabolic drive".13 The anabolic drive is characterized by hyperaminoacidemia, an increase in both protein synthesis and breakdown with an overall positive nitrogen balance. In animals, there is a correspondent increase in anabolic hormones such as IGF-1 and GH. Though this response is difficult to identify in humans, an increase in lean tissue accretion does occur with exaggerated protein intakes.14,15

The take home message is that, if you are going to maximize muscle growth you have to minimize muscle loss, and maximize protein synthesis. Research clearly shows this is accomplished with heavy training, adequate calories, and very importantly high protein consumption. This means that meals containing more than 30 grams of protein will be the norm. Not to worry, all that protein will certainly be used effectively by the body.

Myth #3: Protein must be rapidly digested to build muscle.
Fact: Both rapidly and slowly digested proteins offer significant benefits to athletes.

Recent research has brought up the notion of "fast" and "slow" proteins.11 They are designated as such according to the rate at which they raise blood levels of amino acids after they are consumed. Whey protein for example is considered a fast protein and causes a rapid increase in amino acid levels. Casein on the other hand is considered a slow protein.

Both rapid and slow proteins offer benefits to someone trying to build muscle. Research has shown that proteins that enter the blood stream rapidly significantly increase protein synthesis. Proteins that enter the blood stream slowly have a pronounced effect on protein breakdown, significantly inhibiting it even at low quantities.

By using a combination of proteins that exhibit both fast and slow properties one should be able not only to jump-start protein uptake into muscle cells during a grueling workout, but also ensure that protein synthesis is jump started and that protein break down is kept at a minimum during the hours following their workout. Take the fast protein before training, and a slow protein after for maximum anabolic effect.

In summary, it is a mistake to say that a "fast" protein is better than a "slow" protein. Both types of protein should be used in strategic fashion to alter protein metabolism in favor of net protein deposition (i.e. muscle growth).

Myth #4: A protein must have added peptides of specific molecular weights to effectively build muscle.

Fact: The body¹s digestive tract makes its own variable molecular weight peptides from the whole proteins you eat.

As soon as protein hits the stomach it is attacked by powerful stomach acids. This acid, along with an enzyme called pepsin, serves to change or denature the proteins structure preparing it for further digestion in the small intestine. In the small intestine several other enzymes work to break down the protein into various molecular weight peptides and free amino acids. Each enzyme acts on a specific part of the amino acid chain cleaving it in the appropriate place. Whether you¹ve just eaten a steak, scrambled eggs or a glass of whey protein, the end result of digestion is the same, a full spectrum of molecular weight peptides and a moderate amount of free amino acids perfectly suited for absorption into the body.

The small intestine has special transporters which actively pull peptides across the brush border membrane and into intestinal cells. All the various peptide transporters have yet to be clearly identified. As a result of these transporters, peptides can be actively absorbed faster than free amino acids. Within intestinal cells, peptides are further broken down into individual amino acids by enzymes called protease (prote = protein, ase = to split or cleave). It has been shown that a very small percent of digested peptides can enter the blood stream by squeezing between intestinal cells. Even though some peptides make it into the blood stream intact, they are quickly broken down by proteases on the surface of liver and muscle cells. If by some small chance peptides actually make it all the way into these cells, they are rapidly broken down by proteases within the cell.

So you see, all this talk about adding various molecular weight peptides simply means that they predigested an already easily digestible protein. This simply adds to the expense of manufacturing the protein. The added cost, of course, is passed on to the consumer.

Myth #5: Arguments over whose protein scores highest on various methods of protein assessment will make or break your success in the gym.
Fact: As protein intake increases the influence of protein quality decreases. In other words, high quantity can significantly make up for low quality.

The quantity of protein in the diet may in fact add importance to the scoring

assessment of a given protein. In fact, if you only eat 35- 45 grams a protein a day you better make sure you chose the highest quality protein you can find. On the other hand, if you eat quantities of protein common among bodybuilders, say 1.6 – 1.8 grams per kilogram, the large amount of amino acids overcome slight differences in scoring. Once you achieve a certain levels of quality in a protein supplement, increasing it further will not significantly change it¹s effectiveness when consumed in quantities sufficient to pack on muscle.

Here is a quick overview of the various methods used to determine protein quality. Keep in mind that tests used to determine protein quality use the lower threshold of protein requirements. This creates a metabolic environment far different from that seen in a well fed bodybuilder or athlete.

Chemical Scoring

The most obvious way to determine the quality of a given protein is to break it down into it's individual amino acids. This amino acid profile is then compared to a standard profile. Egg protein is the standard that is used in a Chemical Scoring scale for protein quality and has a rating of 100. Take for example a protein that has a limited amount of a specific amino acid. This amount is then com-pared to the amount found in egg protein. If the amount in the test protein is 75% of that found in egg then the test protein gets a rating of 75. From this you would assume that if you could feed a person an amount of this protein that is exactly his requirement, you would see nitrogen excreted in the urine in the amount of 25 percent of the nitrogen fed.

Although it is relatively easy and inexpensive to do a chemical scoring of any protein, it does not always accu-rately predict how well the body can utilize it. So the ad-vantages of chemical scoring in determining the quality of protein are that it is easy and inexpensive. It's drawback is that it cannot tell you anything about the digestibility of the protein. Chemical scoring also involves a procedure that may destroy certain amino acids and this may lead to inaccurate values. It is also insensitive to substances in a given protein that can adversely effect digestibility. To discover this variable the test would have to utilize living animals.

Biological value (BV)

Biological value (BV) scoring does utilize in vivo testing. To determine the actual amount of a given protein that will be used by the body it is necessary to measure not

only urinary, but also fecal losses of nitrogen when that protein is fed to human beings. This method is used inter-nationally.

When measuring the BV of a protein source, two nitrogen studies are done. The first study determines how much nitrogen is lost from the body even when no protein is fed. This amount of nitrogen loss is assumed to be inevitable and that the body will naturally lose it regardless of the amount of nitrogen in the diet. In the second study an amount of the protein is fed that is slightly below what is required. As before, the nitrogen losses are then measured, but this time they are compared to the amount of nitrogen consumed. To determine the actual BV of the protein the re-sults are then derived using this formula:
NPU = (N retained / N intake) x 100

This method often involves animal test subjects and is more frequently used. It's draw backs are that if a low NPU is obtained, it is impossible to know if it is because of a poor amino acid profile or low digestibility.

Protein efficiency Ratio (PER)
Protein Efficiency Ratio (PER) is the best known procedure for evaluating protein quality and is used in the United States as the basis for regulations regarding food labeling and for the protein RDA. This method involves rats who are fed a measured amount of protein and weighed periodically as they grow. The PER is expressed as: **PER = weight gain (g) / protein intake (g)**

The benefits of this method are it's expense and simplicity. It's drawbacks are that it is time consuming; the amino acid needs of rats are not those of humans; and the amino acid needs of growing animals are not those of adult animals (growing animals and humans need more lysine, for example).

The PER is used to qualify statements about daily pro-tein requirement in the United States. You are assumed to eat protein with a PER that is equal to or better than that of the milk protein casein; if the protein's PER is lower, you must eat more of it to meet the RDA. Food labels have to take protein quality into consideration, using the PER of casein as a reference point. If a food has a protein quality equal or better than that of casein, the RDA is 45 grams. If the protein quality is less than casein you need 65 grams for the RDA.

You may be wondering if it makes any difference if you eat your protein from a supplement or from food. Remember that by the time it gets absorbed into the blood stream, all your body knows is how much of each amino acid was present in the food you ate. If you have the money, it is certainly convenient to just drink down a high quality protein supplement. Beyond that, it makes no difference in what form you get your protein from as long as its a complete protein and sufficiently digestible.

Protein digestibility-corrected amino acid score (PDCAA)

As outlined above, protein quality can be measured by the quantity of indispensable amino acids they contain. If a protein contains all the amino acids essential for life, it is called a complete protein and is given a high score. Because some proteins are not as efficiently digested there arose a need to not only test for the amino acid composition of proteins but also for digestibility. This type of testing is called protein digestibility-corrected amino acid score (PDCAA). It is now a federally accepted standard for determining protein quality for preschool aged children.

Some foods however, contain anti-nutritional factors. These factors sometimes occur naturally like in some beans, or are a result of heating and/or cooking, and inhibit the ability of the body to digest and thus absorb certain amino acids. Research has shown the PDCAA method of scoring protein often over estimates the quality of foods containing anti-nutritional factors.12

The take home message from all this is that arguments about who¹s protein scored highest on this test or that test are really meaningless to the average well fed athlete.

Conclusion

Certainly exposing these myths about protein leaves advertisers with less fodder to bombard you with. Nevertheless, getting rid of these misconceptions will only benefit you the consumer. Knowing the truth about protein will not only save you money but may also open up new opportunities for muscular gains. Knowledge is the key to effective supplementation with protein or any other supplement. Don¹t let your purchasing decisions be controlled by false claims and misleading pseudo science. A wise man once said, ³…know the truth, and the truth shall set you free.² In this case, the truth will give you the freedom to make educated decisions about protein supplementation and the freedom to discern between marketing hype and honest manufacturers offering quality products.

References:

1. Tipton K., Ferrando A., Phillips S., Doyle, JR D., Wolfe R. Post exercise net protein synthesis in human muscle from orally administered amino acids. Am. J. Physiol. 276: E628-E634, 1999

2. Bennet, W. M., A. A. Connacher, C. M. Scrimgeour, and M. J. Rennie. The effect of amino-acid infusion on leg protein turnover assessed by L-[15N]phenylalanine and L-[1-13C]leucine exchange. Eur. J. Clin. Invest. 20: 37-46, 1989

3. Castellino, P., L. Luzi, D. C. Simonson, M. Haymond, and R. A. DeFronzo. Effect of insulin and plasma amino acid concentrations on leucine metabolism in man. J. Clin. Invest. 80: 1784-1793, 1987

4. Fryburg, D. A., L. A. Jahn, S. A. Hill, D. M. Oliveras, and E. J. Barrett. Insulin and insulin-like growth factor-I enhance human skeletal muscle protein anabolism during hyperaminoacidemia by different mechanisms. J. Clin. Invest. 96: 1722-1729, 1995

5. McNulty, P. H., L. H. Young, and E. J. Barrett. Response of rat heart and skeletal muscle protein in vivo to insulin and amino acid infusion. Am. J. Physiol. 264 (Endocrinol. Metab. 27): E958-E965, 1993

6. Mosoni, L., M. Houlier, P. P. Mirand, G. Bayle, and J. Grizard. Effect of amino acids alone or with insulin on muscle and liver protein synthesis in adult and old rats. Am. J. Physiol. 264 (Endocrinol. Metab. 27): E614-E620, 1993

7. Newman, E., M. J. Heslin, R. F. Wolf, P. T. W. Pisters, and M. F. Brennan. The effect of systemic hyperinsulinemia with concomitant infusion of amino acids on skeletal muscle protein turnover in the human forearm. Metabolism 43: 70-78, 1994

8. Watt, P. W., M. E. Corbett, and M. J. Rennie. Stimulation of protein synthesis in pig skeletal muscle by infusion of amino acids during constant insulin availability. Am. J. Physiol. 263 (Endocrinol. Metab. 26): E453-E460, 1992

9. Newsholme, A.E., Parry-Billings M. Properties of glutamine release from muscle and its importance for the immune system. JPEN. 14 (4) supplement S63-67

10. Oddoye EA., Margen S. Nitrogen balance studies in humans: long-term effect of high nitrogen intake on nitrogen accretion. J Nutr 109 (3): 363-77

11. Boirie Y, Dangin M, Gachon P, Vasson M-P, Maubois J-L, and Beaufrère B. Slow and fast dietary proteins differently modulate postprandial protein accretion (amino acid turnover / postprandial protein anabolism / milk protein / stable isotopes) Proc. Natl. Acad. Sci. USA Vol. 94, pp. 14930-14935, December 1997

12. Sarwar G. The Protein Digestibility-Corrected Amino Acid Score method overestimates quality of proteins containing antinutritional factors and of poorly digestible proteins supplemented with limiting amino acids in rats. J. Nutr. 127: 758-764, 1997

13. Millward, D.J. Metabolic demands for amino acids and the human dietary requirement: Millward and Rivers (1988) revisited. J. Nutr. 128: 2563S-2576S, 1998

14. Fern EB, Bielinski RN, Schutz Y. Effects of exaggerated amino acid and protein supply in man. Experientia 1991 Feb 15;47(2):168-72

15. Dragan, GI., Vasiliu A., Georgescu E. Effect of increased supply of protein on elite weight-lifters. In:Milk Protein T.E. Galesloot and B.J. Tinbergen (Eds.). Wageningen The Netherlands: Pudoc, 1985, pp. 99-103

Source: hypertrophy-specific.com

This entry was posted in Nutrition and tagged bodybuilding, diet, myth, myths, Nutrition, protein on February 4, 2010 by myoblast.

Training on the Cyclical Ketogenic Diet: Effects of Cyclical Ketogenic Diets on Exercise Performance

1 Reply

"Training on the Cyclical Ketogenic Diet: Effects of Cyclical Ketogenic Diets on Exercise Performance

by Lyle McDonald, CSCS
Author of The Ketogenic Diet

Introduction

As the Cyclical Ketogenic Diet (CKD) becomes more popular among natural bodybuilders, a great many questions have arisen regarding any and all manners of topics. One of the primary has to do with exercise on a CKD. First and foremost, individuals want to know what types of exercise can and can not be sustained on a CKD. Secondly questions arise as to what is the optimal training structure to maximize either fat loss or muscle gains on a CKD.

To answer these two questions, a lot of topics have to be covered ranging from exercise biochemistry to the hormonal response to different types of exercise to the implications of a diet which does not contain

carbohydrates during the week. The goal of this article will be to discuss the CKD primarily for fat loss. For reasons beyond the scope of this article, the CKD is most likely not the optimal diet for mass gains.

What is the CKD?

The Cyclical Ketogenic Diet, CKD, is a general term to describe diets such as The Anabolic Diet (by Dr. Mauro DiPasquale) and BODYOPUS (by Dan Duchaine). While there are many variants, the most common structure for a CKD is 5-6 days of strict low carbohydrate eating (less than 30 grams per day) with a 1-2 day carb-loading period (where carbohydrate intakes is roughly 60-70% of the total calories consumed). The idea behind the CKD (which will be discussed in a later article) is to force the body to burn fat during the lowcarb days, while sustaining exercise intensity by refilling muscle glycogen stores during the weekend carb-load.

Some Basic Exercise Metabolism

To better understand the effects of a CKD on exercise performance, we have to look briefly at how different forms of exercise affect fuel utilization in the body. There are four potential fuels which the body can use during exercise: glycogen, fat, protein and ketones. Except under certain conditions (which will be mentioned when necessary), protein and ketones do not provide a significant amount of energy during exercise. Therefore this discussion will focus primarily on glycogen and fat use during exercise. To simplify this article, exercise will be delineated as either aerobic or anaerobic (which will include interval training and weight training).

Aerobic Exercise

Aerobic exercise is generally defined as any activity which can be sustained continuously for periods of at least three minutes or longer. Examples would be walking, jogging, cycling, swimming, aerobics classes, etc.

The primary fuels during aerobic exercise are carbohydrate (muscle glycogen and blood glucose) and fat (from adipose tissue as well as intramuscular triglyceride) (1,2). At low intensities, fat is the primary fuel source during exercise.

As exercise intensity increases, less fat and more glycogen is used as fuel. At some intensity, sometimes called the “Crossover point”, glycogen becomes the primary fuel during exercise. (3) This point corresponds roughly with something called the lactate threshold. The increase in glycogen utilization at higher intensities is related to a number of factors including greater adrenaline release (3,4) decreased availability of free fatty acids (5), and greater recruitment of Type II muscle fibers (3,6,8). The ketogenic diet shifts the crossover (i.e. lactate threshold) point to higher training intensities (3) as does regular endurance training (4).

Under normal (non-ketotic) conditions, ketones may provide 1% of the total energy yield during exercise (8). During the initial stage of a ketogenic diet, ketones may provide up to 20% of the total energy yield during exercise (9). After adaptation, even under conditions of heavy ketosis, ketones rarely provide more than 7-8% of the total energy yield which is a relatively insignificant amount (10,11,12).

Generally, protein use during aerobic exercise is minimal, accounting for perhaps 5% of the total energy yield. With glycogen depletion, this may increase to 10% of the

total energy yield, amounting to the oxidation of about 10-13 grams of protein per hour of continuous exercise (14). This is at least part of the reason that excessive aerobic exercise, especially under low glycogen conditions, can cause muscle loss while dieting.

Studies on ketogenic diets (2 to 6 weeks) find a maintenance (15, 16) or increase (17,18) in aerobic endurance during low intensity exercise (75% of maximum heart rate and below). At higher exercise intensities (around 85% of maximum heart rate which is likely above the lactate threshold), as glycogen use increases, performance decreases on a ketogenic diet (19).

Anaerobic Exercise

While anaerobic exercise refers generally to any activity which lasts less than three minutes or so, most individuals are interested in the effects of a CKD on weight training. However athletes involved in sports such as sprinting, or any activity lasting less than three minutes, will have the same considerations discussed in this section.

Weight training refers to any activity involving the use of heavy resistance which lasts less than three minutes (i.e. it is anaerobic). Weight training is slightly more complicated to discuss in terms of fuel use than aerobic exercise. For very short activities (less than 20 seconds), muscles use ATP (adenosine triphosphate) which is stored directly in the muscle. Activities lasting greater than 30 seconds will rely on the breakdown of glycogen (carbohydrate stored in the muscle). During anaerobic exercise, fat can not be used directly as a fuel (1).

Relatively few studies have examined the effects of carbohydrate depletion on resistance training. In fact no studies have studies the effects of a ketogenic diet on weight training performance. However since weight training can only use glycogen for fuel, we can logically conclude that carbohydrates are critical for weight training performance. In fact, this is the primary reason to insert the carb-loading phase of the CKD on the weekend: to sustain high intensity exercise performance while still deriving the benefits of ketosis. Other issues pertaining to glycogen levels and depletion appear below.

The Hormonal Response to Exercise

The hormonal response to exercise is important from two standpoints. First and foremost, manipulation of the type of exercise done on a CKD can affect how efficiently fat loss or muscle gain occur. Second, to most rapidly enter ketosis (which requires a depletion of liver glycogen), certain types of exercise will be more effective than others. The primary hormonal response to both aerobic and anaerobic exercise are discussed below.

There are several hormones which are affected by aerobic exercise depending on exercise intensity and duration. They primarily impact on fuel utilization.

Catecholamines:

Adrenaline and noradrenaline are both involved in energy production. The catecholamines raise heart rate and blood pressure, stimulate fat breakdown (lipolysis), increase liver and muscle glycogen breakdown, and inhibit insulin release from the pancreas (20). Both adrenaline and noradrenaline increase during aerobic exercise although in differing amounts depending on intensity of exercise. Noradrenaline levels rise at relatively low exercise intensities stimulating FFA utilization in the muscles but relatively low levels of liver and muscle glycogen breakdown.

Insulin:

During aerobic exercise, insulin levels drop quickly due to an inhibitory effect on it's release from the pancreas by adrenaline (20, 21). The drop in insulin allows free fatty acid release to occur from the fat cells during exercise. Lowering insulin is also important for establishing ketosis. Despite a decrease in insulin levels during exercise, there is an increased uptake of blood glucose by the muscle. An increase in glucose uptake with a decrease in insulin indicates improved insulin sensitivity at the muscle cells during exercise.

Glucagon:

As the mirror hormone of insulin, glucagon levels increase during aerobic exercise (20). Thus the overall response to aerobic exercise is pro-ketogenic in that it causes the necessary shift in the Insulin/Glucagon ratio to occur.

Thus the overall response to aerobic exercise is to decrease the use of glucose and increase the use of free fatty acids for fuel. This is beneficial from the standpoint of establishing ketosis, as will be discussed in greater detail below.

Weight training affects levels of many hormones in the human body depending on factors such as order of exercise, loads, number of sets, number of repetitions, etc. The primary hormones we are interested in which are affected by weight training are the androgens (primarily testosterone, growth hormone and IGF-1. With the exception of testosterone, the hormonal response to weight training primarily affects fuel availability and utilization (22).

