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VIRTUAL LAF CONFERENCE

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SUBJECT: *LAF and Ketosis*

Step 9 of Hans' 12 Step Afib Elimination Plan is following a strict Paleo Diet – see http://www.afibbers.org/resources/12stepplan.pdf. While a Paleo Diet may be restrictive to many eating a first world diet, it does allow for a fair latitude with respect to fat, protein and carbohydrate content. There are a number of possible reasons for the afib remission success following a paleo plan. Gluten/gliadin and casein are common triggers. Paleo eliminates them. It also eliminates many food additives from prepared foods. It may promote better digestion. It may promote less insulin spiking and more even blood sugar. If implemented with restricted enough carbohydrates, it may produce a state of ketosis.

Ketosis is a natural state. The brain needs to fuel on about 200 grams of glucose/day. The brain does not fuel on fat. If you are starving or on a low carb diet, the body will utilize protein - either food you are eating or your muscles to make glucose to feed the brain. A byproduct of this and fat metabolism is the production of ketones.

Most on a first world diet have their ketone processing system turned off. It takes 2-3 weeks of carb restriction and or starvation to turn it on. Once turned on, ketones can replace about 40% of the glucose requirement of the brain. Ketones also require 28% less oxygen to metabolize. They can fuel other parts of the body too.

Ketosis will stop instantly with ingestion of a significant quantity of carbs. However it takes some significant time of carb feasting to turn off the ketone processing system. I do not know how long this is, but can say from personal experience that it is longer than several days.

Several notable examples of a ketotic diet helping afib include William and my friend with adrenergic bigeminal PAC's.

William follows a strict "raw paleo" plan, focussed on pemmican, ghee, organic coffee and tobacco. He has recently added supplemental iodine which he feels has helped his digestion and irregular beats dramatically.

My friend with bigeminal PAC's (every other beat is a PAC) originally came to me complaining of foot cramps. I suggested supplemental magnesium, both oral and transdermal. This helped. She is also a Wolfe Parkinson White ablatee. WPW's are at greater risk for developing afib. WPW is genetic. Her mother is also a WPW ablatee and has afib.

Wearing a Polar S810 monitor during exercise (a beat to beat recording heart rate monitor) revealed the bigeminal PAC's. For more info and examples from the Polar, see CR52 and 52a http://www.afibbers.org/conference/session52.pdf http://www.afibbers.org/conference/session52a.pdf

Though always fit, a swimmer in high school and a ski patroller for 35 years, she's always had weight issues. When she talked to me, she weighed about 170 lbs on a 5'4" frame. She asked for advice in loosing weight. She is also a

vegetarian. I suggested a glucometer and sampling her blood sugar. The rules - very little spiking above normal (85 mmol/l) 45 minutes after meals (generally a relative maximum) and no spiking upon waking on a 12 hour fast. She didn't monitor every meal, only as a way to see what various food choices would do to her blood sugar. When she found food combinations that worked, she would only sample new food combinations.

As a vegetarian, this was a challenge as most veg foods are carboydrate rich. She spent a lot of time in the USDA food database finding foods with a good protein/carb ratio.

Over time she lost about 45 pounds. She said before, she'd gain weight on 1200 calories a day, but with this plan, she could loose at 1500/day.

A byproduct was that when her blood sugar control is good, her bigeminal PAC's settled down, too! A constant for her is supplementing with magnesium to bowel tolerance, potassium and taurine. However the variable that was not constant was her diet compliance. This variable is visible in the heart rate data.

Looking at possible reasons why ketosis may be good for a lone afibber, I came across this paper by Veech indicating that ketones may be much more efficient for ATP production
http://www.coconutketones.com/pdfs/Veech%202004_therapeutic_implications.pdf

A very complete discussion of ATP and a possible part in the afib equation is in CR 72
http://www.afibbers.org/conference/session72.pdf There was much discussion of the importance of ATP and the Na/K pump.

And this paper indicating that ketosis may clean our cells of "junk" protein:
http://www.proteinpower.com/drmike/ketones-and-ketosis/ketosis-cleans-our-cells/

In summary, I think ketosis deserves further study for possible benefits to lone afibbers.

George

For background on low carb diets and ketosis, here are some references:

http://www.diabetes-book.com/

http://drrosedale.com/
http://www.amazon.com/Rosedale-Diet-Ron/dp/006056573X/ref=sr_1_1?ie=UTF8&qid=1312347339&sr=8-1

http://www.amazon.com/New-Atkins-You-Ultimate-Shedding/dp/1439190275/ref=sr_1_1?s=books&ie=UTF8&qid=1312347377&sr=1-1

This link is to an interview with Stephen D. Phinney MD, PhD on Ketogenic diets & exercise, below is a link to one of Dr. Phinney's paper's on the same topic. This was done a few years ago. Phinney is a co-author of the new Atkins book above.

The you can listen to or download the interview here:
http://hoe.kgnu.net/hoeradioshow.php?show_id=184

The paper is here:
http://www.nutritionandmetabolism.com/content/1/1/2

An old, but interesting paper on ketone metabolism is here:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2441301/pdf/tacca00109-0225.pdf This includes an observation that hibernating bears are in ketosis and conserve nitrogen, therefore urinating very little.

http://www.ajcn.org/content/68/1/1.full.pdf

http://www.proteinpower.com/drmike/ketones-and-ketosis/metabolism-and-ketosis/

http://www.proteinpower.com/drmike/ketones-and-ketosis/tips-tricks-for-starting-or-restarting-low-carb-pt-i/

http://www.proteinpower.com/drmike/saturated-fat/tips-tricks-for-starting-or-restarting-low-carb-pt-ii/#more-4549

http://www.proteinpower.com/drmike/low-carb-library/why-we-get-fat/

http://www.bodyrecomposition.com/the-ketogenic-diet

George,

I totally agree with your comments; in my three year battle with LAF I have tried just about everything (drugs- Rythmol and Flec, several beta blockers, Prop Bromide (which worked but caused severe side effects), every supplement know to humankind, gluten-free diet, catheter ablation (failed), etc.) but the one thing that reduces my AFIB burden is my low carb diet. When I am low-carbing my AFIB burden averages an episode every 10 to 15 days. When I am not low-carbing, I average an episode every 4-7 days.

There are side effects but all are positive:
- lost 30 pounds (from 213 to 183); I am at my college weight;
-total cholesterol went from 228 to 170;
-GERD symptoms gone;
-energy level- much higher (dropping 30 lbs probably a factor in that);
-never hungry- as you note, when you are in ketosis the hunger trigger is turned off.

About the only negative factor is that the diet is somewhat inconvenient, especially when traveling. I end up eating salads and meat quite a bit when business requires me to be away from home.

As I said, it hasn't eliminated my afib but it definitely has improved it.

Would definitely recommend it for anyone with LAF-

EB

George,

I too have gone to a paleo diet with great benefit. I am curious as to what types of foods you eat (beef, chicken, fish, nuts seeds etc) to achieve your daily intake of fat and protein? Also it is very interesting that some people's cholesterol's levels drop even though their diets have higher saturated fat. This result flies in the face of "conventional wisdom."

Steve

Steve,

A typical breakfast would be 2 chicken and 2 duck eggs cooked in either ghee or coconut oil. Lunch is fish, but as of late is optional. Dinner is a bunch of Atkins "foundation vegetables," http://www.atkins.com/Program/Phase1/WhatYouCanEatinthisPhase.aspx (see vegetables) along with grass fed beef cooked again in ghee or coconut oil. It can also be fish or chicken or some other meat.

I've kept the ketone processing system active for nearly two years. Sometimes I'll eat carby nuts like cashews, other times macadamia, hazelnuts or brazil nuts. If I have a carby day, I'll be strict on the following day, I'm always trying to

make sure my system gets a good dose of ketones every couple of days to keep the ketone system active. I'd prefer not to have to restart it.

'Also it is very interesting that some people's cholesterol's levels drop even though their diets have higher saturated fat. This result flies in the face of "conventional wisdom." '

My take is that excessively high cholesterol is due to inflammation, such as from a high saturated fat diet COMBINED WITH a continual high dose of carbs. It is not the sat. fat by itself. When one gets rid of the insulin spikes, the cholesterol drops.

Obviously when people like EB drop 30 pounds, they are using as opposed to storing fat.

George

George,

Lower caloric and carb intake at least partially explains the longer life expectancy in countries like France and Spain in comparison to the US. It was nice to think that it was the red wine, but that answer certainly doesn't explain everything. We are victims of the carb fad. I used to have pasta 3 or 4 times a week.

Steve

Steve,

They eat a lot of pasta in Italy and yet Italy is ranked 12th in life expectancy while the US is ranked 36th. Maybe it is the wine after all!

Hans

"Supersize me" is certainly alive and well here in the US. My state (CO) is supposed to be the fittest and the only one with the obesity level below 20% of the population. That being said, the obesity level here was less than 10%, twenty years ago.

A friend went home to visit his mother in rural Arkansas. She lived about 4 miles out of town. Her car needed work so he drove it to town and ran back to her house. He was stopped several times by people asking if he was OK and didn't he need a ride? He mentioned that most of his relatives consider an outing in the woods, one where they can use a motorized conveyance, not where they have to walk.

A physician friend went back to Ohio, his home. His father had recently passed away. He stayed at his father's house, but did not have a car. He decided to walk to a sibling's house 7 miles away. He had many relatives calling him on his walk saying it was too far and he needed a ride. His response - this is flat, on pavement, and at low elevation to boot! Not a stress on him at all, but obviously out of the norm for people from that area.

George

Hans,

I am intrigued to find out if societies exist where a-fib is almost non-existent. I realize that finding this type of data from some places would be very hard, but are you aware of any? Not that high fat, high protein diets are that prevalent in many developing countries, but what about Eskimos or other quasi hunter-gatherers in places like New Guinea? They are known to have less heart disease, but what about a-fib? I know that in western countries the a-fib curve is steep and upward, but in so-called traditional societies who have not adopted similar diets is the same true?

Steve

The body does produce cholesterol as a result of inflammation and not because eating foods containing cholesterol. Elevated cholesterol also often is the result of hypothyroidism.

Jackie

George,

I'm going to give your approach a go. Over the last 20 months I've had a steady weight loss from 266lbs to 233lbs (I'm a wide shouldered 6'4") but would like to drop another 30lbs or so. I also like the idea of reducing my considerable ectopics including on and off bigeminy - as successfully did your friend.

