Cool, all right. Good morning. It's going to be a little bit different talk, I think, than what you're probably used to. I have no disclosures that I need to make, and you know, the CrossFit mantra is, “Off the couch and off the carbs.” Well I'm an off-the-carbs guy, and I've been an off-the-carbs guy for about 35 years now. And about 30 years ago, probably this very day, I was laboring over this, my first book, that was a low-carb book. And it came out, I think in 1989, so that means I was working on it right now 30 years ago. And as I say, it was basically a low-carb book. It was about kind of a protein diet. And this was sort of the big achievement of my professional life till that time. And it came out, and I worked hard to get it written, and I'd never really written anything before. Probably the last thing that I wrote before that was a college theme that I turned in a week late and got docked a grade.

So, it was an accomplishment. The problem is, hundreds of thousands of people couldn't have cared less, and it sort of sank slowly beneath the waves. So, then I was nothing if not persistent, so I ended up getting another book contract. This one with a working title of the *Insulin Connection*, and it was all about hyperinsulinemia, insulin resistance, the insulin-glucagon ratio, and all the good things that could happen if you lowered the insulin-glucagon ratio. And these are all things that we had kind of figured out on our own in our practice.

And while this book was sort of in gestation, I was doing a lot of just general reading, and I happened onto this book, and this book actually changed my life, believe it or not. It's really not a very good book, and I remember that I was — I was laying in bed at night in Little Rock, Arkansas, reading before I went to sleep. And I was thumbing through this book, and I came to page 107. And on page 107, what jumped out at me was this — this sentence: “Blood-vessel disease was common —” this is about Egyptian mummies, the mummy data. “Blood-vessel disease was common, contrary to assumptions that it arises from urban stress and a modern high-fat diet.” And I was electrified by that sentence, because I had gone through this “I want to be an Egyptologist” period of my life when I was in college, and I'd studied the — the dynastic Egyptians, and I realized that they had basically a wheat-based diet. And I thought, “Wow.” And I'd never made the correlation between their illnesses and what their diet was.

So, I was really intrigued by this, and I flipped to the back of the book, and sure enough, there were two or three pages of references which I couldn't even wait to get to the library the next day to track down and — and read more about this. And I was so excited about it, I almost couldn't sleep that night, which is sort of a testament to how pathetically boring my life was at that time. But anyway, this is
what kicked me off on what you're going to hear about today, was this one sentence in this book.

Now, what it did is, it took me from that book to the Egyptian data, to *Paleopathology and the Origins of Agriculture*. I joined the Paleopath Society along with my wife. We met a lot of really great people. We kind of got involved in the anthropology community, you know. We studied paleopathology. We met this guy named Michael Richards, who was just starting his career, and now he's at the Max Planck Institute, and he's one of the — the really, heroes in the, the whole stable isotope analysis movement. He and my wife and I, and Loren Cordain, whom some of you may know, went out in Hamburg, Germany, on one rainy afternoon and found the Kaiserkeller, where the Beatles got their start and kind of cut their musical teeth. And then I met Leslie Aiello, who wrote one of the great papers of all time, I think based on the work of this kind of quirky Swiss physiologist, and she had it published in *Current Anthropology*. She told me she really had difficulty getting it published, and — and now it's the most-cited article in that journal. So anyway, we're gonna go on this — this journey today through the anthropological literature and what that means in terms of “off the carbs.”

Okay, so everybody's seen one of these tables like this in one form or another. How little time we've spent really eating the diet that we all eat today. Ninety-nine point six of all Homo generations had no evolutionary experience with the foods that basically we eat today. And this is kind of summarized in this quote from really an atrocious, awful paper, and this is the one decent part of a sentence in it: “Our physiology should be optimized to the diet that we have experienced during our evolutionary past” — which makes sense. We had about 2.4-million years since Australopithecus afarensis, which is the first time that we've been shown to — to be meat eaters, and it kicked off during that period. And so, over the intervening 2.4-million years, we've been exposed to a diet that's low in carb, high in meat, basically. And that's — that's when we laid down our genome, so it should make sense that we would perform better on such a diet now.