Growth hormone (GH):

GH is a peptide hormone released from the hypothalamus in response to many different stimuli including sleep and breath holding (23). Although growth hormone is thought to be muscle building, at the levels seen in humans, it's main role is to mobilize fat and decrease carbohydrate and protein utilization (24).

The main role of GH on muscle growth is most likely indirect by increasing release of Insulin-like Growth Factor 1 (IGF-1) from the liver (24). The primary stimulus for GH release with weight training appears to be related to lactic acid levels and the highest GH response to training is seen with moderate weights (~75% of maximum), multiple long sets (3-4 sets of 10-12 repetitions, about 40-60 seconds per set) with short rest periods (60-90 seconds). Studies using this type of protocol (generally 3X10 Rep maximum with a 1 rest period) have repeatedly shown increases in GH levels in men (25, 26) and women (27,28) and may be useful for fat loss due to the lipolytic (fat mobilizing) actions of GH. Multiple sets of the same exercise are required for GH release (28).

Testosterone

Testosterone is frequently described as the 'male' hormone although women possess testosterone as well (at about 1/10th the level of men or less) (4).

Testosterone's main role in muscle growth is by directly stimulating protein synthesis (23,29). Increases in testosterone occur in response to the use of basic exercises

(squats, deadlifts, bench presses), heavy weights (85% of maximum and higher), multiple short sets (3 sets of 5 repetitions, about 20-30 seconds per set) and long rest periods (3-5 minutes). Studies have found a regimen of 3X5 rep max. with 3 rest to increases testosterone significantly in men (25,26,30) but not in women (27). It is unknown whether the transient increase in testosterone following training has any impact on muscle growth.

Insulin like growth factor 1 (IGF-1)

IGF-1 is a hormone released from the liver, most likely in response to increases in GH levels (31). However the small increases in GH seen with training do not appear to affect IGF-1 levels (32). More likely, IGF-1 is released from damaged muscle cells (due to eccentric muscle actions) and acts locally only to stimulate growth (33,34).

Exercise and Ketosis

In that ketosis indicates that the body has shifted to using fat as it's primary fuel, and since only five to six days exist per week to be in ketosis, a question which arises is how to most quickly establish ketosis.

Aerobic and anaerobic exercise have somewhat differential effects on ketosis and are discussed here.

It has been known for almost a century that ketones appear in higher concentrations in the blood following aerobic exercise (35). The overall effect of aerobic exercise below the lactate threshold is to induce or enhance ketosis. Liver glycogen decreases, insulin decreases, glucagon increases and there is an increase in free fatty acid levels in the bloodstream.

Aerobic exercise can quickly induce ketosis following an overnight fast. One hour at 65% of maximum heart rate causes a large increase in ketone body levels but the ketones do not contribute to energy production to any significant degree (36). 2 hours of exercise at 65% of maximum heart rate will raise ketone levels to 3mM after 3 hours. High levels of ketonemia (similar to those seen in prolonged fasting) can be achieved five hours post-exercise (36).

During high intensity exercise, the same overall hormonal picture described above occurs, just to a greater degree. Adrenaline and noradrenaline both increase during high intensity activities (both interval and weight training). The large increase in adrenaline causes the liver to over-release liver glycogen raising blood glucose (4,20). While this may impair ketogenesis in the short term, it is ultimately helpful in establishing ketosis initially. Insulin goes down during exercise but may increase after training due to increases in blood glucose. Glucagon goes up also helping to establish ketosis. Probably the biggest difference between high and low intensity exercise is that free fatty acid release is inhibited during high intensity activity, due to the increases in lactic acid (5).

Glycogen Levels and Depletion

To understand how to optimize training for a CKD, a discussion of glycogen levels under a variety of conditions are necessary. As well, some estimations must be made in terms of the amount of training which can and should be done as well as how much carbohydrate should be consumed at a given time.

Muscle glycogen is measured in millimoles per kilogram of muscle (mmol/kg). An individual following a normal mixed diet will maintain glycogen levels around 80-100 mmol/kg. Athletes following a mixed diet have higher levels, around 110-130 mmol/kg (37). On a standard ketogenic diet, with aerobic exercise only, muscle glycogen levels maintain around 70 mmol/kg with about 50 mmol/kg of that in the Type II muscle fibers (38,39).

Fat oxidation increases, both at rest and during aerobic exercise around 70 mmol/kg. Below 40 mmol/kg, exercise performance is generally impaired. Total exhaustion during exercise occurs at 15-25 mmol/kg. Additionally when glycogen levels fall too low (about 40 mmol/kg), protein can be used as a fuel source during exercise to a greater degree (14).

Following total depletion, if an individual consumes enough carbohydrates over a sufficient amount of time (generally 24-48 hours), muscle glycogen can reach 175 mmol/kg or higher (38). The level of supercompensation which can be achieved depends on the amount of glycogen depleted (40,41). That is, the lower that muscle glycogen levels are taken, the greater compensation will be seen. If glycogen levels

are depleted too far (below 25 mmol/kg), glycogen supercompensation is impaired as the enzymes involved in glycogen synthesis are impaired (42). A summary of glycogen levels under different conditions appears in figure 1.

Figure 1: Summary of glycogen levels under different conditions

Condition Diet Glycogen

level (mmol/kg)

48 hour carb-up High carb 175

36 hour carb-up ~150

24 hour carb-up ~120-130

Athlete Mixed diet 110-130

Normal individual Mixed diet 80-100

Normal individual, Ketogenic diet 70

Aerobic exercise only

Fat burning increases 70

Exercise performance decreased 40

Exhaustion 15-25

Glycogen Depletion During Weight Training

Having looked at glycogen levels under various conditions, we can now examine the rates of glycogen depletion during weight training and use those values to make estimations of how much training can and should be done for the CKD.

Very few studies have examined glycogen depletion rates during weight training. One early study found a very low rate of glycogen depletion of about 2 mmol/kg/set during 20 sets of leg exercise (43). In contrast, two later studies both found glycogen depletion levels of approximately 7-7.5 mmol/kg/set (44,45). As the difference between these studies cannot be adequately explained, we will assume a glycogen depletion rate of 7 mmol/kg/set.

Examining the data of these two studies further, we can estimate glycogen utilization relative to how long each set lasts. At 70% of maximum weight, both researchers found a glycogen depletion rate of roughly 1.3 mmol/kg/repetition or 0.35 mmol/kg/second of work performed (44,45).

Rates of glycogen depletion during weight training at an intensity at 70% max

Depletion per set 7.5 mmol/kg/set

Depletion per repetition 1.3 mmol/kg/rep

Depletion per second of work 0.35 mmol/kg/second

Designing the Workout

With all of the above information presented, we can go through the steps to develop a CKD workout for fat loss. The goals of the workout are:

1. Deplete muscle glycogen in all bodyparts to approximately 70 mmol/kg by Tuesday as this will maximize fat utilization by the muscles but will not increase protein utilization.

2. Maximize Growth Hormone output (which is a lipolytic hormone) on Mon/Tue with a combination of long sets, multiple sets, and short rest periods.

3. Maintain muscle mass with tension work outs on Monday and Tuesday.

4. Deplete muscle glycogen to between 25 and 40 mmol/kg on Friday to stimulate optimal glycogen supercompensation.

5. Stimulate mass gains during the weekend of overfeeding with a full body tension workout (a high rep depletion workout is also an option)

6. Use cardio to quickly establish ketosis and enhance fat loss

The primary goal that still needs to be discussed is how much training is necessary to achieve goals #1 and #4.

We will assume a lifter has completed a 36 hour carb-up, ending Saturday evening, with a muscle glycogen level of 150 mmol/kg in all major muscle groups. To deplete to 70 mmol/kg in the first two workouts, this person needs to deplete:

150 mmol/kg – 70 mmol/kg = 80 mmol/kg of total glycogen.

Using the rate of glycogen depletion listed above we see that

80 mmol/kg divided by 1.3 mmol/kg/rep = 61 total reps.

or

80 mmol/kg divided by 0.35 mmol/kg/sec = 228 seconds of total set time.

Assuming an average set time of 45 seconds (10-12 reps at 4 seconds per repetition) this level of glycogen depletion would require approximately 5-6 sets per bodypart.

For the Friday workout, our lifter now wants to deplete muscle glycogen to between 25-40 mmol/kg before starting the carb-up. This would require a further glycogen depletion of

70 mmol/kg – 25 mmol/kg = 45 mmol/kg

70 mmol/kg – 40 mmol/kg = 30 mmol/kg

30-45 mmol/kg.

This would be

30-45 mmol/kg divided by 1.3 mmol/kg/rep = 20-30 reps

30-45 mmol/kg divided by 0.35 mmol/kg/second = 85-128 seconds.

The CKD Workout Routine

With the above estimations for sets and reps having been made, we can develop a sample workout routine. The format for the CKD week is:

Day Workout type Diet

Sunday: 30'+ of low intensity cardio in Ketogenic

morning to establish ketosis

Monday: Tension weight training workout Ketogenic

Tuesday: Tension weight training workout Ketogenic

Wed/Thu: cardio optional for fat loss Ketogenic

Fri: Full body workout Ketogenic prior to workout

Begin carb-load after

workout

Saturday: No workout Carb load

Sample workouts appear below.

Mon: Legs and abs

Exercise Sets Reps Rest

Squats 4 8-10 90

Leg curl 4 8-10 90

Leg extension OR 2 10-12 60

feet high leg press

Seated leg curl 2 10-12 60

Standing calf raise 4 8-10 90

Seated calf raise 2 10-12 60

Reverse crunch 2 15-20 60

Crunch 2 15-20 60

Total sets 24

Tue: Upper body

Exercise Sets Reps Rest

Incline bench press 4 8-10 60

Cable row 4 8-10 60

Flat bench press 2 10-12 60

Pulldown to front 2 10-12 60

Shoulder press 3 10-12 60

Barbell curl 2 12-15 45

Triceps pushdown 2 12-15 45

Total sets 20

There are two options for the Friday workout. One is to perform a tension workout to stimulate growth during the carb-load. The second is to do a high-rep depletion workout, which should be done in circuit fashion solely to deplete muscle glycogen.

Sample Friday tension workout:

Exercise Sets Reps Rest

Leg press 3 8-10 90□

Leg curl 1 10-12 60□

Calf raise 2 10-12 60□

Bench press 3 8-10 90□

Wide grip row 3 8-10 90□

Shoulder press 1-2 10-12 60□

Undergrip pulldown 1-2 10-12 60□

Total sets 14-16

Sample circuits for Friday depletion workout:

leg press, dumbbell bench press, cable row, leg curl, shoulder press, overgrip pulldown, calf raise, triceps pushdown, barbell curl, reverse crunch.

leg extension, incline DB bench press, narrow grip row, seated leg curl, lateral raise, undergrip pulldown, seated calf raise, close grip bench press, alternate DB curl, twisting crunch.

squat, flat flye, cable row, standing leg curl, upright row, overgrip pulldown, donkey

calf raise, overhead triceps extension, hammer curl, crunch.

Since the intensity is lower (roughly 50-60% of maximum) glycogen depletion per set will also be lower. Additionally, 20 reps will only require about 20-40 seconds to complete. Assuming glycogen had started at 70 mmol/kg, it will likely take 4-5 circuits to fully deplete glycogen.

Perform 10-20 quick reps per set (1 second up/1 second down). Take 1□ between exercises, and 5□ between circuits. The sets should not be taken to failure; the goal is simply to deplete muscle glycogen. Many trainees complain of nausea during this workout, which is caused by not resting long enough between sets.

References

1. Eric Hultman “Fuel selection, muscle fibre” Proceedings of the Nutrition Society (1995) 54: 107-121.

2. Edward F. Coyle “Substrate Utilization during exercise in active people” Am J Clin Nutr (1995) 61 (suppl): 968S-979S.

3. George Brooks and Jacques Mercier “Balance of carbohydrate and lipid utilization during exercise: the “crossover” concept” J Appl Physiol (1994) 76: 2253-2261.

4. “Physiology of Sport and Exercise” Jack H. Wilmore and David L. Costill. Human Kinetics Publishers 1994.

5. Romijn J.A. et. al. “Regulation of endogenous fat and carbohydrate metabolism in relation to exercise intensity and duration” Am J Physiol (1993) 265: E380-391.

6. Vollestad, NK et al. “Muscle glycogen depletion patterns in type I and subgroups of Type II fibers during prolonged severe exercise in man” Acta Physiol Scand (1984) 122: 433-441.

7. Gollnick, P.D. et. al. “Selective glycogen depletion in skeletal muscle fibres of man following sustained contractions” J Physiol (1974) 241: 59-67.

8. “Exercise Metabolism” Ed. Mark Hargreaves. Human Kinetics Publishers 1995.

9. Elia, M. et. al. “Ketone body metabolism in lean male adults during short-term starvation, with particular reference to forearm muscle metabolism” Clinical Science (1990) 78: 579-584.

10. Bergstrom, J. et. al. “Diet, muscle glycogen and physical performance” Acta Physiol Scand (1967) 71: 140-150.

11. Edmond O. Balasse and F. Fery “Ketone body production and disposal: Effects of fasting, diabetes and exercise” Diabetes/Metabolism Reviews (1989) 5: 247-270.

12. Wahren J. et. al. “Turnover and splanchnic metabolism of free fatty acids and ketones in insulin-dependent diabetics at rest and in response to exercise” J Clin Invest (1984) 73: 1367-1376.

14. Lemon, P.R. and J.P. Mullin “Effect of initial muscle glycogen level on protein catabolism during exercise” J Appl Physiol (1980) 48: 624-629.

15. Phinney, S.D. et. al. “The human metabolic response to chronic ketosis without caloric restriction: preservation of submaximal exercise capacity with reduced carbohydrate oxidation” Metabolism (1983) 32: 769-776.

16. Phinney, S.D. et. al. “Effects of aerobic exercise on energy expenditure and nitrogen balance durin very low calorie dieting.” Metabolism (1988) 37: 758-765.

17. Phinney, SD et. al. “Capacity for moderate exercise in obese subjects after adaptation to a hypocaloric, ketogenic diet” J Clin Invest (1980) 66: 1152-1161.

18. Lambert E.V. et. al. “Enhanced endurance in trained cyclists during moderate intensity exercise following 2 weeks adaptation to a high fat diet” Eur J Apply Physiol (1994) 69: 387-293.

19. Hargreaves M. et. al. “Influence of muscle glycogen on glycogenolysis and glucose uptake during exercise in humans” J Appl Physiol (1995) 78: 288-292.

20. “Exercise Physiology: Human Bioenergetics and it’s applications” George A Brooks, Thomas D. Fahey, and Timothy P. White. Mayfield Publishing Company 1996.

21. Wade H. Martin III “Effects of acute and chronic exercise on fat metabolism” Exercise and Sports Science Reviews (1994) Vol 22: 203-231.

22. Katarina Borer “Neurohumoral mediation of exercise-induced growth” Med Sci Sports Exerc (1994) 26:741-754.

23. William Kraemer “Endocrine responses to resistance exercise” Med Sci Sports Exerc (1989) 20 (suppl): S152-S157.

24. Rogol, A.D. “Growth hormone: physiology, therapeutic use, and potential for abuse” ESSR (1989) 17: 353-377.

25. K. Hakkinen and A. Pakarinen “Acute hormonal responses to two different fatiguing heavy-resistance protocols in male athletes” J Appl Physiol (1993) 74: 882-887.

26. Kraemer, W.J. et. al. “Hormonal and growth factor responses to heavy resistance exercise protocols” J Appl Physiol (1990) 69: 1442-1450.

27. Kraemer, W.J. et. al. “Changes in hormonal concentrations following different heavy resistance exercise protocols in women.” J Appl Physiol (1993) 75: 594-604.

28. Mulligan, S.E. et. al. “Influence of resistance exercise volume on serum growth hormone and cortisol concentrations in women” J Strength Cond Res (1996) 10: 256-262.

29. Griggs, R.C. et . al. “Effect of testosterone on muscle mass and protein synthesis” J Appl Physiol (1989) 66: 498-503.

30. Schwab, R. et. al. “Acute effects of different intensities of weight lifting on serum testosterone.” Med Sci Sports Exerc (1993) 25(12): 1381-1385.

31. Kraemer, W.J. et. al. “Responses of IGF-1 to endogenous increases in growth hormone after heavy-resistance exercise” J Appl Physiol (1995) 79:1310-1315.

32. Katarina Borer “Neurohumoral mediation of exercise-induced growth” Med Sci Sports Exerc (1994) 26:741-754.

33. R. Smith and O.M. Rutherford “The role of metabolites in strength training I. A comparison of eccentric and concentric contractions” Eur J apply Physiol (1995) 71: 332-336.

34. DeVol, DL et. al. “Activation of insulin-like work-induced skeletal muscle growth” Am J Physiol (1990) 259: E89-E95.

35. J. H. Koeslag “Post-exercise ketosis and the hormone response to exercise: a review” Med Sci Sports Exerc (1982) 14: 327-334.

36. Edmond O. Balasse and F. Fery “Ketone body production and disposal: Effects of fasting, diabetes and exercise” Diabetes/Metabolism Reviews (1989) 5: 247-270.

37. John Ivy “Muscle glycogen syntehsis before and after exercise” Sports Medicine (1991) 11: 6-19.

38. Phinney S.D. et. al. “The human metabolic response to chronic ketosis without caloric restriction: physical and biochemical adaptations” Metabolism (1983) 32: 757-768.

39. Phinney, S.D. et. al. “The human metabolic response to chronic ketosis without caloric restriction: preservation of submaximal exercise capacity with reduced carbohydrate oxidation” Metabolism (1983) 32: 769-776.

40. Zachweija, J.J. et. al. “Influence of muscle glycogen depletion on the rate of resynthesis” Med Sci Sports Exerc (1991) 23: 44-48.

41. Price, TB et. al. “Human muscle glycogen resynthesis after exercise: insulin-dependent and -independent phases” J Appl Physiol (1994) 76: 104-111.

42. Yan Z. et. al. “Effect of low glycogen on glycogen synthase during and after exercise” Acta Physiol Scand (1992) 145: 345-352.

43. D.D. Pascoe and L.B. Gladden “Muscle glycogen resynthesis after short term, high intensity exercise and resistance exercise” Sports Med (1996) 21: 98-118.

44. Robergs, RA et. al. “Muscle glycogenolysis during different intensities of weight-resistance exercise” J Appl Physiol (1991) 70: 1700-1706.

45. Tesch, PA et. al. “Muscle metabolism during intense, heavy resistance exercise” Eur J Appl Physiol (1986) 55: 362-366.”

Source: thinkmuscle.com

This entry was posted in Endocrine system, Nutrition, Physical Conditioning and tagged bodybuilding, cyclical, diet, ketogenic, Lyle McDonald, Physical conditioning on February 4, 2010 by myoblast.

Carbing Up on the Cyclical Ketogenic Diet

Leave a reply

“**Carbing Up on the Cyclical Ketogenic Diet**

by Lyle McDonald, CSCS
Author of The Ketogenic Diet

Introduction

Although ketogenic diets are useful for fat loss, while simultaneously sparing muscle loss, they have one significant drawback: they cannot sustain high intensity exercise. Activities like weight training can only use carbohydrates as an energy source, ketones and free fatty acids (FFA) cannot be used. Therefore the lack of carbohydrates on a ketogenic diet will eventually lead to decreased performance in the weight room, which may result in muscle loss, and carbohydrates must be introduced into a ketogenic diet without affecting ketosis. Probably the most common way to do this is

to do a weekend carb-load phase, where ketosis is abolished. During this time period, assuming training volume was sufficient to deplete muscle glycogen (see last article), the body can rapidly increase muscle glycogen levels to normal or supra-normal levels prior to beginning the next ketogenic cycle.

Anyone who has read both "The Anabolic Diet" (AD) by Dr. Mauro DiPasquale and "Bodyopus" (BO) by Dan Duchaine should realize that there are two diametrically different approaches to the carb-up. In the AD, the carb-up is quite unstructured. The goal is basically to eat a lot of carbs, and stop eating when you feel yourself starting to get bloated (which is roughly indicative of full muscle glycogen stores, where more carbohydrate will spill over to fat). In BO, an extremely meticulous carb-up schedule was provided, breaking down the 48 hour carb-up into individual meals, eaten every 2.5 hours. The approach which this article will provide is somewhere in the middle. This article will discuss a variety of topics which pertain to the carb-load phase of the CKD, including duration, carbohydrate intake, quality of carbohydrate intake, fat gain, and others.