A few questions please George.

1. As regards your diet as briefly introduced/outlined above, how many days per week out of 7 do you adhere to this? Or, put another way, how many days per week are 'carby'?

2. Do you have a particular favourite web site you could point me to for more detail on the ketogenic dietary approach?

3. Do you ever take alcohol these days? I must admit that I'd really miss an occasional evening G&T during the summer months! But if it has to be done, so be it.

4. My basic uneducated approach would be to just stick to protein, good fats and lots of veg with some fruit with a few handfuls of nuts per week, a small bowl of porridge a couple of times a week and a large G&T a couple of times a week. Would such an approach be effective, or do I really need to ditch the latter two items?

I have always (and continue to so do) envied your self discipline George!

Kind regards,

Mike

Mike,

I'll prepare some detail for you.

Specifically for getting started on ketosis, I suggest following a guide such as the latest Atkins book (referenced in my first post). The first couple weeks, the body is unhappy switching fuels. Also there is an issue with electrolyte wasting during this time. I'll address it, too.

Cheers,

George

A few notes for those who wish to follow a ketogenic diet.

First, I strongly suggest doing some research and understanding the diet. It takes 2-3 weeks to switch the body from burning primarily glucose to primarily burning fat. During this changeover, there can be side effects.

The latest Atkins book http://www.amazon.com/New-Atkins-You-Ultimate-Shedding/dp/1439190275/ref=sr_1_1?s=books&ie=UTF8&qid=1312347377&sr=1-1 is a reasonable guide.

A good part of the Ketogenic Diet book is online. You can read it here. http://tinyurl.com/3l7z3u3

Stephen D Phinney MD PhD's paper on Ketogenic diets and physical performance is here http://www.nutritionandmetabolism.com/content/pdf/1743-7075-1-2.pdf More writing from Dr. Phinney http://www.nap.edu/openbook.php?record_id=5002&page=303 (continue on further pages) and an interview transcript

with Dr. Phinney http://www.meandmydiabetes.com/2010/03/23/steve-phinney-on-pemmican-and-indigenous-diets-will-become-public-in-2-weeks/

Also going through my list of references in my first post.

Issues

- low carb diet can be catabolic (wasting) vs. anabolic (building). Need to make sure you have sufficient protein. Phinney says 1.25 grams protein/day/kg body mass. If you are overweight, I'd use ideal body mass. Says >1.1 gram/day, you'll lose muscle mass.

- Most think this is a high protein diet. Dr. Ornish's program- vegetarian is 70% carb, 10% fat & 20% protein. These low carb plans are also 20% protein, but 75% fat & 5% carbs. Nobody accused Ornish of having a high protein diet.

- Phinney added 3 grams sodium to his diet/day & 1.5 grams potassium. This is to counteract electrolyte loss. This loss occurs during first 3 weeks when driving out stored muscle glycogen that has 4 grams water associated with it (water weight loss). Water takes electrolytes with it. Don't know about the optimal K/Na ratio in this program, but need to supplement with electrolytes.

Mike-

"1. As regards your diet as briefly introduced/outlined above, how many days per week out of 7 do you adhere to this? Or, put another way, how many days per week are 'carby'?" Initially 7 out of 7. Have to do this to get the process going. Need to stay this way till you are at target weight. At target weight, have options.

"2. Do you have a particular favourite web site you could point me to for more detail on the ketogenic dietary approach?" See above and refs in my first post.

"3. Do you ever take alcohol these days? I must admit that I'd really miss an occasional evening G&T during the summer months! But if it has to be done, so be it." I don't, but that is not the issue. On the Protein Power site, Dr Eades' wife (also an MD) addresses this here http://www.proteinpower.com/drmd_blog/recipes/on-the-wagon-try-a-cham-plain-mocktail/#more-635 Again, I'd be strict till I was at target weight.

"4. My basic uneducated approach would be to just stick to protein, good fats and lots of veg with some fruit with a few handfuls of nuts per week, a small bowl of porridge a couple of times a week and a large G&T a couple of times a week. Would such an approach be effective, or do I really need to ditch the latter two items? "The brain needs about 200 grams of glucose a day. Once switched on, the ketone system can supply up to 75% of this. Atkins starts out with 20 grams net carbs/day for a couple of weeks (induction), then gets slightly more generous. My veg. friend, mentioned in the first post, had to have somewhat more carbs as it is almost impossible to get the required protein from veg sources without more carbs. She "backed" in to the ketosis process more gently and over a longer period of time because of this. This may be more reasonable for an afibber as the risk of electrolyte depletion may be less.

Atkins keeps you pretty strict, say 30-40 net grams of carbs (net is carbs less fiber)/day till you get near target weight. Then allows you to increase 10 g/day, one week at a time. Your signals that you've reached your carb limit are: 1) you start gaining weight, 2) you get cravings for carbs, or 3) you get tired in the afternoon after eating. Any of these means to go back down 10 g/day till these symptoms go away. How much you can do is individual.

I dropped from 210 pounds down to 172 on my 6' frame. My waist is now 32.5". I'd added weight to play American football in college and never took it off, even though I remained chronically fit. The last time I weighed this, I was 15. When I see the TV infomercials on for the exercise programs, they spend 98% of their time touting the exercise and 1 or 2% saying "& we include a diet plan, too." Looking at the before & after on the models, I'm sure all the success stories did the diet, too. Even in the 1960's in his "Aerobics" book, Ken Cooper MD says that 80% of weight loss is diet.

Dr. Bernstein http://www.diabetes-book.com/ (which I highly recommend for any diabetics), says that high intensity interval training (HIIT) is the best way to clear glucose out of the system. He uses that and strength training to the exclusion of endurance training (which can be catabolic). Several examples of HIIT include Tabata 20:10

http://en.wikipedia.org/wiki/High-intensity_interval_training#Tabata_Method and Mercola's Peak 8 30:90
http://fitness.mercola.com/sites/fitness/archive/2010/12/24/a-fountain-of-youth-in-your-muscles.aspx
http://fitness.mercola.com/sites/fitness/archive/2010/06/26/10-minutes-of-exercise-yields-hourlong-effects.aspx

In either case, the exercise portion is at max effort, then slack off for either 10 seconds (Tabata) or 90 seconds (Mercola). Repeat only 8 times. Both are very difficult and probably not recommended for adrenergic afibbers. As a vagal afibber, I figure less time working out is better. This is a way to do it and keep fitness levels up. I also read not to eat carbs for at least an hour afterward. These HIIT programs are anabolic, and will stimulate growth hormone, but if you eat carbs within the hour, it stops that hormonal process.

One thing that is not addressed is keeping the ketone processing system active once you've reached a weight goal. The way I do this is to make sure I'm strict more than I'm not. I use ketone urine strips to make sure, however these have issues as the kidneys will reabsorb more ketones over time, as you stay in ketosis. There are other approaches such as periodic fasting (unlimited eating of anything every other day, then fasting the next). Calorie restriction (30%) is the only proven way to extend life in animals. However most humans won't do this. Periodic fasting has the same effect, even though the total calories eaten over two days is more on it than the restriction plan. It is theorized it works because of the ketosis on the fasting day.

On p 19 of the Ketosis Diet (link above), there is a table of food storage in a 150 pound man. 135,000 calories of fat, 24,000 of muscle protein and 840 calories of carbs. As you can see the system is really designed to run off fat. It is here in the First World where we keep refilling the carb tank every few hours.

Atkins suggests eating 14 grams a day in net carbs from "foundation Veggies." This is important to keep the system moving. See:
http://www.atkins.com/Program/Phase1/WhatYouCanEatinthisPhase.aspx You can also look around this site for more info.

Mike, I hope I've answered your questions. Wrote this fairly quickly at the end of a busy day, so please ask more if I didn't answer them all.

Cheers,
George

PAC count correlated with fasting blood sugar, exercise capacity and diet.

Summary: diet (carb intake) predicts next day's fasting blood sugar, which predicts exercise capacity later in the day, which correlates with PAC count on a recording heart rate monitor for an individual with adrenergically triggered PACs.

Graphs for this post will be at http://www.afibbers.org/Polargraphs/glucose.pdf

As mentioned previously, my friend is a WPW ablatee. They have a higher risk for afib and her mother is also a WPW ablatee and has afib. After undergoing her ablation, she had a Holter monitor test, including exercise as a ski patroller (which she's been for 35 years) at 11,000-12,000'. The EP cleared her after reviewing this test.

She came to me and complained that at night, when she removed her shoes, her toes would cramp and curl under. I suggested topical magnesium immediately, followed by oral magnesium to bowel tolerance on an ongoing basis. This "cured" the cramping. She later added taurine and potassium supplements, too.

She purchased a heart rate monitor. One day on the ski slope she showed it to me. It was alternating from 115 to 125, a response I'd never seen before. Most monitors show a moving average, this one did not. Later she got a Polar S810 beat to beat recording monitor. The Chart 1 is an example from this time. After some research, found a textbook with an illustration of a tachogram with a similar signature (http://tinyurl.com/3d5bsc5). It was bigeminal PAC's. When examined in detail, not all of these PAC's are bigeminal (every other beat is a PAC). However there are a significant number of PAC's per minute. These occur for her during exercise, not at rest. Details on interpreting the ectopic

signatures are on p14 of http://www.afibbers.org/conference/session52.pdf . More examples of annotated Polar charts are in http://www.afibbers.org/conference/session52a.pdf. An example of bigeminal PAC's from an 85 year old woman are shown below in chart 7. An example of a normal 21 year old woman are shown in chart 8. Chart 2 is a zoom of minutes 41-43 of Chart 1.

This continued. Later my friend asked me about diet as she'd always had a hard time controlling her weight. I suggested testing her blood sugar with a glucometer (Bayer Ascencia Contour), and not spiking after meals or upon fasting getting up in the morning. Over time, she lost 45 pounds on her 5'4" frame. From 170 down to 125. She is an ovo-lacto vegetarian. Her plan was to try to keep carb grams equal to protein grams, at 60 each/day. She did not experience the electrolyte wasting that is common with a 20 gram/day "induction" phase of a low carb diet. This may be an important point for afibbers as this wasting puts them at risk for an afib episode. This wasting is a transient event and should not be concerning past the first 3 weeks.