Now, this is said a little bit better, more to my liking, in this book by Blake Donaldson, and Donaldson was an old doctor that got his medical degree right before World War I. He was an Army doctor during World War I in Europe, and he came back and went into practice and practiced in Manhattan in New York until about the mid-60s, when he died. But he fell under the influence of Vilhjalmur Stefansson, the famous arctic explorer who was famous for having gone on a two-year meat diet at Bellevue Hospital. And anyways, Stefansson convinced Donaldson that an all-meat diet was the way to go. So Donaldson put all his patients on an all-meat diet, no matter what they came in for. If they came in for allergies, they went out on an all-meat diet. If they came in for heart disease, they went on an all-meat diet. They came in for obesity, they went out on an all-meat
diet, and that was just what he did. And he — he has this great quote in this book that I think is better than the other one: “During the millions of years that our ancestors lived by hunting, every weakling who could not maintain perfect health on fresh fat, meat and water was bred out.” And that says it a little — little bit differently, but accurately I think. And if you ever want to get this book and read it, I'm gonna give you a trigger warning right now: I'm probably the least politically correct person in this room, and I was appalled by some of the stuff in this book. And this book was a mainstream publisher in the 1960s, and so, I think it was Macmillan — yeah, but anyway, you can see how times have changed since then. But it really is an interesting book.

So, the um — this is Mark Nathan Cohen, who's a renowned anthropologist. And he says, “The field of medicine often appears naive about the full range of human experience —” blah blah blah — because mainly modern doctors base what they know and what they use to practice with in “the comparatively narrow experience of contemporary Western society.” And this is what he's talking about. This is, uh — this is the — whatever it is, the public health something — I don't remember what the “C” is — org diets, not .org, it's .uk. But it's PHCorg.uk, and you can get this. And this is a — it's a Public Health Collaboration. This is a group in the U.K. that takes studies in which low-carb diets and low-fat diets have been compared head-on, and — and then it tabulates them, and then you can see head-on which one works the best. And in the, you know, in sportscasting terms, the low-carb diet has crushed the low-fat diet — you know low-fat, high-carbohydrate diet. But they're at — to date, there are only 62 studies, and these are the studies over the last 10 or 15 years. There are only 62 studies. So if you go to the anthropological literature, there are probably a hundred times as many studies that all show the same thing, but doctors never read the anthropological literature, so they don't see that. So what they base their experience on is this relatively narrow group of studies or group of knowledge and that's been generated by RCTs.

So let's take a look. This is — this is one of my all-time favorite papers, by Leslie Aiello. and this is basically a thought experiment that she converted into a hypothesis. And what she says is that — and she based it on this kind of eccentric Swiss physiologist named Max Kleiber, who practiced — or taught the last years of his career at the University of California at Davis. And he wrote this book called The Fire Of Life: An Introduction to Animal Energetics that I just checked on Amazon this morning, and you can get a copy for about 200 bucks, up to 900 bucks. I mean, it's a pricey little tome. But Kleiber was obsessed, like Gary was talking about yesterday. He was obsessed with one thing: He was trying to come up with an equation that correlated metabolic rate to body size, and he worked and he worked and he worked on that, and this paper was published in Physiological Reviews in 1947, which was a great year because that was the year of my birth. And this is the way that this graph came out in the paper. So you can see the difference in papers then and
now. This hand-drawn graph actually appeared in the journal, but what Kleiber did is that he finally came up with this equation, and this is called the Kleiber line. And pretty much everything, whether it's an elephant or a rhinoceros or a dog or a bat, will fall on that line. And the — there are a handful of things — there's some kind of a shrew, and some other kind of an animal that doesn't fit on it. But by and large, just about every mammal fits on this line, this Kleiber line, including us: Human males and females fit right on the Kleiber line. And so, what this tells you is that if you know the body mass, you know what the metabolic rate is. And it also tells you that if you know what the metabolic rate is, if you know what all the metabolic — the different organ metabolic rates are, they all add up to the overall metabolic rate. And for a 65-kilogram primate or human, this is about what it calculates out to be. But when you actually look at what the metabolic rate is on a 65-kg human, it's different, because we've got these great big brains. Okay? But because of the constraints of the Kleiber line — the metabolic constraints — we can't just keep the same gut size, because we need the liver, we need the kidneys, we need the heart, we need the muscle. But we can't — something's got to change. If we're gonna grow a brain, it's got to give somewhere to keep us on this line. And so, what gives is the gut tissue, and so the guts become smaller as the brain gets larger. And if you — if you look at this, you know, the mass-specific metabolic rate of the brain is nine times higher than the mass-specific metabolic rate of the body as a whole. And if you look at it, this way out on the right is us. You can see what our brain mass is compared to our gut size, compared to all this array of primates.