Duration and Amount of Carb Load

Arguably the two most critical aspects of a successful carb-load are the duration of the carb-load and the total amount of carbohydrates consumed during this time period. In brief, to achieve optimal glycogen levels, both the duration of the carb-load and the amount of carbs eaten must be correct. The rate limiting step in glycogen resynthesis appears to be activity of the enzymes involved in glycogen synthesis (1). Regardless of carbohydrate intake, there is a maximal amount of glycogen which can be synthesized in a given amount of time. That is to say, consuming all of your carbohydrates in a 4 hour time span, with the goal of returning to ketogenic eating that much sooner, will not work. Only when the proper amount of carbohydrates is consumed over a sufficient period of time, can glycogen compensation and/or supercompensation occur. Following exhaustive exercise and full glycogen depletion, glycogen can be resynthesized to 100% of normal levels (roughly 100-110 mmol/kg) within 24 hours as long as sufficient amounts of carbohydrate are consumed (1,2). Assuming full depletion of the involved muscles, the amount of carbohydrate needed during this time period is 8-10 grams of carbohydrate per kilogram of lean body mass (8-10 g/kg). With 36 hours of carb-loading, roughly 150% compensation can occur, reaching levels of 150-160 mmol/kg of muscle glycogen. To achieve greater

levels of muscle glycogen than this (175 mmol/kg or more) generally requires 3-4 days of high carbohydrate eating following exhaustive exercise (3). It should be noted that carb-loading has primarily been studies following endurance training, not weight training and there may be differences in how the body handles carbs following weight training. The first 6 hours after training appear to be the most critical as enzyme activity and resynthesis rates are the highest, around 12 mmol/kg/hour (4). Following weight training, with a carbohydrate intake of 1.5 grams carbohydrate/kg lean body mass taken immediately after training and again 2 hours later, a total of 44 mmol/kg can be resynthesized (4). Over the the first 24 hours, the average rate of glycogen resynthesis ranges from 5-12 mmol/kg/hour depending on the type of exercise performed (5). In general, aerobic exercise shows the lowest rate of glycogen resynthesis (2-8 mmol/kg/hour), weight training the second highest (1.3-11 mmol/kg/hour), and sprint training the highest (15 to 33.6 mmol/kg/hour). (5,6). The reason that glycogen resynthesis is lower after weight training than after sprint training may be related to the amount of lactic acid generated as well as the muscle damage that typically occurs during weight training (5). At an average rate of 5 mmol/kg /hour, approximately 120 mmol/kg of glycogen can be synthesized over 24 hours. This can be achieved with the consumption of 50 grams or more of carbohydrate every 2 hours during the first 24 hours after training. Intake of greater than 50 grams of carbohydrate does not appear to increase the rate of glycogen synthesis. Over 24 hours, at 50 grams per 2 hours, this yields 600 grams of carbohydrates total to maximize glycogen resynthesis. These values are for a 154 pound (70 kilogram) person. Significantly heavier or lighter individuals will need proportionally more or less carbohydrate. Simply keep the value of 8-10 grams of carbohydrate per kilogram of lean body mass as a guide. In the second 24 hours, glycogen resynthesis rates decrease (1) and a carbohydrate intake of 5 grams/kg is recommended to further refill muscle glycogen stores while minimizing the chance of fat gain. For many individuals, the small amount of additional glycogen resynthesis which occurs during the second 24 hours of carbohydrate loading is not worth the risk of regaining some of the bodyfat which was lost during the preceding week.

Type of Carbohydrates

The type of carbohydrate consumed during a carb-up can affect the rate at which glycogen is resynthesized. During the first 24 hours, when enzyme activity is at it's highest, it appears that the consumption of high glycemic index (GI) foods such as

simple sugars promote higher levels of glycogen resynthesis compared to lower GI foods like starches (5,7,8). Glycogen resynthesis during the second 24 hours has not been studied as extensively. It appears that the consumption of lower GI carbs (starches, vegetables) promotes higher overall levels of glycogen resynthesis while avoiding fat gain by keeping insulin levels more stable (9). Most individuals find that their regain of bodyfat, as well as retention of water under the skin, is considerably less if they switch to lower GI carbohydrates during the second 24 hours of carbohydrate loading. Fructose (fruit sugar, which preferentially refills liver glycogen) will not cause the same amount of glycogen resynthesis seen with glucose or sucrose (5, 8). Whether liquids or solid carbohydrates are consumed also appears to have less impact on glycogen resynthesis as long as adequate amounts are consumed (10). Anecdotally, many individuals have had success consuming liquid carbohydrates such as commercially available glucose polymers during their first few meals and then moving towards slightly more complex carbohydrates such as starches. Liquid carbohydrates should raise insulin even more than solid carbs, which is useful during the initial hours of the carb-load.

Timing of Carbohydrates

While it would seem logical that consuming dietary carbohydrates in small amounts over the length of the carb-up would be ideal, at least one study suggests that glycogen resynthesis over 24 hours is related to the quantity of carbs consumed rather than how they are spaced out. In this study, subjects were glycogen depleted and then fed 525 grams of carbohydrate in either two or seven meals. Total glycogen resynthesis was the same in both groups. (11) From a purely practical standpoint, smaller meals will generally make it easier to consume the necessary carbohydrate quantities and will keep blood sugar more stable. In Bodyopus, it was recommended that dieters wake up during the night to consume carbohydrates. However this tends to dissuade many dieters from trying the diet at all. The study cited above suggests that eating strictly every 2 hours does not have a large impact on overall glycogen resynthesis rates. Empirical evidence shows that individuals who do not awaken to eat carbs during the night, but consume enough carbohydrates over the length of their carb-up, do achieve glycogen compensation anyway. If an individual must go a long time without eating (i.e. during sleep), a possible strategy is to consume the amount of carbohydrates that would have been consumed during that time period (i.e. 8 hours at 50 grams per 2 hours or 200 grams of carbs over 8 hours) can be

consumed at once to keep blood glucose levels and glycogen resynthesis rates as high as possible (5). Consuming these carbs with some protein, fat and fiber will slow digestion and give a more even blood glucose release, helping to promote glycogen resynthesis. Those wishing truly maximal glycogen resynthesis may wish to experiment with eating small carb meals throughout the night.

When to Begin Carb-Up

The carb-up should begin immediately following training. A delay of even 2 hours between the end of training and the start of the carb-up causes glycogen resynthesis to be 47% slower than if carbs are consumed immediately. (10,12). Ideally you should consume a large amount of liquid carbs immediately after training. A good rule of thumb is to consume 1.5 grams of carbs/kg lean body mass, with approximately one half as much protein, immediately after training and then again two hours later. Additionally the consumption of carbohydrates prior to (and even during) the workout prior to your carb-up will lead to higher rates of glycogen resynthesis, most likely as a result of higher insulin levels when the carb-up begins (1,10). It is recommended that individuals consume a small carbohydrate meal approximately 1-2 hours prior to the training session that precedes the carb-up.

Training and the Carb-Up

An important issue regarding the carb-up is the type of exercise that precedes the carb-up. Typical carb-ups have been studied in endurance athletes, not weight trainers so extrapolations must be made with care. It has been long known that only the muscles worked immediately prior to the carb-up are supercompensated. Recall from above that a delay of even several hours slows glycogen resynthesis greatly. Muscle groups which have been trained several days prior to the start of a carb-load will not be optimally supercompensated. This suggests that, for optimal results, the whole body should be worked during the workout prior to the carb-up (this is the basis for the whole body workout on Friday, discussed in the last article). It should be noted that many individuals have achieved fine results not working the entire body prior to the carb-up, using a more traditional split routine workout. Additionally the type of training preceding the carb-up affects the rate and amount of glycogen resynthesized following training. Muscles that have been damaged with eccentric training show lower rates of glycogen resynthesis following training (13,14). However this decrease

in resynthesis does not show up immediately. In muscles which have undergone eccentric trauma, glycogen levels are typically 25% lower following a carb-up but this difference does not become apparent until three days after training (or when soreness sets in) (13,14). For individuals performing a 1 or 2 day carb-up, the type of training prior to the carb-up is probably not that critical. For bodybuilders performing a 3 day carb-up prior to a contest, eccentric muscle trauma should be avoided as much as possible.

Other Macro-Nutrients

Another issue regarding the carb-load is the amounts and types of other macronutrients (protein and fat) which should be consumed. The co-ingestion of protein and fat do not affect the levels of glycogen storage during the carb-up as long as carbohydrate intake is sufficient (15). However, many individuals find that fat blunts their hunger and prevents them from consuming enough carbohydrates to refill glycogen stores. Recall that carbohydrate level will be 10 gram/kg lean body mass during the first 24 hours. This will make up 70% of the total calories consumed during the carb load. Preliminary research has shown that a high carbohydrate to protein ratio may increase testosterone (16) and it is suggested that individuals consume 70% carbohydrates, 15% protein and 15% fat during the first 24 hours of their carb-up. Many bodybuilders may feel that this percentage of protein is too low but this is not the case. First and foremost, a high calorie intake reduces protein requirements and increases nitrogen retention (17). As a result, less dietary protein is needed when caloric/carbohydrate intake is high. Protein should be consumed with carbohydrates as this has been shown to increase glycogen resynthesis, especially after training (18). Additionally, combining carbohydrates with protein after weight training raises insulin and growth hormone, which may enhance anabolism (19). Further the most protein lifters need is 1 gram per pound of bodyweight under extremely intensive training conditions (20). Even at 15% protein calories, most individuals will be consuming sufficient protein during the carb-up. Example calculations appear below.

What About Fat Gain?

Possibly the biggest fear many individuals on a ketogenic diet have about the carb-load is the potential to regain body fat due to the high number of calories being consumed (almost double maintenance during the first 24 hours). We will see that fat

gain during the carb-up should be minimal as long as a few guidelines are followed. In a study which looked surprisingly like a CKD, subjects consumed a low-carb, high fat (but non-ketogenic) diet for 5 days and depleted muscle glycogen with exercise (21). Subjects were then given a total 500 grams of carbohydrate in three divided meals. During the first 24 hours, despite the high calorie (and carb) intake, there was a negative fat balance of 88 grams meaning that fat was actually lost during the period of high-carbohydrate eating. When muscle glycogen is depleted, incoming carbohydrates appear to be used preferentially to refill glycogen stores, and fat continues to be used for energy production. Additionally the excess carbohydrates which were not stored as glycogen were used for energy (21). In general, the synthesis of fat from glycogen (referred to as De Novo Lipogenesis) in the short term is fairly small (22,23). During carbohydrate overfeeding, there is a decrease in fat use for energy. Most fat gain occurring during high carbohydrate overfeeding is from storage of excessive fat intake (24). Therefore as long as fat intake is kept relatively low (below 88 grams) during the carb-up phase of the CKD, there should be a minimal fat regain. In a similar study, individuals consumed a low-carb, high fat diet for 5 days and then consumed very large amounts of carbohydrates (700 to 900 grams per day) over a five day period (25). During the first 24 hours, with a carbohydrate intake of 700 grams and a fat intake of 60 grams per day, there was a fat gain of only 7 grams. As with the previous study discussed, this indicates that the body continued to use fat for fuel during this time period. In the second 24 hours, with an intake of 800 grams of carbohydrate and a fat intake of 97 grams, there was a fat gain of 127 grams (25) indicating that the body had shifted out of 'fat burning' mode as muscle glycogen stores became full. This is unlike the suggestions being made for the CKD, where the carbohydrate intake during the second 24 hours will be lower than in the first 24 hours. A large fat gain, as seen in this study would not be expected to occur on a CKD. As long as fat intake is kept low and carbohydrate intake is reduced to approximately 5 gram/kg lean body mass during the second 24 hours, fat regain should be minimal. Once again, individuals are encouraged to keep track of changes in body composition with different amounts and durations of carb-loading to determine what works for them. Those looking to maximize fat loss may prefer only a 24 hour carb-up. This allows more potential days in ketosis for fat loss to occur as well as making it more difficult to regain significant amounts of body fat.

How Long Does Glycogen Compensation Last?

Pre-contest bodybuilders (and other athletes) want to know how long they will maintain above normal glycogen levels following a carb-up so that they can time the carb-up around a specific event. With normal glycogen levels, and no exercise, glycogen levels are maintained at least 3 days. (26,27) It appears that above-normal glycogen stores can be maintained at least 3 days as well. (28)

Implications of the carb-load on the adaptations seen in ketosis As discussed in the previous chapters, there are a number of potentially beneficial adaptations which occur during ketosis in terms of decreased protein use and increased fat use. A question which arises is how the insertion of a 1-2 day carbohydrate loading phase will affect these adaptations. To this author's knowledge, no research has examined any effects on ketosis to repeated carbohydrate loading. In general, the adaptations to ketosis take three full weeks in ketosis to occur. A question without an answer is whether these adaptations will take longer, or whether they will occur at all, with repeated carbohydrate loading. Anecdotal experience suggests that they do, but research is needed in this area. Since no physiological measures of the adaptations to ketosis have been measured (except in the short term), it is impossible to make any conclusions regarding the long term adaptations to a CKD. Based on anecdotal reports, it seems that the adaptations do occur, but that they simply take longer. For example, most people starting a ketogenic diet (of any sort) go through a period of low energy, where they are mentally 'fuzzy'. Those who stay on straight ketogenic diet (no carb-load) generally move past this stage by the second or third week of dieting. In contrast, those on a CKD seem to take slightly longer to overcome this feeling. As a personal example, this author experienced a great deal of fatigue in the first week of being on a CKD, a smaller (but still above baseline) amount of fatigue during the second week, and essentially no fatigue on the third week. This suggests (but requires further research) that the adaptation of the brain to ketosis may take slightly longer due to the insertion of a carb-load phase. This also suggests that individuals may want to do two weeks of an CKD prior to their first carb-up, to allow the adaptations to occur more quickly. Of course, if this compromises training intensity, it is not a viable option.

Adjustments to the Carb-Load

To a great degree, the carb-load can be the part of the CKD which either makes or breaks the diet. A balance must be struck between carb-loading enough to support

intense weight training without gaining back the bodyfat lost during the previous week. Many individuals do well with an unstructured approach to the carb-load. They simply eat a ton of carbs, get some protein and fat in there, and do just fine. However for many individuals this does not work well and there is too much fat spillover during the carb-load, making the CKD a 2 steps forward, 1 step backwards ordeal. In this case, the following modifications can be made.

1. Shorten the length of the carb-load. Considering that the body stays in a 'fat burning' mode for at least the first 24 hours of the carb-load, any carb load shorter than 24 hours should make it generally impossible to gain appreciable fat. In fact some individuals have had success with the CKD buy doing 2 24 hour carb-load phases during the week, for example on Wednesday and Sunday.

2. Clean up the carb-load. While part of the attraction of the CKD is the ability to eat whatever you want during the carb-load, a steady diet of donuts and chicken wings on the weekend can short-circuit fat loss. Making better food choices, starting with high GI carbs and moving to more complex starches as the hours pass, can make all the difference between a successful and an unsuccessful fat loss CKD.

3. Watch total macronutrient intake. Although it's a bit of a pain, monitoring total carb, protein and fat intake during the carb-load can help prevent fat spillover, especially when coupled with strategy #2.

4. Use specific supplements like Citrimax and Alpha-lipoic acid. Although the human data on Citrimax (the trade name for hydroxycitric acid) is few and far between, empirical evidence suggests that it's use during the carb-load significantly decrease carb spillover to fat and leads to better carb-loads. Additionally, Citrimax tends to blunt hunger and can help to prevent overeating during the carb-up. A dosage of 750-1000 mg taken three times daily, at least 30 minutes before meals, is the recommended dose. Additionally, alpha lipoic acid (ALA) is an anti-oxidant and glucose disposal agent (29) which has shown great use during carb-ups for many individuals on the CKD. In comparison to chromium, magnesium and vanadyl sulfate, ALA appears to work significantly better. A dosage of 200-600 mg per day is a good place to start as far as dosage but be forewarned that it can get expensive quickly.

Summary of Guidelines for the Carb-Load

1. 8-10 grams of carbohydrates per kilogram of lean body mass should be consumed during the initial 24 hours of the carb-load. This will make up 70% of the total calories consumed. During the second 24 hours, approximately 5 grams/kg should be consumed which will be approximately 60% of the total calories consumed.

2. Protein intake should be approximately 1 gram per pound during all phases of the carb-load. In the first 24 hours, this will represent about 15% of total calories, in the second 24 hours, this will represent about 25% of total calories.

3. Fat intake should be kept at 15% of total calories during the first 24 hours, or a maximum of 88 grams of fat. Fat intake should be roughly cut in half during the second 24 hours of the carb-load.

Sample calculations for a carb-load for different body weights So simplify the calculations for the carb-load, the following charts give approximate amounts of protein, fat, carbohydrate, and total calories for the carb-load phase, based on different amounts of lean body mass.

During the first 24 hours of carb-loading, carbohydrate intake should be 10 grams per kilogram of lean body mass or 4.5 grams of carbs per pound of lean body mass . This will represent 70% of the total calories consumed. The remaining calories will be divided evenly between fat (15% of total calories) and protein (15% of total calories). Figure 1 gives estimated amounts of carbohydrate, protein and fat for various amounts of lean body mass.

Figure 1:

Summary of nutrient intake during first 24 hours of carb-loading

Lean body mass (pounds)	Carb (grams)	Fat (grams)	Protein (grams)	Total calories*
100	450	43	98	2600

120	540	51	115	3100
140	630	60	135	3600
160	720	68	153	4100
180	810	76	172	4600
200	900	85	193	5100

* The total calories consumed during the first 24 hours of the carb-load will be approximately twice what was being consumed during the lowcarb week.

During the second 24 hours of carb-loading, carbohydrates will make up 60% of the total calories, protein 25% and fat 15%.

Figure 2:

Summary of nutrient intake during second 24 hours of carb-loading

Lean body mass (pounds)	Carb (grams)	Fat (grams)	Protein (grams)	Total calories
100	227	20	90	1448
120	270	25	108	1737
140	310	30	126	2014
160	360	35	144	2331
180	405	40	162	2628
200	450	45	180	2925

Once again, the above amounts should be considered guidelines only. Experimentation coupled with good record keeping will help an individual determine the optimal amounts of nutrients to consume during their carb-up.

References

1. John Ivy “Muscle glycogen synthesis before and after exercise” Sports Medicine (1991) 11: 6-19.

2. William M. Sherman “Metabolism of sugars and physical performance” Am J Clin Nutr (1995) 62(suppl): 228S-41S.

3. “Physiology of Sport and Exercise” Jack H. Wilmore and David L. Costill. Human Kinetics Publishers 1994.

4. Pascoe D.D. et. al. “Glycogen resynthesis in skeletal muscle following resistive exercise” Med Sci Sports Exerc (1993) 25: 349-354.

5. Edward F. Coyle “Substrate Utilization during exercise in active people” Am J Clin Nutr (1995) 61 (suppl): 968S-979S.

6. D.D. Pascoe and L.B. Gladden “Muscle glycogen resynthesis after short term, high intensity exercise and resistance exercise” Sports Med (1996) 21: 98-118.

7. 19. Burke, LM et. al. “Muscle glycogen storage after prolonged exercise: effects of the glycemic index of carbohydrate feedings” J Appl Physiol (1993) 75: 1019-1023.

8. 20. Janet Rankin “Glycemic Index and Exercise Metabolism” in Gatorade Sports Science Exchange Volume 10(1).

9. 21. Costill, DL et. al. “Muscle glycogen utilization during prolonged exercise on successive days” J Appl Physiol (1971) 31: 834-838.

10. 22. Reed, MJ et. al. “Muscle glycogen storage postexercise: effect of mode of carbohdyrate administration” Med Sci Sports Exerc (1989) 66: 720-726.

11. 23. Costill, DL et. al. “The role of dietary carbohydrate in muscle glycogen resynthesis after running” Am J Clin Nutr (1981) 34: 1831-1836.

12. 24. Ivy, JL et. al. “Muscle glycogen synthesis after exercise: effect of time of

carbohydrate ingestion" J Appl Physiol (1988) 64: 1480-1485.