She noticed that her heart rate graphs got better, and she felt better with exercise. When I asked her to describe these correlations, she said:

- What she ate (i.e. the more carbs during the day) correlated with a higher fasting blood sugar the next morning.
- A fasting blood sugar of 80 mmol/l (to convert to mg/dl, divide by 18), was "perfect" and predicted a great exercise session. This exercise session was consistent on a program on an exercise bike at the rec. center. As fasting blood sugar increased in steps above 80 to 95 mmol/l, exercise capacity decreased and continually getting worse as the fasting blood sugar increased. It should be noted that a fasting blood sugar of 95 would be considered very "normal" by most doctors – not pre-diabetic.
- The quality of the exercise session correlated with the PAC count as captured on the Polar monitor. More PAC's equated to less exercise capacity. So more carbs the day before equals higher PAC counts during exercise!

She had noted that several years ago, she'd gone on a demanding hut to hut cross country ski tour. She ran completely out of energy. She'd stop and eat a carby snack, assuming her blood sugar was low. This would only make it worse. She now theorizes the carby snacks were increasing her PAC count and therefore giving her less rather than more energy.

She says she now knows if she is to go on a demanding hike or a hut to hut ski trip, she needs to be very strict with her diet.

Chart 3 is from March 2011, when her dietary compliance was very good. Chart 4 is a zoom of minutes 10-14 from Chart 3. Exercise capacity was excellent. Chart 5 is from July 2011. When dietary compliance was not as good as March 2011. Chart 6 is a zoom of minutes 1-5 of Chart 5. Exercise capacity was lower than in March 2011, but better than November 2009.

In summary, for her, compliance (or not) with an equal carb to protein diet predicts fasting blood sugar level. Fasting blood sugar level predicts exercise capacity. Exercise capacity is negatively correlated with PAC counts.

Q&A. Q: "So when you cheat, is it usually at night? That is after you've exercised. Otherwise you might expect a cheating lunch or breakfast to interfere with the predictability of a fasting blood sugar reading."

A: "When I cheat usually after lunch, it shows up in my fasting BS. When I cheat early (breakfast) it shows up in how I feel that day a little more. But this is not hard and fast. Eating dinner at my mother-in-law's is the worst at the moment because she does not understand my diet or why I am on it - so there is only salad for me unless I cheat on the vegetarian too. So my carbs are either at night or breakfast - I seem to be
able to control lunch.

Q: "Back to diet cheating. So if you got 80 in the morning & cheated at breakfast or lunch, I assume you'd have a poor day at the recreation center on the exercise bike, correct? In other words, the predictive power of the fasting BS assumes being compliant between taking it and going to exercise."

A: "It seems that how long I have been compliant is also in the mix. If I am good for several days and then have carbs, I get more of the start up looking HRM (Chart 5 at the start) where the first few minutes are bad and then everything

settles better. Not a great day but not bad. If I am compliant one or two days then eating carbs during the day means that it will be my new normal ugly (not my original ugly) so lots of PVC's and not very fast on the bike."

Q: "Subjectively, how would you compare the importance of electrolyte supplementation with diet for you and exercise capacity right now?"

Answer: "Mg and K helped the cramps - and helped some on the mountain (as a ski patroller). But I still thought I had asthma. I would do a short hard push and I would be out of breath for a while. So if I ran somewhere or got in a spot with a toboggan and had to muscle it out - I was out of breath. This pretty much disappeared when I went on the diet. I think that my 'Exercise induced Asthma' in my case was a cardiac symptom. SO the answer is that Mg helped on the mountain but the diet did significantly more."

(My comment) Fasting blood sugar responding to diet is an interesting area. I noticed that I could make my fasting blood sugar look "perfect" (60-85 mmol/l) or nearly diabetic (115 mmol/l) depending upon how wild I went with carbs in the evening before. Even if I went very carby for dinner, a BS reading taken before bed would be fine – the carbs cleared out. However, it would show up in a higher fasting reading. This was curious to me as I'd added no carbs to the system during the night. There is the "dawn or Somogyi effect." http://www.mendosa.com/blog/?p=232. In simple terms the liver wakes up the body at around 4 AM by producing glycogen. The fasting BS is an indication as to how well the insulin system handles this glycogen. However, why would this vary depending upon the carb quantity eaten the day before? I'm not sure. Another possible answer is nocturnal hypoglycemia during sleep. This could be caused by the carby meal. The liver can respond to hypoglycemia by overproducing glycogen (thereby creating a high fasting blood sugar). For the afibbers, nocturnal hypoglycemia can be associated with palpitations (vagal afib attacks at 3AM?). Another symptom of nocturnal hypoglycemia is sweating. One way to reduce this (besides reducing the carbs) is to consume a lot of soluble fiber with your meals. I should note that stress such as illness will effect (raise) blood sugar independently of diet.

A question is what about the diet is helpful in reducing PACs? Is it lack of insulin spikes that keep electrolytes from being wasted. Is it fuelling on ketones? Or ??? I would say it is not the electrolytes or supplementation would have helped more. I'd vote for fueling on ketones. They use 28% less oxygen than glycogen to metabolize, and can be used by the heart as well as the brain.

The http://www.coconutketones.com/SciReferences.html website is a good place to study ketones. There are data that indicate they may be helpful for some Alzheimer's patients because they are an alternative brain fuel. A way, other than a ketogenic diet, to get ketones in the blood stream is to consume medium chain triglycerides (MCT oil or coconut oil). These MCT oils cause the liver to create ketones. The Alzheimer's people have found you need to consume MCT oil throughout the day to keep the ketone levels up. For an afibber who wanted to give ketones a try, but wasn't up for the diet, could try consuming lots of MCTs, spread out throughout the day & see if there is a benefit. Again, studying Dr. Newports material on the http://www.coconutketones.com site will provide clues as the best way to do this. Background material: http://www.coconutketones.com/pdfs/Veech%202004_therapeutic_implications.pdf

I have more questions than answers, I'd love your comments and thoughts.

George

Reposting from the regular board:

Gluten, primal blueprint, pemmican
Author: Mike H (---.nastech.com)
Date: 08-08-11 12:34

I have been reading with interest posts on gluten and William's post on pemmican http://www.afibbers.net/forum/read.php?f=9&i=8981&t=8981 and merged the two ideas and started a version of the primal blueprint diet with considerable success. I am a vagally mediated afibber, long term endurance athlete and had my first afib episode at age 44. I have done the Mg, K taurine combo but really without much success. I have always had stomach issues with GERD bloating and have tried the proton pump inhibitors, deglycyrrhizinated licorice etc also without success. I was tested for H. pylori and was negative. I was currently on 2 x 75 mg of Flec with 120 mg of

diltiazem and experiencing short runs of Afib of 5 to 15 minutes of length every second night. This was always associated with excessive gas. OK, to cut a long story short, I started reading the primal blueprint and immediately cut out all grains and increased my amount of protein such that I am getting at a minimum 100 g a day. The effects have been profound! NO burping, few if any PAC/PVC but more importantly no AFIB! I have cut my dose of Flec down to 2 x 50 mg and plan to cut if down further. The reasons for the improvement are 1) I have a mild to moderate gluten sensitivity and 2) I am very active and fit and I wasn't getting enough protein in my diet and 3) switch over to a ketogenic diet. My protein comes from meat, fish nuts and lots of yogurt. I supplement with protein powder when needed. For a snack I eat beef or turkey jerky and am interested in replacing this with Pemmican. The switch in diet was hard. I was definitely and still am in ketosis as I can smell the acetone in my urine. There was the usual two weeks of lethargy during the switch over to a ketogenic diet but that has passed. This has only been three weeks but this has been the longest stretch without AFIB for me in a long time. I was going to schedule an ablation before the switch but I am going to pursue this course and see what happens. Thanks to George N, William and Jackie as I think the posts around Pemmican, Jackie's gluten report and George's posts on ketogenic diet are must reads.

Re: Gluten, primal blueprint, pemmican
Author: DickI (---.dhcp.wlwl.wa.charter.com)
Date: 08-08-11 18:43

Aren't there evidence-based arguments on both sides of the issues surrounding the ketogenic diet?

How might carbohydrate restriction differ from the ketogenic diet?

http://www.afibbers.org/S/researchreports/carbohydrate_restriction.htm

My understanding is that carbohydrate restriction (substituting primarily with mono- and saturated fats for the energy/calories lost) that falls short of switching the body to ketone metabolism can be beneficial without the possible drawbacks of the latter?

-- Dick

Re: Gluten, primal blueprint, pemmican
Author: GeorgeN (---.hlrn.qwest.net)
Date: 08-08-11 20:32

Dick,

"falls short of switching the body to ketone metabolism can be beneficial without the possible drawbacks of the latter"

Having turned on my ketone processing for about 22 months, I don't see a downside. Quite the contrary.

George

Re: Gluten, primal blueprint, pemmican
Author: Eric (---.evrt.wa.frontiernet.net)
Date: 08-08-11 23:48

Congratulations!!!

I have gone Paleo and it has made a world of difference to me. I promise to post soon. :-)

I also read Taubes books and they have changed how I eat forever.

Re: Gluten, primal blueprint, pemmican
Author: William (---.opera-mini.net)
Date: 08-09-11 15:36

Just found this page today:
http://www.texasgrassfedbeef.com/the_real_diet_of_man.htm
about the real diet of Man.

Ted Slanker ships the right beef and fat all over the U.S.A.

Re: Gluten, primal blueprint, pemmican
Author: Jackie (---.lightspeed.bcvloh.sbcglobal.net)
Date: 08-10-11 07:27

Good for you, Mike - gluten-free and dairy-free is definitely the way to go.

Glad you are doing so well.

Jackie

George

Possible Issues with ketosis:
http://high-fat-nutrition.blogspot.com/2009/11/brief-discussion-of-ketosis.html

"An aside: Hyperglycaemia is also a potent elevator of serum catecholamines and seems to be the routine trigger for atrial fibrillation."

"Both the pre-and post-exercise levels of adrenaline, noradrenaline, and cortisol were enhanced"

This is the sort of thing I file as interesting. That is, until the anecdotes trickle in about people who have gone to extreme ketogenic diets and have developed abnormal cardiac rhythms. You know the thought train that grabs you when you discover LC eating, that moment of realisation: Carbs are bad. Followed by: All carbs are bad. Most people can do zero carb with absolutely no problem. With reasonable protein intakes it is really very easy and doing a "Stefansson", using an all meat diet, is not difficult. But a few people will get in to problems. If you are wired for a heart problem along the lines of Wolff Parkinson White Syndrome, cranking up your adrenaline and noradrenaline levels might not be a good idea. If you have atrial fibrillation, ditto.