Now, if you if you look at the, sort of, the skeletal morphology, you can see also that just the way that the ribs are structured, you can see that this is a chimpanzee on the left. If you extrapolate that out, and this is an Australopithecus, you can extrapolate that out, and you can see that they have big bellies and humans have relatively small bellies. And you can see that a little bit better here. Here's an Australopithecus, which is considerably smaller than we are, and you can see the gut volume. And here is our gut volume. It's a lot smaller, but our brain is a lot bigger. And if you look at a gorilla, you can see the great big belly on the gorilla, and gorillas are herbivores. If you look at a chimpanzee, you can see kind of the same thing, not to the same extent, but you can see the same thing.

This is interesting. This is an actual true hunter-gatherer. Now there was a — there was a doctor named Arne Høygaard, who is Norwegian, and he went to Greenland in the mid-1930s with the intent to kind of seek out a true hunter-gatherer, somebody that hadn't been corrupted by civilizing influences. So he went into deepest darkest Greenland to — to try to find this, and even then he found that these people had been corrupted a little bit. They had been exposed to sugar, and they've been exposed to refined carbs, but he found some that hadn't been exposed as much as others, and he took pictures of them. And this is one of them, I think this is a 26-year-old male. So, that's what a true hunter-gatherer looks like,
kind of in the flesh. And you can see that there's not a big ponderous belly like there are on these herbivores.

Now, the reason that these herbivores have such large bellies is because they eat plants, and plants are not very nutritionally dense. And if you look at a 3,000-calorie diet, 65% of that, which is what they say herbivores get — you know, they get the other — whatever's left — 35% from other sources. But it takes 10.3 pounds of carrots just to get 65% of 3,000 calories, 23.5 pounds of tomatoes. And you can go down the list and see, so it's a big volume of food, and you've got to remember these are today's fruits and vegetables. These have been Luther Burbanked, you know? These have been — have been bred for nutritional density. If you go out in the woods and find a crabapple, they're these little gnarly things that, you know, you have to eat a ton of them to get 10 calories. So these animals — these herbivores had big bellies because they had to process a lot of food.

Now if you look at our sort of evolution, you can see the Australopithecines down here. This is how far back they were, and this goes right up to, you know, modern humans, and you can see how the brain size has just increased in sort of stupendous fashion. And the reason that it did that is because, according to Leslie Aiello, is expensive tissue hypothesis, because we converted to eating more meat in the diet. Now it used to be that this was the — this was the reasoning right here, that, I mean, everybody knows that the brain has gotten larger then the gut's gotten smaller, but they thought it was driven by hunting, that hominids learned to hunt, and because they learned to hunt, they had to develop more complex foraging strategies. In an effort to develop these more complex foraging strategies, they had to grow bigger brains. And what she's saying is that the increased nutrient density of the meat diet brought about — allowed us to drop the size of our gut, still provide the energy to drive and maintain a larger brain. And that's basically her expensive tissue hypothesis.

So it may generate the question, "Well, how did we do this to begin with? If we didn't have a small brain, how did we get all this meat if it requires complex foraging strategy?" Well, we did it because we scavenged. And this Briana Pobinar, who is a researcher I think now at the Smithsonian, has done a lot of work on this in Africa. She's actually gone out after big carnivore kills and gone to the carcasses of zebras and gazelles and wildebeest and warthogs, and after the lions or the hyenas or the leopards have eaten to satiation and gone away. Then she's gone and stripped all the flesh and found out that there's an enormous amount of flesh left on these carcasses after the big carnivores are through with them. Excuse me. After the big carnivores were through with them, there's plenty to eat foraging-wise, and that doesn't even include cracking the bones for the marrow.
So, we obviously started to forage: kind of developed a taste for meat, started eating meat, allowed our guts to decrease in size, and allowed our brains to grow. So, I like to say based on this: We didn't evolve to eat meat. We evolved because we ate meat, and I think that's an important point.

Okay, we're gonna switch gears a little bit. If I were Dr. Goldacre I would say, “Then!” We're gonna — we're gonna go over to stable isotope analysis, which is a real kind of geeky way to determine what ancient peoples eat. And I'm going to spare you a lot of the geekiness of it, but talk about what an isotope is for those that don't know. This is carbon, you know. The atomic mass of carbon is 12. It's got six protons and six neutrons. An isotope is something that has a little bit different component structure, so you add an extra neutron and you've got seven neutrons and six protons, and so you got carbon-13. You got — carbon-12 is the standard-issue variety. And these are both stable isotopes. I mean, they don't decay over time, they — they remain stable, and they remain stable in certain ratios depending on what ate them, and — and because different animals treat those differently, the different isotopes, and so, the — these are the — this is a stable isotope carbon-12, carbon-13. Carbon-14 is not a stable isotope. That's what we use to do carbon dating because it decays, and so, we can measure that decay. That decay curve is known, so we can check the carbon-14 in something and then track back and tell how old it is. But 12 and 13 are stable, and nitrogen-14 and nitrogen-15 are also stable, and those are the really important ones in terms of what we're looking at. Now, there's been no change in them. I'm going to whip through these.