13. 25. Doyle, J.A. et. al. "Effects of eccentric and concentric exercsie on muscle glycogen replenishment" J Appl Physiol (1993) 74: 1848-1855.

14. 26. Widrick, J.J. et. al. "Time course of glycogen accumulation after eccentric exercsie" J Appl Physiol (1992): 1999-2004.

15. 27. Burke, L.M. et. al. "Effect of coingestion of fat and protein with carbohydrate feeding on muscle glycogen storage" J Appl Physiol (1995) 78: 2187-2192.

16. 28. Anderson, K.E. et. al. "Diet-hormone interactions: protein/carbohydrate ratio alters reciprocally the plasma levels of testosterone and cortisol and their respective binding globulins in man" Life Sciences (1987) 40: 1761-1768.

17. 29. Chiang, An-Na and Po-Chao Huang "Excess nitrogen balance at protein intakes above the requirement level in young men." Am J Clin Nutr (1988) 48: 1015-1022.

18. Zawadzki, et al. "Carbohydrate-protein complex increases the rate of myscle glycogen storage after exercise" J Appl Physiol (1992) 72: 1854-1859.

19. Chandler, RM et. al. "Dietary supplements affect the anabolic hormones after weight-training exercise" J App Phys (1994) 76: 839-45.

20. Peter Lemon "Is increased dietary protein necessary or beneficial for individuals with a physically active lifestyle?" Nutrition Reviews 54(4): S169-S175, 1996.

21. Acheson, K.J. "Nutritional influences on lipogenesis and thermogenesis after a carbohydrate meal." Am J Physiol (1984) 246: E62-E70.

22. Meena Shah and Abhimanyu Garg "High-fat and high-carbohydrate diets and energy balance" Diabetes Care (1996) 19: 1142-1152.

23. Marc Hellerstein "Synthesis of fat in response to alterations in diet: insights from new stable isotope methodologies" Lipids (1996) 31 (suppl) S117-S125.

24. Jebb, SA et. al. “Changes in macronutrient balance during over- and underfeeding asessed by 12-d continuous whole body calorimetry” Am J Clin Nutr (1996) 64: 259-266.

25. Acheson, K.J. et. al. “Glycogen storage capacity and de novo lipogenesis during massive carbohydrate overfeeding in man” Am J Clin Nutr (1988) 48: 240-247.

26. Knapik, J.J. et. al. “Influence of fasting on carbohydrate and fat metabolism during rest and exercise in men. ” J Appl. Physiol (1988) 64: 1923-1929.

27. Loy, S. et. al. “Effects of 24-hour fast on cycling during endurance time at two different intensities.” J Appl Physiol (1986) 61: 654-659.

28. Goldforth, H.W. et. al. “Persistence of supercompensated muscle glycogen in trained subjects after carbohydrate loading.” J Appl Physiol (1997) 82: 324-347.

29. Jacob S, et al. “The antioxidant alpha-lipoic acid enhances insulin-stimulated glucose metabolism in insulin-resistant rat skeletal muscle.” Diabetes. 1996 Aug; 45(8): 1024-1029.”

Source: thinkmuscle.com

This entry was posted in Nutrition and tagged carbing, cyclical, diet, ketogenic, Lyle McDonald, Nutrition, up on February 4, 2010 by myoblast.

Nutrition – Millos Sarcev

Leave a reply

This entry was posted in Nutrition and tagged bodybuiding, diet, Milos, Milos Sarcev, Nutrition, Sarcev, seminar on February 4, 2010 by myoblast.

Protein Cycling for Maximum Gains

Leave a reply

“**Protein Cycling for Maximum Gains**
by Marcus R. Jones, MD

We'd like to take the opportunity to introduce one of the notorious "Gang of Five." His name is Dr. Marcus R. Jones and he's a practicing physician in Virginia Beach, Virginia. Marcus is not only a doctor with extensive clinical interests in endocrinology, he's also former nationally-qualified bodybuilder. And, if he doesn't mind us saying so, he's the resident mad scientist of the group. Don't get us wrong, he doesn't give questionable advice. Hardly. Instead, he introduces theories that definitely go against the grain of conventional bodybuilding thinking. As radical as some sound, they definitely work. This is his first article for Testosterone. Let us know what you think.

What if I told you that bodybuilders eat too much protein? What if I told you that the key to perpetual growth, without plateaus, was within your reach and all you had to do was to cut down on your protein intake? Would you petition the AMA to revoke my license to practice medicine, or would you hear me out? Hopefully, it's the latter and not the former.

With that in mind, let me dive right into my seemingly preposterous concept.

Protein metabolism is complex and a truly complete overview is beyond the scope of this article but I'll deliver some relevant highlights so that you'll have a general idea of why cycling protein intake is so rife with possibility.

Protein has many physiologic roles. The most important to us, as bodybuilders, is that protein is the substrate for the synthesis of muscle. It's also important for muscle hypertrophy and remodeling. These mechanisms, again, do not warrant discussion in detail at this juncture (it would take too long, and it would undoubtedly put you to sleep). Protein also serves as a precursor for gluconeogenesis (carbohydrate creation) and ketogenesis (fat and ketone creation). You knew that already, of course, because many of us obtain a large portion of our energy needs from protein?but this is not necessarily a beneficial or intelligent thing to do?and we'll discuss that in greater detail in a minute.

Protein has a plethora of other roles, too. It's an important player in the modulation of immunity as well as being a precursor for plasma protein synthesis (SHBG, THBG, etc.). And, protein also is the substrate for the synthesis of many cell components as well as being the precursor for peptide hormone synthesis, among other things.

Whew! Now let's talk more about the down side of protein consumption and metabolism. There are several toxic metabolites of protein that damage multiple organ systems. This includes damage and functional compromise of the central nervous system (brain), circulatory system, as well as renal functions. The most important and well-understood toxins are ammonia, homocysteine, and uric acid. Ammonia is a product, formed in large quantities, during amino acid deamination (the process, which modifies aminos to become substrates for carb and fat synthesis? referred to earlier) and is very, very toxic?especially to the brain. Ammonia is the reason people with liver failure get encephalopathic (brain damaged) and is an etiologic factor in their deaths.1

Normally, the liver converts ammonia to urea but this conversion subjects the liver to a great deal of stress under many circumstances and can cause liver hypertrophy. The liver may also commonly be subclinically overwhelmed such that there are no overt symptoms of encephalopathy, just slow brain damage?but we bodybuilders are supposed to be dumb anyway, right? Yeah, maybe in more ways than one. Needless to say there are many, many more sequelae of ammonia but you get the idea.

Another toxic metabolite of protein is homocysteine. This metabolite is a free radical of sorts and is notorious for scarring blood vessels and thus predisposing us all to atherosclerotic plaque formation.2 Just think, we all thought it was only the fat and cholesterol responsible for our early heart attacks and strokes! One thing I've learned is that science and medicine will always throw you a curve ball when you least expect it.

Although there are many other protein-derived toxins, the last one I'll discuss is uric acid. This chemical is the culprit in gout (you know?the "swollen, red big toe" disease). Anyway, uric acid can also get deposited in the kidneys as crystals, which cause poor function, damage, and occasionally, in those predisposed, kidney stones. We won't even begin to discuss the link between excessive protein and cancer because it would take up too much space…3

By now, you must be saying" What the HELL is this guy's problem?there is no way I'm giving up MY protein!" Well I don't want you to give it up?for too long. And, even though I think giving up protein for awhile would be a good idea, health-wise, it could also have some really, really, dramatic effects on your overall physique.

Haven't you ever wondered why so many guys claim that a protein intake of greater than 400 grams/day is the only key to growth? Well, the reason is that they aren't all that smart. You see, most of us take in so much protein that our bodies have gone into a constant state of panic! I just illustrated how physiologically stressful a huge protein load can be. The body has had to up-regulate every protein destroying and detoxifying enzyme it can synthesize to keep from getting poisoned?literally. In the face of a chronically high protein load, the body also becomes entirely too efficient at disposing of and shunting protein as waste rather than utilizing it for anabolism.

One of the shunting pathways of protein just happens to be muscle synthesis but overloading your system with protein has to be one of the most archaic and unintelligent ways to achieve growth ever used. The key to intelligent protein use is forcing the body to become efficient at protein storage (muscle is the prime storage depot) rather than protein shunting and disposal (muscle is a secondary shunting destination). This is easily done with a little manipulation? which is the whole point of this article.

First of all, before proceeding, I must say that I'm at a definite advantage with respect to understanding and applying anabolic theory for at least three reasons:

• I'm one sharp cookie (and modest too).

• I've authored and published legitimate scientific research and thus have learned how to objectively investigate a hypothesis.

• Most importantly, I am a legitimate bodybuilder, and I have a physique that many readers are still trying to achieve (approximately 230 lean, muscular pounds at a height of 5'10" while working 110 hours/week).

Now that I'm finished blowing my own horn, let's cut to the chase. Natural and assisted (a euphemism for "juiced to the hilt") bodybuilders will benefit immensely from cycling protein because of all the physiologic adaptations that can be achieved by "tricking" the body in the manner I am about to outline. Protein cycling, by my definition, is the use of periods of low protein intake to cause the body to become extraordinarily efficient at storage, as well as tricking it to become very sensitive to protein's anabolic effects. If the body is chronically overloaded with protein it begins down-regulating

protein storage enzymes secondary to anticipating excess protein. The body also initiates other adaptive changes including decreased absorption and increased excretion of protein (definitely counterproductive).

The body can be fooled into thinking that it is becoming protein deficient during periods of low protein consumption even in the face of normal caloric intake. Of course, when this idea is taken to an extreme it results in a condition of malnutrition called KWASHIORKOR.

You're probably thinking that none of this sounds too great so far. Well, here's one major benefit that will get your attention. During these periods of decreased protein consumption the body's growth hormone production can increase to TEN TIMES THE NORMAL LEVEL! That's not a misprint. Ten times the normal level of GH! Do I have your attention yet? This level remains elevated for greater than a month after the readdition of protein to the diet. In some cases GH can remain at levels 100% above normal levels twenty-five days after increasing protein consumption.4

This is only one beneficial physiologic adaptation. There are other adaptations that occur during protein restriction that result in explosive growth during the high protein phase of protein cycling. One such adaptation to the low protein phase is decreased production of protein degrading enzymes and gluconeogenic enzymes. This decrease in enzyme production occurs along with an increase in protein storing enzymes.

Think about this concept for a second. You can create an environment in which there is increased circulating GH, decreased protein degrading enzyme production, decreased enzymes for protein conversion to energy, and a huge increase in protein storage enzymes (where muscle is the prime storage depot). Are your eyes getting wide yet? Well, there's even more but it requires a little more explanation…

Gaining muscle through massive consumption of protein is a "live by the sword, die by the sword" kind of concept. Let me explain. The body, in an attempt to dispose of excess protein, will shift metabolic gears, so to speak, and preferentially use protein via gluconeogenesis and ketogenesis for energy. This may sound tolerable (even though we just discussed the associated toxicity) but what happens if, God forbid, you miss a meal or two? Guess what?all those enzymes sitting around chewing up all that excess protein for energy are still there, turned on full blast, using muscle for fuel at

nearly the same rate that you were consuming your protein. Your gains will soon disappear via the adage “easy come, easy go.”

Most of us have experienced this, especially when dieting (Hey, didn’t I just see some lights come on?) but couldn’t figure out what happened. Protein cycling eliminates that trap completely! What happens is that cycling protein minimizes the mechanisms for protein degradation during the low protein phase such that by the time the body begins to gear them back up again during the high protein phase (4-6 weeks later), you’ll have already made enormous gains.

Then, you can start dropping your protein again, thus avoiding the cascade of catabolism FOREVER. You see, the reason I’m able to say “forever” is that each time you complete a cycle of protein manipulation you create a new “MUSCLE SETPOINT,” so to speak, and become immune to the catabolic sequelae of a diet chronically high in protein.

Other benefits of protein cycling include more efficient function of the liver and kidneys and a decrease in organ size. We all know that a smaller liver is great, especially to those of us with protruding guts secondary to liver hypertrophy.5 A diet with excessive protein is one of the major culprits in hepatic hypertrophy (along with exogenous GH and oral anabolic agents, etc.). The biggest benefit is the continual and exceptional gains that can be achieved while using a lot less protein (and spending a lot less money, too). Let’s recap the benefits of cycling protein:

• HUGE increases in natural GH production?up to ten times normal
• Extraordinary decreases in protein degradation
• Exceptional reductions in protein waste and use for energy
• Massive increases in protein storage as muscle
• Improved liver function?probably translating into increased IGF-1 elaboration and GH sensitivity
• Decreased liver size (with decreased gut protrusion likely)
• A new “MUSCLE SETPOINT” more resistant to catabolism
• Perpetual growth without plateaus

If you’re smart, you’re now drooling to hear the exact program. Well, here we go. It’s simple! First, protein is gradually decreased by 50% each week. As the protein is

decreased, the calories are replaced by carbohydrate, but not completely. Only one half to two-thirds of the protein calories should be replaced (metabolically, protein and carbohydrate do not provide the same amount of energy, and this concept could take an entire article so just trust me on this point).

The protein should be decreased each week until protein intake is only 40 grams per day (even though I suspect 20 grams per day may cause a more beneficial metabolic compensation). Keep the 40-gram/day protein intake for one month. During the low protein period of the cycle, increasing repetitions can cause an increase in glycogen storage enzymes in muscle. This increase in repetitions (50% more than usual) is not necessary, but why waste the opportunity to teach the muscles to overfill?

Hey, don't be afraid of losing muscle and wimp out…many of our current ideas about building muscle are stupid and based on the ideas of peons and pencil necks. For instance, I have discovered, in the literature and through self-experimentation, that muscle can be built during complete starvation…but that's another topic for another day.6 Anyway, after 4 weeks of 20-40 gm of protein per day it will be time to shock the body into growth explosion! Protein should suddenly be increased to 1 gram per pound body weight divided into four to six meals daily. See? Nothing too radical or complex there, either.

Hopefully, you'll have cash for some new clothes because I guarantee a growth spurt unlike any you've ever experienced. The high protein phase is the period that you'll realize that I have taught you how to use protein like a drug rather than just food. When I first tried this cycle out after theorizing it, my attending physician (boss/evaluator/employer) ran a prescription check just to see if I had indulged in a little anabolic script writing…no joke. I actually made drug-like gains without drugs. If you do happen to be "juiced to the hilt", you might be doing the Nationals this year after adding this regimen to your stack…I'm not kidding. Oh well, you get the point.

Continue the high protein phase for four to eight weeks, depending on when you begin to plateau (usually around week 8). Do not increase protein to overcome your plateau phase, it defeats the purpose of changing your metabolism. Cycle your protein down again and start over. The difference this time will be that you will continue to gain…trust me. I promise you eternal gains with less physiologic damage and more cash in the pocket…think about it, no one has anything to gain in any way

with this program but you! Let's recap:

• Decrease protein by 50% per week until a goal of 20-40 gm of protein per day is reached.
• Replace only 1/2 to 2/3 protein calories with carb calories unless weight loss is noted.
• Remain at 20-40 gm or protein per day for four weeks.
• Increase protein to one gram per pound body weight per day immediately after four weeks of low protein intake.
• Continue this for four to eight weeks and then start over.

Here are a few pointers that I have found to be helpful through trial and error as well as solid research:

1) Consume your protein immediately after training to minimize muscle loss during the low protein phase.

2) Increase carbs during low protein phase if weight loss is noted to persist for more than four days.

3) AVOID YOHIMBINE LIKE THE PLAGUE!?IT'S A POTENT INHIBITOR OF GH SECRETION.7

4) Skip the vitamin B supplements during the low protein phase?many B vitamins increase protein use for fuel which could crush you during this phase.

5) DON'T PANIC IF YOU SMOOTH OUT A LITTLE during the low protein phase?the edema resolves after two weeks or so.

The beauty of this program is that it appears basic but is grounded in an enormous base of research. Do me a favor and photograph your results. Don't forget, if you think I'm full of it, then write or call about seeing my pics...I'd be glad to prove I'm all that I claim to be. Train hard.

T

References

1) Hyperammoniaemia. Batshaw-ML. Curr-Probl-Pediatr. 1984 Nov; 14(11): 1-69
2) Homocysteine and coronary atherosclerosis. Mayer-EL. J-Am-Card. 1996 Mar 1; 27(3): 517-27
3) Diet and nutritional factors in...CA. Sain-MS. Anticancer-Res. 1987 May-Jun; 7(3): 293-300
4) Guyton text of Physiology.
5) Differential effects...on visceral organs...in lambs. Wester-TJ. J-Anim-Sci. 1995 Jun; 73(6): 1674-88
6) Effect of food restriction on rat muscle hypertrophy... Brown-CR. Comp-Bioch-Physiol-A. 1990; 95(3): 321-4
7) Role of alpha-1 and alpha-2 adrenergic receptors in GH and prolactin response...in man. Tatar-P. Neuroendocrinology. 1984 Sep; 39(3): 275-80

PUBLISHED 07-17-98 00:00

Source: tmuscle.com

Complementary article: Protein Cycling Revisited -by Marcus R. Jones, MD"

This entry was posted in Nutrition and tagged absorption, bodybuilding, cycling, diet, gains, Marcus R. Jones, Nutrition, protein on February 2, 2010 by myoblast.

Anabolic Burst Cycling of Diet and Exercise (ABCDE) – Torbjorn Akerfeldt – Part 1

12 Replies

"**Torbjorn Akerfeldt interviewed by Bill Phillips – Part I**

(...)

Bill Phillips: What exactly is Anabolic Burst Cycling, and how does it work?

Torbjorn Akerfeldt: It's primarily a new bodybuilding nutrition theory I've developed–it's quite different from anything bodybuilders are doing right now in America or Europe. As a bodybuilder and scientist, I follow the many trends in nutrition with great interest. Sometimes people tell you to eat a high-carbohydrate diet; other times, we're told to ingest a lot of protein. Lately, we're reading that a high-fat diet is the way to go. The strange thing is, virtually all of these diets can be backed up by scientific studies.

BP: How can this be–how can the positive effects of all of these diets be backed by studies?

TA: Most of these studies are performed during a limited period of time, so what is actually being measured is the metabolic consequences of a change in the diet, and therefore, people misinterpret their results. This was one of the observations that helped me develop my theory–I noticed that scientific studies have reliably shown that when there is a drastic change in the diet, the body responds very swiftly and efficiently.

BP: Isn't changing the diet often unphysiological–unnatural?

TA: No, it's the opposite. Our genes have not evolved much during the last 100,000 years; thus, they are still developed for our hunter/gatherer and, more recently, pastoral ancestors, who, whenever they succeeded in killing an animal, lived on meat for a week or two. At other times, when they had bad luck hunting and a crop failed, they lived on a low-calorie diet. This selective pressure gave man adipose tissue with almost unlimited storage capacity and a very adaptive metabolism to cope with periods of different diets. So, that's what we're made for!

BP: How do our bodies adapt to these changes?

TA: Basically, our genes control the expression of enzymes. These enzymes control every aspect of our metabolisms, including the activation of different pathways and the rate at which chemical reactions take place in our bodies. [Outside biochemical system enzymes are often referred to as catalysts.] Evolution has given our genes the ability to control the production of these enzymes as well as their activity level. Due to this fact, the body will be able to adapt to different food intakes as well as become prepared or "primed" for a future, sudden change in the diet. For example, during a

calorie [or any macronutrient] restricted period, the number and activity of enzymes which govern storage will increase, while the degrading enzymes and those which promote the efficiency or utilization will decrease in activity. This is one reason you should never restrict your calorie or dietary-fat intake too much if you want to lose fat–your body will respond the opposite of how you want it to.