This is the effect of a water fast on sympathetic nervous tone:

"After 17 days of TF [total fasting] norepinephrine (NE) and epinephrine (EPI) urinary levels showed a two-fold and nine-fold increase respectively, but they became undetectable at the end of TF"

So increased sympathetic tone seems to be a feature of both fasting as well as ketogenic eating. It does look as if the effect is transient during fasting, so this may also be the case in ketogenic eating, but I have no data on that. The fact it may well be transient is no consolation if you have been admitted to a cardiology ward via A&E due to severe palpitations!

An aside: Hyperglycaemia is also a potent elevator of serum catecholamines and seems to be the routine trigger for atrial fibrillation.

==========
On the other hand...
Atrial tachycardia and fibrillation

http://high-fat-nutrition.blogspot.com/2007/12/atrial-tachycardia-and-fibrillation.html

"After the CHO-rich meal a greater increase in LF/HF and in plasma NE levels was observed in lean... women, while

no differences were observed after the fat-rich meal."

NE stands for norepinephrine, or noradrenaline as we say in the UK. The prime purpose of taking a beta blocker is to block the action of noradrenaline (and adrenaline too, if it's sloshing around). LF/HF is an ECG derived marker of sympathetic nervous system activity.

Just occasionally you are privileged to observe someone have a "eurika" moment.

His comment was:

"That's me! It's always in the evening, after a high carb meal, especially pasta."

You can guess what a "heart healthy" diet had been doing to his rhythm problem! We chatted over lunch, he ate the cheese, ham and salad but skipped the bread. I met him a year latter. He hadn't needed to take another beta blocker.

==========
background info...

Differential effects of high-fat and high-carbohydrate isoenergetic meals on cardiac autonomic nervous system activity in lean and obese women.

http://www.ncbi.nlm.nih.gov/pubmed/14624401?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum

After the CHO-rich meal a greater increase in LF/HF and in plasma NE levels was observed in lean, compared to obese women while no differences were observed after the fat-rich meal.

George

I have taken a meandering route to carb reduction. After being diagnosed with afib two and a half years ago, I started looking carefully at my diet about six months in. My first step was to eliminate dairy and gluten with the one exception of a bowl of oat groats in the morning. This step eliminated the digestive problems that I had had for a number of years. It was also helpful for my afib. Seven or eight months after that I decided to stick to a strictly paleo diet. I made this change to try to cut down the number of PACs that I had at night. Realistically, I would say that I experienced moderate success. I should note that when I make these changes, I am a fundamentalist about them. I don't allow myself to deviate. Fear that any deviation will lead to me going back is my principal motivation.

In the last two weeks, I have decided to limit my carb intake even further, on the fringes of a ketogenic diet.
I have done this to further limit the possibility of an afib episode, but also to gain more energy. I can see how these energy fluctuations not only destabilize the heart, but also lead to decreased overall health. I have found this last step to be the most difficult in that I love fruit. Also the increased fat and protein load has affected my digestive system. It's minor, so at this point I see non reason to change. I am going to give this new diet a couple of months to see if major changes take place. I remain optimistic.

Steve

An update on my friend who reduced her adrenergic PAC count with diet by keeping her fasting blood sugar low.

She told me that before starting her diet, she tested how long she could hold her breath - 6 seconds. Now according to the Buteyko breathing theory. Being able to hold your breath longer is good and 6 seconds is bad. Buteyko says the more CO2 you can tolerate in your system, the longer you can hold your breath.

In any case, she retested today - 23 seconds. Also the elevation where she tested initially was at 6,000', today was at 9,000'. One would actually expect a worse result at greater elevation.

One hypothesis is that when operating in a ketotic fashion, she requires less oxygen as ketones require 28% less oxygen than glucose to metabolize. This may explain her exercise capacity increasing with a lower fasting blood sugar.

Can't prove anything, but very interesting.

To try and get more data, I suggested retesting at 6,000' with and without eating coconut oil before the test. Coconut oil will increase the ketone level in the blood (because the liver will metabolize the medium chain triglycerides in the oil to ketones).

George

More thinking about the reduction in adrenergic PAC's. Is it ketones as a fuel or perhaps a lowering of fasting insulin.

In Dr. Atkins' New Diet Revolution by Robert C. Atkins (2000 Large Print edition), on p 238, Dr. Atkins says, "Patients with episodes of cardiac arrhythmias maintained a normal rhythm as long as they kept to the diet."

He did not elaborate. In the case of afib, I could envision that people who resolved underlying issues, such as hypertension or CAD, had better rhythm control.

This is not the case with my friend's adrenergic PAC's.

Dr. James E Carlson is another low carb doc. He always had a weight control problem and the first seven years of his practice prescribed the standard low fat diet to his patients. He picked up the Eads' book, "Protein Power" and followed their low carb protocol, curing his hypertension, weight and low HDL/high triglyceride problems. After trying this approach on family and friend and getting good results, he started prescribing to his patients. He wrote his book, "Genocide!" in 2007 after 9 years of positive experience with patients issues. In it, he describes the inflammation caused by hyperinsulinemia.

A lessening of the inflammation could be an explanation for the reduced adrenergic PAC's as well as William's success and perhaps that in his case, any carbs cause issues.

You can read the first 10 chapters of Carlson's book on his website: http://www.drjamescarlson.com/content.aspx?idx=33 Choose the "My Book" tab in the center of the page. It contains a good biochemical explanation as to why carbs can cause high cholesterol.

As an aside, Dr. Carlson lists diseases for which he has had clinical success prescribing a low carb diet. These include:

polycystic ovarian syndrome
issues with pregnancy
obesity
diabetes
coronary artery disease (CAD)
hypertension
GERD
IBD
colitis
eczema
psoriasis
allergies
asthma
rheumatoid arthritis
depression
pain

Many of these came about when he prescribed a low carb diet for CAD and the patient reported the other issues getting better.

In the case of pain, he lists this chain:

carbs stimulate the release of insulin
which create arichidonate
which create prostaglandins
which increase the pain.

The arichidonate creates inflammation, so could be a possible key in the arrhythmia world.

This blog http://high-fat-nutrition.blogspot.com/2011/05/fasting-insulin-and-weight-loss-on.html looks at this paper http://www.nejm.org/doi/full/10.1056/NEJM197110072851504 with regard to obese patients and fasting insulin on low and high carb iso-caloric diets. "Three obese subjects were fed, during three successive four-week periods, 1500-calorie diets with high, then low, and then high-carbohydrate content. Basal plasma insulin levels were significantly reduced on the low-carbohydrate diet. Refeeding of the high-carbohydrate diet, despite continued weight loss, resulted in markedly increased basal plasma insulin. In both protocols, most patients also exhibited a decreased insulin secretory response to oral glucose when on a low intake of carbohydrate and an increased response on a high intake."

So low fasting insulin = less arichidonate = less inflammation and possibly fewer PAC or afib.

George

In "The Art and Science of Low Carbohydrate Living: An Expert Guide to Making the Life-Saving Benefits of Carbohydrate Restriction Sustainable and Enjoyable" by Stephen D. Phinney MD PhD and Jeff S. Volek PhD, they comment that a low fasting insulin changes the kidney such that sodium tends to be excreted rather than retained. The extent of this effect is large enough that they recommend supplementing with at least 1g/day of sodium when daily carbohydrate intake is less than 50g.

There is a great deal of discussion in CR72 Potassium/Sodium Ratio in Atrial Fibrillation http://www.afibbers.org/conference/session72.pdf about the sodium potassium ratio. In addition, several afibbers have had success using a Cardymeter to monitor saliva or serum potassium levels. By modifying their sodium intake, serum potassium levels can be changed.

I'm wondering if fasting insulin is another key to this K/Na puzzle. It can be another explanation for my friends PAC reductions.

George

Thoughts on why my friend's prior day's eating predicts her fasting blood sugar.

Her phase I insulin response may be lacking or ineffective from many years of having to overcompensate, her pancreas has partially burned out, her ability to store insulin is diminished or gone, and her phase I insulin response is attenuated. Her phase II insulin response is still intact.

See Dr. Bernstein's explanation of phase I & II on the 3rd & 4th pages of
http://www.diabetes-book.com/book/chapter1.shtml

George

According to Dr. Flechas in the two hour mp at:
http://curezone.com/upload/Audio/Iodine/IodineDrFlechasDrStanTwoHour.mp3
supplementing with iodine (might be either Iodoral or Lugol's) made it possible for his patient whose blood sugar was 1,380 (yes, over a thousand) to completely stop insulin, and maintain a blood sugar reading of just under 100.

This toward the end of the fascinating audio.

He also said that iodine reverses insulin resistance and makes cells more sensitive to blood sugar so that muscles can burn glucose directly, without insulin. (?)

I don't understand this, but those familiar with the subject can make sense of it.

William

Reposting from the main board:

Author: Barb H. (---.dyn.optonline.net)
Date: 10-01-11 20:21

All I know Hans is that when I tried to follow a very low carb diet like Atkins, I had much more afib than I had in a long while. It started by the end of the first day! As I'm not inclined to measure with monitors and things, I don't think a diet that causes a great deal of urination and salt excretion is necessarily a good thing. Good for the BP, but not for the afib. Just my experience.

Barb

Reply To This Message

Re: Low carbohydrate diet
Author: GeorgeN (---.hlrn.qwest.net)
Date: 10-02-11 07:35

Barb,

This is a significant point. I will take the liberty to repost your comment in the CR and answer it in detail later.

The short answer is that Volek and Phinney address this in their book, "The Art and Science of Low Carbohydrate Living". They supplement with up to 5 grams/day sodium, which oddly enough, conserves potassium, too.

George

Reply To This Message

Re: Low carbohydrate diet
Author: Jackie (---.lightspeed.bcvloh.sbcglobal.net)
Date: 10-02-11 07:48

Just remember - as emphasized repeatedly, it's the relationship of the two electrolytes... you can't correctly reference a sodium intake without also mentioning a potassium intake...they work in a reciprocal manner. It's all there in CR 72 and Dr. Moore's book. So even if you cut back to a gram a day of sodium...what does that mean in terms of your potassium intake.... this is only half the picture as your ratio might still be too heavily weighted in sodium.

