

Cold Thermogenesis 8

Readers Summary

1. Can we funnel the CT series into 15 concepts?
2. What is the main problem modern humans face?
3. What is the evolutionary bottleneck that drives this process?

Radical Theory #1: If our brains can rewire, then Einstein's theories predict our biochemistry should be able to as well. [My Leptin Rx](#) and the modern cochlea implant definitively prove this in modern humans.

Radical Theory #2: Considering that 90% of the earth's current biome lives in extreme conditions on our own planet today still, we might need to consider that what we think is "our normal environment" is not so normal for most of life on our planet or our evolutionary history. Life on Earth evolved in an environment much like we see on Titan today; in a deep ocean frozen solid at its surface with the capability of life buried deep within it. The only escape was due to ejections of water vapor from super heated water from underwater volcanoes. All these things are present today on Earth's crust too. There is one major difference now between the two. We are a lot warmer today than when life began. There are others, but when one looks at Titan we see a frozen giant moon with a monstrous ocean beneath it.

All life on our planet came from the oceans first. We know this to be true as well. And because of this, studying extremophile forms of life here on earth today might explain the complexities of how biochemistry allows for life to exist at all in a thermoplastic environment.

What the bio-astronautics found on Titan with the Cassini Solstice mission, may be a huge clue that life first adapted to extreme environments and then was naturally selected and adapted to a cyclic warming trend on our planet's crust over time.

Our hominid species may have adapted during this warming trend, but the DNA we inherited came from animals that were cold adapted. Evolution uses epigenetics to determine adaptation to environments. We have discarded the strict definition of genetic determinism in the last ten years. We know today that the power of epigenetics dictates a lot more about newer generations adaptations than we even knew since the 1950s. The implications of this information now has to make us look at some of our own long standing assumptions about how living cells work in cold and warm environments to see how our cells react to a thermoplastic environment.

They may not have even made a big impact when hominids evolved 2.5 million years ago because by all geologic accounts it was still warm. But it remains possible that the impact could be a lot larger than we expect as well. We may not fathom this possibility but it is clearly in the realm of possibility.

The modern science of epigenetics shows that who we came from and what they faced has a direct biologic effect upon subsequent generations DNA and phenotypes. It is crystal clear today, but the biologic implications remain unexplored in all modern day literature. What is happening on Titan today may be like opening up a black hole back to a reality that used to be our own. The ability to see Earth at life's evolutionary beginning is now a possibility.

Radical Theory #3: One of my readers pointed out recently he was confused by Dr. Gamble's CT-2 video (below), 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. Human creativity also constantly generates them with its new "modern technological advances" Consider Google glass as the next catastrophe we will face.

Why is this happening? [Factor X](#) is the evolutionary reason and Factor X was an evolutionary bottleneck that resulted in the natural selection of the Ancient Pathway (leptin-melanocortin system) of the mammalian brain. I think most humans are not really ambiently aware of how how basic circadian mismatches destroy our biology slowly via the "slow erosion of metabolic function." This factor is the source of most of our neolithic diseases modern hominids face today. We can now measure these mismatches with simple blood tests. I laid this out in the [Paleo Summit talk with Sean Croxton](#) and in my many panel discussions at Paleo fx 2011. I strongly suggest you review them when they become available.

Radical Theory #4: Sleep and cold the environment, were our ancestors primordial condition and as such, this was evolutions starting point for life on our planet. This is why even today [90% of the living biome on Earth remains in a freezing cold environment](#). Humans believe because they are the penultimate species of evolution there current environment is a more important factor than it really is.

That is a very faulty assumption. Life on this planet evolved from the deep oceans to land. Therefore the biochemistry that dictate's modern energy generation can not be generalized to all life forms on this planet. It can be studied on those mammals, animals, and bacteria that have undergone natural selection to a warmer climate and have assumed a warm adapted diet. Just because we use and live this way, has no bearing on what we evolved from, or if energy generation is somehow more efficient or less efficient in a different thermoplastic environment. Sleep is the most important part of our biology for Optimal living in my opinion. I begin every hack I do in the clinic using sleep as the basis.

