Cold Thermogensis 2

Readers Summary

1. Are you aware that you can easily change your metabolism by yourself at home?
2. Do you know that you can change your calorie needs?
3. Are you aware of what you do not know, because you have not considered it?
4. Consider three new radical rules that might intrigue you to know more about CT

Now that you understand that I believe cold environments were how life first evolved, what implications does this hold for all life and humans today? I think with this thought experiment we need to begin to talk about another aspect of evolution to fully conceptualize how cold works for biology. Let's talk about sleep for 4 short minutes. First, I want you to watch this video before you proceed.

Recently, one of my readers pointed out he was confused by Dr. Gamble when she said the normal pattern of sleep in a natural environment had two cycles. He wanted to know why her version and my version for sleep as written in my post "Rx for the Leptin Rx" were not congruent. It was a great question that really opens the discussion to the idea of evolutionary mismatches. These mismatches occur in many modern systems of biology, and they are actually increasing in frequency and severity as time elapses. The reason is quite simple. Evolution is constantly getting faster as time goes on, relative to the current state of our genome. This is really how the "cellular theory of relativity" is currently affecting our own genome today. The speed of evolutionary change has far out stripped the ability of our paleolithic genes to catch up. This mismatch causes major problems for modern humans. When they further exacerbate the system with choices

not congruent with our biology, the results are magnified in disease incidence and prevalence.

She also mentioned in passing, early in her talk, that people who went deep into the ground have been found to be “very productive” while in a cold dark environment. She did not expand on this concept at all, but I would strongly suggest you remember this as the cold thermogenesis series progresses on. There is a deep biologic reason this occurs. As we use this pathway, lots of things improve that we do not expect.

She assumed in her talk that native polar people without artificial light sleep differently than we do today. She spoke about the effect of ***light cycles***. She said that she felt that light cycle were the most important affect on our biology. Light cycles are important to all life, but this bright researcher is apparently unaware that mammals have an innate ability to change their internal chemical circadian clocks when the environment they are in changes. Plants have the same ability.

We stop using the photic light cycles to yoke metabolism to our sleep when it is cold. There is an epigenetic switch in us that stops our suprachiasmatic nucleus from using light in cold environments. *This is done by design by evolution because light cycles do not become important in freezing cold because carbohydrates cannot grow in these environments*. This is tied to ubiquination rates and how light control carbon utilization from foods. So evolution designed a plan to teach mammals who cannot think, as humans can. We can control our environment but wild animals cannot. When an animal has no way to control its environment away from the equator at higher latitudes, the best way to yoke the season cycles at our poles is to use temperature instead. That is precisely what happens in plants and animals. Humans seem to think they are immune to this condition. I will explain the complex biochemistry later in the series and provide you with cites. Right now, I want you to be aware of this metabolic trap door. Its mere presence is

shocking enough. But its implications are far greater for modern humans because of how they link to ubiquination rates in cells.

There is one larger problem with her assumptions in this TED talk. She said light is the big deal. She was right but never gave the context of why it was a big deal. It turns out on cold environments light becomes less dominate in signaling. Today we know it is not true any longer in seasonally cold environments. This means that if evolutionary biology gave up on light for some reason, switched and used cold temperatures to monitor to how to us carbon in us when light levels were uncoupled from our mitochondria in seasons where light is not dominate. It raises a question: what else may happen to our metabolism in cold? Evolution does not do these things without a reason. She was quick to point out that this ability has been lost in modern humans, in her estimation, because of our discovery and widespread use of artificial light has become a huge game changer. We know Paris, France became the first city in our world that used artificial light in 1924. Today NYC is knows as the city that never sleeps. I think most humans are not really aware of how basic circadian mismatches destroy our biology slowly via the "slow erosion of metabolic function by the use of artificial light frequencies"

We know that humans die most from heart disease and heart failure. Heart failure is the number one cause of admission according to Medicare data. The heart has a lot of mitochondrial density. After this blog is through, you might know why this makes complete sense. The reason has to with a slow erosion of the process of autophagy in humans due to the circadian mismatches created by our choices in life when they are married to the rapidity to the development of our neolithic brain. In essence, humans became so smart so fast eating DHA, we became able to control too much of our environment for our own epigenetic and genetic good. The

smarter we became, the more mismatches we became able to create. This cause our biology to become uncoupled from the cell cycle and metabolism for longer than just autumn or winter. We became able to live disconnected to nature for decades. For humans, this disconnection of chrono-biology lead to a steady walk over thousands of years to become the less efficient metabolically during sleep. This is especially true during REM sleep when autophagy dominates our biology. Autophagy is used to set ubiquitin marking to fix and recycle proteins for repair. Reduced autophagy leads to heart failure and it will lead to brain shrinkage. So this means that biologic mismatches are best measured in animals by looking at their rates of heart failure. For humans, the rates are staggering. That is a big clue that what we all believe to be true could be what is actually killing us slowly. Remember autophagy occurs when we sleep.