On the other hand, after a period of restriction, the body is now optimized for a forthcoming period of "excess" intake of calories. When this period takes place, the body will store excess calories at a tremendous rate. This applies to carbohydrates [glycogen] and is the basis for "carb loading." It also applies to fats [triglycerides] and amino acids [proteins]. Sometimes this mechanism is called "super-compensation." However, it is important to remember that the body has a high turnover rate of enzymes; hence, the increased activity/number will disappear in a relatively short period of time—less than two weeks in most cases. Enzymes not only control the metabolism of fats, glucose, and proteins directly but also indirectly via hormones. The reason the endocrine system evolved in multi-cellular organisms could be to make a regulatory system that operated over a longer period of time. For example, persistent excess-calorie intake rapidly increases the release of certain anabolic hormones [to store the excess energy as muscle] with a peak after about two weeks. According to the metabolic situation, the body has a preset program under which suitable proteins [enzymes, receptors, binding proteins, and peptide hormones] are being synthesized. This metabolic situation depends on what and how much you have been eating and the type of training during the last few days. Do you get the picture now? You have to make the body believe that an anabolic burst is necessary now and then.

The bottom line is that if your goal is to not look like an average person, you have to "trick" the body constantly in order to have different enzymatic and endocrine systems primed at different times. The timing is a very crucial factor here. That's what the ABCDE program is all about.

BP: Now, let me see if I've got this straight–by eating a certain way–by changing your diet often, you can enhance muscle building? Do you follow a high-carb diet for a period of time, then switch to a high-protein diet or a high-fat diet?

TA: Not exactly. The research indicates that overall energy [calorie] intake has a much greater effect on nitrogen balance [associated with muscle gain] than protein intake does.13 I believe the same is true of carbohydrates and fats.

A good study, with test subjects having a fixed protein intake of 1.25 g/kg/day but with different total-energy intakes, showed that an increase in calories of 15% enhanced nitrogen retention from 7.2 mg/kg/day to 23.8. When energy intake was increased to 30% above requirement, nitrogen balance rose to 33.3 mg/kg/day.1 Basically, adding calories to the diet is anabolic, and I don't just mean it raises insulin levels–by adding just one anabolic hormone, you'll never get optimal gains in muscle. You need the whole array of anabolic hormones, and they have to be in the correct ratio to each other. This is what happens during puberty.
Few people have access or the financial wherewithal to purchase all of the necessary hormones, and certainly, no person has the knowledge of the optimal dosages in this "stack." But, your own body creates this "stack" or "hormonal milieu" when you overfeed it. Then you reach an anabolic state. While dieting, there will be a muscle anti-catabolic response that ultimately will fail with time. By combining these two states–by cycling your calorie intake over the correct period of time, your average fat mass will not increase, but your average lean body mass will go up significantly!

BP: Okay. I think I see what you're saying. The human body has been programmed to store excess energy very efficiently when you overfeed it, so it can survive periods of famine that our ancestors regularly had to go through. Now, that sounds fine and dandy, but bodybuilders have tried high-calorie diets before, and although they do help you get big, it seems like you gain a lot more fat than muscle, and when you diet to lose the fat, you sacrifice the muscle, too. You just end up going around in circles–I've done the same thing myself. Isn't this what we're talking about?

TA: No, not at all. I'm not talking about going on a "bulking diet" where you overeat for an entire season and then take 12 weeks to cut up–that doesn't work. I'm not talking about one of these ridiculous 10,000-calorie-a-day diets, either. The secret to my system is acute or "whiplash" calorie cycling. You overfeed the body for only two weeks and then diet for two weeks.

BP: What's the rationale behind staying on each calorie cycle for just two weeks?

TA: The two-week calorie cycles are based on scientific evidence and empirical data. In one study by Forbes, et al., entitled the "Hormonal Response to Overfeeding,"2 it was demonstrated that when test subjects started with a maintenance-calorie-intake diet and then went on a nutrition program that provided 1,200 to 1,600 extra calories a

day, their blood tests showed a progressive increase in IGF-1, testosterone, and insulin [which doubled in 14 days!], all in concert with an increase in lean body mass. However, the hormone levels peaked and began to decline on day 14 of the high-calorie diet! This is a very important observation.

By day 21, the test subjects in this study gained 3-6 lbs of lean body mass and gained a few pounds of bodyfat as well. However, these test subjects did not perform any resistance exercise, and the excess food provided only six percent of energy from protein, and the test subjects were women–we don't know yet, but the testosterone boost could be even greater in men, leading to more muscle accumulation.

BP: Interesting. Are there any other studies that support your theory?

TA: Yes, there are. In a 12-day study conducted by Jebb, et al., reported very recently in the American Journal of Clinical Nutrition,7 entitled "Changes in Macronutrient Balance During Over- and Underfeeding Assessed by 12-Day Continuous Whole-Body Calorimetry," it was shown that when male test subjects went from a maintenance-calorie-intake diet to an overfeeding diet [approximately 3,600 total calories a day], within 12 days, they gained 4.38 lbs of lean mass and put on just 2 lbs of fat. The same study showed that when test subjects went on a pretty drastic [around 1,000 calories a day] diet for 12 days, they lost, on average, 4.6 lbs of bodyfat and only 2.4 lbs of lean mass.

As you can see, during this short overfeeding period, the amount of lean mass to fat gained was in a ratio greater than 2:1, and in the underfeeding phase, the amount of fat versus muscle lost was 2:1.

Hypothetically, if you were to follow a two-week overfeeding phase with a two-week diet, you would actually gain muscle and lose fat, even if you didn't exercise. Needless to say, if you train with weights and follow a more precise nutrition program, much less use supplements that can enhance the anabolic and anti-catabolic effects of each phase of this diet, you can continue to gain muscle, without getting fat!

Experiments I've conducted on myself and a number of my bodybuilding colleagues confirm that body composition is enhanced after each cycle.

BP: I don't understand how someone can gain muscle without working out–I mean, after you've gone through puberty, hasn't your body pretty much established how much muscle you're going to have naturally without providing some type of stimulus for new growth–without working out or taking steroids or something?

TA: When an individual who is consuming a maintenance-calorie diet [eating as much as the body's metabolism requires each day] increases calorie intake substantially, that is a stimulus for muscle growth–even in adults. It's somewhat of a widely accepted fallacy that when you eat too much, whether it's hamburgers, donuts, or even healthy foods like fruits, vegetables, lean meats, etc., your body's only storage compartment for these excess calories is adipose tissue [fat]. Scientific research shows that people who are overweight have more fat mass and more lean mass than their slender counterparts.3

The truth is, overfeeding your body is actually more anabolic [causes more muscle growth] than training with weights! Unfortunately, overfeeding also produces an undesirable increase in fat mass, which is contrary to what most bodybuilders seek—they work to build a lean, muscular physique, not simply one that takes up more space.

The tricky part of developing my new theory, which I've been working on for years, was to find a way to harness the body's natural "calorie-induced" anabolic potential while somehow finding a way to not increase bodyfat stores significantly. The secret is acute calorie cycling or ABCDE.

BP: If the body rapidly adapts to all of these different diets, won't it adapt to the ABCDE system also?

TA: I don't think it can. As long as you drastically increase calories, then reduce calories during each cycle, the body has to respond the way it's programmed to. I would recommend that someone keep doing high- and low-calorie cycles, back to back, as long as they continue to gain muscle with each cycle.

BP: Why do you suppose anabolic hormone levels peaked in Forbes' study after approximately two weeks?

TA: This has to be the body's natural response to such conditions, as it was seen in virtually all the test subjects. Exactly why this happens, no scientist can say for certain, but I have a theory: throughout the evolution of man, there have always been times of plenty followed by periods of famine. When the food supply was abundant, it became very important for the body to start up the right "metabolic program" with the right priorities, since it didn't know how long the abundance would last. In the short run, let's say over a few days, the availability of swift energy was always more important for

our ancestors than muscle strength. I know some bodybuilders will not agree with me there. Anyway, the energy cost of building muscle tissue is much greater than just storing fat as triglycerides or carbohydrates as glycogen. Therefore, during the first days, the glycogen depots will increase, and now we are coming to the interesting part: the amount of fat inside the muscle cell will increase as well, which is actually a good thing! This is why you are experiencing such a nice muscle pump the day after you have been feasting on fatty food items. Recently, research has concluded that this fat [intracellular triglycerides] has very important regulatory functions. I'm not going into great detail here–I'll cover that in our next article–but the result will be muscle synthesis, followed by storage of the excess calories in adipose tissue.

Back to your question. Even though our ancestors had to be strong enough to fight and hunt, if they built too much muscle, their metabolic rates would get too high, and in the "old, old days," people with very high metabolic rates did not survive famines. Thus, the body adjusts, so after two weeks of overfeeding, the body becomes more efficient at storing excess calories in adipose cells.

Basically what I'm saying here is that we have a small time window of about 14 days–long enough for muscle hypertrophy to occur, while short enough to keep a substantial amount of fat from being stored in the adipose tissue.

By the way, Bill, have you noticed that more and more steroid-using bodybuilders are switching over to ultra-short cycles, for one to two weeks, with mega doses? They claim the extra strength and mass they put on after this period is only due to water retention and will subsequently be lost. Maybe the perfect duration of an anabolic boost is around two weeks.

It's really quite fascinating when you think about it, and it's a logical theory. Can I substantiate this with rock-hard scientific data? No, not yet, but the available scientific literature offers evidence this is the way the human body works.

BP: Wow. That's powerful stuff! You mentioned that you've already tried calorie cycling–how did it work? Torbjorn is not a small guy—he's 6'1□, 225 lbs, 8% bodyfat, and he's definitely not on steroids; I guarantee it!

TA: It flat out works. During the two-week bulking phase, you can eat just about anything you want, which is actually fun–guilt-free ice cream and Swedish meatballs! If you begin an overfeeding program after a diet, within a matter of days, you'll notice an increase in muscle fullness and strength. It's absolutely "drug like" the way your body changes so rapidly.

During my last 2 bulking phases, I gained 7 and 6 lbs, respectively, and during both cycles, the amount of lean mass to fat was 3:1.

Of course, some of the lean mass is increased cell volume from the extra glycogen; remember, when you start overfeeding, your body stores macronutrients in every available compartment–you store protein as muscle, fat as triglyceride in adipose tissue, and carbohydrate as glycogen, which enhances strength and muscle size.

The dieting phase is fairly difficult, but restricting calorie intake for just two weeks is nothing compared to what many bodybuilders do–starving themselves for two, three, or even four months to get ready for a photo shoot or contest. Every time I get hungry, I always know it will be only a matter of days before I can eat just about anything I want again. This helps compliance a great deal.

During my dieting phases, I have been able to lose virtually all of the fat I gained on my bulking cycles while dropping only a couple pounds of lean mass. You might think of the ABCDE as a two-steps-forward, one-step-back program.

I have a number of "gym buddies" who I've had experimenting with the system, and their results have been very similar to mine. On each cycle, you'll gain between two and five pounds of muscle, which, for someone who has been training for over a decade, like I have, is a phenomenal thing to experience.

BP: I've heard that the type of muscle you gain from consuming a high-calorie diet is structurally not the same as the muscle you gain from weight training–that it's not quality muscle. Is this true?

TA: I can't agree with that. Let me explain. During the bulking phase of the ABCDE program, several things happen. First of all, fluid, glycogen, and amino acids are loaded into the myocyte [muscle cell]. According to Häussinger's theory of cellular hydration5,6 and Millward's "full-bag" theory,9 the cell will actually stretch. This stretching, or as Millward calls it, "bag filling," occurs rapidly during the bulking phase of this system. Bag enlargement is remodeling of the connective tissue. [This topic will be discussed in detail in Part 2 of this article, which will be featured in the next issue of Muscle Media 2000.] Remodeling is stimulated during the stretching or eccentric components of exercise and is further enhanced by the incredible pump you'll get while training during this phase of the diet. [Remember how Arnold used to always say the pump meant you were growing? Maybe he was right!]

After the cell has loaded up with glycogen, amino acids, creatine, and fluid–when it cannot store any more energy, 2 things will happen as long as the endocrine

environment is optimal, which it is after 10-14 days of overfeeding, according to Forbes' study.2 The cell will start to build up the ultimate storage form of energy, namely actin and myosin, and under the influence of IGF-1, satellite cells will start to split to create new nuclei. Try to follow me closely here–toward the end of the anabolic/bulking phase, when all of the energy stores within the myocyte are completely full, when the cell is hydrated to its maximum, when the myocyte is not inhibited by a lack of space, when the blood has a high concentration of IGF-1, when there is a high mitochondrial activity of the cell, when exercise has induced an acute local [autocrine and/or paracrine] release of growth factors, THEN the potential for satellite cells to fuse with the myocyte is increased, thus adding nuclei to the muscle cell. [Go ahead and take a minute to read that very long, complicated sentence again. I'll wait. Okay, ready to continue? Good.]
This represents the ultimate quality growth of muscle, since the amount of available DNA [which makes proteins] increases. I have coined this phenomenon neomyobolism. It seems that the cell wants to keep a constant relationship between cell volume and number of myonuclei.10 The myonuclear number also seems to be correlated with mitochondrial content of the cell.15 Therefore, if you increase the number of mitochondria through exercise and elevate hormone levels, as well as increase the volume of the cell through overfeeding and using cell-volumizing supplements, like creatine and glutamine, it is logical that fusion will take place and deliver more nuclei. Voilà–steroid-like gains in quality muscle mass!

BP: All righty then… So what you're telling me is that the muscle you gain during the bulking phase of the ABCDE system is good muscle, and I assume you're saying it's the type of muscle that is functional and lasts—it won't disappear overnight?

TA: Exactly, and boy was I happy when, after my early experiments, I discovered that my theory on lasting muscle was confirmed.

BP: What type of macronutrient profile do you think is optimal during each phase of the diet? Do you recommend a high-protein intake, a high-carb intake, or…?

TA: The macronutrient profile of the diet is not nearly as important as the total-energy intake, but one could logically surmise that consuming a higher protein diet during the bulking phase may stimulate anabolic drive and produce even greater nitrogen retention. In the studies by Forbes and Jebb that I've already mentioned, I believe the

results would have been more substantial if the subjects had been consuming more protein.8

The ratio of macronutrients during the anabolic phase is actually not far from the ordinary, habitual diet most people eat and is actually in concert with Dr. Erasmus' recommendations of 20% protein, 50% carbohydrates, and 30% fat. However, an even higher protein, lower carbohydrate bulking diet may also be effective, but the health aspects concern me a bit here.

I have numerous theories, which I'm developing, on how to set up "microcycles," where you consume different macronutrient profiles on different days of the two-week high-calorie and low-calorie phases. But rather than get into all those intricacies at this point, I will simply emphasize that it is very likely a substantial effect will be realized by consuming high quantities of food rich with quality protein [at least one gram per pound of bodyweight per day], carbohydrates, and unsaturated fats.

BP: What about the low-calorie phase? What type of nutrient profile do you recommend?

TA: First of all, let's backtrack a bit and go over why it's so important to have a low-calorie/dieting phase in this program. This dieting phase actually serves two very important purposes. First, we want to strip off what fat will be gained during the two-week bulking phase. This is very important, as bodybuilders want to gain muscle, not fat.

A second very important aspect of the dieting phase of this program is to "reprime" your body's enzymes and anabolic hormones. As I've already discussed, testosterone, insulin, and IGF-1 levels start to decline after about two weeks of overfeeding. In order to boost these levels again, you've got to trick the body into thinking it's necessary to store more calories as muscle tissue.

The great thing about these short, low-calorie, two-week dieting phases is that fat loss is very efficient during this time. As one of your authors, Dan Duchaine, has cited often in previous issues of Muscle Media 2000, after a few weeks of dieting, the body starts to adjust–to adapt. I'm sure you and your readers have experienced this–after a few weeks of dieting, your progress comes to a standstill, and to experience further weight loss, you have to increase calorie expenditure through exercise or further decrease energy intake, both of which may lead to an increased loss of fat and muscle.

As you know, fat loss is all but impossible in the presence of elevated insulin levels—a

high-carbohydrate diet will severely inhibit fat oxidation. Also, if you followed a high-carbohydrate diet during the low-calorie phase, the accompanying increase in fat oxidation would make you put on a lot of fat during the next bulking phase. Nevertheless, carbohydrates also have some very important properties during a hypocaloric diet, such as keeping GH and IGF-1 primed. Therefore, it's almost necessary to perform "microcycles" for optimal results.

BP: How many calories should somebody eat on the bulking phase and cutting program?

TA: Once again, I'll go into much more specific detail on this topic in future articles, but a rough guideline–a place to start–would be to take your bodyweight times 12 [to approximate maintenance-calorie intake for an individual who's not extremely active] and add 1,500 calories to this number. For example, a person who weighs 200 lbs, like yourself, would consume about 4,000 calories a day during the bulking phase [200 x 12 = 2,400 + 1,500]. On the low-calorie phase, I would recommend consuming a number of calories equal to your bodyweight times eight. That would be about 1,600 calories for you [200 x 8 = 1,600].

This is just a rough place to start–a person's activity level [whether they have desk jobs or are construction workers could make a big difference] and a person's muscle mass and metabolism also come into play. If a bodybuilder is following this recommendation and not gaining weight during a bulking phase, I would recommend increasing calorie intake by 500 calories a day, for a week, and if a substantial weight gain is not realized, I would take it up 500 more calories the next week.

Likewise, if someone is not losing bodyweight on the low-calorie phase, I would recommend decreasing calorie intake by 300 calories a day, per week.

Remember that each time you start an anabolic phase, you may need to increase your calorie intake, provided you're gaining lean body mass. For example, if you go from 190 to 195 lbs during your first anabolic and fat-burning cycle, you should add about 100 more calories to your diet per day for the next cycle.

BP: What happens if you don't gain a significant amount of weight on the bulking phase or lose weight during each dieting phase?

TA: I would highly recommend that all those who try this system keep track of their calories as best they can, simply by writing down what they eat each day, the time

they eat it, and do their best to calculate how many calories they're consuming–this data could be recorded in a notebook or journal. Having a record of what you've done will allow you to troubleshoot your program very effectively. If you're not gaining a significant amount of weight [at least three pounds a week during the bulking phase], then you need to increase your calorie intake. During the cutting phase, if you don't lose weight, you need to consume less calories. It's very simple to make adjustments on this program.

In addition to keeping a journal, it would also be very beneficial to keep track of your body composition and actually maintain an updated line graph [like the one shown below] to gauge your progress.

BP: What if you fail to gain muscle and lose fat even after making adjustments?

TA: Well, I would be amazed if that were the case. But if that happens to you, then your body's got bigger problems than the Anabolic Burst Cycling of Diet and Exercise system can solve.

BP: What about exercise? Should you perform a different type of training during the bulking phase versus the dieting cycle?

TA: This is an area that can also get quite complex, but for the time being, I think it would be sufficient to say that during the bulking phase, you should avoid aerobic exercise and conduct heavy, intense weight-training sessions. As energy, strength, and recovery levels will be heightened during this period, you might be able to train with weights five days a week. When I'm on my high-calorie/bulking phase, my strength literally goes up every workout. During intense weight training, your body further stimulates the release of testosterone and growth hormone.

During the dieting phase, it is very important to include aerobic exercise, and the best time to do this is in a fasted state; i.e., in the morning, before breakfast. Recent studies at my lab strongly support this. I have experienced excellent results doing 40 minutes of moderate-intensity aerobic exercise 4 days a week–I keep my pulse around 120 beats per minute. During aerobic exercise, your body is more likely to stimulate the production of fat-burning chemicals like epinephrine.

During this low-calorie phase, I would expect one to see good results training with weights 3 days a week, doing a more moderate-intensity program—for example, conducting 3 sets of 8-12 reps on standard exercises like dumbbell bench presses,

lateral side raises, incline curls, triceps pushdowns, etc. Remember, your training goals during the low-calorie phase are to lose fat while maintaining as much muscle tissue as possible.

BP: I see–you should go all out during the bulking phase, training heavy and hard, eating a bunch of food, then after two weeks, drop the calorie and carbohydrate intake substantially, perform regular aerobic exercise, and back off a bit on the weight training. That makes sense. What about meal frequency and supplements?

TA: I'm a proponent of frequent feeding–I think you should eat every three hours or so during the day for optimum results. This would mean you'd consume five or six meals a day.

In terms of supplements, this is an area where I think you can substantially increase the effects of the ABCDE program. It's also an area that can get quite complex and one that I'll go into in greater detail on in the future. In fact, I'm presently writing a book about this system, which will spell out every aspect of this program–all my theories on nutrition, training, and supplementation will be revealed. I think I can have this book completed within the next six to eight months–I would be able to finish it sooner, but my research obligations and time in the ER make it difficult to allocate a significant number of hours to this project, even though it is one I'm quite passionate about.