In my extensive experiences with measuring fasting insulin.... what really matters is what your body does in the way of insulin response to what you eat... that is the postprandial insulin response. Those dealing with dysglycemia say that while it's good to know a baseline fasting insulin, the real key is the postprandial measurements of insulin which show the metabolic response at 1, 2, 3 and 4 hours after a meal.

Barb - one of the immediate and well-known side effects of a strict Atkins-type diet (where carbs limited to 20 grams a day) is a lot of urination as a result. If you are already low in potassium and then implement the Atkins without a concentrated focus on potassium intake, increased arrhythmia is not at all surprising, especially if the food consumed

contains significant sodium.

In fact, as I recall, the instructions of the original Atkins were to drink water frequently to help flush out the undesirable metabolic residues produced as a result. The critics of the diet were concerned about the huge mineral loss and bone health... and there were outcries about 'peeing out your bones' on Atkins. Then, they decided to modify the diet somewhat but the concern remained about keeping the body in a constant acidic pH which still wasn't considered healthy.

Jackie

Reply To This Message
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Barb,

In "The Art and Science of Low Carbohydrate Living: An Expert Guide to Making the Life-Saving Benefits of Carbohydrate Restriction Sustainable and Enjoyable" by Stephen D. Phinney MD PhD and Jeff S. Volek PhD, they suggest adding 2-3 grams of sodium/day plus 2 grams in the food a total of 5g/day) (p 240-241) whenever carb intake is less than 60 grams/day. Their experience is that this takes care of most of the unpleasant side effects of electrolyte depletion. On P 150, "With severe sodium restriction (like 1.3 grams/day) combined with the natriuretic effects of carbohydrate restriction, the body responds first by mobilizing any excess extra cellular fluid and then by contracting its circulating volume. At some point, when confronted with this low sodium intake plus carbohydrate restriction, most people's defense mechanisms can't maintain normal mineral balances. So the body's next level of defense is for the adrenal gland to secret aldosterone, which makes kidney tubular cells excrete potassium IN ORDER TO CONSERVE SODIUM (caps mine). That is, the body waists some of its intracellular potassium in order to cling to whatever sodium it can. However unless there is copious potassium coming in from the diet, this excess urinary potassium comes from the body's potassium pool inside cells. Two things then happen. First nerve and muscle cells don't work well, leading to cardiac dysrhythmias and muscle cramps. Second, because potassium is an obigate component of lean tissue, the body starts losing muscle even if there is plenty of protein in the diet.

Jackie,

Same reference, p44. Volek & Phinney (V&P) recommend between 1.5-2 g protein/kg/day. As a general rule the minimum is 0.8g/kg/day. Most non-vegetarians get V&P recommended amounts. In any case it was thought that protein intake > 0.8g/kg/day would create a small but measurable increase in urinary calcium excretion. However it was found that increasing protein intake above the minimum also caused intestinal absorption which offsets the excretion. Research suggests that diets higher in protein are associated with healthier bones as people age.

p 166. Uric acid levels rise in blood because kidneys temporarily clear less of it as the ketones compete for kidney clearing. After adaptation, blood levels fall to those of pre-carbohydrate restriction.

As to post prandial insulin measurements. These are not an issue on a low carb diet. Only when you add significant carbs.

My comments. I only recently learned of the effect of low fasting insulin on the kidney and the effect of reversing the conservation to excretion. I've been eating a low carb diet for over two years. There were issues with electrolyte depletion during conversion. I did not supplement with sodium as I was not familiar with the recommendations above. Subsequent to adapting, I have modestly supplemented with sodium and I have had no issues with this at all. Personally, I feel it is more of an issue during the conversion or adaptation phase, where the ketone system is getting "turned on" than later.

My own blood pressure (no meds) dropped from ~108/64 before carb restriction to 90/50 afterward. I had no good explanation till now. By the way I have absolutely no signs of hypotension at 90/50. I can be prone for hours and jump up and run with no light headedness.

For me the benefits of being keto adapted are marvellous. I can't image living any other way. I always have a good

source of energy that does not depend upon constant eating - ketones. No more "bonking" or "hitting the wall" or just being very hungry and being driven to eat.

If anyone wants to try a low carb approach, I suggest reading V&P's book listed above and the book they co-authored with Eric Westman - "The New Atkins for a New You." and following to guidelines to avoid the pitfalls. The V&P book I list above was written to summarize the research for medical professionals. There are other good references. Point is, there are pitfalls that can be avoided with proper planning and execution.

George

"Just remember - as emphasized repeatedly, it's the relationship of the two electrolytes... you can't correctly reference a sodium intake without also mentioning a potassium intake...they work in a reciprocal manner. It's all there in CR 72 and Dr. Moore's book. So even if you cut back to a gram a day of sodium...what does that mean in terms of your potassium intake.... this is only half the picture as your ratio might still be too heavily weighted in sodium."

I'm away from my copy of Dr. Moore's book. However my recollection is that his 4:1 K:Na ratio or better is all based on the assumption that the kidney conserves sodium and excretes potassium (which he repeatedly states). If you change this assumption, i.e. the kidney excretes sodium, then everything changes.

As mentioned above, on a low carb program, my BP is 90/50. When I've done analyses of K:Na in my diet, it is at best, 2:1.

Lastly Dr. Rosedale's program has been mentioned on this site frequently in a positive fashion. It would be very easy to be lower than 60 g/day of carbs on his program. This is not surprising as a low fasting insulin (as well as a fasting glucose <= 85) is one of the goals of his program.

George

Throughout the references that have been so plentiful in this conference room ketosis is often referred to as a state that either you are in or not in.

Is it not the case that ketosis is a continuous variable that varies inversely with the intake of carbohydrates and measures the percentage of metabolic energy needs not supplied with glucose and the value of the ketosis variable can be anywhere between zero and perhaps ninety percent (since certain cells can only survive on glucose)

Josiah

Josiah,

Technically you are correct.

Phinney & Volek (P&V-see above) say that person eating 300 grams/day of carbs would have a serum ketone level of 0.05 mM (millimolar). For most people, several weeks after reducing carb intake to 60g/day or less, the serum ketone level would rise to abovbe 0.5 mM. The range of "nutritional ketosis" where ketones can provide a significant amount of energy is 0.5-5.0 mM. The latter being achieved in total starvation. My understanding is that 3.0 mM is normally the high end concentration ketones for someone on a low-carb diet.

The increase from ~0.05mM to 0.5 mM does not occur immediately, but after a several week adaptation period. Some call this "nutritional ketosis" or being "ketoadapted." It is after being ketoadapted that the term ketosis is normally used.

So, while ketones are always present in a non-ketoadapted individual, they provide a very minimal proportion of energy.

As a point of comparison, in Dr. Newports PPT presentation http://www.coconutketones.com/CoconutOilandAlzheimersWAPFconference11_09.ppt using coconut oil to generate ketones. If you look at slide 33, you'll see the max plasma ketone level is around 0.4mM (adding together the AcAc & bHB levels). Most of the time is much less than this. This doesn't even get up to the "floor" of ketone levels in nutritional ketosis.

On slide 34, about 0.55 mM is the max (again adding AcAC & bHB).

Obviously if one was going to try this on Alzheimer's patients, diet would provide a much bigger ketone response than the coconut oil or MCT oil.

Also look at slide 70 for a comparison of brain energy sources with a normal and in starvation overnight.

George

George-

I certainly admire your ability handle all this graduate level physiology - indeed you seem to thrive on it.

If I raise my sodium intake to 5g/day which is triple my current intake, should I raise my potassium intake as well?

I gather you think that Phinney & Volek's book is important, but is it readable by a lay person?

Josiah

Medium Chain Triglycerides
In a discussion of a ketogenic diet, the use of Medium-Chain Triglycerides (MCTs) which get broken down into medium-chain fatty acids and monoglycerides, should be of interest. Following are notes and clips from a Designs for Health presentation and Tech sheet.

Since Alzheimer's disease is associated with a poor ability of the brain to use glucose as a fuel source, the use of MCTs is particularly interesting. If glucose is not available, the only other fuel the brain can use is fat in the form of ketones. MCTs can be converted to ketones and used by the brain as an alternative energy source. The result is better cognitive function and memory along with other beneficial results.

Medium-chain triglycerides are a unique form of fat with some very impressive health benefits. One of the basic ways in which fats are categorized is by their carbon chain length. Compared to long-chain triglycerides (LCTs), the predominant form of fat in the American diet (found in most vegetable oils and animals fats), MCTs are shorter in length, containing 6 to 12 carbons as compared to more than 12 carbons found in their long-chain counterparts. It is this smaller size which sets MCTs apart and which gives them their distinct advantages, allowing for easy and rapid absorption and digestion.

MCTs, which are found mainly in coconut and palm oil, are processed in the body very differently than long-chain triglycerides. MCTs require less energy and enzymes in order to be digested. They get broken down easily by enzymes in saliva and gastric juices, so there is no need for the bile salts and pancreatic enzymes that are usually needed for fat digestion. In the body, MCTs get broken down into medium chain fatty acids (MCFAs) and their derivatives monoglycerides. They are easily absorbed across the wall of the small intestine into the blood stream and then delivered straight to the liver where they can get burned for energy (instead of being stored as fat).

In essence, they act similar to a carbohydrate, but without the requirement of insulin. As a result, MCTs are more readily used as a source of energy, leading to an increase in metabolism and providing quick energy replenishment when needed.

In the teleconference I heard, it was suggested that those who are beginning a strict very low carb diet (ketogenic) and not having the quick glucose supply for fuel – would find consuming MCTs first thing in the morning gives them a

welcome boost.

I was especially interested in the “no insulin requirement” and therefore, the link to brain health.

MCTs and the Brain
Among the many attributes of MCTs, one stellar feature is their role in support of brain function, specifically in enhancing cognition and brain activity. Instead of being stored as fat, MCTs have the distinct capability of being converted to ketones, the body’s alternative source of energy made from the breakdown of body fat in the absence of sugar.

This phenomenon takes place with a ketogenic diet (a high fat, adequate protein, very low carbohydrate diet). In a ketogenic diet the body, including the brain, is starved of carbohydrates and is forced to use these ketones, or fat by-products, for energy, instead of the preferred glucose. (The only two fuel sources for the brain are glucose and ketones, in that order of preference.)