The ratios differ between two carbon-containing substances because of the way the carbon-containing substances handle the isotopes. And then when the sub — sample goes to the mass spec, it determines the C-13 to C-12 ratio, and it's called the relative C; it's called the δ13C, and that's the number that you're looking for, which all this stuff is kind of meaningless unless you really get into this. I'm going to show you how later, if you really want to delve into this, you know, how you can do it, because it is pretty interesting.

But what you learn from this: What does it all mean? It means one thing: that C-13 is found in greater quantities in marine mammals or marine animals than terrestrial diets or terrestrial animals. And so, if you find a higher 13-level in something you're looking at and the collagen and a bone from a skeleton you found, that indicates that diet's a little bit higher in the seafood. And over time, the δ13C got larger, because as all the big game was hunted out, people went to smaller and smaller game and fish and mussels and snails, and so the C-13 over time has gotten larger. That was kind of an interesting finding. And the C-13 sort of groups itself out in what are called C-3 plants and C-4 plants. C-3 plants are almost everything, including some wheat. C-4 plants are mainly corn, sugarcane, and
sorghum. And what you can see over time is that if you look at samples, skull samples found of Native Americans, you see that, you know, that down here they're mainly C-4 plants — or C-3 plants, I'm sorry. And if you look up — if you look up here, as they learn to cultivate maize, what you find is huge amounts of C-4 and their carbon-13 now, or — their δ13. And so — if you looked at it now, with everybody eating high-fructose corn syrup, god only knows what you'd find, but I'm sure we'd be way up here if you analyzed teenagers today. But the important thing is the δ15N, because that tells the carnivorous story.

Now, plants contain a fairly constant nitrogen-15, and when herbivores eat plants, they concentrate it by about five to eight percent in their collagen. So it's just — So, if a collagen hemp sample contains δ15 greater than seven percent of the local flora, then the animal is an herbivore. All right? Because it's concentrated that nitrogen-15 isotope. And they concentrated just like, you know, when you get tuna: It's got mercury in it because the tuna is eating the smaller fish — was eating a smaller fish, which has eaten a smaller fish, and that mercury has been concentrated. Well, this nitrogen-15 concentrates also, and what you find out if you've heard, no doubt seen, the literature that that Neanderthals were big meat eaters. So if you look at meat eaters, they eat the herbivores, so they concentrate it even more. So when you look at an analysis of a Neanderthal, for example, and there are tons of these done. I've just picked out two just for illustrative purposes.

But if you look at in the Neanderthals, and you look at — what is this? This is a bison and a deer, and just some sort of a herbivore of unknown species, but you can see what their δ15 is. You look at an Arctic fox and a wolf, and it's up there because they've eaten herbivores, and they've concentrated the N-15. If you look at Neanderthals, they're even higher, so what that tells you is not only that the Neanderthals eat the herbivores, they ate some of the carnivores too, because they concentrate it even more. It's even more impressive, because you hear all this about Neanderthals being big meat eaters. You don't hear as much about anatomically modern humans: Homo sapiens sapiens.

But here's some from about 12,000 years ago, and again, all the data pretty much mimics this, and there's the herbivores. Here's the Arctic fox, and then here are the humans, the anatomically modern humans. So they really chowed down on meat. They were super carnivores, because they ate not only the herbivores but the carnivores as well, because otherwise they couldn't have concentrated the nitrogen-15 like that. And so, this is the kind of stuff that you can find with stable isotope analysis, which I think is really cool. And, you know, humans were hunters. Who knows — who knows what that is? That is called a glyptodont. There's one — a little better picture of it. A glyptodont is probably a forerunner of an armadillo, but they were huge. They were about the size of Volkswagen Beetles. And they were all over northern South America, Central America, in the southern part of North America, and they were hunted to extinction by early man. When a man came
across the Bering Strait, it took a thousand years to go from there to the tip of South America, decimating all the large herbivores. I mean, he was a fearsome hunter. And here's one of the things that they decimated: This is a giant woolly rhinoceros. And if you ever go to the Museum of Natural — American Museum of Natural History in New York City, go up to the third or fourth floor, where they have these enormous halls full of these giant herbivores that trod the sod right where we are in North America, that are all now extinct because they were hunted to extinction by early man. So, early man was a hunter, and you can tell it from the — from the stable isotope analysis.