Radical Theory #5: Evolution speeds up as time progresses on. This is a known biologic fact. The faster this epigenetic evolution occurs the greater risks

we face at the hand of mismatches. We may then begin to see the real causes of why diabetes might occur.

Radical Theory #6: Modern epidemics are not caused by genetics, but by epigenetics! This is also a medical clinical fact that gets lost in the modern scientific literature but you would never get that from reading the literature on diabetes. In fact, the totality of the diabetes literature would have you believe the exact opposite. This is a neolithic thought that has hurt all modern diabetics and is at the seat of why modern medicine has failed to find a cure.

Mother Nature has a cure for insulin resistance in all eutherian mammals. That is cold exposure of their peripheral nervous systems. The stimulus to this pathway begins when the mammal is exposed to a high dietary carbohydrate diet that is found in long light cycles on this planet. This is how the gut senses the environment and this signals are transmitted to the brain via the vagus nerve. Modern biochemistry books and biochemists stop here..They immediately go to what we know about energy generation in cells. But I am focusing in on what they have failed to realize.

When dietary carbohydrates are high it stimulates the eutherian mammal to begin to upregulate omega 6 content into every cell membrane of their body slowly through the autumn while temperature falls. It speeds up as the temperature drops in winter. This process is completely independent of dietary sources as I laid out in [CT-3](#). Why does this occur in all mammals? Because to cell membranes to function in cold weather it requires all land based mammals from cold adapted ancestors to have an EFA ratio of 4:1 for optimal signaling. The reason is tied to mitochondria. Mitochondrial function improves in colder conditions. In water based mammals who are cold adapted, like whales, walrus, and seals they face steeper temperature gradients in the water that require a much lower EFA ratio (essential fatty acids) in their cell membranes to function properly.

This lowered ratio of EFAs also changes the biology of adipocyte biochemistry. It favors the accumulation of surface fat but not of visceral fat. Visceral fat is used to burn first to maintain core temperature in these animals. In land based cold adapted mammals like the polar bear the same is true. When they emerge from their den in spring they are shredded of all visceral fat and no longer insulin resistant, and have the biggest and strongest muscles they will have all year. Their body composition is at its best at this time. They accomplish all this without needing **any** exercise or food to do so.

This is in counter distinction to modern man beliefs. Why is this? The question is more complicated than the answer. The answer is again, simple. Modern man is further down the evolutionary path and a product of a faster evolution. He uses all the parts of the physical world to generate energy to his advantage. This means his evolutionary development was the product of a sped up epigenetic process for some reason. In essence, epigenetics also speeds up as time elapses. This allowed for the human brain to develop faster than our body plan because our diet radical changed from our immediate ancestors, the chimpanzee.

This ability caused two simultaneous evolutionary adaptations to occur simultaneously. As our brain expanded, our guts shrunk in length. We only needed a smaller gut when we become adapted to eat predominantly fat and protein from animals. A diet high in fat and protein was also used to fuel encephalization of hominids. Larger brains meant we needed pelvic changes to become bipedal and it also extinguished the need to hibernate. Hibernation needs were shrunk into our sleep cycle during stage 3 and 4 sleep. As we became smarter we became able to control our environment. This is how a sped up epigenetic plan set up modern man to become more susceptible to many biochemical mismatches.

When our recent ancestors lost the ability to hibernate, they also lost their best way to fight insulin resistance. Cold shreds us of fat normally. Since those ancestor mammals ate carbohydrates in a proper circadian cycles, purely controlled by their seasonal growth, the biochemical systems in those mammals readily adapted to these new states without much problem. This biologic adaptation required alteration of the leptin receptor to function with higher levels of cytokines present. It appears natural selection also made adjustments to liver biochemistry and bioenergetics to mirror those changes made in the brain.

Every eutherian mammal born on this planet up until 2.5 million years ago had to live by the dictums of their environment. When hominids evolved, much later, this situation radically was altered. Hominids remain the only mammal on the planet who can `100{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}` control its own environment. This allows our species to create mismatches at great speed, as our brain continued to develop over the last 2.5 million years. This trend dramatically speeds up all our chemical clocks in every cell of our body that is controlled by circadian biology. This is well known by modern science.