Moreover, when one looks at the biology and biochemistry of sleep and truly understands the power of autophagy for longevity, it becomes apparent that we may want to consider that maybe sleep is our primordial condition and not wakefulness. Maybe, just maybe, we evolved consciousness over time. This theory I have follows the thoughts I have developed in my cold thermogenesis theory, because in extreme cold environments, the process of autophagy becomes "super sensitized" to save energy while it increases our metabolic capabilities. Remember when Jessa Gamble said that humans in dark deep holes become more energized and productive in her TED talk? The reason why is cold dark environments super sensitize the human process of autophagy without us actually having to sleep at all. The cause is an increased efficiency of autophagy by cold and dark. The metabolic trap door does something to us that we cannot do in long light cycles. To get suprasensitive autophagy in light we have to sleep well. This is an example of how metabolism and biochemistry can rewire or become thermoplastic in cold and dark environments.

In fact, in cold, sleep is heavily selected for in terms of how mammalian nervous systems are built by evolutionary design. Cold stimulus changes the behavior or eutherian mammals. This is why mammals can sleep so long underground in sub zero conditions and survive. Sleep is heavily selected for in cold.

Radical Rule #3: Sleep and cold environments were our ancestor's primordial condition and as such, this was evolutions starting point for life on our planet.

Sounds more radical does it not? Let's consider these thoughts and facts today.

If we assume this to be true, this thought explains why epigenetics has been found as the dominant player in how genetics operate in biology. Why? Anything that promotes survival and reproductive fitness has to be passed to the next generations. This is evolutions main directive. I think evolution found that epigenetic modifications to be quite effective way to pass on environmental information to succeeding generations. So successful, that it became a backbone law of genomic functioning. Evolution follows fractal patterning. So it is also highly conserved in all species. Today that appears to be true too. Life at its genesis was likely static, and to get the nutrients it needed, it used passive diffusion because of proximity. This made food scarce to life at all times. To survive it had to overcome this impedance. This manner of nutrient collection is highly inefficient, but the suprasensitivity of autphagy in cold made the process biologically plausible for great part of our evolutionary history. It appears that evolution naturally adapted to improve access to nutrients and to do so, it had to **evolve wakefulness to obtain them**. Yes, you read that correctly. To complete this, it yoked metabolism to sleep early on in evolutionary biology so it could account best for nutrients and autophagic repair to lead to optimal survival. I believe the use of timing became an easy evolutionary solution

because of the rhythm of the sun and the freezing cold that these cells found them in could account for these cycles.

I believe that fractal organization of sleep and metabolism remains in every organism studied today. If you ask sleep researchers, (I have) they have told me this is a correct assumption. I believe that sleep and autophagic efficiencies are extremely high conserved across all species on our planet. We still have yet to find a species that does not sleep some. I think as life evolved wakefulness and not sleep, because it had to account for its environment. Such evolution then moved from a static model to a dynamic one, and then a whole new set of environmental problems had to be navigated to make life persist. Now you see why autophagy sits at position 15 on the Quilt. It is a critical component of optimal living in all species, not just our own.

This also signals where movement was first coupled to memory or actions in life. Even today, all learning in higher order animals is directly coupled to movement in their environment. The more one moves, the more intelligent one becomes. I just explained that to you in a recent blog, The Rewarding Feeling of Safe Starches.

We can prove this today because if we just get an Alzheimer's patient with a demolished brain, when we introduce exercise, we can increase their cognitive function in a completely broken organ. In fact, in any neurodegenerative condition this happens by evolutionary design. That tells me a lot of how "evolution thinks". The more I learn how she thinks, the more I learn. I hope this helps you understand how I think about life and how it all began. It is a foundational concept behind my QUILT document. When you see my point of reference, you begin to see a new reality that you might have not anticipated before.

Let's continue on now to metabolism from the light and temperature story. There was a recent paper done that showed

mammals may have another unique ability that is thermoplastic we are also not aware of. It is currently assumed by researchers and scientists that the only way a mammal can change its fatty acid concentration is by its diet. This article showed us that assumption might also not be true. ("Changes in 'Good' Fatty Acid Concentration of Inner Organs Might Be Largely Independent of Diet") In this article, they state the following, "it is generally believed that mammals are unable to alter the proportions of essential fatty acids in their cell membranes except by changing their diets.

