Thank you very much. Thanks everybody for coming. I graduated from Chico State in '98 with an undergrad in biochemistry, did an undergrad research fellowship in selective and antimeric excessive prochiral ketones which is 10 times more exciting than even what it sounds like. After I left Chico State, I went up to Seattle and was looking at entering a medical program, either a naturopathy program or the program at the University of Washington and through the course of wrapping up my undergraduate and moving up there, actually developed a whole host of health problems; ulcerative colitis, high blood pressure, bunch of things which I don't have enough time to go into because we actually have to get into some of the other the other good fun stuff but the relevance to the talk today is that in the course of trying to figure out what was going on with this, this host of metabolic problems and autoimmune problems that I was suffering from, somebody threw out to me this idea of an ancestral diet, a Paleolithic diet that the potential that our modern foodstuffs which are basically grains, legumes, and dairy which most of humanity had not seen up until somewhere between a couple of hundred to a couple of thousand years ago, that these things were novel food substances in our evolutionary past and that this could actually be problematic and could be causative in some of the problems that I had going on. So I did something crazy which was I tried this Paleo diet approach and my ulcerative colitis, high blood pressure, depression and everything resolved in rather short order and instead of going the medical school route, I went into biomedical research, started studying lipid metabolism as it relates to autoimmunity and cancer and eventually got tired of clinking test tubes and beakers together and came back to Chico and opened a gym, started a blog, started a podcast, and wrote a book.
And the message that I carried, whether it was the gym, the blog, the seminar series that I teach, has always been this idea of evolution via natural selection, Darwinian medicine applied to exercise, nutrition, lifestyle, socialization and we've been very, very successful. Our gym was picked as one of Men's Health Top 30 gyms in America. The podcast is currently bouncing between number 1 and number 5 on iTunes and has been for over a year. We get over a million unique visitors to my website per month and my book's a New York Times bestseller and I have no remarkable talents other than I had an idea which, It's interesting, professor Loren Cordain whom I did my research fellowships with, he made a statement once which was if you know the answer to a question, it's very easy to look very, very smart and I think that that's part of the success that we've had is that we've simply applied evolutionary medicine to wacky things like personal training and strength coaching, doing lifestyle counseling and stuff like that. And we've applied large doses of what we are going to experience today which is this Paleolithic diet. So, that's kind of the preamble for all this stuff.
If we were coming into this class and say we were sitting down to take a class and it was actually a physics class, what would be some of the guiding tenets in a physics class? What would be some orienting theory that would keep us all on the same page? Newtonian mechanics, quantum mechanics, statistical mechanics and stuff like that. So what's the guiding tenet of biology? What's the thing that organizes our thoughts and kind of provides orientation for the whole thing? This is interactive, jump in there. Darwinian evolution, evolution via natural selection yeah that's it. My wife actually speaks in Russian so she's been coaching me on this [speaking in foreign language] pretty close? He made this statement nothing in biology makes sense except through the light of evolution and up until rather recently, Darwin forward and then Watson and Crick forward when they elucidated the structure of the DNA molecule, the whole field of biology was a taxonomic event. This has that name, that has that name, there are all kinds of wacky theories trying to weave the whole thing together but nothing really stuck until Darwinian evolution was applied to biology and then we've kind of moved forward and we've made stunning progress in our understanding of the world from that that Darwinian evolutionary perspective. And this is not knocking on people but this is a simple question, where does medicine fit within biology? It's a subset of biology. It's a subset of physiology but our MD's, our doctors, our dietitians are not steeped in, educated in Darwinian medicine at all.
They may, as a passing glance, experience the concept of evolution when they take a microbiology class or something like that but as an orienting feature, our medical providers are not steeped in Darwinian and it's my opinion that that is a massive problem. Interestingly, the folks in this room, your professors are actually very savvy to the realities of Darwinian medicine and the, I'm hoping that a day like today some of the work that I'm doing a lot of the work that the folks that I'll mention today, it's the skinny end of the wedge, it's the beginning of a change. We're starting to orient ourselves in this Darwinian medicine approach. So, a thing that I get from people frequently is this sense that humans are exempt from the forces of evolutionary biology which I find shocking in some ways and just kind of sad in other ways. And so my idea is that humans are in fact a part of biology and that we play by the same rules of physics and molecular biology and evolutionary biology that everything else does and so if we were to make a statement, something along the lines of say, cows have evolved to eat grass and that's their biome with which they're most well suited, that that same type of orientation would probably apply to humans.