In neurodegenerative diseases such as Alzheimer’s, the brain’s ability to use glucose is diminished, which is detrimental since glucose is the brain’s principle energy source. When neurons are deprived of energy they lose their ability to function and will eventually die. Increasing the brain’s levels of ketones through the administration/consumption of MCTs will give the neurons this alternative source of energy and thus help to assist in improving cognitive function and memory where it was otherwise impaired (i.e. dementia, post brain injury, epilepsy, autism, childhood cognitive development problems). This ability of MCTs to serve as a direct source of fuel for the brain, sparing protein and bypassing the sugar/insulin process, is vital when brain function is declining due to neurodegenerative diseases such as Alzheimer’s.

Quick notes on other benefits derived from MCTs include

<u>Cancer</u>
Studies show an impressive therapeutic strategy for cancer patients to help inhibit tumor growth through the consumption of a ketogenic diet whose fat content included medium-chain triglycerides. One study performed on mice showed that tumor growth in those fed a ketogenic diet containing MCTs was significantly delayed when compared to those given a standard diet where the body was not starved for carbohydrates (Otto C et al, BMC Cancer, 2008). Another study which looked at pediatric patients with advanced-stage cancer also showed promising results when a ketogenic diet based on MCTs was used to affect tumor growth and metabolism (Nebeling LC et al, J Am Diet Assoc, 1995). Also helps in the wasting process (extreme weight loss/malnutrition) is often the crucial factor which makes cancers fatal.

<u>Weight Loss</u>
Unlike other fats, MCTs are not stored in the body and are burned for energy.. They promote weight loss through thermogenesis and have the ability to increase metabolism.

<u>Athletes</u>
MCTs give quick boost of energy. Very useful to athletes and those with intense weight training. Often, these groups of individuals are drastically restricting their carbohydrate intake. MCTs will provide the missing energy source, a very important key for muscle recovery. Also, protein is of vital importance in the world of weight training. Since MCTs are quickly converted into energy, they offer an outstanding way for the body to spare the amino acids provided by protein from being used as fuel, and thus these amino acids can be used for their main objective, to build muscle. This anti-catabolic role is crucial in preserving muscle during intense exercise, especially when a low carbohydrate diet is being followed.

<u>Antimicrobial/Antifungal properties</u>
Caprylic (Octanoic) acid has been shown to have antifungal effects, making MCTs an effective adjunct in helping to combat Candida albicans (yeast infection). Capric (Decanoic) acid, which becomes the monoglyceride monocaprin in the gut, exhibits antiviral and antibacterial activity, which may prove beneficial in fighting HIV, herpes simplex, chlamydia, and other bacterial infections.

Dosing of the MCT product by DFH indicated that 2 teaspoons was equivalent to 5.7 grams of MCTs one or more times a day. Laxation and gas can occur if one takes too much. Taking with food can help. Start with low doses and titrate upward.

I've been using about a tablespoon daily of organic, cold-pressed coconut oil from Tropical Traditions for many years.

Lipid expert, Mary G. Enig, PhD says:
Virgin Coconut oil is rich in lauric acid, a nutrient that supports the body's immune system. Lauric acid is also found in human mother's milk. She suggests the average adult include about 3.5 tablespoons of coconut oil per day in their diet to take in an equivalent amount of lauric acid that a nursing infant would receive from breast milk.

I have a list of published studies on MCT findings which I'll gladly share if you email me.

Jackie

Resource - Designs for Health
Suffield, CT 06078

Josiah - if you raise your sodium to 5 grams a day, are you able to consume 20 grams of potassium-containing foods? I'd be very careful with raising sodium that high. The advice in that referenced book may not take in to account the biophysics involved with atrial fibrillation.

Jackie

Jackie,

In my version of Dr. Moore's book, he recommends the "standard" low fat, low cholesterol, relatively high carb dietary prescription (which is not a good thing in my opinion). This leads me to assume he did not consider what happens in the kidney when fasting insulin is dramatically lowered on a very low carb diet. As I recall (his book is not currently handy), he states that kidneys excrete potassium and retain sodium. Clearly this is not the case all the time. There is a relationship between insulin and sodium excretion.

In this old paper, "The Effect of Insulin on Renal Handling of Sodium, Potassium, Calcium, and Phosphate in Man", RALPH A. DEFRONZO, C. ROBERT COOKE, REUBIN ANDRES, GERALD R. FALOONA, and PAUL J. DAVIS, The Journal of Clinical Investigation Volume 55 April 1975-845-855. Insulin caused both Na and K to be retained and Ca to be excreted as insulin levels increased. As far as potassium goes, this contradicts what it typically said here that insulin causes potassium to be excreted. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC301822/pdf/jcinvest00168-0222.pdf

A Google search of Insulin Sodium excretion kidney will bring up many papers reporting the insulin/sodium relationship in the kidney.

In posting Phinney & Volek's recommendation, I'm not suggesting that afibbers go quite that far. In my own experience with a very low carb diet, there was a time during conversion where more sodium MAY have prevented an afib episode. When you read the details in Phinney & Volek, the reason is that too little sodium (caused by excretion in a very low carb diet), actually CAUSES potassium excretion. Again, in my own experience, this is a transitory situation in the first couple of weeks while conversion to ketosis is ongoing and the body is ridding itself of stored glycogen and the associated water. While I season food liberally with Celtic Sea Salt, I'm sure I get no more than 1 or so grams above what is in the food. When I did an analysis, I estimated potassium intake around 4 g/day and sodium at 1.5 g/day.

If I were to go through conversion again, I'd pay attention to symptoms (achy muscles & etc) and dose accordingly. My vegetarian female friend who lowered her PAC count with her diet did not have any of these symptoms. Perhaps because she had a somewhat higher carb intake of 60 grams/day and the same of protein. Something like this may be more appropriate for an afibber. However there are Type II diabetics who can't get their blood sugar under control and loose weight unless they eat at the 20-30g/day carb level. As pointed out in the new Atkins book, this is a very individual thing.

As an aside, Gary Taubes eats similarly to me and posted his blood lipid results here http://www.garytaubes.com/2011/04/before-sugar-were-talking-about-cholesterol/ You will note his triglyceride to HDL ratio is < 1, fantastic! Also, his LDL's are large fluffy LDLs, which are not a problem at all. This is for those who are worried that eating this way will be bad with regard to heart disease.

Another aside, a paper showing that A1C tests > 4.6% are correlated with an increase in heart disease in non-diabetic people. http://archinte.ama-assn.org/cgi/content/full/165/16/1910 Also fasting blood sugar is poorly correlated with heart disease as it does not measure elevated excursions of blood sugar after meals. There are some data suggesting that excursions above 140 mg/dl are the big issue. In a recent webinar, Dr. Bernstein said he considers any A1C >4.6% to be abnormal (equivalent to average blood sugar of 86 mg/dl or 4.8 mmol/l). http://attendthisevent.com/?eventid=22289682 This would be very tight blood sugar control in the general population.

George

So I looked up in my (1993) edition of Dr. Moore's book "The High Blood Pressure Solution" on p 182, he lists a suggested meal plan for day 12 of his program. It is 2050 calories, 26 g fat (234 cal or 11%), K= 4600 mg, Na 1000 mg. So looking at the protein and carb components. The protein component is not specified but is most likely between 15 and 20%. If we assume 15%, or 272 calories, then the carb component would be 1544 calories (75%) or 386 grams of carbs. His other meal plans are similar.

Knowing what I know now, this would most likely spike the blood sugar of anybody with blood pressure issues reading his book. Making my point that Moore did not consider the insulin effect on sodium excretion from the kidney (or conservation as the case may be).

I'm guessing most reading Moore's book and eating like this would have a fairly high fasting insulin level (as well as after meals).

On MCT oil, ketones and cancer:
"Studies show an impressive therapeutic strategy for cancer patients to help inhibit tumor growth through the consumption of a ketogenic diet whose fat content included medium-chain triglycerides. One study performed on mice showed that tumor growth in those fed a ketogenic diet containing MCTs was significantly delayed when compared to those given a standard diet where the body was not starved for carbohydrates (Otto C et al, BMC Cancer, 2008). Another study which looked at pediatric patients with advanced-stage cancer also showed promising results when a ketogenic diet based on MCTs was used to affect tumor growth and metabolism (Nebeling LC et al, J Am Diet Assoc, 1995)."

As I reported in my post above, the ketone levels from eating MCT's was at the very low end of what can be achieved with a ketogenic diet. Most of what I've read suggests that the reason a ketogenic diet has an effect on cancer is that the cancer cells lose their ability to process ketones or fat for energy, therefore when glucose is limited, tumor growth is moderated, giving the immune system time to act on the cancer. So it is not the ketone per se that are effective, it is the lack of glucose as a fuel. There may be other benefits also due to low levels of insulin.

George

George - My one objection to Dr. Moore's book was and still is... the food/meal recommendations. I always tell people to ignore that section and stick with the low carb version of a diet that works for them because of the insulin involvement as you point out. It's not uncommon to find a great book with immensely significant facts only to have some dietary suggestions cast some negative reactions.

I look to Moore's book for the biophysics involved and what that means for afibbers' heart cells and the corresponding voltage.

The notes I wrote on MCTs were just suggestions to help people get used to the transition when beginning a ketogenic diet. The lack of carb intake at first can be discouraging for some who begin this diet. Using the MCTs helps get over that hump.

Jackie

Jackie,

My point is that all of Dr. Moore's work starts with the assumption that people are eating a high carb diet. Since most people do eat a high carb diet, it is not an unreasonable assumption.

However, when one eats a very low carb diet, it is a game changer. None of this changes what happens at a cellular level. However it may change what are appropriate micro-nutrient levels for intake. Many people reduce their blood pressure in a dramatic fashion on a low carb diet. The explanation may be that it changes the K/Na ratio retained by the system, as opposed to changing the K/Na ratio on intake, which is Moore's approach. As I've previously mentioned, my BP went from about 108/65 to 90/50 when I changed diets. My potassium intake did not change and, if anything, my sodium intake went up as I did read the recommendations to supplement. However because of Dr. Moore, I did not implement these recommendations fully. This may have lead to my one afib episode brought on by diuresis during conversion. Today, my K/Na ratio is about 2.5:1 and my resting BP remains in the 90/50 range.

A very low carb diet may be very positive for some afibbers for just this reason. It could very well explain the correlation of PAC's with my friend's fasting blood sugar.

As an afibber, I would tread lightly approaching a very low carb diet. If I felt I needed to get as low as the 20-30 grams/carbs/day, I would certainly consider at least some sodium supplementation, at least during the first several weeks.