Now, I want to go to another study that's, that's one of my favorite studies. And it's one of my favorite studies not because it tells me what I want it to tell me, because all these anthropological studies — all the anthropological studies that look at the difference between hunter-gatherers and agriculturalists show a huge health disparity. When agriculture came along, health went to hell in a handbasket. People got shorter, they got less cortical bone thickness, had more signs of inflammation, more signs of infection, more caries — you know, dental cavities — shorter stature — may have already said that. But anyway, health really took a turn for the worse when agriculture came along. But the reason that I like this study is because we're studying two groups of people, and both groups were non-nomadic because they stayed put. Even the hunters stayed put. And so, one of the big criticisms when you say, “Well, hunter-gatherers have better health than agriculturalists,” people say who are of the pro-agriculturalist bent will say,” Well yeah, but that's because agriculturalists were tied to the ground. They had greater population density. They got more disease. They have, you know, more infectious diseases. The infectious diseases debilitated them. They're obviously going to be in poor health.”

Well, this study is interesting because both of these groups were non-nomadic. Okay? They both stayed put, and they were both pretty much in the same place. The hunter-gatherers lived in western Kentucky, 250 to 350 — or 2,500 to 300 — 3,500 B.C., and the farmers lived in eastern Kentucky 500 A.D. So these are separated by four or five thousand years in time. They're probably the same genetic material, and they're both off the couch. I mean — gosh dangit — I hate that when that does that. It gets ahead of me. Sorry. I'm gonna flip through all these suckers one at a time, okay? The so — They were both pre-contact, even the ones at 15 A.D. So they had not been exposed to sugar. They had not been exposed to refined carbohydrates, and so, they were in pretty much their pure state. They were probably the same genetic material because they were roughly in the same area, but as I say, separated by four or five thousand years in time and separated by diet. And they're both off the couch, because back then, life was tough. You know, as Thomas Hobbes said, it was “nasty, brutish, and short.” And so, I'm sure that they all worked hard, and they all expended a lot of energy to get their food.
PALEOPATHOLOGY AND THE ORIGINS OF THE PALEO DIET

So though, “The hunter-gatherers ate basically a low-carbohydrate diet” — This is right out of the paper by Claire Cassidy, who was at the Smithsonian at the time — “composed of river mussels, snails, deer, black bears, small mammals (squirrel, porcupine, raccoon, rabbit, woodchuck, beaver), wild turkey, turtles, fish and the occasional dog. (And) they gathered (a few) wild grapes, acorns, blackberries, sunflowers and hickory nuts.” So that was primarily the diet of the hunter-gatherers, and they were definitely off the couch and off the carbs. If you look at the — I don't know why this thing is gonna — maybe ya need to point it at there. Okay, so the “farmers ate a low-protein, high-carb diet ... mainly corns, beans, and pumpkins. They (also) gathered other wild plants” and they had the occasional little bit of meat. But corn was their staple. It's like those things I showed you on that curve, with a C-4 where it really went up. So they raised corn, and corn was the weaning food for young children, and we'll see what that means in just a second. So these guys were off the couch but definitely not off the carbs. So let's see what happened to them.

If you look at the paleopathology, which I love, what you see is — is this is called parodic hyperostosis, and that comes from iron deficiency anemia. This is cribra orbitalia. It's kind of moth-eaten, real soft, grungy stuff inside the eye socket. This is on the surface of the skull. It's really painful when people get this, so the people that had this must have been miserable. And it's there — as I said, there's signs of iron deficiency anemia. If you look at the — and this commonly found when societies switch to an agricultural lifestyle. And it was present in 50% of the children under five years old and the farmers, 50% in — half of the kids had this, none of them in the hunters. These are called — this is called enamel hypoplasia — see these lines in the teeth? That's called enamel hypoplasia. That's when the enamel quits growing, and usually that represents a really severe nutritional stress. And if you look at that — vastly more prevalent among farmers. If you look at these, this is radiographic evidence. These are called Harris lines, right here. These are growth arrest lines, and you find these actually more than — these represent mild nutritional stress — you actually find these more in hunter-gatherers than you do in farmers. So that indicates that hunter-gatherers did have their own times of nutritional stress but were fairly short-lived. Whereas the farmers, if the crops went south on ya, you're pretty much screwed. And so the — so what you see is, as I said they're — they're more common among hunter-gatherers than they are farmers, and that was the case in this.