And if we have that orientation, if we do a rough timeline of human and pre human evolutionary development, you know australipithecine development, you know 4 million years, 5 million years, that stuff seems to get pushed back. Archaic homo sapiens, what are we thinking maybe 200,000, they just found some interesting stuff in Israel with maybe 300,000 year old archaic homo sapiens. But the point with all this is that if we're orienting ourselves p- mainly towards food which is what I'm going to talk about today, we did not see the bulk of what passes for our nutritional foodstuffs until very, very late in the game. We didn't see grains, legumes and dairy in any significant quantities until somewhere between a couple of hundred and a couple of thousand years ago. And what that fact raises is a question. Can folks see that behind the counter there? Could evolutionarily novel foods be pathogenic? There also needs to be a statement here that just because something is evolutionarily new, it does not necessitate that it's bad. At various points in evolution, all kinds of organisms encounter new food sources and that actually provides a selective advantage and we actually see that that potentially advantageous shifts in the evolution of a particular organism. But when we see large scale problems in an organism, usually there's some sort of evolutionary discordance. The environment is changing, foodstuffs are changing, something in that line are changing, so we just ask this question, could these evolutionarily novel foods which we did not see throughout most of human history, could they pose a problem? Could we use an evolutionary perspective to help make sense of modern diseases?
For most of the last 50 years we've been in a reductionist race to figure out, you know, this enzyme and this DNA molecule and we still are not any closer to really understanding cancer, diabetes, heart disease, Parkinson's, Alzheimer's. If we were to make an analogy here, the amount of money that we're putting into medicine grows ever greater but yet our health problems grow ever greater also. If his was analogous to the space program, we would be dumping money into rockets but not even producing submarines. Like w- we're getting nowhere with this process and I believe it's largely because the reductionist approach doesn't lend itself well to a large scale holistic macro systems like what we see in biology.
And the solution that I would like to put forward with this is taking some anthropological perspectives, drawing from what we know from anthropological research, people living in and among our currently living hunter gatherer groups, marginalized agriculturalist groups and then also what we can study from stable isotope and analysis and various methods that hopefully you guys are learning a ton about in your program. What can we learn from an anthropological with regards to human health and longevity? With that then we'll couple it with clinical nutrition both in and among existing hunter gatherers but also within our westernized populations to begin doing a comparison and contrast between our evolutionary history and the phenotype that is expressed in our evolution which is pretty typified by this this gentleman here. Our hunter gatherer ancestors were lean, muscled and healthy for the most part. They had a short, on average, lifespan, but if you don't have the antibiotics or emergency medical care, your likelihood of dying fairly young is quite high. But we're going to couple our anthropological perspective with clinical observation and then finally, we, as good as these things are and I think that they're very nice for orienting our thinking, we cannot hang our hat simply on epidemiological studies or on anthropological observation. We need mechanistic bio- biomechanical or biomolecular descriptions of disease and that's ultimately what we hang our hat on. Given our time today, I'm only going to be able to talk about the anthropology and the clinical observation. Hopefully that's a hook to reel you in and come see another talk where we'll talk about some of the mechanisms at some future point.
So, out of this anthropological perspective I want to mention a book, it's a nutritional anthropology written in 1980, Professor Cassidy, A Nutrition and Health and Agriculturalists in Hunter Gatherers, a Case Study of Two Prehistoric Populations. It's a really interesting piece.