Thinking out loud - it might even make more sense to start with a higher carb intake for several weeks, say 60g/day and then gradually step down to the level required. That way the diuresis occurring at the beginning would be over a longer period of time.

I know why Atkins recommended generally starting at 20g/day of carbs - it reduces cravings and hunger quickly and allows people a better chance of succeeding on his program. In the new version of his book, there are options to start at a higher carb intake level.

In summary, a very low carb diet is perhaps another option for afibbers to try. However, they may wish to "start slowly," if they do a "hard start," they should be aware of the symptoms of the Na wasting and be prepared to supplement. For the record, Phinney & Volek recommend supplementing with K, Na and Mg - don't see that very often.

George

Jackie,

On ketones and cancer, I did find this paper http://www.cancerci.com/content/9/1/14

The goal of the current study was to test the hypothesis that ketone bodies can inhibit cell growth in aggressive cancers and that expression of uncoupling protein 2 is a contributing factor. The proposed mechanism involves inhibition of glycolytic ATP production via a Randle-like cycle while increased uncoupling renders cancers unable to produce compensatory ATP from respiration.

Conclusion

Seven human cancer cell lines grown in glucose plus acetoacetate (ketone) medium showed tightly coupled reduction of growth and ATP concentration. The findings were not observed in control fibroblasts. The observed over-expression of UCP2 in cancer lines, but not in controls, provides a plausible molecular mechanism by which acetoacetate spares

normal cells but suppresses growth in cancer lines. The results bear on the hypothesized potential for ketogenic diets as therapeutic strategies.

George

So Jackie,

I almost can't stand it. I went back and looked at Moore.

The description of the effect of insulin runs throughout. For example on p 52 of my '93 copy. "Elevated levels of insulin promote the storage of fat in adipose tissue, thus promoting obesity. More importantly, "insulin resistance" together with elevated levels of insulin is known to increase the production of serum triglycerides, decrease levels of the "good" (HLD) cholesterol, and promote increased levels of total and LDL cholesterol....high levels of insulin appear to be at the center of a web of interrelated hormonal and metabolic factors that lead to coronary artery disease....high insulin levels play a key role in producing the pathology associated with primary hypertension."

And he prescribes a meal plan that is 75% carbohydrates for those with hypertension. HOW DOES HE THINK THE LEVEL OF INSULIN GETS ELEVATED!!!

From my reading of docs who clinically prescribe a very low carb diet, lowered blood pressure is usually one of the outcomes, without specifically changing the K/Na input ratio in the diet.

Just changing the K/Na ratio and then keeping the insulin level high by suggesting a 75% carb diet seems very short sighted.

I'm not questioning Moore's basic cellular biophysics, but the carry through leaves something to be desired.

George

Hi Jackie,

In Moore's book, he tells people with high blood pressure to do 3 things:

- Lose weight
- Exercise
- Get the K/Na ratio above 4 on intake.

To a certain extent, loosing weight and exercising are proxies for "lower your insulin level." Ironically, he suggests people eat a diet that is 70-75% carbs. This is going in the wrong direction to get insulin down.

Also, looking at this from a lifecycle perspective, a healthy teenager eating a diet with a low K/Na ratio will most likely have a "normal" blood pressure. Now fast forward a few decades and that same person will have a high BP on the same diet. What happened? He's packed all his cells with glucose and they can't take anymore, so he's become insulin resistant. His insulin levels have increased, and therefore the kidneys are conserving sodium. This brings on a higher BP.

Getting his K/Na ratio above 4 will help his BP, but ideally, he should also address the high insulin levels. If he fixes his insulin levels with a diet change, he will most likely also fix his BP, whether or not he implements the K/Na ratio above 4, because the kidneys will start excreting sodium and the problem self-corrects at that level.

What does this mean to the afibber. Well, if the K/Na ratio is important to the afibber at the cellular level, as suggested in CR72 http://www.afibbers.org/conference/session72.pdf, the same applies to him.

Regarding the current discussion, in my friend's case, fasting blood sugar may be a proxy for fasting and other insulin levels. Her PAC counts may be associated with higher insulin levels (as indicated by fasting blood sugar levels), and

therefore more sodium in the system due to the action of insulin in the kidney.

As I said, rereading Moore's book, references to the negative actions of insulin with respect to sodium and blood pressure are listed throughout. So the lack of directly addressing high insulin levels appears to be the "Elephant in the Room" here. But it may be prudent for afibbers to do so.

In CR3 http://www.afibbers.org/conference/session3.pdf, PC suggests that hypoglycemia due to high insulin sensitivity may be an issue for afibbers.

Ben, the first respondent seems to fit PC's insulin hypersensitive profile:

"I'll throw in my two cents worth from a layman's point of view based on my personal experience with hypoglycemia. I've had hypoglycemia most of my life and was severe in earlier years. The cause was from living on sugar and even though I have a significantly different diet since then the insulin sensitivity still exists after many, many years of better diet.

I have believed for some time, but have never stated so, that the hypoglycemia is part of the equation. I am also tall and slender, 6-4, 190, with lots of good cholesterol. If I eat a very low carbohydrate diet my afib doesn't give me much trouble. If I so much as have a nice big piece of
chocolate cake or pie after supper the afib is almost automatic?"

So is it hypersensitivity to insulin or a normal insensitivity followed by overproduction causing the hypoglycemia? In any case the low carb solution worked by keeping insulin in check.

Much to think about.

George

George- I know that you've covered this earlier in the conference room,
but could you point me to a physiological description of how ketone body metabolism works and how it contrasts with glucose metabolism. Also do the mitochondria play an important role in ketone body metabolism?

Josiah

Josiah,

My original post seems to have vanished. I know this guy goes into it in his series of 9 YouTube videos on Alzheimer's. I don't remember which one. http://www.youtube.com/watch?v=j1FmK4582mA

Also on Dr. Newport's site http://www.coconutketones.com/pdfs/VANITALLIE_NUFERT_ketones_ugly_duckling.pdf

This talk describes both - warning there is some foul language used by the speaker in the talk, Doug McGuff MD. The ketones & glucose metabolism explanation is in the last 1/3 of the talk.
http://conditioningresearch.blogspot.com/2011/03/it-is-all-about-information.html

George

For what it's worth after having been on a lower carb diet (perhaps 75 gram/day) for about ten days I had an afib episode after 20 months in NSR. There may well have been other factors (supplemental lapse, a little caffeine, a little alcohol, a stressful day) and so I have no intention of not proceeding with my low carb goals.

Josiah

Josiah,

I can relate. Somewhere at about 10-14 days after initiation of a low carb routine, I had my first afib episode in many months. However, this issue appeared to be transient and has not occurred in the 2 years hence of being keto-adapted.

I'm sure I was taking in a much lower carb intake than you, perhaps around 20g/day.

Two years ago, I did not know the reason for the suggestion to supplement with sodium. I was aware that Dr. Phinney's study diets included supplemental sodium (as well as magnesium and potassium) however because of Dr. Moore's work and all of our discussion in CR 72, I shied away from the supplemental sodium. In hind sight, this was probably a mistake.

As Phinney points out, the reason is that too little sodium (caused by excretion in a very low carb diet), actually CAUSES potassium excretion. Significant supplemental sodium rectifies the problem. For non-afibbers, the consequence is generally feeling poorly. For afibbers, the consequence can be afib. Once the body adapts, the issue goes away, in my experience. This means that afibbers should be very careful during this time, if they try a low carb diet.

Longer term, James Carlson MD in his book, Genocide, notes that he see's PVC and PAC counts decrease in patients on a low carb diet. He also says that Dr. Atkins mentions the same thing in his books. Carlson says he does not know why this is, he just reports that it happens.

As for me, advanced glycation end-product (AGE) http://en.wikipedia.org/wiki/Advanced_glycation_end-product seems to be a potent cause of aging and the associated declines in function. AGE is a very large issue in diabetics; however most of us are on the same path, just at a slower rate. Hence the short term afib risk was worth the long term health benefit of very stable blood sugar.

I'm surprised that 75g/day of carbs was low enough to cause the sodium & other electrolyte wasting. My friend at 60g/day never experienced it. Of course there is the biochemical diversity at work, too.

George

Pemmican Diet

William,

How much pemmican would one consume per month, if on a pemmican only diet? What is the cost? Do you know of any distributors? Would you be willing to prepare a 3 month supply for sale? How long do you estimate one should eat pemmican only, before noticing positive results?

I have exhausted all other options. I am uninsured. Before bankrupting my business and family by paying up to $40,000 cash for an ablation, I would like to try one more thing. I have been reading this forum for 8 years, and feel your approach may be my best bet.

I am currently in a 3+ month afib episode. I feel I may be stuck in permanent at this point. War indeed.

Curt

Curt,

Here is a US supplier. In this list is even a salt free model.

http://www.grasslandbeef.com/Categories.bok?category=Grassland+Beef

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According to their site, each bar is 400 calories, & 20 grams of protein.

At a minimum you should get 1 gram of protein per kg of bodyweight (unless you are very overweight). This can be increased if you exercise a lot.

You could also go at this from the basic calories you generally consume and then divide by 400 for the number of bars/day.

My vegetarian friend who went low carb at my suggestion can see significant increases in her adrenergic bigeminal PAC's on her recording heart rate monitor when she cheats and adds too many carbs in.

George

How much pemmican would one consume per month, if on a pemmican only diet?

I don't know. The neat thing about a high animal fat diet is that it satisfies, and I just eat enough. A very shaky guess would be about 25 to 30 pounds of beef/month, and about 1/3 to 1/4 that much tallow/clarified butter.

What is the cost?

About $1400/year for meat. Note that I get preference from the farmer who knows that I am using this meat for medicine so I get old cow. Cheap. His other customers get young steer (30 months old), which costs $3.25 per pound. These are both totally grass-fed and grass-finished.

The fat is expensive, as I've not found a source for edible beef fat in Canada. There isn't enough on grass-finished beef, and the locally traditional farm beef is corn-finished with corn that is marked in the feed stores "not for human consumption". Tallow did not taste right, and I will never use that fat again.
I've clarified different kinds of butter, they all seem OK, but need to learn more before deciding. Maybe 3 pounds of butter /week? About $15 locally.

Do you know of any distributors?

No. George's link is to a U.S. source, we can't get it by law, and many have tried it and found it wrong. They put salt in, which is a big no no, and evil carbs in one kind.
They also don't properly render the tallow so it still contains some water, result is it won't keep without freezing. Becomes moldy otherwise.

