Transcribed from a CrossFit Health event delivered at CrossFit Headquarters in Scotts Valley, California, on Dec. 15, 2019:

Thank you, Greg Glassman and the whole CrossFit team, for inviting me to participate in this really important conversation about *The Game Changers* film.

So, we all have biases. I'm convinced by the science that animal foods belong in the optimal human diet, but despite that, I am nutritionally pro-choice, and by which, I mean informed choice. The information is very important. You get to make — you get to decide what you eat. I am not funded by the meat industry or any other food or pharma industry, contrary to popular belief. So these are, on the left, my sources of income and on the right are my unpaid affiliations.

So *The Game Changers* message, as you've heard now from other excellent speakers already, is really essentially: meat bad, plants good. And in order to underscore this point, the filmmakers, what they do is that they basically say, “Okay well, let's show elite athletes can feel and perform their best on a plant-based diet.” Now, elite athletes are viewed as paragons of health, so if I'm a viewer of this film I'm thinking to myself, “Wow, it's — if it's good enough for them, just imagine what it could do for me.” Even if I'm not an athlete, even if I'm male. Because I actually think that one of the unspoken goals of this film is to rebrand veganism as manly. Right now three-quarters of vegans are female. So, is this true: meat bad, plants good? Is that an inconvenient truth that we're in denial about, we need to wrestle with and do something about, or is it a convenient half-truth? And so, in this talk, we've only got about 20 minutes and so there are many, many, many half-truths in the film to wrestle with. I just chose seven, some of which one my favorite people in the world, Dr. Zoë Harcombe, has also mentioned.

So, half-truth number one: Even animals and omnivores need B12 supplements. Now, they argue in the film that human beings never needed B12, that we never needed to eat animals directly to obtain B12 because B12 comes not from animals, but from bacteria. So, and they say, “You know, we used to be able to obtain B12 directly from traces of dirt on plant foods or drinking water from rivers and streams.” And so, you know, cue the idyllic image of, you know, this pristine meadow and babbling brooks, completely free of animals, where we’re, you know, in order to get our B12, we’re flossing our teeth with wildflowers, and so it's really a lovely sentiment. And then they go on to say, “But now, because pesticides, antibiotics, and chlorine kill the bacteria that produce this vitamin, even in farm animals have to be given B12 supplements.”

Now the only — So this is what they imagine we've done to the Earth: completely free of B12-producing bacteria. Now the only source they provide for this sweeping and rather controversial statement is a paper about how to supplement B12 in

commercially raised chickens. So, but do all chickens, even chickens raised on pasture, now need B12 supplements? Well not according to the Merck Veterinary Manual, which says, quote, “Deficiency of B12 is highly unlikely, especially for birds grown on litter or where animal-based ingredients are used.” And this is because chickens naturally — and other birds, naturally — obtain the B12 by eating insects, or to put it carefully, snacking on their own waste products. So, you know, chickens are not vegetarians. So it's true that B12 comes only from bacteria and other similar microorganisms, not directly from animals. However, the vast majority of B12 in the soil is produced by those bacteria inside the gut of animals and then is deposited, shall we say, into the soil.

So, I actually couldn't find a single reference, and I hunted for a long time, blaming pesticides, antibiotics, or chlorine for B12 deficiency that you sometimes see — you see it frequently in, you know, conventionally raised animals, sort of industrially raised animals. But you even sometimes see it in scattered populations, certain isolated populations of freely grazing herbivores. And so, what I actually found instead was that the reason why animals can sometimes be B12-deficient is not because there isn't enough bacteria in the soil. It's because there's not enough cobalt in the soil. And so cobalt is a mineral that the bacteria need to make vitamin B12, which is a big cobalt atom right in the middle. So and — But it's not pesticides, antibiotics, and chlorine that cause cobalt deficiency in certain areas of the world. It's actually, as far as I could tell from everything I read, had more to do with geographical variations in the soil, a season — seasonal changes, drainage characteristics of the soil, and liming practices.

So, you know, it really — if you follow their argument to its logical conclusion, you would think, “Well the Earth is deplete of B12-producing organisms. Therefore all animals, including wild animals which require B12 as well, would need to take supplements.” And they simply, this simply isn't happening. So we don't see wild animals roaming the Earth wasting away, anemic, you know, and confused and neurologically impaired by vitamin B12 deficiency, which is, over time, deadly. So, you know, it only — it takes three to five years for a human to deplete our B12 stores, so it takes a while to see the effects. So, you know, the whole truth is that supplements of B12 are only necessary under unnatural conditions, by which I mean human beings who are not eating animal foods or animals which are not eating their proper diet or are not raised on pasture, if that's where they belong.