It's occurred in the Ohio River Valley and you have two genetically identical peoples, basically you've got a anthropological archaeological record of hunter gatherers in this area from about 3,000 B.C. about 5,000 years ago. Those folks gave rise to the agriculturalists which are in the same area and so they're genetically identical. You just have one group of people that lived in the area earlier. They transitioned then into an agricultural life way. So we have a really interesting compare and contrast between the health and the longevity, infant mortalities rates in the hunter gatherer group relative to the agriculturalist group. Both groups were settled which is really important to consider because different diseases spread based on whether a group is settled or not settled. Tuberculosis and things like that have very different disease rates and also if the individuals are settled we have some differences in exercise output. So it's interesting that among these agriculturalists and the hunter gatherers, they tended to live in the same area, didn't move around a whole lot. The food with the hunter gatherers, deer, turkey, turtle, mussels, they had the large middens. I believe, your talk last time in the San Francisco Bay Area hunter gatherer groups, huge shell piles that that were found in those areas. The typical or typification of these two diets, basically the hunter gatherer diet is quite high in protein, quite diversified in in plant and animal stuff whereas the agriculturalist diet centered right around corns, beans and squash that were just supplemented with hunted and gathered materials but the diet was much, much higher in carbohydrate. So now here's the question for our budding anthropology students, how do we know that one group had a higher protein intake relative to the other?
Okay. How do we know if those organisms were terrestrial or aquatic? Some stable isotopes studies, nitrogen, isotopes and all that sort of stuff so. So we're looking at C3 versus C4 plants with some of these comparisons. But these are some of the analysis which forensic anthropologists, medical anthropologists are very good at elucidating what folks ate and largely from stable isotope studies if we can't find intact foodstuffs around these human remains.
So, both of these groups were pretty cool in that we had very large amounts of remains; almost 300 remains in both groups which allows for some robust statistical analysis. In the hunter gatherer group there was no iron deficiency, anemia. There were numerous diseases that were analyzed in this paper, I'm just looking at really one of them, the iron deficiency anemia and then some of the infectious diseases that are directly related to iron deficiency anemia. Within the agriculturalist group, we had about almost a 10% rate of iron deficiency anemia, about 50% of the children, the remains of the children that were found suffered from the iron deficiency anemia.
Now what this leads to as a baseline, can anybody, anybody know what this condition is? Yes. Yeah when it's in the eyes, cribra orbitalia. It's a horrifically painful condition when you are lacking an iron then your calcium metabolism is altered and normal bone formation does not occur so what's happening is basically the orbit of the eye is being filled in with these fibrous, prickly, calcium deposits which the eye then needs to move around on. It's a very, very painful condition.
And then what do we have there? Very nice. Good. Yeah. Both of these conditions were in children too so we're seeing this manifest from the iron deficiency anemia. We see much higher rates of this in children than we did in the adults. And again we saw no instances of iron deficiency anemia in the hunter gatherer group but we see quite high levels of this in the agriculturalist group.
So this iron deficiency anemia also opens the door for various kinds of infectious disease. I can't really talk a lot about this today but there are elements of these grains and legumes which not only from a nutrient qualitative standpoint are they lacking relative to fresh meats, fruits, vegetables etcetera, but they actually cause damage to the gastrointestinal lining that impairs nutrient absorption. So when we're looking at these things, if we were to just pump the food through a nutrition analyzer of the hunter gatherers versus the agriculturalists, the agriculturalists look terrible by comparison. They're lacking in all kinds of vitamins, minerals, essential amino acids, but additionally there's the problem that these grains and legumes cause gastrointestinal irritation that once the gastrointestinal lining is irritating, then your absorptive capacity is even less. That's something I just want to throw out there and have folks think about but I can't go into really today. So, with infectious disease they, they looked at rates of dental caries and periosteal inflammation. If you notice, the dental caries in the agriculturalists were almost 10 times that of the hunter gatherers. And if you think about what your options were for dentistry in prehistoric times, they weren't good. And typically if you ended up with some sort of a dental cary, it didn't bode well for you. It was typically a fatal event, or at least very, very detrimental to health. This periosteal inflammation was 13 times more prevalent in the agriculturalist groups. The periosteum is the fibrous sheath which wraps around all of our bones and periosteal is indicative of different chronic diseases like schistomiasis, trypanosomes and stuff like that; typically some sort of a parasitic infection but it indicates a low nutritional status and a susceptibility to disease yet some periosteal inflammation present in the hunter gatherer groups but much greater instance of that in the agriculturalists.