Would you be willing to prepare a 3 month supply for sale?

Can't. Regret it, but my dryer only stops for one day/week now, and I doubt that the farmer has any extra.

How long do you estimate one should eat pemmican only, before noticing positive results?

Three weeks. Please keep in mind that although I had splendid results the first year, recently it's obvious that I was/became iodine-deficient.
Magnascent (TM) is what I have, but Tennant writes that Lugol's Solution is just as good, and any pharmacist will make it for you. Apply to skin.

Until you find a source for grass-finished beef, store beef works for the short term. I've done that for a few months. The leanest round roast is best. Don't use ground beef from a store.

Um. I've always eaten some eggs as well, usually every day, sometimes raw yolks, more often soft boiled. My stomach tells me to do this, I don't know why but think it's wiser than I am. Cooked eggs need salt.

It's probably cheaper than a normal diet because of all the stuff I don't buy, including drugs.

I think that the iodine is of critical importance for all who do not eat raw seaweed, and have heart problems.

Good Luck,

William

Curt,

Here is the live link:

http://www.grasslandbeef.com/Categories.bok?category=Grassland+Beef

If you Google *Grassfed beef* along with your state or area, you may find many sources.

Grassfed beef is available in my local natural foods market for about $6/pound.

I'm sure William can coach you on making your own pemmican. I've not done it. As I understand, you dry the beef and grind it up, then mix it with a fat source. Ideally it is 20% protein and 80% fat.

I also buy ghee at the same market. This is the brand: Purity Farms Organic Ghee Clarified Butter. You can easily make Ghee (clarified butter) from organic UNSALTED butter. Instructions are here: http://whatscookingamerica.net/Q-A/ButterGhee.htm

Other ideas are to Google - *Paleo diet food sources* and perhaps your state.

My diet is mostly non-starchy veggies and grass fed beef or wild caught fish. Not the same as William's. I figured out keeping my afib at bay with supps before I changed diet, so haven't noticed afib change from it.

In my opinion, there are several possible reasons that paleo diet can help afib. One is avoiding insulin/blood sugar spikes (depending upon how the diet is implemented). William would certainly have low (normal) and constant blood sugar. My previously mentioned friend with bigeminal PAC's has found this is important. Another reason is avoiding foods that can cause issues - for example gluten in many people, and better digestion in general.

William is most likely in ketosis 100% of the time. There may be a benefit to this as ketones use 28% less oxygen to metabolize. If you go this way, I'd look at an Atkins diet reference, as it takes about 2 weeks to "turn on" the latent ketone processing system. This is a normal result of either starvation or a very low carb diet. There is a transient effect during this time as the body uses up its store of glycogen in the muscles. There are 4 molecules of water associated with every molecule of glycogen. As the glycogen is used, the water is excreted, taking with it electrolytes. Hence it is important to have a significant intake of potassium, sodium and magnesium. Also the body doesn't like switching fuel systems initially. Again a transient effect. If you Google *Atkins induction phase side effects*
you'll see what I'm talking about. I did experience the electrolyte issue when I switched diet, even though I was supplementing with significant quantities of potassium and magnesium. Again, this is a transient issue, not continual.

Although I'm not zero carb, raw as William is, I have seen interesting benefits from keeping the ketone processing system turned on. Not needing to eat or drink for long periods, even while exercising all day is one of them.

Here are some references that William originally suggested:

This link is to an interview with Stephen D. Phinney MD, PhD on Ketogenic diets & exercise, below is a link to one of Dr. Phinney's paper's on the same topic. This was done a few years ago. Phinney is a co-author of the new Atkins book above.

The you can listen or download the interview here:

http://hoe.kgnu.net/hoeradioshow.php?show_id=184

The paper is here:
http://www.nutritionandmetabolism.com/content/1/1/2

An old, but interesting paper on ketone metabolism is here:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2441301/pdf/tacca00109-0225.pdf This includes an observation that hibernating bears are in ketosis and conserve nitrogen, therefore urinating very little. It is an explanation for my relative lack of need to drink water while exercising all day.

Good luck!

George

For years I've needed to drink water or electrolyte mix all day and some at night, until I started the iodine some days ago. Possibly because I eat no seafood.

I make clarified butter rather than ghee for two reasons - first, I don't like the strong buttery taste of ghee that overwhelms the pemmican taste, second, if it is overheated it is very bad for us. Some have had to go to a hospital. Has to be watched constantly.
I make the clarified butter in a deep glass pot, set the electric burner just above 1 and ignore it for two hours, then take off heat and leave it cool for 40 minutes, then skim the foam and very carefully pour off the fat, then pour the watery stuff down the sink.

Expect lethargy for three weeks - that's for the young in good physical condition. For old guys with wrecked bodies, it took me most of a year to get some energy back. Changing a body from sugar burning to fat burning is not trivial.

William

William - why do you make the ghee? What's the purpose?

Also, bison/buffalo is totally grass fed. It's probably more expensive than beef and maybe not as available in some areas but that may be an option for some.

If I use any at all, it's bison... but not as you prepare it; I'm still stuck on rare but not raw.

Jackie

Jackie,

In my area, bison a) is not always grass finished and b) is about 50% more expensive than grass fed beef.

As for Ghee- it is a great, stable saturated fat. I use it or unrefined organic coconut oil as a fat source.

Like William, I also eat fresh eggs (at least 2 chicken and 2 duck/day). I buy them from a lady who raises them in her back yard nearby. I found her with a Craigs List search on eggs.

See this post on ATP and ketones http://www.afibbers.net/forum/read.php?f=9&i=9011&t=9011

In the linked paper by Veech (http://www.coconutketones.com/pdfs/Veech%202004_therapeutic_implications.pdf) I found it interesting that ketones can substitute for insulin.

In my analysis, paleo man most likely always lived with the ketone processing system turned on. Not that he was always in ketosis, but that food was scarce enough that ketones were a regular feature in his life, thus keeping the processing system turned on. Once the system is turned on, one does not have to be in ketosis 24x7 every day to

keep it turned on. It took weeks to turn it on, I don't know how many days of a carb feast it would take to turn it off (nor do I care to finds out), however it is longer than several days, from personal experience.

Also, from personal experience, once turned on, you never run out of energy as you do when fueling on carbs. Even the thinnest of us have plenty of free fatty acids to fuel on and create ketones with.

In the Sunday supplement, there was an article comparing cats and dogs.
http://www.parade.com/news/2011/07/31-battle-of-cats-vs-dogs.html

"Which Have More Stamina?
The sled dogs that compete in Alaska's annual Iditarod run about 1,100 miles in less than two weeks, often in temperatures as low as -40 degrees F. "They use fat as their primary energy source far better than any other athletic species that's been studied", says exercise physiologist Michael Davis, who notes that a 55-pound husky can burn as many as 12,000 calories a day. Davis's research has also shown that sled dogs have an enormous capacity to process oxygen."

Some time ago, I read an article in Outside Magazine. The US Military had sent a researcher to biopsy these dogs to find out what is in there genes that allowed them to run like this. Then they interviewed the vet who said, "their diet is 40% protein 60% fat - if humans ate like this they'd all die of heart disease." I thought - they don't need to biopsy the dogs. The answer is they are living in ketosis.

I have experienced this relative unlimited energy personally. Though I make an effort to moderate on endurance activities, in deference to afib. I routinely will participate in anaerobic activity for 7 1/2 hours/day, without stopping for food or drink. My energy level shocks even my 25 year old playmates who are in fantastic shape. However they are still carb fueled and it makes a difference.

I think this ATP issue may be part of the story for those who have afib remission success on a Paleo diet. I realize that Paleo does not require living in ketosis, but doing so is certainly within the parameters of the Paleo diet.

George

William,

Thought you might find this interesting. Talks about ketosis cleaning up bad proteins in the cells:
http://www.proteinpower.com/drmike/ketones-and-ketosis/ketosis-cleans-our-cells/

And for a general description of ketosis (for others, I'm sure you know this, William): http://www.proteinpower.com/drmike/ketones-and-ketosis/metabolism-and-ketosis/

George

Sorry George - our bison is totally grass fed; no grain finishing.

Jackie

Hi Jackie,

Here some are, some aren't. Even to ones that aren't more expensive than the grass fed beef & the ones that are - even more expensive.

I like bison, just not enough to regularly pay a lot more for it.

My hunter friends sometimes supply me with wild elk, deer & etc. I also have a friend that goes fishing offshore Alaska & he brings back some for me.

George

Here is a go-by from the literature on the amount of pemmican needed per day.
http://www.nap.edu/openbook.php?record_id=5002&page=304

"This debate was fueled on the one hand by the experience of trappers, fur traders, and explorers who lived among the native peoples of the North Plains and Pacific Northwest in the United States and throughout Canada. A typical voyageur working for the Canadian Northwest Company was given a daily ration of 1.25 lb (0.6 kg) of pemmican as his sole ration. Nourished by this food, these men would paddle and portage loaded canoes across great distances via the lakes and rivers of Canada. The other side of the debate was fueled by the cultural experience of the English, whose empire depended upon a navy fed by salted meat and dried ship biscuits."

Assuming the same protein/fat ratio as this:

http://www.grasslandbeef.com/Detail.bok?no=1061
3.2 ounce bars will average 45% tallow and 55% dried jerky. Each bar contains 20 grams protein, approximately 400 calories and no carbs.

So 1.25 pounds is 6x3.2. This would equate to a 2400 calorie a day diet with 120 grams of protein. Not unreasonable.

George

George, that sounds low to me, if the sled dogs' consumption is accurate.

"A typical voyageur working for the Canadian Northwest Company was given a daily ration of 1.25 lb (0.6 kg) of pemmican as his sole ration."

I don't have the URL handy, but the competition (Hudson's Bay Co. established 2 May 1670) grumbled about how much their paddlers ate.

William

William,

I'm sure you've read all this, but you may be interested:

http://www.meandmydiabetes.com/2010/03/23/steve-phinney-on-pemmican-and-indigenous-diets-will-become-public-in-2-weeks/

Also, you may wish to comment in the current CR on ketosis: http://www.afibbers.net/forum/list.php?f=5

George

After 32 months of pemmican diet I found that I need to supplement with Iodine as well as potassium and magnesium. I think it's because modern farm soil is deficient in I and Mg, possibly need calcium as well.

William

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