As far as supplements go, creatine, HMB, glutamine, Vitamin C, and chromium would all be extremely useful as long as they are used properly.4,11,12,16 I'll cover this in the next article, as it is quite complicated.

BP: So whom would you recommend the ABCDE program to?

TA: This is the type of bodybuilding program I would highly recommend to drug-free weight trainers who are trying to increase muscle mass without gaining fat. On this program, it's even possible to lose bodyfat while you gain muscle mass, but I would not recommend it for the obese.

BP: Would this program work for someone who's using steroids or who has just completed a steroid cycle?

TA: I'm not sure. I'm concerned that if someone is coming off a steroid cycle, the

body's endocrine system may not function properly and will not respond to the anabolic stimulus of a hypercaloric diet.
I would have the same concern about someone who is presently using steroids–the body may not respond optimally because of all the interrupted feedback loops.

BP: What if someone tried to create his own "super-enhanced" bulking and fat-burning cycles by taking insulin, growth hormone, and fast-acting oral steroids for two weeks while consuming a lot of calories and then went on fat-burning drugs, like Cytomel and clenbuterol, and consumed a low-calorie diet for two weeks. Is it likely he would get phenomenal results?

TA: Hmm. I've never thought about that. It's obvious you know your readers better than I do and are anticipating this is what some radical bodybuilders might try to do. But actually, it's an interesting question. Whether we take a number of hormones or we overfeed, we create constantly elevated levels of anabolic hormones in the bloodstream. These two states [exogenous vs. endogenous hormones] may look the same, but they are totally different. You see, in the former case, you add hormones to a body in homeostasis, meaning it will do a number of things to counteract the increased level, including blunt its own production of the hormones, increase the breakdown and excretion, decrease receptor sensitivity and number, increase the amount of binding proteins, and so on. While in the latter case, the body has created a hormonal environment aimed for anabolism and will not counteract itself. This way, the cycle will work very well every time you try it. I actually can't see any advantages to using drugs during the ABCDE program.

BP: What if people are already on a high-calorie diet, or what if they're presently on a low-calorie diet and they want to try your ABCDE program?

TA: If some of your readers are already consuming an excess number of calories, they should start the ABCDE program with the low-calorie phase to "reprime" their anabolic systems, so to speak.
If they are already on a low-calorie diet, let's say they're getting ready for a bodybuilding contest or a photo shoot, following this would be an excellent time to start the Anabolic Burst Cycling program with a high-calorie phase. In fact, many bodybuilders will probably recognize that they have "unintentionally" done an anabolic-burst high-calorie dieting phase already–anyone who's cut up for a contest

and then "pigged out" for a few weeks afterwards will confirm he/she gained size and strength at a phenomenal rate, and not all of the weight gained was fat. Ask them–they'll confirm this!

One of the things that's often discussed in bodybuilding is that those who compete make better gains, year in and year out, than those who don't because they're forced to go on calorie cycles, albeit rather traditional, longer ones. My acute, two-week calorie cycles will produce even better results than competitive bodybuilders get from cutting up and bulking up. On this system, you're literally bulking and cutting every month.

BP: Are there any down sides to this program?

TA: Traditionally, high-calorie diets are associated with several undesirable effects, such as increased cholesterol levels and a greater risk of cardiovascular disease, but since the overfeeding phases are only two weeks in length and are followed by a fat-loss phase, I don't believe there will be any adverse health consequences. I think the ABCDE program is very safe.

And, the program has numerous advantages over other diets, which make it much easier to follow, henceforth more effective, such as: it offers variation, thus it won't become tedious to follow; it doesn't induce a mental state where you can't function within a social context; it's based on legitimate scientific findings; the "perfect" ratio of macronutrients in every meal is relatively unimportant; overall, the diet is relatively easy to follow; and the program allows you to make changes within the framework of the diet in regards to your personal ambitions and goals.

All of these things that I just mentioned are not true of ketogenic diets, the Zone Diet, very high-protein diets, starvation diets, very low-fat diets, high-carbohydrate diets, and high-fat diets.

Back to Top

Conclusion

As you can see, you really do have access to some powerful anabolic hormones–the good stuff! You really do have a source for real insulin, IGF-1, and testosterone–a source you can use to pack on pounds of new muscle! And, now you know some things about how to tap into that source and how to use your body's natural biochemistry to build muscle size and strength faster than you might have ever

imagined!
The ABCDE system just flat out makes sense. It's backed by a strong scientific theory, and before long, I predict thousands and thousands of bodybuilders will be singing the praises of this system, and we'll all be smacking ourselves in the forehead and saying, "Damn... why didn't we think of this sooner... it makes so much sense!"
Remember, Muscle Media 2000 was the first magazine–the source–to break this exclusive story, one that I think is probably among the most exciting bodybuilding discoveries ever made!
After this interview with Torbjorn, I was "sold." I'm going to try this program. You may want to try it, too. But, Torbjorn says the ABCDE system will work even better if you know all the details of this program. So, you may want to wait until after you read Part 2 of this story to give it a try.

Back to Top
References Cited

1 A.N. Chiang, et al., "Excess Energy and Nitrogen Balance at Protein Intakes Above the Requirement Level in Young Men," Am. J. Clin. Nutr. 48 (1988) : 1015-1022.

2 G.B. Forbes, et al., "Hormonal Response to Overfeeding," Am. J. Clin. Nutr. 49.4 (1989) : 608-611.

3 G.B. Forbes, et al., "Lean Body Mass in Obesity," Int. J. Obes. 7.2 (1983) : 99-107.

4 A.L. Green, et al., "Creatine Ingestion Augments Muscle Creatine Uptake and Glycogen Synthesis During Carbohydrate Feeding in Man," J. of Phys. 491.P (1996) : 63-64.

5 D. Häussinger, et al., "Cellular Hydration State: An Important Determinant of Protein Catabolism in Health and Disease," Lancet 341.8856 (1993) : 1330-1332.

6 D. Häussinger, et al., "Cell Swelling Inhibits Proteolysis in Perfused Rat Liver," Biochem. J. 272.1 (1990) : 239-242.

7 Jebb, et al., "Changes in Macronutrient Balance During Over- and Underfeeding Assessed by 12-Day Continuous Whole-Body Calorimetry," Am. J. Clin. Nutr. 64 (1996) :

259-266.

8 D.J. Millward, “The Endocrine Response to Dietary Protein: The Anabolic Drive on Growth,” Milk Protein (1989) : 49-61.

9 D.J. Millward, “A Protein-Stat Mechanism for Regulation of Growth and Maintenance of the Lean Body Mass,” Nutr. Res. Rev. 8 (1995) : 93-120.

10 F.P. Moss, “The Relationship Between the Dimension of the Fibers and the Number of Nuclei During Normal Growth of Skeletal Muscle in the Domestic Fowl,” Am. J. Anat. 122 (1968) : 555-564.

11 S.L. Nissen, et al., “Effect of ß-Hydroxy ß-Methylbutyrate (HMB) Supplementation on Strength and Body Composition of Trained and Untrained Males Undergoing Intense Resistance Training,” Experimental Biology ’96 Conference Presentation Abstract (1996).

12 S.L. Nissen, et al., “The Effect of the Leucine Metabolite ß-Hydroxy ß-Methylbutyrate on Muscle Metabolism During Resistance-Exercise Training,” J. Appl. Physiol. 81.5 (1996) : 2095-2104.

13 E.B. Oddoye, et al., “Nitrogen Balance Studies in Humans: Long-Term Effect of High Nitrogen Intake on Nitrogen Accretion,” J. Nutr. 109.3 (1979) : 363-377.

14 E. Ravussin, et al., “Short-Term, Mixed-Diet Overfeeding in Man: No Evidence for ‘Luxuskonsumption,’” Am. J. Physiol. 249.5 (1985) : E470-E477.

15 B.S. Tseng, et al., “Cytoplasm-to-Myonucleus Ratios and Succinate Dehydrogenase Activities in Adult Rat Slow and Fast Muscle Fiber,” Cell Tissue Res. 275 (1994) : 39-49.

16 M. Varnier, et al., “Stimulatory Effect of Glutamine on Glycogen Accumulation in Human Skeletal Muscle,” Amer. J. Physiol. 269.2 (1995) : E309-E315.”

Related links:

– Anabolic Burst Cycling of Diet and Exercise Part I:

http://wp.me/pN5lq-78

or http://www.4web.dk/training/part1.htm

– Anabolic Burst Cycling of Diet and Exercise Part II:

http://wp.me/pN5Iq-eS

or http://www.4web.dk/training/part2.htm

– Anabolic Burst Cycling of Diet and Exercise Part III:

http://wp.me/pN5Iq-eZ

or http://www.4web.dk/training/part3.htm

– Anabolic Burst Cycling of Diet and Exercise Part IV :

http://wp.me/pN5Iq-f6

or http://www.4web.dk/training/part4.htm

– How to BULK UP Fast! (TRUTH about "Bulking and Cutting") – Athlean-X

– Coach Charles Poliquin's Take on Bulking Myths

This entry was posted in Nutrition and tagged ABCDE diet, diet, hormone, insulin, Nutrition, Torbjorn Akerfeldt on February 2, 2010 by myoblast.

Trans fat, health risks

Leave a reply

"(...)

Health risks

Partially hydrogenated vegetable oils have been an increasingly significant part of the human diet for about 100 years (particularly since the latter half of the 20th century and in the West where more processed foods are consumed), and some deleterious effects of trans fat consumption are scientifically accepted, forming the basis of the health guidelines discussed above.

The exact biochemical methods by which trans fats produce specific health problems are a topic of continuing research. The most prevalent theory is that the human lipase enzyme is specific to the cis configuration[citation needed], rendering the human body unable to metabolize or remove trans fat. A lipase is a water-soluble enzyme that catalyzes the hydrolysis of ester bonds in water-insoluble, lipid substrates. Lipases thus comprise a subclass of the esterases. Lipases perform essential roles in the digestion, transport and processing of dietary lipids (e.g. triglycerides, fats, oils) in most – if not all – living organisms. The human lipase enzyme is ineffective with the trans configuration, so trans fat remains in the blood stream for a much longer period of time and is more prone to arterial deposition and subsequent plaque formation. While the mechanisms through which trans fats contribute to coronary heart disease are fairly well understood, the mechanism for trans fat's effect on diabetes is still

under investigation.

Coronary heart disease

The primary health risk identified for trans fat consumption is an elevated risk of coronary heart disease (CHD).[38] A comprehensive review of studies of trans fats was published in 2006 in the New England Journal of Medicine reports a strong and reliable connection between trans fat consumption and CHD, concluding that "On a per-calorie basis, trans fats appear to increase the risk of CHD more than any other macronutrient, conferring a substantially increased risk at low levels of consumption (1 to 3% of total energy intake)".[4] This study estimates that between 30,000 and 100,000 cardiac deaths per year in the United States are attributable to the consumption of trans fats.[39]

The major evidence for the effect of trans fat on CHD comes from the Nurses' Health Study — a cohort study that has been following 120,000 female nurses since its inception in 1976. In this study, Hu and colleagues analyzed data from 900 coronary events from the study's population during 14 years of followup. He determined that a nurse's CHD risk roughly doubled (relative risk of 1.94, CI: 1.43 to 2.61) for each 2% increase in trans fat calories consumed (instead of carbohydrate calories). By contrast, it takes more than a 15% increase in saturated fat calories (instead of carbohydrate calories) to produce a similar increase in risk. "The replacement of saturated fat or trans unsaturated fat by cis (unhydrogenated) unsaturated fats was associated with larger reductions in risk than an isocaloric replacement by carbohydrates."[40] Hu also reports on the benefits of reducing trans fat consumption. Replacing 2% of food energy from trans fat with non-trans unsaturated fats more than halves the risk of CHD (53%). By comparison, replacing a larger 5% of food energy from saturated fat with non-trans unsaturated fats reduces the risk of CHD by 43%.[40]

Another study considered deaths due to CHD, with consumption of trans fats being linked to an increase in mortality, and consumption of polyunsaturated fats being linked to a decrease in mortality.[38][41]

There are two accepted tests that measure an individual's risk for coronary heart disease, both blood tests. The first considers ratios of two types of cholesterol, the other the amount of a cell-signalling cytokine called C-reactive protein. The ratio test is

more accepted, while the cytokine test may be more powerful but is still being studied.[38] The effect of trans fat consumption has been documented on each as follows:

Cholesterol ratio: This ratio compares the levels of LDL (so-called "bad" cholesterol) to HDL (so-called "good" cholesterol). Trans fat behaves like saturated fat by raising the level of LDL, but unlike saturated fat it has the additional effect of decreasing levels of HDL. The net increase in LDL/HDL ratio with trans fat is approximately double that due to saturated fat.[42] (Higher ratios are worse.) One randomized crossover study published in 2003 comparing the postprandial effect on blood lipids of (relatively) cis and trans fat rich meals showed that cholesteryl ester transfer (CET) was 28% higher after the trans meal than after the cis meal and that lipoprotein concentrations were enriched in apolipoprotein(a) after the trans meals.[43]

C-reactive protein (CRP): A study of over 700 nurses showed that those in the highest quartile of trans fat consumption had blood levels of CRP that were 73% higher than those in the lowest quartile.[44]

Other effects

There are suggestions that the negative consequences of trans fat consumption go beyond the cardiovascular risk. In general, there is much less scientific consensus that eating trans fat specifically increases the risk of other chronic health problems:

Alzheimer's Disease: A study published in Archives of Neurology in February 2003 suggested that the intake of both trans fats and saturated fats promote the development of Alzheimer disease.[45]

Cancer: There is no scientific consensus that consumption of trans fats significantly increases cancer risks across the board.[38] The American Cancer Society states that a relationship between trans fats and cancer "has not been determined."[46] However, one recent study has found connections between trans fat and prostate cancer.[47] An increased intake of trans-fatty acids may raise the risk of breast cancer by 75%, suggest the results from the French part of the European Prospective Investigation into Cancer and Nutrition.[48][49]

Diabetes: There is a growing concern that the risk of type 2 diabetes increases with trans fat consumption.[38] However, consensus has not been reached.[4] For example, one study found that risk is higher for those in the highest quartile of trans fat consumption.[50] Another study has found no diabetes risk once other factors such as total fat intake and BMI were accounted for.[51]

Obesity: Research indicates that trans fat may increase weight gain and abdominal fat, despite a similar caloric intake.[52] A 6-year experiment revealed that monkeys fed a trans-fat diet gained 7.2% of their body weight, as compared to 1.8% for monkeys on a mono-unsaturated fat diet.[53][54] Although obesity is frequently linked to trans fat in the popular media,[55] this is generally in the context of eating too many calories; there is no scientific consensus connecting trans fat and obesity.
Liver Dysfunction: Trans fats are metabolized differently by the liver than other fats and interfere with delta 6 desaturase. Delta 6 desaturase is an enzyme involved in converting essential fatty acids to arachidonic acid and prostaglandins, both of which are important to the functioning of cells.[56]
Infertility: One 2007 study found, "Each 2% increase in the intake of energy from trans unsaturated fats, as opposed to that from carbohydrates, was associated with a 73% greater risk of ovulatory infertility…".[57]

(…)"

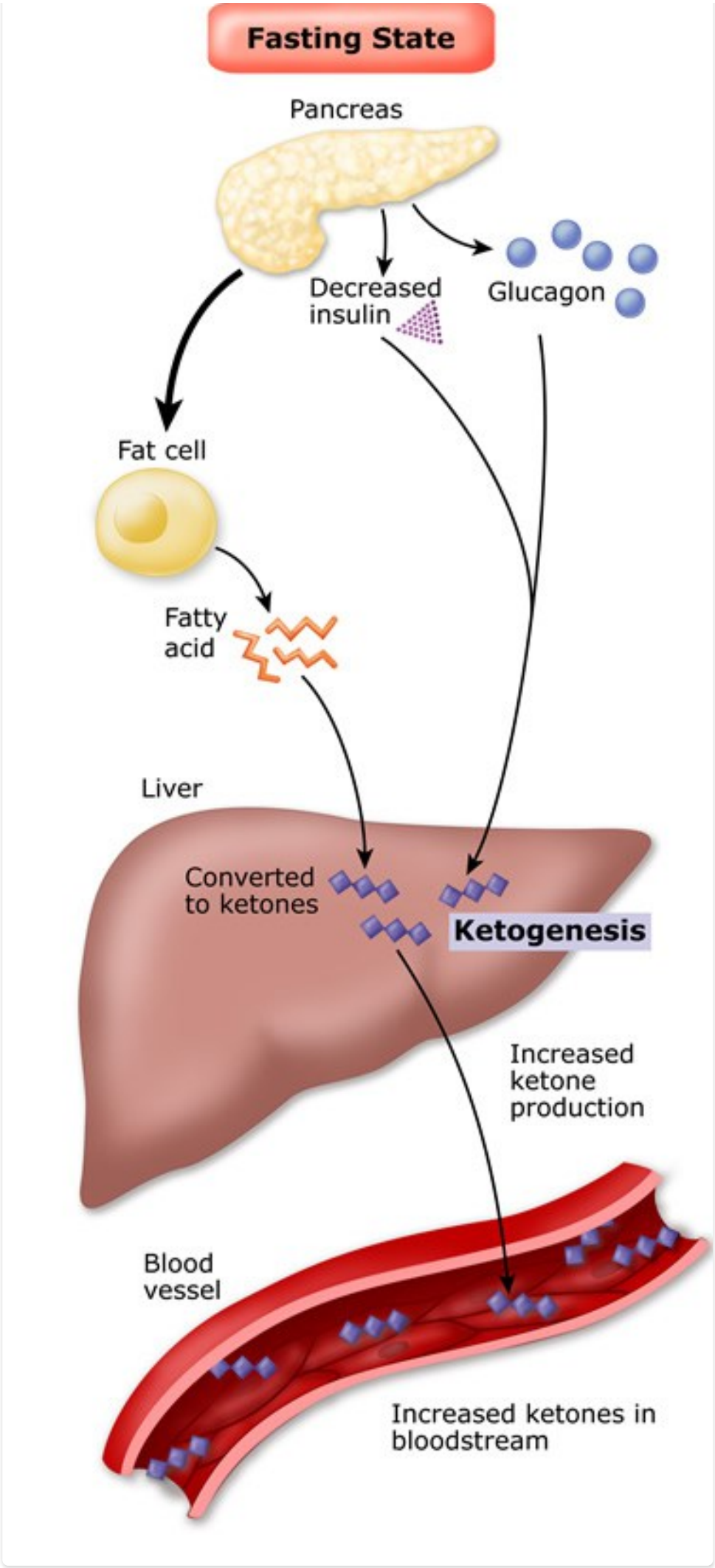
To access the full description, you can click on:
http://en.wikipedia.org/wiki/Trans_fat

Other links:
http://www.cspinet.org/transfat/about.html
http://www.bantransfats.com/abouttransfat.html

This entry was posted in Nutrition and tagged diet, food, health, Nutrition, risks, trans fat on February 2, 2010 by myoblast.

Ketosis

Leave a reply


Fasting State
Pancreas
Decreased insulin
Glucagon
Fat cell
Fatty acid
Liver
Converted to ketones
Ketogenesis
Increased ketone production
Blood vessel
Increased ketones in bloodstream

“In biology, ketosis (pronounced /k□□t□□s□s/) is a state of the organism characterised by elevated levels of ketone bodies in the blood, occurring when the liver converts fat into fatty acids and ketone bodies (which can be used for energy as an alternative to glucose).

Metabolic pathways

Ketone bodies, from the breakdown of fatty acids to acetyl groups, are also produced during this state, and are burned throughout the body.[clarification needed] Excess ketone bodies will slowly decarboxylate into acetone. That molecule is excreted in the breath and urine.