And then what this leads into is an analysis or a study of the infant mortality rates. It’s kind of a bummer this thing is so low there. Um, not sure how to fix that. Just a point of interest, this paper which was submitted was in the early, late 1970’s early 1980’s. This graph is written by hand and then was submitted in that format so, what we have going on here, we have a the open circles are the hunter gatherers. The closed dots are the agriculturalists. Men on average lived longer than women did and we can usually ascribe most of that to infant mortality related issues, giving, during childbirth. The important things to look at here is that the largest difference between the hunter gatherers and the agriculturalists happened for children between ages 2 and 5 which is indicative of deficiency issues. Once the children are weaned, then we start seeing very significant malnutrition issues and we also see this end stage of life in which the agriculturalists are not living into advanced age. What's fascinating about hunter gatherer groups is if they lived that 30, 35 year old state, they were about as likely as we are to live into their 60's or 70's. But in prehistoric agricultural groups, the life expectancy at and end stage, a maximum life expectancy was much, much shorter. So this is kind of an interesting step wise analysis in which we see insufficient nutrition leading into elevated rates of infection leading ultimately into curtailed life expectancy for agriculturalists relative to hunter gatherers.
And, I think it's probably big enough for folks to read. I'll actually read this, I apologize, I hate doing big chunks of this stuff but this is really good. This is from Professor Cassidy who wrote this paper. The health and nutrition situation at the Hardin Village may profitably be compared to that in modern peasant villages and many of these children are typically fairly healthy until weaned. At this point they are introduced to a soft diet consisting largely of carbohydrates (in much of Africa and Central America, a pap is made of sugar, water, and maize flour; in Jamaica green bananas replace maize). In many cases, within a few weeks or months these children develop diarrhea, lose weight, suffer multiple infections, and may eventually develop the form of protein-energy malnutrition called kwashiorkor. In this disorder caloric intake is usually adequate, but protein and other nutrient intakes are extremely limited; without modern hospital care many victims die. Dr. CM Cassidy.

Infant Mortality & Life Expectancy

The health and nutrition situation at Hardin Village may profitably be compared with that in modern peasant villages. In many of these, children are typically fairly healthy until weaned. At this time they are introduced to a soft diet consisting largely of carbohydrates (in much of Africa and Central America, a pap is made of sugar, water, and maize flour; in Jamaica green bananas replace maize). In many cases, within a few weeks or months these children develop diarrhea, lose weight, suffer multiple infections, and may eventually develop the form of protein-energy malnutrition called kwashiorkor. In this disorder caloric intake is usually adequate, but protein and other nutrient intakes are extremely limited. Without modern hospital care, many victims die.

Which this is exactly what we see out of the anthropological record which is these children in the agriculturalist group transitioning from breast feeding to the grain and legume based carbohydrate which are nutrient deficient and what I would like to talk about even more but we don't have time, causes gastrointestinal problems which then lead to further nutrient deficiencies leading into increased infant mortality rates.
So this whole story is what I like to liken a fractal analysis of hunter gatherer transitions. A fractal is a self similar, self repeating entity. We see these things all throughout nature. On the left we have an Aloe Vera plant, on the right it's an interface of a river and a ocean complex. So a fractal if you're taking tiny little segments of it and look at it, or blow up a massive piece of it and look at it, they are identical regardless of what piece you look at. And the human transition from hunter gatherer to agriculturalist is the same in that we see decreasing health regardless of whether we look at this on the global level or on a microcosm. This story of the Hardin Valley villagers, this is the same story that we saw in the hunter gatherers in the San Francisco Bay Area. It's the same story that we see with the Clovis people who populated the Americas which transitioned from a very robust, healthy people who are hunter gatherers, who are unfortunately too good at hunting and gathering, kill off all the mega fauna and then start relying on eventually agriculture as the end game but we see a decided decrease in the quality of life within that whole transition. So it's just kind of an interesting aside with that.