And tooth decay was rampant in the farmers. The — The farmers had, I mean you can — you can see all this, you know, kind of nasty mouth stuff, and the farmers had an average of seven caries — seven cavities per skull. And there was tooth loss in children, and there was less than — on average less than one in the hunters. And there was some tooth loss in old age because the hunters ate these snails and river mollusks and things from the river, and they got sand, and they kind of abraded
their teeth, and it would get down — and they would get down into the pulp, and
they could lose teeth that way. And then this is a tooth abscess that you can see
down here, and this is really dreadful. I mean, that's a giant pus pocket, you know,
giant suppurating pus pocket. And those were fairly common in the agriculturalists
too. So that's not anything you'd want to wish on anybody — I can't imagine how
painful it must have been.

Now there's a syndrome that you find on a lot of ancient remains. It's called a
syndrome of periosteal inflammation. Nobody really knows what it is. They think it's
probably a treponemal disease, probably some variant of YAWS, but nobody really
knows. But you find this commonly, and what you find is 13 many as — times as
many farmers as hunter-gatherers have it. It's really common in agriculturalists but
not so much in hunters.

Other findings: You'd say the life expectancy was lower among the farmers. Infant
mortality was higher among the farmers, which was interesting because they both
had infant mortality during the weaning phases that were about the same. But
once you got to the post-weaning phase, the hunter-gatherer mortality pretty much
dropped off in terms of childhood mortality, whereas the, the — the farmers went
way up because they weaned their kids on this mush of corn. So it obviously didn't
do them a lot of good. More farmer children were infected than the hunters.
And overall, the conclusion of the Hardin Villagers, the agricultural Hardin — Hardin
Villagers were clearly less healthy than the Indian Knollers, who lived by hunting
and gathering.

And then you've got these lovely teeth with the dental calculus on them, and the
dental calculus, it's not uncommon to observe that in agricultural populations. The
cariogenic bacteria streptococcus were absent in pre-Neolithic human populations,
and they just generally came around once people started eating a lot of
carbohydrates. This is 10,000 years ago, but this is a picture of a really bad mouth.
And this is from a group of peers — it's a subject from a group of people they found
in a cave in Morocco that dated back to about 15,000 years old. And you can see —
I mean, God, you've got abscesses, you've got all kinds of cavities, you've got split
teeth, you've got avulsions, I mean you've got — that's a whole atlas of dental
pathology right there in that one mouth. And they were all like that. Over 53% of
the people in this — in this assembly of skeletons had cavities like this, and this, as I
say, was 15,000 years ago, and these people ate basically acorns and pine nuts. And
so you don't have to have sugar to get cavities, as these people have shown.

All right so, “The adoption of agriculture” — I love this quote from Jared Diamond —
“supposedly our most decisive step toward a better life, was in many ways a
catastrophe from which we've never recovered.”
Now let's talk about the — the ancient Egyptian diet. Because the ancient Egyptian diet is what, you know, you would call a modern nutritionist nirvana. The ancient Egyptians ate a diet that almost any nutritionist would tell us to eat now to avoid getting all the things that the Egyptians got. And so, let's talk about that a little bit. So Egyptians had basically a bread-based diet on all echelons, all socioeconomic levels. I was at a — three or four years ago, happened to be in Paris at the time that there was a display at the Louvre on Egyptian art. And they have a million of these little figurines of people making bread, you know, grinding wheat. And it just — you know, you could almost O.D. on them there were so many. So you're probably gonna O.D. on them too because I've got several in this, this thing. But it was pretty back-breaking work, and when people ground the meal with these stones, they would put sand in it to make it grind a little bit better. And consequently, sand ended up in the bread, and there are actually advertisements that I've read about saying, you know, “Don't eat Joe's bread, because it's got too much sand in it,” because they tried to sift the sand out, but they couldn't get it all out. And there were some consequences for them eating all of this — all of this sand in — in their diet. But bread was a staple. As I say, you're gonna O.D. on these. And it was coarse-ground, whole-wheat bread: every nutritionist's, you know, wet dream — Typically emmer wheat — I warned you. “The most important food of the Egyptians was bread.” The fondness of Egyptians for bread, they were called “artophagoi” by the Greeks: eaters of bread. They were rationed, you know, four pounds per day, their army was. I mean, it really had a bread-based diet. I didn't mean that was the only thing they ate. They had, you know, they had this elaborate netting system that they would use to capture wild fowl along the Nile. They had some animals that were used basically for planting that would occasionally die and they would eat those, but not very often. They even used pigs to stomp the seeds into the ground to grow their crops. So basically, their large animals were beasts of burden of one means or another, and they fished in the Nile, but mainly they ate wheat, and they ate a lot of it. And if you look at their diet, it was primarily bread, fruits, vegetables, honeys, oils, fish, waterfowl, and occasionally red meat. Now, what nutritionists today, your standard mainstream nutritionist, wouldn't go crazy over this? This is the diet that they would recommend to almost everybody. And let's see what happened.