Amazingly, the amount of so-called "n-6″ polyunsaturated fatty acids (those with the final double bond at the sixth position) in the membranes was found to increase dramatically before the start of hibernation. Apparently, to prepare the body, particularly the heart, for operation at very low temperatures. Consistent with this idea, the transition to a higher content of n-6 fatty acids in membranes takes place extremely rapidly just before the animals enter their hibernation chambers. The changes are reversed again, over a short time, around the termination of hibernation in spring when the animals return to a life at **high body temperatures.**

The fatty acids incorporated in the membranes probably stem from the marmots' white adipose tissue. Surprisingly, however, fatty acids are not simply taken from the fat stores at random but n-6 polyunsaturated fatty acids are transported preferentially. The mechanism remains a mystery.

These new and unexpected findings show that mammals can make highly significant and rapid seasonal changes to the lipid composition of their cell membranes. But the results go far beyond this. During and immediately after hibernation, marmots are unable to eat anything – their food is under a thick layer of snow – so the changes cannot be related to immediate dietary influences.

Because the animals hibernate underground isolated from any

external signals, the changes are probably controlled by an endogenous clock as part of an annual cycle."

This article implies some more evidence for my theory on thermoplastic change. It is really not a theory, but an evolutionary dictum in all eutherian mammals. Let's examine why evolution may allow mammals to do this.

The critical points for us to consider in this article are twofold: 1. the stimulus for hibernation in eutherian mammals and their descendants are tied to high dietary carbohydrate intake (proven fact already in science and not controversial) and high placement of omega six intake into their cell membrane prior to hiberantion begins. This was not known until this article came out. It did not escape my view, because it makes total sense of why mammals in particular would do this. The dietary stimulus of plentiful carbohydrate availability is a metabolic sign that they should soon den (fat and happy) and this seems to change what happens to the fatty acid synthetase enzyme in the mammalian gut lining. In this new research, scientists studied mice that are unable to make fatty acid synthase (FAS) in the intestine. FAS, an enzyme crucial for the production of lipids, is regulated by insulin, and people with diabetes or insulin resistance have defects in FAS. Mice without the enzyme in the intestines develop chronic inflammation in the gut, which is a powerful predictor of insulin resistance. This is how mammals used to signal their body that it was time to lay down under ground and avoid the harsh arctic winters. This biology is now coming to light in humans and you can read about it in my second cite. It appears all the biology is lining up quite well with my theory.

This signal is likely tied to signaling that the mammal should begin to replace its own cell membranes with PUFA's. Why would evolution do that? Why should we pay attention to it? We should pay attention to it because it has major implications for modern humans who are direct descendents of these

animals. Moreover, this evolutionary design feature allows for an interesting conundrum to potentially develop for us. It appears incorporation of PUFA's into cell membranes are a "normal signal" in mammalian hibernation for them to den. I also found out from organic chemistry that high cell membrane concentrations of PUFA's make the cell membrane of our cells very fluid in cold environments. This explains why mammals need this adaptation to sleep and not freeze their cells. It is a cellular anti freeze.

I also found out from Canadian frog biology that high glucose levels also act as antifreeze for animals in extreme environments. This information was nothing short of shocking. Maybe diabetes is an ancient epigenetic program for survival and not a disease at all? When I found this out I realized immediately why evolution needed to plan for this. In cold environments, if our cell membranes are filled with MUFA's and saturated fats they become too stiff to work. All cellular functioning in organ systems depend upon proper cellular signaling. Mother Nature knew it so it designed a system to incorporate PUFA's normally into all mammals cell membranes to get optimal functioning in cold environments. Any organic chemists can verify that this is a complete and factual statement. Here is another example of how biologic thermoplasticity occurs in nature.

So it appears that dietary carbohydrates, which are only present in long, light cycles in the summer in cold places, induce mammals to add PUFA's to our cells to become fluid so we can function as we hibernate. This makes complete logical sense when viewed from an evolutionary stand point. I asked several mammalian vertebrate physiologists if this is how carbohydrates work for hibernating mammals and their answer was yes.

This implied to me that maybe if this is how mammalian physiology was designed to work to begin with. After all, they evolved in the polar environments on earth. This implied

something even bigger to me. Why would we need diabetes to survive? Then the answer occurred to me. I called it Factor X. I checked my facts, and continued to connect more dots. Diabetes is required in mammals who are designed to work for optimal adaptation in cold environments.