So, so they conclude that with the B — that with the B12 argument conveniently out of the way, we're left with no good nutritional reason to eat animal foods and when it comes to B12, that's technically true: You don't need to eat animals directly for B12 if you don't want to. You can eat fecally contaminated plant foods like in the good old days, and there are actually studies that show that you can do this or you can take a supplement. But the whole truth is that it's about so much more than

B12. You know, as Zoë was also saying, there are many nutrients that are much more difficult for us to obtain from animal foods, and this is just a selection of them. But it's partly because sometimes the plant foods don't contain enough of that nutrient, or in some cases they don't contain it at all. And sometimes it's because the form of nutrient in the plant foods is the wrong form. So we have to take it and then it has to jump through some chemical hoops to become the form that we can use best.

So we're just going to look at a few of these full complement of amino acids, iron, and DHA, which is an omega-3 fatty acid critical for brain development and brain health. So you would think that a complete amino acid, which contains all the amino acid — a complete protein that contains all the amino acids you need — that would be an argument in favor of animal foods, because plant foods are notoriously incomplete. They do not contain enough of all the amino acids that we need. And so, you'd think that'd be a good thing, but Professor Walter Willett has said in the film — this is a quote from the film: "The amino acids that come from animal sources tend to make our cells rev up and multiply faster" — i.e., will cause cancer. Now, there's no citation to support this claim in the film, but Professor Willett was the lead author of the EATLancet report, which came out about a year ago, and the very same claim was made in that — in that report, and there was a single source cited to support that claim, and it was this paper, which mentions the word protein, amino acid, meat zero times. So this is not a paper about protein of any kind, meaty or otherwise, causing cancer.

Now heme iron really gets a bad rap in the film. Many, many claims are hurled against heme iron. Now heme iron is the most bioavailable form of iron and happens to be the form that is in animal foods, not in plant foods. It's at least three times more bioavailable, and again, you would think here's an essential nutrient in its superior form. That should be an argument for eating animal foods not against. But one of the arguments hurled against heme iron is by Dr. Helen Moon in the film, who tied heme iron, the amount of heme iron in one-third of a burger — a burger patty — with an increased risk of heart disease, 27%.

Now, I haven't read this study and the reason why — I've mostly — I usually read the studies that I use to prepare presentations. I did not read this study, because I can tell just by looking at the words in the description that it's an epidemiological study. The word "associated," the word "risk" — when you see those words, it's a dead, a dead ringer, dead giveaway: You've got an epidemiological study on your hands. And epidemiological studies — and I've read many, many, many of them — is they are not scientific experiments. They're questionnaire-based wild guesses about connections, possible connections between foods and diseases, and when they're actually tested in clinical trials, they're wrong at least 80% of the time. So

they're really not worth reading. And anymore — I mean, I've read enough of them to understand this. So epidemiology is not biology. Epidemiology is mythology.

Now I really want to call your attention to DHA. I mean, this film was obviously not about pregnant women. It was not about children. It was about athletes, but there were some female athletes in the film. So all of us need DHA, whether a male or female or pregnant or not, but DHA is a critical omega-3 fatty acid, important for the proper development of the human brain, for the proper function of mitochondria, and many, many other things. So obviously we have to have it. Now, plant foods contain absolutely no DHA. Instead, what they contain is ALA, a different type of omega-3 that is very very difficult for us to convert into DHA and in some cases virtually impossible. But so, in any case, study after study has shown that women who are choosing vegan or vegetarian diets have far lower levels of DHA in the infant, infant red blood cells, umbilical cord, and breast milk, meaning that it's very, very hard for women to get enough DHA to the developing baby. So you can see that the less meat they eat, the lower the DHA levels are. Now we don't, you know — DHA, as I said, is important for brain development. This is a lovely quote, you know, essentially letting us know that without DHA, it's been hypothesized that consciousness and symbolic thinking, hallmarks of human intelligence, would be virtually impossible. And so, we really don't know what the long-term impact is of DHA deficiency in infants, but do we really want to take that risk? You know, I think that — I mean, all of us obviously need DHA, but if you're a woman planning a family, you really need to. I think it's medically mandatory to take a vegan-friendly B12 supplement. They now exist. They haven't for very long, but they're sourced from algae — algae is neither a plant or an animal, discuss. It's uh, it's basically — I think it's medical malpractice not to recommend DHA supplements, especially for pregnant women.