So moving from the anthropological side into the clinical observations and molecular underpinnings, we're going to look mainly at the Kitava study. Have you guys talked at all about the Kitavans? These folks are near Papau New Guinea, very well researched. The gentleman on the left is over 100 years old and this is documented by historical validation of him mentioning like seeing over flights during World War II and World War I and stuff like that. On the right, you can just barely see Professor Staffan Lindeberg who's a MD PhD at the University of London, Sweden, and he's doing some analysis of one of the Kitavans there which, again, this is pretty typical for the phenotypic expression of our hunter gatherer ancestors; lean, muscled, pretty healthy.
The Kitavans are an interesting study in that they had a traditional diet of yams, taro, bananas, fish, pork and coconut. It's about 60% carbohydrate which is pretty high even by most hunter gatherer standards bouncing somewhere between 15 and 25% protein and fat, the primary fat is saturated fat from lauric acid in coconut. So what's interesting with this is that despite a high carbohydrate diet which a lot of people look at, you know, our problem historically with health has been are high carbohydrates bad? Are high fat diets bad? But really what we haven't been asking is are the foods that we're eating evolutionarily sound and so we've been kind of bouncing between one thing and the other and we can't really make sense of stuff, but what we find here is that these Kitavans who are eating a 60% carbohydrate diet, they get their main fat from a saturated fat, 3 out of 4 of these people smoke, and they have no cancer, diabetes, heart disease, Parkinson's, Alzheimer's. They live into advanced age and then they typically have a 1 to 2 week period of decline and then they die. And that again is a fractal representation of how hunters gatherers lived. If they lived into advanced age, they tended to be very, very healthy and then they died all at once relative to our 30 or 40 year slide into the abyss. So, it's a very well studied population. Folks have been living in and among them since the 1920's so we have a mountain of data on these folks which is very, very helpful for what we want to look at here.
So this is from Professor Lindeberg's website which is an outstanding, it's linked off of my website. He makes the contention that foods are appropriate for any given species if they were regularly consumed during most of its evolutionary history. This is just kind of, you know, a normal biomic matching; an organism matches the biome within its it, how it's evolved to meet. Plants protect themselves with bioactive substances directly aimed at animals, substances which may have untoward effects on long-term human health. This may come as a surprise but plants do not lie there benignly waiting to offer themselves or their offspring up for their consumption. They actually have anti-predation chemicals which are very robust and we're not just talking poison oak. Cruciferous vegetables, brocoli and cauliflower have goitrogens. They will cause iron, or not iron but iodine malabsorption if consumed in too large amounts. Don't go home and don't eat cruciferous vegetables. Well the thing is that everything is fighting for survival and part of the fight for survival within plants is finding anti-predation techniques to prevent some critter from eating them essentially. And this this works all the way from bacteria to yeast to rodents and even us. And so what Professor Lindeberg proposed here is an agrarian diet and disease of affluence to evolutionary novel lectins cause leptin resistance.
And so we need to look at a couple of items here that are, are very similar in sound but are completely different. Lectins are sugar binding proteins which are self-surface identifiers. They, within our body they designate self from non-self and there are tons and tons of lectins both in animal and plant material. Most of them are benign. Some of them are actually therapeutic. Banana leaf lectins have actually shown therapeutic potential against HIV 1, but many are pathogenic. Ricin which is a chemical weapons agent from, I'm totally, castor bean oil. And then these products lead into something called leptin resistance and leptin is an adipose tissue derived neurotransmitter. What it does, is it inhibits appetite and it stimulates metabolic rate. So it tells you when you're full and it tells your body to burn energy effectively. What we understand now also is that it regulates insulin sensitivity. Insulin is our primary storage hormone in our body related to blood glucose levels, muscle mass. It's also very well tied into aging and you want good insulin sensitivity throughout your life if you want to age well. Excuse me. Leptin resistance, which is an inability for the body to sense the hormone leptin we now understand leads to insulin resistance and this opens the door for obesity, type II diabetes, Parkinson's, Alzheimer's, and endothelial derived cancers like breast, colon, prostate and astrocyte brain tumors. What we're proposing here, what Professor Lindeberg proposed is that when we look at the diets of the Kitavans, we saw no cancer, diabetes, heart disease, Parkinson's, Alzheimer's. When we look at westernized diets, we see tons of that stuff. Why? And what his proposal is that evolutionarily novel foods which contain lectins for which we are poorly adapted to deal with are in some way impacting the leptin signaling within our body.