Maybe, just maybe, it has become thought of as a neolithic disease in humans because we have simultaneously lost the ability to hibernate because we evolved the ability to control our environment completely? After all, we know evolution is moving faster today than our genome can adapt, Cordain and LaLonde have pointed out many times.

Remember, we still have our mammalian paleolithic genes that control our use of dietary carbohydrates and the up-regulation of PUFA's in our cell membranes in us today. These biochemical pathways remain in us. This is another well known fact in the paleosphere. What is not so obvious to most, however, is that the rapidity of our brains' evolution created the ultimate mismatch in this system. I believe some perceive this mismatch, but no one has explained this as yet. **So it then follows that when we create a biologic mismatch with our neolithic thoughts we get something we have been socialized to believe is a disease. It is not at all. It is an evolutionary novelty created by our own rapid evolution secondary to our brain amazing development in the same time period?**

This is how I view it from a 30,000 foot level today. The skeptics will immediately jump down my throat and point out that type one diabetics and CW that says it is a genetic disease! I don't and never have. I think Type 1 and 1.5 diabetes are decidedly epigenetic phenomena of this mismatch that has been passed from every eutherian mammal to us today, and we remain unaware of this possibility either! Epigenetics has also speeded up if evolution has. This is why humans have no ability to stop diabetes once it starts unless they get in a cold environment. And this is why we assume that these two conditions are diseases, rather than consequences of a

“relative time frame shift” in evolutionary time due to how fast our brains developed. This also explains why we have a paucity of hominid skeletons in the fossil record. This time disruption is part of levee one, which I called the “cellular theory of relativity.” Time is something we failed to consider in how our species maybe its own missing link to this puzzle!

Several of my friends have asked me, if this is not a disease then how does nature cure diabetes on its own? The answer should be intuitive now to you. When you began this post you might have thought that where I was headed was counter intuitive and frankly insane. Well, now you see how I think about it from a new perspective. The biology we know to be true today lines up completely with this theory. But how are IR and DM cured? Well, can you really cure a disease that is not a disease to begin with?

In IR, we get expansion of the fat mass to increase storage from carbohydrates we ate during long light cycles. That implies to reverse this process, there has to be a system. There is, it’s called hibernation in freezing cold. It means the cure is to live by your descendants biologic directs and in congruency with our evolved biology. Since we no longer hibernate maybe you need to consider how you eat carbohydrates within the circadian controls? Maybe what you thought was safe really is not?

Final point in part two of this series. “Doc, how does evolution eliminate these fat cells normally? What is the biologic process?” The reason diabetic researchers can’t find a cure is because their manner of looking at the problem is skewed and dead wrong. When you put on your evolutionary glasses, you see a different view of a perplexing issue. Cold environments are found as mammals hibernate in normal circadian biology. This completely reverses IR in mammals and wakes them up when conditions are better for life. Humans extinguished this ability rapidly in our evolutionary history because we are fully capable of controlling our environment.

There is no need to den any longer, because we control our environment regardless of the temperature but we still have the machinery that acts within us. If we eat outside that directive, we get modern day diabetes. We can forage and succeed all the time. We can obtain Chilean bananas on Dec 31 in the Arctic Circle. Do you think evolution has a plan for this set of circumstances yet? Nope.

The modern result is that we have created a world where carbohydrates and PUFA's are available 24/7 while we no longer can access to evolutions solution for Insulin resistance. It also makes sense why we have no built in hard wired metabolic pathways for fat removal. But cold thermogenesis does it and does it remarkably well. That implies that our ancestors paleo genes remain dominant as we evolved out of the Savana. Or it could even mean that maybe other assumptions we have made are also wrong? Realize that because our brains development was so rapid, it allowed evolution to extinguish the ability to hibernate. But there is a lot more to this story yet to be told so added biologic plausibility and maybe ultimate proof as to what is the optimal diet and what is just good enough.

Radical Rule #4: Evolution speeds up as time progresses on. This is a known biologic fact. The faster this evolution occurs, the greater the dietary mismatch becomes, and then we begin to see the real causes of why diabetes might happen.

Radical Rule #5: Epidemics are not caused by genetics. This is also a medical clinical fact that gets lost in the scientific literature, but you would never get that from reading the literature on diabetes.

Are you connecting any dots yet? Are you beginning to see how the QUILT was built? We are just getting started. Next up, the mind bending biochemistry that backs up all I have said here. Prepare for some cranial work out.

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- My Leptin Prescription
- The Quilt: Autophagy
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Cites

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