When glycogen stores are not available in the cells (glycogen is primarily created when carbohydrates such as starch and sugar are consumed in the diet), fat (triacylglycerol) is cleaved to give 3 fatty acid chains and 1 glycerol molecule in a process called lipolysis. Most of the body is able to utilize fatty acids as an alternative source of energy in a process where fatty acid chains are cleaved to form acetyl-CoA, which can then be fed into the Krebs Cycle. It is important to note that acetyl-CoA can only enter the Krebs Cycle bound to oxaloacetate. When carbohydrate supplies are inadequate, however, the liver naturally converts oxaloacetate to glucose via gluconeogenesis for use by the brain and other tissues. When acetyl CoA does not bind with oxaloacetate, the liver converts it to ketones (or ketone bodies), leading to a state of ketosis. During this process a high concentration of glucagon is present in the serum and this inactivates hexokinase and phosphofructokinase-1 (regulators of glycolysis) indirectly, causing most cells in the body to use fatty acids as their primary energy source. At the same time, glucose is synthesized in the liver from lactic acid, glucogenic amino acids, and glycerol, in a process called gluconeogenesis. This glucose is used exclusively[clarification needed] for energy by cells such as neurons and red blood cells.

Similar conditions

Ketosis should not be confused with ketoacidosis (diabetic ketoacidosis or the less common alcoholic ketoacidosis), which is severe ketosis causing the pH of the blood to drop below 7.2. Ketoacidosis is a medical condition usually caused by diabetes and accompanied by dehydration, hyperglycemia, ketonuria and increased levels of

glucagon. The high glucagon, low insulin serum levels signals the body to produce more glucose via gluconeogenesis and glycogenolysis, and ketone bodies via ketogenesis. High levels of glucose causes the failure of tubular reabsorption in the kidneys, causing water to leak into the tubules in a process called osmotic diuresis, causing dehydration and further exacerbating the acidosis.

[edit]

Diet

If the diet is changed from a highly glycemic diet to a diet that does not provide sufficient carbohydrate to replenish glycogen stores, the body goes through a set of stages to enter ketosis. During the initial stages of this process the adult brain does not burn ketones; however, the brain makes immediate use of this important substrate for lipid synthesis in the brain. After about 48 hours of this process, the brain starts burning ketones in order to more directly utilize the energy from the fat stores that are being depended upon, and to reserve the glucose only for its absolute needs, thus avoiding the depletion of the body's protein store in the muscles.

Whether ketosis is taking place can be checked by using special urine test strips such as Ketostix.

Ketosis is deliberately induced in the ketogenic diet used to treat epilepsy. Other uses of low-carbohydrate diets remain controversial.[1][2]

Controversy

Some medical resources regard ketosis as a physiological state associated with chronic starvation.[citation needed] Some clinicians regard ketosis as a crisis reaction of the body due to a lack of carbohydrates in the diet and consider it a dangerous and potentially life-threatening state that stresses the liver and causes destruction of muscle tissues.[3][4][5] It should be remembered from the above discussion that ketogenesis does not destroy muscle tissue. Ketogenesis can occur solely from the byproduct of fat degradation: acetyl-CoA. Ketosis, which is accompanied by gluconeogenesis (the creation of de novo glucose from amino acids), is the specific state with which clinicians are concerned.

The anti-ketosis conclusions have been challenged by a number of doctors and

adherents of low-carbohydrate diets, who dispute assertions that the body has a preference for glucose and that there are dangers associated with ketosis.[6][7][8] It has been argued that not only did hunter societies live for thousands of years in a primarily ketogenic state, but also that there are many documented cases of modern humans living in these societies for extended periods of time.[9] While it is believed by some that exercise requires carbohydrate intake in order to replace depleted glycogen stores, studies have shown that after a period of 2–4 weeks adaptation, physical endurance is unaffected by ketosis[9].

(…)"

Source: http://en.wikipedia.org/wiki/Ketosis

This entry was posted in Nutrition and tagged carbohydrate, carbs, diet, endurance, energy, fat, glucose, ketones, ketosis, Nutrition, physical on February 2, 2010 by myoblast.

Carbohydrate Tolerance: Frontline Fat Loss

Leave a reply

"**Carbohydrate Tolerance: Frontline Fat Loss**
by Dave Barr

If you're looking to optimize your fat loss, then you've come to the right place.

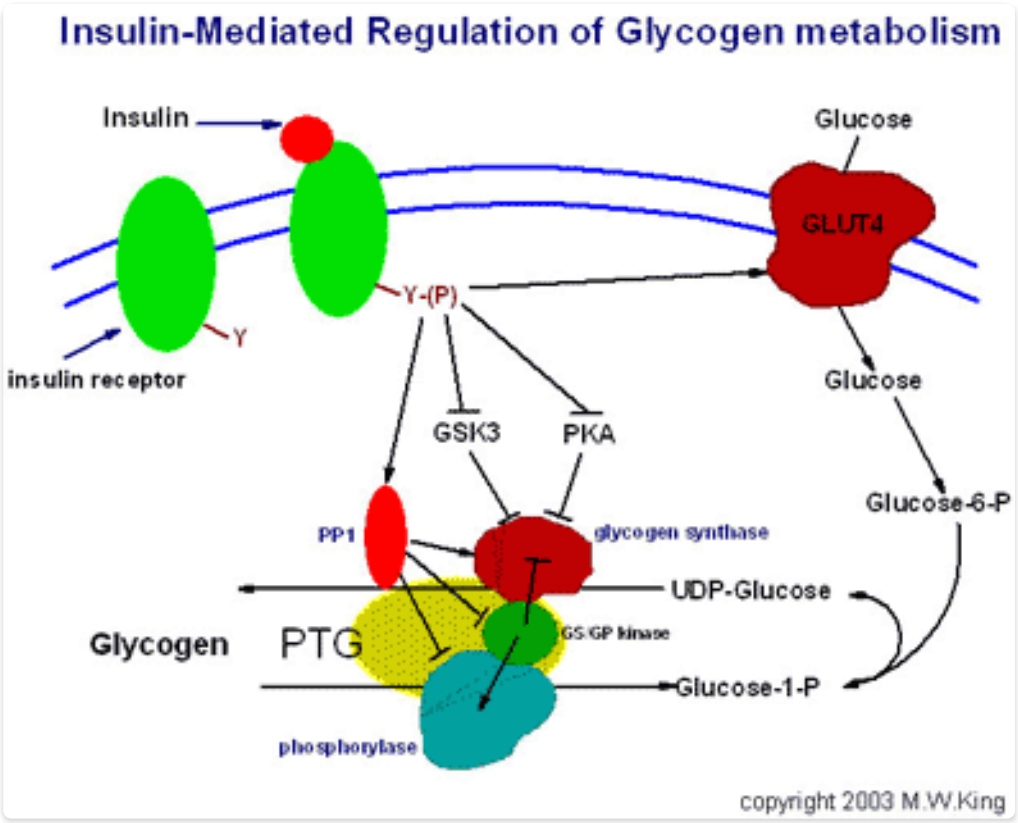
Unfortunately, we've overlooked a key factor for far too long, and it's time that changes. I'm going to show you how to lose weight as efficiently as possible by exploring the concept of carbohydrate tolerance.

We'll cover the theory, practice, and the specific "How To's", along with plenty of Quick Tips along the way.

What Is Carbohydrate Tolerance?

Before we get to this critically important concept, let's back up a minute and consider another point called insulin sensitivity. This simply refers to how responsive a particular tissue is to the hormone insulin. A tissue with high insulin sensitivity will respond quite well to this hormone, while another with low sensitivity won't be as responsive.

This is important because insulin is known as the storage hormone, and it's our goal to keep it as low as possible in order to lose bodyfat. In addition to the overall quantity, it's our goal to maintain a high insulin sensitivity in muscle, but keep a low insulin sensitivity in fat cells.



That way, insulin can do its job better in muscle, but not so well in fat cells (and as you probably guessed, the job of the latter is to store fat).

Now, insulin sensitivity sounds important, and it is, but it's been the sole focus for far too long. The parameter that comes into play, even before insulin is affected, is known as carbohydrate tolerance.

What's perhaps even more important is that carb tolerance can even indirectly affect insulin sensitivity and hormonal control.

Quick Tip: Ideal insulin sensitivity is critical for not only the maintenance of muscle mass when on a diet, but also optimal fat loss. By optimizing carbohydrate tolerance we maximize insulin sensitivity, thereby preserving muscle and burning more fat!

So What Is It?

Although carbohydrate tolerance is similar to insulin sensitivity in many ways, it specifically pertains to the way in which our body deals with carbohydrates alone. The concept is best explained by treating our muscle as a sponge that's responsive to carbs. For the optimal fat loss we want it relatively "dry," so that when the time comes, it can suck up as many carbs as possible.

As long as the sponge has a little dryness to it, it'll be able to absorb the water (a.k.a. carbs) without affecting the rest of the body. (Remember that insulin isn't involved quite yet. This is how we maintain an optimal fat burning state for as long as possible.)

After the muscle has absorbed a relatively large amount of carbohydrates, it's considered full, and reaches what is known as the saturation point. Only after the saturation point has been reached do the carbs begin to "spill over," at which time insulin, and our sensitivity to it, becomes important.

Quick Tip: For an easy to conceive analogy, consider the following: if fat loss is a battle, then insulin sensitivity can be considered the reserves, while carbohydrate tolerance is the front line! Only by engaging all of the troops can we win the battle.

The Key Benefit

Having a high carb tolerance relates to fat loss because it performs a vital role: it keeps insulin levels low.

Because insulin is our storage hormone it has the double impact of not only stopping any fat loss that is occurring, but also directly induces fat storage itself. Obviously if we're trying to cut, then having as little of this hormone as possible is a very good thing. And by having optimal carb tolerance, this is exactly what we're doing!

Added Bonus: The Buffer Zone

Another benefit of maintaining a high carbohydrate tolerance is that it acts as a buffer zone for those times when we overindulge in carbohydrates. This ensures that these carbohydrates are not stored as fat, but rather sucked up by the muscle such that insulin levels are minimized.

One might, if in the middle of a carb binge, think of it as a get out of jail free card. The diet won't be ruined, which can have great physiological and psychological implications.

Quick Tip: Stimulant use also greatly assists with fat loss, and can help mitigate any damage done by slipping on our diet. For more information, check out a previous Barrticle: "How to Stimulate Maximal Fat Loss."

Getting There

So how do we enter a state of optimal carb tolerance, and subsequent fat loss? Well, there are 2 main ways: 1) Diet 2) Exercise (no surprises here).

Key 1: Diet

The most efficient way to induce a longer-term state of carb tolerance is to maintain a low carbohydrate diet. This serves to deplete muscle glycogen stores such that they'll be far more responsive to absorbing carbohydrates. Going back to our sponge analogy, carb depleting is our practical version of drying out the sponge.

Key #2: Exercise

Our short-term path to carb tolerance is exercise, particularly that which is able to significantly deplete muscle carbohydrate stores (a.k.a. glycogen). Resistance exercise is particularly efficient at inducing an elevated carbohydrate tolerant state — something that most people take advantage of with a post-workout drink like Surge.

By combining our intense exercise and low carb diet we are setting up an optimal internal environment for fat loss.

The "How To"

Now that we understand the basics and benefits of carbohydrate tolerance, let's take a look at how to do it, and do it well.

Killing Carbs and Bodyfat

The majority of fat loss occurs in a carb-depleted state, in part due to the improved carb tolerance that accompanies this condition. The sooner we can enter this optimal fat burning phase, the better the results. By focusing our first carb depletion day on getting into the optimal carb depleted state, we are kick starting fat loss and setting ourselves up for a successful cut. This critical first day is known as the priming phase.

The easiest way in which to enter the optimal carb tolerance zone is to dramatically reduce carbs on this day. This is because our first day isn't about losing fat per se; it is about priming our body for a state where it is able to destroy fat. It seems like a subtle difference at first, but makes all the difference to our body.

By reducing our carbs to a great extent in the priming phase, we're quickly able to get into the optimal fat loss zone, during which we are able to consume a low quantity of carbs in order to maintain the ideal fat burning state. On subsequent days of the diet, carbohydrates may be increased slightly such that the fat burning condition will be sustained until the carbohydrate refeed.

Quick Tip: Refeeeding will fill our muscles with glycogen and induce a strongly anabolic state. This is critical for both the maintenance of both muscle mass and training intensity.

In order to optimize these effects, excessive glycogen depleting exercise should be avoided during this short time. For this reason, only light cardio should be performed during a refeed, if any.

Divide and Conquer

Here's a quick tip that clients love: separate your cardio and weights into different sessions, rather than trying to cram them all into one shot. This has the dual advantage of optimizing carb tolerance, and maximizing the amount of energy you can put into each session.

Because each training session improves carb tolerance, you're getting twice the bang for your buck. This means that you'll have double the carb tolerance compared to if you performed only a single training session.

In fact, it's likely that you'll more than double your carb tolerance through this method.

Due to the intensity that you can offer to each bout, carb tolerance will be exaggerated relative to that of a compromised intensity session.

Double Intensity

Have you ever tried to do a hard weight session after HIIT, or vice versa? If you're human then probably not, because both are exhausting. But for those masochists who have, you'll likely remember that there was a serious compromise of the latter session.

This is because the intensity simply can't be maintained for two consecutive exercise bouts, particularly when on a low carbohydrate diet. But, by splitting this intensity between two separate workouts, you are better able to focus your energies on a single task, thereby maximizing fat burning potential!

This is particularly critical when it comes to weight sessions because intensity is needed to maintain a strong anticatabolic stimulus to muscle. Without it, muscle will waste in the caloric deficit, metabolism will drop, and the diet is doomed.

Quick Tip: By splitting cardio and weights into two separate workouts, you're preserving muscle mass! This not only helps to maintain an elevated, fat burning, metabolism, but it also ensures that you'll look better when you're all done!

Double Fat Loss

The exercise and diet points are great on their own, but are even more powerful when combined! If you recall, the first day of a carb depletion is critical for getting us into the optimal fat burning zone. Well, this priming phase of carb depletion is also the perfect time for a double workout day!

This will ensure maximum glycogen depletion at a time when we will benefit most from it. By training twice we also take advantage of the training-induction of carb tolerance.

Sample Plan

Day 1: Priming Phase

AM: 30 minutes of HIIT followed by 15 minutes of low intensity jogging/walking

PM: Resistance training session

Carbohydrate intake: extremely low

Day 2-5: Fat Loss Phase

AM: 30 minutes of HIIT followed by 15 minutes of low intensity jogging/walking

PM: Resistance training session

Carbohydrate intake: low

Day 6-7: Refeed

Resistance training only

Carbohydrate intake: high

Conclusions

In our quest for the ideal body we've been neglecting carbohydrate tolerance for far too long. By entering an optimal carb tolerant state we are maximizing fat loss and assisting with the overall ease of the diet. Try applying the tips provided and you can be sure to maximize cuts and lose fat faster and easier than previously thought!

FAQ: You're wrong. I don't focus on no carbohydrate tolerance and I still got ripped and swole, and girls like me now.

A: Congratulations on your success, but I advise you against closing your mind to adjustments, additions, or alternatives. Do what works for you, but remember that there's always room for improvement.

For the sake of doings things as quickly and effectively as possible, most people are concerned with performing optimally. That's exactly what this discussion is about: optimization. You can achieve results without considering carbohydrate tolerance, but it will be less effective and take longer. There's no need to bother dealing with that when there's a simple solution.

David Barr is a strength coach and scientist, with research specialty in nutrition and its impact on performance and body composition. In addition to his work for NASA at the Johnson Space Center, David's research career has involved everything from the cellular basis of muscle breakdown to work on critically ill catabolic patients. He holds certifications with the NSCA as well as USA Track and Field, and can be contacted through his website: http://www.RaiseTheBarr.net.

PUBLISHED 06-28-07 15:05

Source:
https://www.tmuscle.com/free_online_article/sports_body_training_performance_nutrition/carbohydrate_tolerance_frontline_fat_loss&cr=

This entry was posted in Nutrition and tagged carb tolerance, carbohydrate tolerance, David Barr, diet, fat loss, Nutrition on January 29, 2010 by myoblast.

Carb Rehab – Scott Abel and Kevin Weiss

Leave a reply

Abel Bodies Experts coaches Scott Abel And Kevin Weiss discuss the unfounded fear of carbohydrate and the importance of not buying into the window of opportunity.

Source: http://www.youtube.com/user/scottabelcoaching#g/c/2E0067A2FCC90DBC

This entry was posted in Nutrition and tagged calories, carb, carb rehab, diet, Nutrition, Scott Abel on January 29, 2010 by myoblast.

The Supplement Mentality, Scott Abel and Kevin Weiss

Leave a reply

Abel Body Experts coaches Scott Abel and Kevin Weiss discuss the delusion that taking supplements or not taking supplements determines gains and progress.

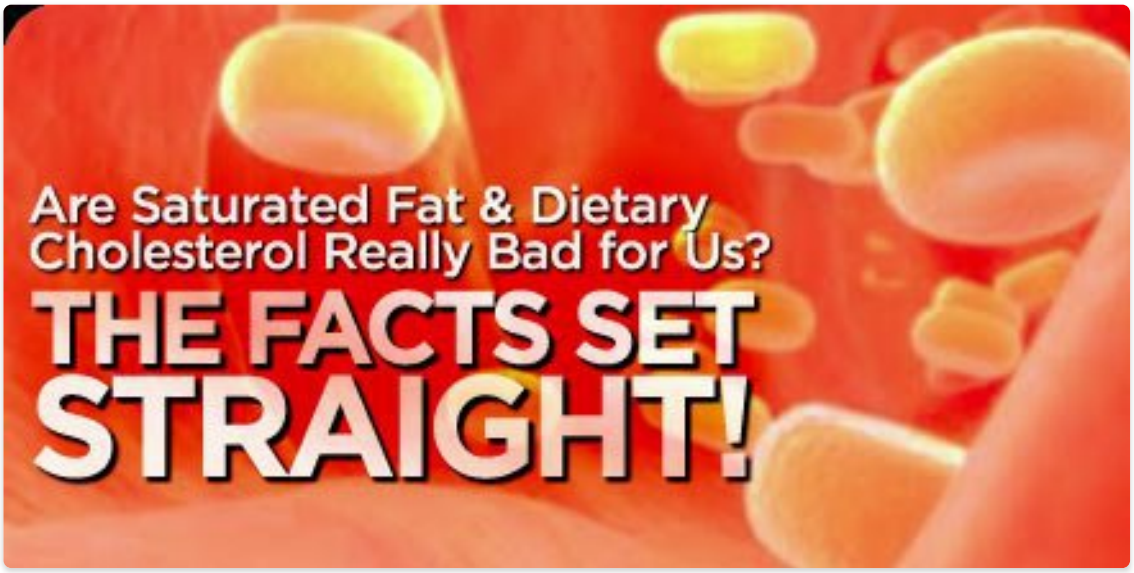
Source: http://www.youtube.com/user/scottabelcoaching#g/c/2E0067A2FCC90DBC

This entry was posted in Nutrition and tagged diet, Nutrition, Scott Abel, supplement, supplement mentality on January 29, 2010 by myoblast.

Are Saturated Fat and Dietary Cholesterol Really Bad For Us? The Facts Set Straight!

Leave a reply

“I want to put to rest the belief that fat and dietary cholesterol are bad for us. I will also show proof that aside from being the best diet for stripping fat, low-carb nutrition actually improves health markers… Learn more.



By: **Mark McManus**

Article Summary:
Raising HDL levels in proportion to LDL is beneficial for your health.
Both Palmitic and Lauric acid raise total cholesterol.
Lipid profiles improve when there is no weight loss on a low-carb diet.

I want to put to rest the belief that fat (especially saturated fat) and dietary cholesterol are bad for us. I will also show proof that aside from being the best diet for stripping fat, low-carb nutrition actually improves health markers more than a low-fat diet. Let the games begin...

Author, Mark McManus Will Show Proof That A Low-Carb Diet Improves Health Markers More Than A Low-Fat Diet.

Where Did All This Nonsense Begin?

Surely if so many people believe something, it must be based on solid evidence right? Wrong! If a hypothesis is put forward and believed without being adequately tested, you have a shaky foundation.

If this hypothesis is built upon for decades with no further questioning or testing, you have a house of cards. This house is ready to topple, in fact, it should have fell a long time ago.

Ancel Keys

It all started with a physiologist named Ancel Keys, Ph.D., back in the 1950's. I'm not going to bash the guy because I feel that although he was mistaken, he was well-meaning.

Ancel Keys
Ancel Benjamin Keys (January 26, 1904 – November 20, 2004) was an American scientist who studied the influence of diet on health. In particular, he hypothesised that different kinds of dietary fat had different effects on health.