The Nobel Prize of 2009 tied this all to telomere lengths in our cells. All mammals have circadian signaling hardware in their brains that wire directly to the cell cycle machinery in every single cell of their bodies. This means that modern hominids are the most sensitive mammal to any circadian mismatch compared to their ancestors. Moreover, since they have the most advanced brain in the mammalian family, they are subjected to the greatest risk of neolithic diseases due to these mismatches. Humans get diseases that no other wild animal gets for this reason. Humans get autoimmune disease when our most recent ancestors, the chimp can not. They do not have zonulin and we do. The reason is because our guts are adapted to different diets that lead to our encephalization. Animals domesticated by humans suffer the same fates as we do, ironically. Wild mammals tend not to get these issues because they live by the rule that Mother Nature determines for them in their own selected environments.

The ultimate paradox of modern hominids is that they evolved the ability to live on a warm adapted diet and in a warm environment, but that they retain the cold adapted biochemistry buried in their brains even though they do not need to use it presently. Evolution has not extinguished this ability for a very good reason, in my view. One reason is that the geologic record shows

that our planet undergoes cyclic cooling and warming over longer epochs. This will keep the pathway active epigenetically over thousands of years. The main reason it has not been extinguished in my opinion, is that this ancient pathway determines ultimate survival of the mammalian species and it was vital at one time in evolutionary history. Modern hominids have an advanced nervous system, but they still are tied to the evolutionary family they come from long ago. They are not divorced from the rules of Mother Nature even though they act as if they are. This ties modern humans directly back to Factor X. The paradox is that they remain blind to it even today.

Radical Theory #7: Since modern hominids are unaware of the thermoplastic nature of their own biochemistry, they have never controlled for it in any modern biochemical study or study on nutrition. biology does not realize mitochondria function can be improved by cold surface temperatures. This is why neurosurgeons use cold in head trauma cases where the brain is swollen.

The brain has the highest density of mitochondria in it so when it swells for any reason it is because either electron transport has slowed or because pseudohypoxia or frank hypoxia has developed. Pseudohypoxia is how hibernation begins in most mammals. This means that any assumptions made in biochemical dogma now needs to be questioned. The hints of these paradoxes are found in NASA astronauts, the Sherpa abilities, Vasper Technology, Russian Winter Olympic dominance, Lance Armstrong's ability to beat cancer and win 7 races, Michael Phelps eight gold medals in one Olympics, Wim Hof's amazing abilities, and the use of cold in human transplantation harvesting, and modern neurosurgical procedures bring these paradoxes to life.

They show us today they are not paradoxes at all. As we gain wisdom, we see the magic in things because our senses grow sharper. Reality is that which, when we stop believing in it, doesn't go away. These "paradox" remain abilities that evolution built into our ancestors and that were passed down into our genome and hardwired into our brain for a reason. We remain blinded to it because few modern humans live in this environment today. Today this remains completely unstudied as our population, while they get more sick and mediocre with each passing decade. Elite athletes are the first humans to push these boundaries and to open our eyes to this possibility that this may exist. We are in inning one of this ballgame right now.

Radical Theory # 8: Modern life and its technology is as bad to us as a vegan or SAD diet. Lab results we draw on people show this. Cortisol patterns and hormone panels are a mess in humans when they are studied. Moreover, eating an ancestral paleolithic diet is a better choice than others, but it can hide the cellular effect of stem cell depletion by other forms of modern circadian mismatches. technology use at night is an easy one. Modern paleo's make this mistake way to often.

The risk of a Paleo diet for them is that the diet is so good in some respects that it could blind your consciousness that you might be depleting your life force at the very same time. You will see this in an altered redox potential. This will show up when disease develops in the back half of your life span. This implies that what you think is really safe.....may not be safe at all. Light after sunset from technology is as bad as eating the wrong diet for our Ferrari engines and our brains because it destroys the cortisol

diurnal rhythms. And it means that your ultimate proof won't come until it's too late for reversal.....unless you prove it to yourself today by testing.