And then he went through a very sophisticated and smart way of proving this. First he started with epidemiological bordering on anthropological studies in which he looked at the serum leptin levels between westernized and non-westernized populations. He polled some age and gender matched folks out of Sweden and compared them to Kitavans. They had a large data set of 200 people in each group and what they found across the board was that westernized individuals had strikingly higher levels of leptin, they tended to carry more body fat and a number of other factors that were eliminated for variabilities such as smoking and exercise and stuff like that. Like it was definitely linked back to leptin resistance.
So they went the next step in testing this hypothesis in which they propose an animal model and interestingly, I was actually the review editor on this paper. Paleolithic diet confirms higher insulin sensitivity, lower C reactive protein and lower blood pressure than a cereal based diet in domestic pigs. Why the heck did they use pigs? Pigs are opportunistic omnivores just like human beings are and their pancreatic function is very, very similar to ours; they way they handle protein, carbohydrate and fat, their digestive processes are very similar to ours so they're actually an outstanding model to compare this whole process.

What they did is they put a group of piglets on a Paleolithic diet which was meat, seafood, fruits, vegetables, roots, tubers. It was absent any grains, legumes or dairy. Then they had a group of piglets that were put on a, what would be termed a Mediterranean diet. High carb, relatively low fat, bread, rice, pasta kind of derivatives, low-fat dairy. Both of them ended up having very, very similar amounts of protein, carbohydrate and fat, but at the end of the whole process, the Paleo diet fed piglets, and do I do I have that in there? Yeah I have that, it's kind of low. I'm sorry guys, I didn't I didn't know that the bench was going to be in here. The Paleo diet produced lower C reactive protein. C reactive protein is a primary indicator of systemic inflammation. It's an indicator of immune activity. If you have a cold, the flu, or a virus, you will have high C reactive protein.
. If you don't have a cold, flu or a virus, and you have high C reactive protein, we have a problem and this is what we’re understanding is somewhat related to this grain and legume intolerance which is damage to the gastrointestinal lining which allows gram negative, gram positive bacteria into the circulation which then makes our immune system angry and is likely the causative factor in heart disease, obesity, a whole slew of things. It's pretty interesting. What they found here also that's a really of interest is that there was no leukocyte infiltration into the pancreas of the Paleolithic diet fed pigs. And what that means, leukocytes are a very aggressive immune cell and they are the precipitating agent in type 1 diabetes. And so in the Paleolithic diet group they saw no leukocyte infiltration into the pancreas. In the Mediterranean diet fed group they saw significant leukocyte infiltration and this is the beginning of what they term leaky gut and the autoimmune response. So these lectins that are found in the Neolithic foods are damaging the gut and allowing infiltration of these lectins that that then cause problems downstream.
And people are like, I went into anthropology, not molecular biology, I'm going to kill myself so sorry guys. So now the next step with this in testing the hypothesis is they found a group of very sick human beings. They had type II diabetes and they had to have existent cardiovascular disease. Either they had to have suffered a cardiovascular event or they had to show a significant occlusion on various radiographic tests, and they put a group of folks on a Paleo diet. They put another group of folks on a representative Mediterranean diet and again, you had significant changes in the outcomes. What we have here, the A group is the Paleolithic diet. In both groups, the black line is the baseline and what they are testing here is an oral glucose tolerance test. You give an individual a dose of 100 grams of glucose and then how high their blood sugar peaks shows whether or not they are insulin sensitive or insulin resistant. If you are insulin resistant, the blood sugar levels climb. And if blood sugar levels are high, we have sugar that sticks to the proteins in our bodies creating advanced glycation end products which is bad. It's very, very bad. What we see here, the black line is the before. The white line is after. We see a 20 per-26% improvement in oral glucose tolerance tests in the Paleolithic group. We see a slightly statistically significant change in the Mediterranean diet group; it barely changed at all. The Paleolithic group, by the end of the intervention, was effectively no longer a type II diabetic. The Mediterranean diet group saw virtually no change and this is kind of stunning to me because these folks were probably eating very, very poorly out on their own and then they were put in a metabolic setting in which they had a very controlled diet in which any dietitian would sign off on and say that that's beautiful. But we have a side by side comparison and again they looked at the number of other variables beyond just oral glucose tolerance. All these variables were shockingly improved with the Paleolithic diet and didn't improve at all or improved only marginally in a, a clinically controlled Mediterranean diet intervention; grains, legumes and low-fat dairy. So where this takes us, it's a blank slide? Oh no there we go.