He examined the epidemiology of cardiovascular disease (CVD) and was closely associated with two famous diets: K-rations, which were formulated as balanced meals for combat soldiers in World War II; and "the Mediterranean diet," which, with his wife Margaret, he popularized. Science, diet, and health were central themes in his professional and private lives.
[http://en.wikipedia.org]

In 1953 he published a paper titled "Atherosclerosis, a Problem in Newer Public Health." It seems that from here, our dietary fate was sealed. Keys compared fat intake and deaths from heart disease in 6 countries:

United States
Canada
England
Australia
Italy
Japan

The implications for dietary fat were dire! As fat intake increases in these countries, heart disease mortality rates increases, oh dear! The US had the highest fat intake and also had the highest number of deaths due to heart disease, Japan ate the least fat and had the lowest number of deaths.

There was, however, one big problem with what became known as the 'Diet-Heart Hypothesis.' Data was available for a total of 22 countries, not 6. When ALL the statistics are analyzed, the 'fat-heart disease' correlation ceases to exist.

Unfortunately, despite the flawed conclusions of Keys, the media and the American Heart Association jumped on board the diet-heart hypothesis bandwagon.

In the 1970's Keys bolstered his hypothesis by publishing a study suggesting that saturated fat (from animal sources) leads to high cholesterol which, in turn, leads to heart disease. This is still the conventional wisdom today.

Again, out of the 7 countries selected, the correlation between saturated fat and heart disease was not seen but hey, don't let the truth get in the way of a good story.

Saturated Fat In The Human Diet

Almost all the saturated fat in our diet comes in 3 forms:

Stearic acid
Palmitic acid
Lauric acid

Before we get into looking at each acid, let's discuss the differences between LDL and HDL cholesterol.

LDL is the bad guy (specifically the small, dense LDL particles)
HDL is the good guy

LDL & HDL
Low-density lipoprotein (LDL) is a type of lipoprotein that transports cholesterol and triglycerides from the liver to peripheral tissues.

High-density lipoproteins (HDL) is one of the 5 major groups of lipoproteins which enable lipids like cholesterol and triglycerides to be transported within the water based blood stream.

Increasing LDL levels while HDL levels remain constant is bad news. The opposite is good news. Raising HDL cholesterol in proportion to LDL is very beneficial for your health. Raising both by equal amounts has no effect.

Stearic Acid

Now let's have a little fun. Firstly, it's well established today that stearic acid has no effect on cholesterol levels. In fact, stearic acid, found in abundance in animal fat, is converted to monounsaturated fat in your liver.

This is obviously healthy and raises good cholesterol and therefore lowers risk of heart disease. Hmm, not much wrong there, is there? The result of consumption of this acid is either nil or even beneficial to your health. Let's move on...

Palmitic & Lauric Acid

Both Palmitic and Lauric acid raise total cholesterol. This obviously has no real effect with respect to coronary heart disease risk factor. Now, let's add the three forms of saturated fat together and see what happens:

1 x Beneficial + 2 x Benign = Beneficial Net Effect

Wow! You mean 'artery-clogging saturated fat' doesn't clog arteries? Yes, and it's important to remember that a diet high in fat will also be high in unsaturated fats so the net result of high fat intake, coupled with lower carb intake, is a reduced risk of heart disease.

This is the story of surprised researchers as they see the startling results of studies involving groups consuming low fat/high carb diets vs groups consuming high fat/low carb diets; i.e. more fat loss and improved lipid profiles in the high fat/low carb camp. However, even though the science is staring them in the face, they fall short of recommending it as a way of eating.

The Proof's In The Low-Fat Pudding

50 years of the 'diet-heart hypothesis' and it turns out to be a dud. So many wasted years and so much money wasted on studies trying to prove the unprovable.

Let's take the latest one for example (7th May 2008). At a cost of $415 million, The Women's Health Initiative monitored 49,000 subjects over an average period of 8 years – a HUGE study. They were advised to eat more vegetables, fruits and grains and less fat (20% of daily calories – only 44 grams of total fat per day on a 2000 calorie-per-day diet), especially saturated fat.

The results finally came in, the media waited with bated breath – guess what effect this low fat diet had on heart disease. None! Zero! Zilch!

So If Low-Fat Doesn't Lower Cholesterol & Prevent Heart Disease, What Does?

I thought you'd never ask. A low carb/high fat does of course. It may seem counter-intuitive but heart disease, a new problem, is not caused by old, traditional foods. It's caused by newer foods that we have introduced into our diets – carb-laden foods. Let's have a look at some studies.

Researchers at Duke University Medical Center found that participants who followed a low-carbohydrate diet for six months raised their good cholesterol and lowered their triglycerides (fat in the blood).

The low-fat group also had positive results in this study. They ate a low-fat, low-cholesterol, low-calorie diet. They lowered total cholesterol levels (lowering good cholesterol which is not so great) and triglycerides. It is important to note that the triglyceride levels fell more significantly for the low carb group; i.e. 74.2 points for the low-carb group and 27.9 points for the low-fat group.

Also, the low-carb group lost more weight even though their calories were unrestricted whereas the low-fat group consumed 500 – 1000 calories below their maintenance calorie-requirement.

Could This Be Due To Weight Loss?

Some people may think that the improvements in blood lipid profiles are simply due to the weight-loss and not carb-restriction, not so it seems.

Ronald Krauss at the Children's Hospital Oakland Research Institute tested this and found that the lipid profiles (cholesterol and triglycerides) improve even when there is no weight loss on a low-carbohydrate diet. You can check the study out for yourself here.

The Alternative Food Pyramid.

Dietary Cholesterol May Be Beneficial To Muscle Hackers

The cholesterol in our foods may be beneficial to anyone wanting to build muscle. I personally take in a lot of dietary cholesterol (though I'm not sure what the exact amount is).

Researchers at Texas A&M University have discovered that lower cholesterol levels can actually reduce muscle gain when weight-training.

3 days a week for 12 weeks, 55 men and women, aged 60-69, (healthy non-smokers able to perform exercise testing and training) performed several exercises, including stretching, stationary bike riding and vigorous weight lifting.

The results showed that there was a significant association between dietary cholesterol and change in strength; i.e. the higher the cholesterol intake, the more

muscle strength gain. One of the researchers, Steven Riechman, said:

"We were not expecting to get these kind of results, we need further research in this area, but what we found could really make us look differently at cholesterol, especially as it relates to a vigorous workout…

Our findings show that the restricting of cholesterol – while in the process of exercising – appears to affect building muscle mass in a negative manner. If it's true, as our findings suggest, that cholesterol may play a key role in muscle repair, we need to know exactly how that happens." Information provided by Texas A&M University.

So, if you want to keep your heart healthy and build muscle at the same time, you'd better opt for some bacon and eggs in the morning.

Now, lest you think I'm just one guy with these opinions on saturated fat and cholesterol, check out the list (not exhaustive) below of professionals who are also in the know:

Dr. Eric Westman from Duke University
Dr. Mary C. Vernon from the University of Kansas
Dr. Jeff Volek from the University of Connecticut
Dr. Richard Feinman from SUNY Downstate
Dr. Steven Phinney from the University of California-Davis
Dr. Jay Wortman from Canada
Drs. Mike & Mary Dan Eades from Protein Power
Gary Taubes – Science Journalist, author of Good Calories, Bad Calories
Dr. John Briffa in the UK
Adam Campbell at Men's Health magazine
Cassandra Forsythe at the University of Connecticut
Dr. Larry McCleary, a brain surgeon who wrote The Brain Trust Program
Dr. Barry Groves in the UK
Dr. Richard Bernstein working with diabetics
Dr. Gil Wilshire, reproductive endocrinologist in Missouri
Dr. Donald Layman from The University of Illinois at Urbana-Champaign
Dr. Keith Berkowitz in New York City
Dr. Fred Pescatore from the Hampton's Diet

Dr. Barry Sears from The Zone Diet
Dr. Jonny Bowden from California
Dr. Annika Dahlqvist from Sweden (who succeeded in changing government dietary guidelines)

Conclusion

Just before I leave you, I'd like to show you the alternative food pyramid. You all know the one the government recommends with all the starches at the bottom and fat at the top, well check this out…

Beautiful isn't it? Now that's healthy eating! I hope this article has dispelled the saturated fat/cholesterol rubbish for you once and for all. If you're someone who has problems with cholesterol, you can always try this way of eating and get your blood work done periodically.

Mark McManus"

Source: http://www.bodybuilding.com/fun/fat_cholesterol_truth.htm

This entry was posted in Nutrition and tagged cholesterol, diet, fat, HDL, LDL, low carb, Mark McManus, Nutrition, saturated fat on January 29, 2010 by myoblast.

The protein and the kidney monologue – CharlesPolquin.com and Jose Antonia

Leave a reply

"**The Protein and the Kidney Monologue**

Credit: CharlesPolquin.com and Jose Antonia, Ph.D.

By Jose Antonio, Ph.D.

One of my close friends is a professor at a fairly high profile Midwestern university (he'll remain anonymous so as to avoid the wrath of his fellow protein-hating colleagues) and we were talking recently about how grossly misinformed many in academia are regarding dietary protein intake.

This is what you'll often hear in the ivory towers.

"High protein diets are bad for your kidneys."
"Protein dehydrates you."
"Athletes get plenty of protein in their normal diets."
"Protein is evil."
Okay, maybe the last one is an exaggeration; albeit a slight one.

For whatever odd reason, some of the most educated individuals are also some of the most misinformed when it comes to dietary protein. First, let me set the record straight.

There is no evidence that high protein diets (which I'll operationally define as 2-3 times greater than the ridiculously low RDA) is harmful to otherwise healthy individuals.(1)
There is evidence that in individuals with renal dysfunction may need to consume protein that even exceeds the RDA.(2)
The addition of protein to a sports drink does not dehydrate you and may in fact improve performance and recovery.(3)
Athletes do need more protein than couch potatoes.
Protein is not evil. (Sorry, no references).
What the heck is protein anyway?
Just as glucose serves as the building block of glycogen, so are amino acids, which are the building blocks of proteins. Proteins are arguably the most important component of your cells.

They're involved in formation of contractile tissue or muscle, they make up a large part of the structural component of cells, they are a part of enzymes, antibodies, blood, etc. You name it, protein is part of it.

The main function of protein is to provide the needed amino acids for maintaining an anabolic (growth) or weight-stable state. However, recent data shows that additional

protein promotes recovery and performance during exercise. (3, 4)

How much protein should you consume?
The easiest way to remember how much protein to consume is via the formula – 1 gram of protein per pound of body weight. Hence, a 200 pound individual needs about 200 grams of protein. And don't be misled by the "carb-Nazis" who pontificate on the impending doom of your kidneys if you consume this much protein. If that were the case, gyms would be littered with strength-power athletes with failing kidneys.
In fact, according to Darryn Willoughby, Ph.D., of the International Society of Sports Nutrition and member of AXL's Advisory Board, "the hazards of eating a high protein diet are as overblown as a big Texas hairdo. Now if you have damaged kidneys then the work that your kidneys need to perform to eliminate excess nitrogen would make it wise to avoid excess protein. Otherwise, enjoy that Porterhouse."

Suffice it to say that the RDA of 0.8 grams per kilogram body weight per day is grossly inadequate for anyone whose activity levels exceed that of a La-Z-Boy recliner. Even though muscle protein degradation or breakdown increases during exercise, there is a significant increase in muscle protein synthesis for at least 24 hours after either resistance or endurance exercise. If you are not getting adequate protein during this time, then it would make sense that you probably will not gain lean body mass.

How much protein can I consume at one sitting?
Great question! Unfortunately, the scientific answer isn't known. But I'll give you the Midwestern common sense answer. Would your 75 year old grandma and the 250 lb, 25 year old martial arts fighter have the same limitations when it comes to digesting and absorbing protein? Obviously, the fighter needs more protein to assist with recovery and repair of muscles.

In all fairness, there are studies in which levels of 30 grams of protein are fed to subjects; and this amount produces a tremendous rise in blood amino acid levels. I'd imagine that 30 grams of protein per meal is a good starting point. If you eat 30 grams a sitting and you eat 6 times daily, that's about 180 grams of protein.

For most "normal-weight" individuals, that should suffice. But imagine if you're a 300 lb football player or bodybuilder? You'd either have to eat more protein per sitting or

just eat more meals. The answer to this problem? Consume meal replacement powders as a protein supplement.

Protein and those with real kidney problems – the other viewpoint
A recent paper discussed two of the National Kidney Foundation Kidney Disease Outcomes Quality Initiative (K/DOQI) clinical practice guidelines for nutrition in chronic renal failure.

These guidelines recommended a dietary protein intake of 1.2 g protein/kg body weight/day for clinically stable maintenance hemodialysis (MHD) patients (Guideline 15) and 1.2 to 1.3 g protein/kg/day for clinically stable chronic peritoneal dialysis (CPD) patients (Guideline 16).

If you do the math, that is roughly 50% to 63% greater than the regular RDA or recommended daily allowance. But I thought eating protein was evil, evil, evil? Maybe not.

Scientists suggest that the possible mechanisms that require these increased protein needs include (a) the substantial quantity of amino acids, peptides, and proteins removed by the dialysis procedure and (b) the protein catabolic or anti-anabolic state caused by the uremic milieu, the inflammatory state, the oxidative and carbonyl stress, and the bio-incompatible dialysis materials to which MHD and CPD patients are exposed. In English, that means these individuals tend to be very catabolic and need to somehow replace the lost amino acids or protein. (2)

Protein types – the slow and the fast!
Cool work from France delineated the concepts of “slow” and “fast” proteins. In fact, this may play a greater role in muscle protein metabolism than the older concepts of biological value.

In essence, there are two proteins that many of us consume, which are digested at different rates (hence, slow and fast). In comparing whey to casein protein, whey is a faster protein, meaning it’s absorbed quickly into the bloodstream and remains elevated for about 3 to 4 hours. On the other hand, casein tends to clot in your stomach and in essence is “timed-released” such that you have significant elevation of blood or plasma amino acids for up to 7 hours.

Why are these distinctions important? First of all, whey is a very anabolic protein. However, inasmuch as you get a quick rise in plasma aminos, you also get quite a bit of oxidation of the protein (i.e. it is used for fuel). Casein however does not promote as much anabolism but is very anti-catabolic (i.e. inhibits protein breakdown). The "net" effect is that if you do a head to head comparison, casein beats whey over the long haul. Does that mean you should dump that bucket of whey into the trash bin? Hell no.

In fact, take advantage of whey's easy and quick digestion/absorption qualities and consume it as part of your post-workout meal. Casein may be best if consumed as a single meal prior to bed (to sustain plasma aminos throughout the day).(5-9)

Protein and bone health

According to one study, protein intakes do not contribute to the wide variability in calcium absorption efficiency. (10) Or put another way, eating protein probably has no effect on bone mineral content.

Another investigation stated verbatim that "several recent epidemiological studies demonstrate reduced bone density and increased rates of bone loss in individuals habitually consuming low protein diets." (10-12) So, one might argue that low protein intakes is the culprit. Either way, it would be wise to consume both adequate protein and calcium to maintain lean body mass and reduce body fat.

Adding protein to sports drinks

In a recent study that compared a traditional sports drink (water, carbs, and electrolytes) versus a sports drink that contained added protein, they found that cyclists rode 29% to 40% longer when they consumed the sports drink with protein than the one without.

Also, peak post-exercise plasma CPK (creatine phosphokinase) levels, an indirect measure of muscle damage, was 83% lower after consuming the sports drink plus protein. So don't believe the baloney about protein dehydrating you ('cause if it did, these cyclists would not have performed better) or being unimportant during exercise. Even a small amount (~3-6 grams) during exercise might do wonders for you!(3)

The Moral of the Story

Consume 1 gram of protein per pound of body weight daily.
Spread it out over 6 meals.
Protein intake 2-3 times over the RDA is not harmful to your kidneys, bones, or anything else for that matter.
Adding a touch of protein to a sports drink may improve performance and speed up recovery.
Consume “fast” proteins after you exercise and “slow” proteins at the end of the day.
Listen to the Performance Nutrition Show at www.pnshow.com ; download the podcast and keep updated on the newest findings in sports nutrition!

References

Poortmans JR, Dellalieux O. Do regular high protein diets have potential health risks on kidney function in athletes? Int J Sport Nutr Exerc Metab 2000;10:28-38.
Kopple JD. The National Kidney Foundation K/DOQI clinical practice guidelines for dietary protein intake for chronic dialysis patients. Am J Kidney Dis 2001;38:S68-73.
Saunders MJ, Kane MD, Todd MK. Effects of a carbohydrate-protein beverage on cycling endurance and muscle damage. Med Sci Sports Exerc 2004;36:1233-8.
Flakoll PJ, Judy T, Flinn K, Carr C, Flinn S. Postexercise protein supplementation improves health and muscle soreness during basic military training in marine recruits. J Appl Physiol 2004;96:951-6.
Dangin M, Boirie Y, Garcia-Rodenas C, et al. The digestion rate of protein is an independent regulating factor of postprandial protein retention. Am J Physiol Endocrinol Metab 2001;280:E340-8.
Beaufrere B, Dangin M, Boirie Y. The ‘fast’ and ‘slow’ protein concept. Nestle Nutr Workshop Ser Clin Perform Programme 2000;3:121-31; discussion 131-3.
Boirie Y, Beaufrere B, Ritz P. Energetic cost of protein turnover in healthy elderly humans. Int J Obes Relat Metab Disord 2001;25:601-5.
Boirie Y, Broyer M, Gagnadoux MF, Niaudet P, Bresson JL. Alterations of protein metabolism by metabolic acidosis in children with chronic renal failure. Kidney Int 2000;58:236-41.
Boirie Y, Dangin M, Gachon P, Vasson MP, Maubois JL, Beaufrere B. Slow and fast dietary proteins differently modulate postprandial protein accretion. Proc Natl Acad Sci U S A 1997;94:14930-5.
Heaney RP. Dietary protein and phosphorus do not affect calcium absorption. Am J Clin Nutr 2000;72:758-61.

Kerstetter JE, O'Brien KO, Insogna KL. Low protein intake: the impact on calcium and bone homeostasis in humans. J Nutr 2003;133:855S-861S.
Kerstetter JE, O'Brien KO, Insogna KL. Dietary protein, calcium metabolism, and skeletal homeostasis revisited. Am J Clin Nutr 2003;78:584S-592S."

Source: www.charlespoliquin.com

This entry was posted in Nutrition and tagged Charles Poliquin, diet, kidney, myth, Nutrition, protein on January 29, 2010 by myoblast.

« Older posts

Older posts

CATEGORIES

Anatomy, biomechanics
Endocrine system
Exercises
Nutrition
Physical Conditioning
Powerlifting
Studies

Search

RECENT POSTS

Pesticides : quels effets sur la santé ?
La vérité sur les perturbateurs endocriniens

La viande : comment la consommer sainement ? – Xenius

Actu, guides et enquêtes relatives aux produits toxiques – 60 millions de consommateurs

High enzyme foods list

USDA Food Composition Databases / Nutrient List

Additifs alimentaires et toxicité

L'Alimentation ou la Troisième Médecine – Jean Seignalet

Le ventre, notre deuxième cerveau

Lipopolysaccharides' levels and potential health related problems

BLOGROLL

Adriano Panzironi on youtube (IT)

Alan Aragon's articles

Alan Aragon's blog

Alwyn Cosgrove articles

ATHLEAN-X – training & nutrition tips

bodybuilding.com

Charles Poliquin's on youtube

Charles Staley articles

charlespoliquin.com

Dr. Eric Berg on youtube

Dr. Josh Axe on youtube

Dr. Oz show

Dr. Squat articles

Dr. Squat knowledge base

elitefts.com articles

ericcressey.com

Exercises (animated) on Abcbodybuilding.com

Exercises (slide show) on Abcbodybuilding.com

Julien Venesson (FR)

Massimo Spattini (IT)

Mauro di Pasquale

Michael Gundill (FR)

Squat Rx / Johnny Mnemonic's Strength Training Videos

Studies and research on simplyshredded.com

t-nation.com

UndergroundWellness on youtube

westside-barbell.com articles

The Weigh We Were, a priori bisexuality, despite external influences, levels the institutional ce
Ta
th s
cu
Ca
pa