Radical Theory #9: Modern humans cannot out exercise/supplement bad choices from diet or from technology. Modern life is plain stressful and can hurt us even if we remain oblivious to it. Moreover, just eating an ancestral template, while over exercising like mad and eating safe starches 24/7, is not justified by your activity level. If you also play on your computers, iPhone, and iPad all night long, and think it has no biologic consequences to your stem cells is a Neolithic thought that just might kill you early.

Trying to get all cute and use food and supplements to hide bad decisions won't work either. Just increasing resveratrol, curcumin, and metformin won't allow you to "out supplement" poor choices. Exercise must be hormetic and within our circadian cycles too. If it's not, you will become a dead marathon runner or an ex-NFL player with a short life span who people wonder why and how that body crashed so fast? You can't fool your telomeres, but you can fool yourself with your thoughts or "feelings". The quality of your health is a summation of great decisions consistently. These decisions are all based upon the quality of your thoughts presently

Radical Theory #10: Your modern beliefs are usually the cause of your ultimate decline. Become fully aware that the human mind is a wonderful servant but usually is a horrible master. This will be a tough one for you to swallow because it was for me; but it is an ultimate truth. We are often our own worst enemy. This is why we often why we see success in going against the grain in Wall Street, Medicine, and in fish, like salmon. Our community must beware of this rule. The paleo tribe are experts at using modern technology to help it move forward, but if it is not applied correctly it might make you a good looking corpse with no stem cells when your telomeres are too short to change it. I do not want you to believe me. On the contrary, I want you to test me! You can check my theory easily yourself. Draw your own telomere test right now at Spectracell labs and test your own dogma.

Radical Theory #11: Cold adapted mammals can do things warm adapted ones can't because at extremes chemistry, physics, and biology change when the temperature is colder. All biochemical reactions slow down in cold so Mother Nature responded to this environmental challenge by speeding up epigenetics. This is where Factor X plays its largest role in mammalian biology to compensate for the slowing of biochemistry to speed up reproduction for survival.

90{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of life on this planet is cold adapted as we speak today. Our anthropocentric point of view has resulted in the classification of cold-adapted organisms as extremophiles, even though environments of permanently cold temperatures (around 0°C) abound on Earth, especially when one considers that these include not only the polar and alpine regions, but also deep-sea waters.

Geek Alert: Psychrophiles, both prokaryotic and eukaryotic, have successfully colonized these cold environments and are able to grow efficiently at sub-zero temperatures. This adaptation requires a vast array of structural and physiological adjustments in order to counteract the reduction in chemical

reaction rates due to the low temperature of the habitat. Most scientists study human physiology in mesophilic environmental conditions. This is a big problem. The reason is that humans have completely different abilities in cold and the resultant physiologic changes are often 180 degrees opposite that one would expect. This fact has blinded many scientists and physicians to some deep realities about human biology. Recently, fish have been found in our polar seas that are believed to be over 10,000 years old.

Organic Biochemist Geek Alert: Temperature is one of the most important environmental factors for life as it influences most biochemical reactions. Low temperatures slow down and strongly inhibit chemical reaction rates catalyzed by enzymes, the 'work-horses' of cell metabolism. The effect of temperature on chemical reactions is basically described by the Arrhenius equation: $k = Ae^{-E_a/RT}$, where k is the rate constant, A is E_a is the so-called activation energy, R is the gas constant (8.31 kJ mol⁻¹) and T is the temperature in kelvins. Accordingly, any decrease in temperature will induce an exponential decrease of the reaction rate, the extent of which depends on the value of the activation energy. The thermodependence of the activity can be approximately expressed by the Q10 value that is normally close to 2-3. This is the main factor preventing the growth, at low temperatures, of non-adapted organisms. So biochemistry of cold says we should have slow growth patterns based upon the biochemistry. I told you earlier that evolution has sped up tremendously as time has gone on. So the question remains is, how did evolution overcome slower growth? Since the cell cycle was slowed by cold it sped up epigenetics to compensate for the slower growth. That is the basis of **Factor X**. It is the most important part of my theory because it is why the human brain was naturally selected for in a mismatched environment. It is an evolutionary factor by itself.