We use our anthropological data and we look at hunter gatherers and we see a conspicuous lack of cardiovascular disease, cancer, diabetes and other factors and we ask this question why? We go to clinical observations including the Kitava study and comparison of lepton levels across populations and then we start auguring in and asking some questions in a much more specific way trying to establish mechanistic causes. And these animal models and human models are very interesting but they are provative of nothing. We still have not gotten to the mechanistic proof and I don't have time to go into that today but that's the next step in the, that part is a little deep in the molecular biology biochemistry but it's some pretty interesting stuff and, but what this is, what Professor Lindeberg has done is he's gone from the anthropological side of things, wrapped it all the way back around to the molecular biological side of things so we don't really need the anthropology to describe this anymore but it provided the input, this Darwinian medicine orientation provided the opportunity to ask some questions which nobody was asking before. Nobody was thinking about, are the foods that we are eating, these Neolithic foods, the problem? Is it not a problem of protein, carbohydrate and fat? Is it actually a problem of a mismatch with certain foods and our genetic heritage? And that was the question that really needed to be asked.
So I'm going to share with you guys now some clinical observations and I might even get this thing done on time here. So these are folks that we have worked directly with and I'm going to share what these folks presented with, what the resolution was and then I'm going to tell you the underpinning mechanism behind all of them at the end. So this 45 year old woman presented with elevated liver enzymes. Alkaline phosphatase, the normal range is 32 to 126. Alkaline phosphatase is indicative of tissue turnover. If you do a Leaving Las Vegas type Thursday night binder like probably somebody in here is going to do, the next day your alkaline phosphatases will be dramatically elevated. But the normal range should be somewhere between 32 and 126. This woman in 2005 had alk phos in the range of about 156. 5/4/07 she was up to 429 and was facing a potential liver transplant but her doctors had no idea what was going on with her and so they didn't want to replace the liver for fear that it was some sort of metabolic process that was causing further problems. When she started working with us she was at 518 and was visibly jaundiced and not doing very well. We got a physician release, started working with her, put her on a grain-free, dairy-free Paleo diet and 1 month later her lab values went to 42. She told her doctor that her trainer told her to eat a grain-free, dairy-free Paleo diet and the doctor said that's not what changed. So that's the buy in we had on that.
Another woman, 38 years old, she presented with early onset Huntington's Disease. Huntington's is a fatal neurological condition. There is no established treatment for it. It's a DNA based pair repeat disease in which folks with condition experience significant oxidated damage, beta amyloid plaques develop in the brain and it's a very horrific downturn for these folks. She was nearly asymptomatic after 1 month on a Paleo diet. There's now a study underway at UCLA, UCSD and I may get a paper out of this or at least a mention in a paper because I found the mechanism of causation on this by doing some reading in the literature and looking at this, there are a number of things that are called genetic diseases. They are genetic predispositions and that is it. We need epigenetic triggers to let them fly and it's my contention that the epigenetic trigger for Huntington's Disease and a number of other diseases is actually some of our Neolithic foods.
A 62 year old woman presented with porphyria cutanea tarda, it's another genetic disease. This is kind of a wacky condition, when you go out in the sun and you get a burn, the burn doesn't stop at the skin, it burns all the way down to the periosteum of the bone. You get reactive oxygen species that that burn all the way down to the bone. She developed this in her 40's and I did some research on this also and figured out that it had an autoimmune underpinning to it. I recommended that she adopt a gluten-free, dairy-free Paleo diet and 1 month later she was asymptomatic and actually went to the Middle East and was able to run around without a hat and long sleeve shirt on for the first time in 20 years.