Oh, just this is from the Egyptian literature about how they had just a basic monotonous diet — basic diet of carbohydrates, and they, you know — fowl appeared to have been abundant. They were all clucking and pecking around on the ground just like they are today in Egypt, I guess. I've never been there, but —

So, if you look at Egyptian hieroglyphics, their drawings, everybody is pretty much idealized. Not so much with a statuary. I think the statuary, for whatever reason, brought out the true artists in them, and they displayed people as they were. And what you see when you see Egyptian statuary is this picture right here:
gynecomastia, large breasts in the males and belly. And the gynecomastia is probably because the large amount of phytoestrogens that they got in all the wheat that they ate. And you see this picture over and over again. There you go: bellies and boobs. Bellies and boobs. There's a female: bellies and boobs. Not so unusual. And there's this guy — I love this guy. This guy right here, I mean, he really sports it proudly. Look at that. And — they think bellies and boobs. They're all over the place. That's the typical picture of ancient Egyptians. Now what you find when you — when you look at these mummies, and there's a ton of mummy material out there. It's estimated there are as many mummies in Egypt as there are living people right now. And back in the 1800s, you could have gone there on vacation and bought one and brought it home with you, and a lot of people did. They sold them, they made paper out of them — they did. I mean, it had a ton of mummies. This guy right here looks like a few people that have been on my payroll — but anyway, he's out hawking mummies. And as I say, there were a lot of them. And this guy's named Sir Marc Armand Ruffer. And Ruffer was a bacteriologist — English bacteriologist and pathologist who was in Egypt at about the turn of the 20th century. And he did some of the first autopsies on mummy material, and what he found — he's the one that generated that quote that was in that book. He drew these pictures — I can't imagine this. This shows, you know, vascular disease that he found in mummies. So you know, he had one eye on the microscope and the other drawing what he saw. He found that cardiovascular disease was pretty widespread among Egyptian — ancient Egyptians. He says he can't really give you a reason why it should have been so prevalent in ancient Egypt, but it's “interesting to find that it was common, and 3,000 years ago represented the same anatomical characteristics as it does now.” And if you look at the Ebers papyrus, which was sort of a medical text at the time, what it says — and it's from 1550 B.C. — it says, “If thou examinest a man for illness in his cardia and he has pains in his arms and in his breast and in one side of his cardia ... it's death threatening him.” I mean, that could be right out of a medical textbook today — today. Obviously, the Egyptians were no strangers to heart attacks. And this, I apologize, is kind of hard to see, but you see this — and this paper. I mean this could be kind of a, just, you know, sob story. But the guy that wrote the paper said that, “You know this was the first earliest record of sudden death possibly due to heart disease.” And you see the guy down here who's collapsed, and here's his wife that they're giving comfort to up there, and he may well have had sudden death.

Now this is Hatshepsut, who was a famous, famous Egyptian woman from the 18th dynasty — 18th dynasty, who was probably the most powerful woman in the world up to this time. And Hatshepsut was — her mummy was examined, and she had horrific dental disease, and you can see — see how the teeth are kind of sharpened down? We're gonna see a little bit more of this, but that's a really characteristic finding in the Egyptian mummy material, because they had this sand in all this bread they, and it ground their teeth, and it gives them a real characteristic look.
But she had this. She had signs of diabetes. She had signs — you can this — this — This Ruffer, Marc Armand Ruffer that I showed you earlier, he developed what's called Ruffer Solution that's still used today to hydrate mummy tissue so that you can make histological slides. You can do blood-typing, they find parasites, they find all kinds of stuff from this. But she had signs of obesity, you know, folds of fat in her mummy. Had signs of, you know, arterial wall thickening and probably diabetes. So she was not in great health despite the fact that her statue looks pretty good, but she was probably a lot younger then.