Radical Theory #12: The Ancient Mammalian Pathway naturally selects for the cold adapted [Epi-paleo diet](#) in all cold adapted eutherian mammals. To access this food source their nervous systems were adapted to remain insensate to pain after and adaptation period. This period differs across species but it is present even in humans after two weeks of peripheral surface cold sensation.

The best food source then for a cold adapted mammals biochemistry would be a ketogenic version of the paleolithic diet ([Epi-paleo Rx](#)) that has a high omega 3 content. The reason is simple. More omega 3's are needed in cold environments to provide for accurate cell membrane signaling due to increased double bonds in their chemical structures of DHA.

VLC Warning: VLC in a warm adapted world has serious limitations. Be aware of them.

Paleo Diet with Metcons: carries even larger risks for the modern human.

Radical Theory #13: The leptin receptor is primordially a cold based electron counter for nutrients from foods. I think it evolved the ability to function in warm environments as mammals evolved onto land and took the planet over. Our earliest ancestors however began in the cold polar seas and on cold polar land masses. The biochemistry we know today in textbooks only represents the

warm adapted mammalian pathways, and as such, are not complete in my view.

Training Fiction: Carbs are mandatory. The work of Volek, Phinney, Attia, and many others are pulling the veil back that ketosis is most efficient mammalian fuel in the cold, and not carb loading. Carb loading is a thought born of only understanding the warm adapted mammalian pathways. There are numerous examples of athletes using the cold adapted pathways having superior performance to the warm adapted pathways. The issue is that too few have decided to access it because it takes 24-36 months to reach those peak levels. The Sherpa's remain the best example of this in today's modern world. They have been extensively studied by NASA.

This blind spot needs to be studied in depth by modern day scientists who are not just elite coaches. Burning fat (FFA) actually increases our VO₂max and proton flow when the ancient pathway is induced. This information is directly in counter distinction to published data because we remain unaware of the cold adapted pathways in humans. It is currently unstudied, but we have numerous examples of humans with exceptional performance in cold environments that few can explain until now.

At extremes, biochemistry changes in nature for our benefit. Evolution has a plan for this because it tapped it many times before. REALIZE THAT modern trainers are oblivious to this therefore they regurgitate what is best from the literature that is based upon mammals who are warm adapted eating a warm adapted diet! Can you say major mismatch! The best example of this today is the technology of Vasper which can not be explained by the published data in modern exercise physiology books. This should be a huge clue that we are missing some major factors. Vasper is a known entity in NASA research. Vasper has licensed the NASA technology generated from the Sherpa's in the 1970's.

Radical Theory #14: Why do humans remain blind to all this? They never face a true winter any longer as do other wild mammals. Behavioral adaptation is most important for the survival of human species. It includes e.g., well heated houses, good thermal insulation of clothing, warm vehicles and short exposures to cold. In fact, behavioral adaptation can work so well, that no physiological adaptation is developed in winter, as shown in young urban residents. These neolithic creations are why we do not see the metabolic benefits of this pathway in modern humans often. When modern humans become aware of them and their benefits they may consider building a small part of their current environment for cold thermogenesis.

Modern humans may find that when they cold adapt it will help treat diseases due to mismatches in circadian biology.

Warm clothes and buildings are neolithic creations that kept us in the dark about the ancient pathways benefits. Wild mammals can't do what our brain allows us to do. Mismatches are not just not good for humans in our modern world where it constantly seems like it is summer time due to artificial light and 24/7 access to carbohydrates.

Radical Theory #15: Neolithic diseases of aging is total cellular chaos.....health is perfect cellular order, in between is cellular mediocrity. We need to decide are searching for optimal or not. Optimal requires a cold

adapted physiology.....sub optimal is found on the pathways in most modern biochemistry books.

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