28 year old fighter pilot developed narcolepsy after a pretty gnarly infection. What we now understand is that there are multiple vectors in the development of autoimmune diseases. Not many people know but narcolepsy has autoimmune underpinnings to it and so I did some research, recommended a Paleo diet, 1 month later he was asymptomatic. He was grounded and was facing no longer being on flight status because when, when he would go to land the plane and his heart rate would go up he would pass out and that's obviously a problem. So, with cleaning up his diet and changing his nutrition, we managed to reverse this autoimmune disease.
So the commonality here, all of these conditions share antibodies to a post translational modifying enzyme called transglutaminase. There are 8 isoforms of transglutaminase in the body. Isoform 8 affects the brain, isoform 3 affects the skin, different isoforms in in the gut. When the gut lining gets damaged from grains, legumes and dairy, one of the primary haptens that are created, and a hatpin is an endogenous protein attaching to an exogenous protein, a protein from outside of our body, one of the main haptens that is formed is the transglutaminase enzyme gets hooked up to something. Transglutaminase modifies every bit of DNA that comes out of our cells. So how many things could problems with transglutaminase affect? Everything. Everything. And this is a little bit of the problem of actually getting some buy in on this topic because you sound like the crazy person, area 51 the aliens are coming kind of gig, because it's like so grain intolerance could affect reproductive health? Yes. Could affect neurological health? Yes. Could affect cardiovascular health? Yes. It affects everything. We may have just, I talked to Professor Cordain last week, we may have tracked down a mechanism of causation for malignant melanomas, transglutaminase. So we have a paper that we're going to start working on that but we're very, very optimistic. This is another thing, you do not see melanomas in hunter gatherer groups; they don't exist. They flat do not exist. And these are some of the things that are shocking to me, you know most degenerative diseases are a mishmash between our ancient genotypes and the epigenetic inputs. The signals that we are sending to our genes, they'll call things like the breast cancer gene, the BRCCA1 gene, it's not a breast cancer gene. It has susceptibility risks that are associated with different epigenetic triggers. It never evolved to give anybody breast cancer, and it's preposterous to propose that, and it's fear mongering to propose that. Without a Darwinian orientation though, we're just scratching in the dirt. It's literally like still using leaches for medicine.
We have an opportunity to change that but what we're fighting here is rather staggering. I'll share a story with you guys. Ricardo Salvador was a professor at Iowa State University, I think he still is. But he was going to take over the Leopold Center for Sustainable Agriculture, and he had gone through a number, everybody knows how challenging it is to get a faculty position of any flavor, and he was at the end stage of this process. And it was essentially an acceptance that he was, you know participating in. And during the speech he made this audacious statement which was effectively cows evolved to eat grass. The best way to orient our meat production is on grass feeding cattle. He got passed over for the position. He's gone. The next day his name was off the docket. Created quite a stir and Wendy Wintersteen the dean of the school of agriculture was interviewed by a number of news agencies and she was asked the pointed question, do you believe that cows evolved to eat grass to which she said I have no opinion on that statement. So when you think about the challenges, I I was supposed to speak, I'm going to speak at the Enloe Hospital on February 24th. I was supposed to speak on February 15th to the Enloe heart patients. Each year they have all the heart patients come in and actually Dr. Puig who's the head of cardiothoracic surgery has read my book, has been putting his patients on the diet and has seen stunning, like remarkable success with all this. But there was so much drama about the potential about having someone come into the hospital and tell people to eat an ancestral diet that it was shot down.
And so I got pushed around to the side and now I'm going to speak directly to the medical staff which is, is good. It's still good, but if you can't make the statement that cows eat grass without political fallout, then is it any surprise that you can't recommend an ancestral diet to human beings and not expect some sort of emotional hyper-reactive response. But this stuff is changing. Again, I'm not particularly talented in any of this stuff. The reason my book has done well, the reason why it continues to do well, the reason why our gym has succeeded during an economic downturn is because we use evolutionary biology to inform our decisions and it works better than anything else out there. And when somebody cooks up something better than evolutionary biology then they'll be right in line to figure out something better than quantum mechanics for physics and the rest of that stuff. I like making the joke that the Paleo diet is a fad diet. It's a fad diet since 3 million B.C., so, thank you guys so much for having me.