They had, you know, bad tooth disease. I say, here you can see this typical look to the teeth, where they're ground down. This is a kid. You can see their, you know, the molars are erupting. This is ante-mortem, or postmortem tooth loss. But you can see already, even in a kid this age, the teeth are starting to get ground down from the silica in the bread and the wheat. Here again, you can see, there's a typical way that Egyptian teeth look from that era. Once again, the same thing. You can see even these — this even has — you can see enamel hypoplasia there. And so, instead of — they used to — went through this period where they would autopsy mummies, and it was always a big deal, but now they scan them, and it's generated really a lot of data.

And this is Lady Rai. She was a lady-in-waiting to a famous queen a little bit before Hatshepsut, and she was in her late 30s, and she had really, pretty bad vessel disease even then. You can see the calcium there, the wall hardening. You see it in the carotid arteries and brachiocephalic, subclavian, the coronary arteries. So she had, you know, pretty good arterial disease.

Now, if you look at the prevalence of arterial sclerosis in mummies in general — these are all mummies that have been found from agricultural societies — what you find is that under 30 years of age, about 15% of them have evidence of arterial sclerosis. You get 30-39 and it goes up there. You get to 40-49 years old, and it's over 50% of them have arteriosclerosis. And remember, this is on a diet that every nutritionist would have us eat to prevent heart disease, and they were eaten up with it.

Now, this is one of my all-time favorite papers. This is a post-hoc analysis. This is really crazy. This is how nuts people get, because all of this stuff has been generated lately from the scanning of mummies and showing that they have bad heart disease, this is some person's take on this whole thing: “The vast bibliography associated with the examination of Egyptian mummy provides overwhelming evidence that atheroma was seen in a variety of vascular beds.” Absolutely true. “Clear evidence of vascular calcification ... a finding associated with accelerated atherosclerosis and increased incidence of coronary artery disease.” Absolutely true. “The explanation for these frequent pathological findings almost certainly
resides in a diet rich in saturated fat that was confined to the elite, while most of
the population remained vegetarian.” So here’s their little logical structure, their
syllogism: Saturated fat causes arterial sclerosis. The Egyptians had arterial
sclerosis. Therefore, the Egyptians ate saturated fat.

I mean, it’s absolutely insane. And so, “... there’s unequivocal evidence to show that
atherosclerosis, a disease of ancient times, induced by diet —” I agree with that.
“... and that the epidemic of atherosclerosis which began in the 20th century is
nothing more than history revisiting us.” Because now we eat saturated fat, so we
all deserve to get heart disease just like they did. So, that’s my take on this whole
deal.

But anyway, this paper — this paper got me thinking about stable isotope analysis
and the Egyptian data. So I’ve never seen that, so I looked it up, and sure enough,
there’s stable isotope analysis, and it’s pretty interesting what it shows. If you use
the stable isotope ratios, you see that the contribution of animal protein to the total
dietary protein is about 30%. Okay, now this is not total protein, this is the percent
of animal protein, because you get protein in wheat. Gluten is protein. So they got
protein in wheat. So only 30% that they got came from animal sources. And if you
take into account potential biases, it could have reached 50%, they say. And so,
both estimates are lower than the average value of 64%, which characterizes
modern omnivorous Europeans. So they really didn’t eat very much animal protein.
The Egyptians didn’t. And what’s also interesting is that there was really no
difference between economic levels as to who ate what. They all ate the same diet.
They all had basically the same stable isotope picture. So this whole idea that the
rich people are the ones that have mummies, and they got the saturated fat, and
they got the heart disease is kind of BS, because they all had the same diet.

So anyway, back to the horrible paper with the one good sentence to wrap this all
up: “... our physiology should be optimized to the diet that we have experienced
during our evolutionary past.” Based on all the anthropological evidence, that is not
a low-fat, high-carbohydrate diet. And I think it’s pretty clear from that.
And so, I’ve got one — oh — So if you look at all the data out there — you look at
the metabolic constraints, the Kleiber line, the expensive tissue hypothesis, you
look at the stable isotope data, you look at the hunter-versus-farmer data, you look
at the ancient Egyptian data, you look at the modern RCTs — and it’s pretty clear
that “off the carbs” is the way to be.

And now, if any of you have smartphones and you want any of these papers, I’ve
put them together in a little package. And what you do on your smartphone is you
just punch “4-4-2-2-2” in the number that you’re dialing, and in the message just put
“CF Health.” And it doesn't matter, it’s not case-dependent. Hmm? You text. Yeah
you put the “4-4-2-2-2” in the text thing to send out. Put “CF Health” in the text place and you’ll get a message that tells you how to access those.

And so, I thank you very much for your attention.