So half-truth number three: Plants have way more antioxidants and reduce inflammation because of those antioxidants. So, this is, well, it's half true. So, the problem with plant antioxidants: So, oxidation happens. So, all of our — many of our biochemical reactions create free radicals and cause some oxidation as a natural byproduct of, you know, their cellular functions. And so we all, all creatures, whether plants or animals, we need to have our own internal antioxidants to deal with oxidation. So yes, plants have lots of antioxidants, but so do humans, and humans have absolutely no nutritional requirement for plant antioxidants. And you can take them if you want to, but good luck making use of them, because they really don't function in the human body unless they happen to be a vitamin that we welcome in. So it's been shown in paper after paper after paper that their bioavailability is extremely low. We either don't absorb them at all or what we do absorb, we rapidly transform into something else and rapidly eliminate it as fast as we possibly can. So instead of, you know, welcoming in as a vitamin, we're kicking it out as an unwelcome guest.

So this is an example: The wonderful folks at POM Wonderful would like to convince us that their juice is really helping us with our antioxidant capacity. But the types of antioxidants that're in POM Wonderful, they're either not absorbed at all, virtually not at all, or they're changed into something else prior to even having a chance to try to absorb them. So this is — there are many many people making a lot of money off of this antioxidant myth. But wait a minute! Doesn't it — doesn't changing to a vegan diet decrease your level of inflammation by, what was it, 27% or something in three weeks? Well, that study was a three-week study, and it was of a vegan diet. However — and it did lower levels of hsCRP, which is a mark of inflammation. However, this diet was administered in a sort of a spa-like retreat environment where all of these other things were occurring, including your morning affirmation, your hydrotherapy, your cooking classes, and of course, the diet was — didn't have any refined carbohydrates in it. It was a whole foods vegan diet. So, how are we supposed to know which elements of this intervention were responsible for the lower amount of inflammation?

So that brings us — and that's a very common problem with plant-based diet experiments, which brings us to half-truth number four, which is: Plant-based diets reverse heart disease. These doctors — Esselstyn, Ornish — figure prominently in the film. They're pioneering plant-based heart health heroes to many people, and their studies do suggest some degree of success using their dietary prescriptions. But most people don't know the whole truth behind these studies. Dr. Esselstyn's arrest and reversal study, that was a very low-fat diet, 11 people, 10 of them male, severe coronary artery disease. And after five years, eight of the patients, their cholesterol went way down and their stenosis, which is the amount of blood — the degree of blockage in their arteries was a little bit less. So regardless of whether you think that that's impressive or not, the other things you need to know about this study is that this is how the diet was described: grains, legumes, lentils, vegetables and fruit, skim milk and nonfat yogurt. They were instructed to include animal foods in their diet, moderate caffeine and alcohol, to moderate those things, take a multivitamin and a cholesterol-lowering medication. So, how in the world are you supposed to know why this diet — why this intervention may have looked a little bit better? We just have no idea.

And the Ornish Lifestyle Heart Trial was a randomized control trial, low-fat diet, 28 subjects, 20 controls. Again, grains, legumes, vegetables, fruit. In this case, you don't just get dairy, you also have to eat egg whites and also not a vegan diet. And after one year, the — You have to take your B12. After one year, a little tiny bit of reduction in stenosis in the experimental group and a little tiny bit of increase in stenosis in the control group. So, again, we see far too many variables to know what this study is really telling us. It is just remarkable, you know. Point to anyone of these things; could have been the reason for this little bit of improvement.

So the whole truth is, about vegan and vegetarian diets, is that I'm not aware of any studies demonstrating that simply removing animal foods from the diet makes any human being healthier in any way, because as far as I know, simply removing animal foods from the diet has never been tested. If you find a study, please let me know. I'm still looking for one. So when it comes to these and other studies, you know, we have no way of knowing whether it was the meatlessness, or whether it was the oillessness, or whether it was the lack of refined starches, the lack of refined sugars, the sloth-lessness or the cigarette-lessness that may have been responsible for the differences in the outcome.

So now, this one, as a psychiatrist just, I know — the brain — So they interviewed a geneticist, for some strange reason, about brain glucose, and this geneticist said, “We have a brain that is just desperate for glucose, and it's the only way you can get glucose. You can't get glucose from meat. You must, you know, eat a carbohydrate.” Well, that's a half-truth. So, yes the brain does require a small amount of glucose at all times. However, as I think most of us in this room already know, there is no dietary requirement for carbohydrate in the human diet, because we can make all of our own glucose smoothly, naturally, 24/7 without any drama, without any big peaks and valleys, through this process called gluconeogenesis, which simply means making glucose from scratch so that we can — and you can make that out of fat and protein. So, yes the brain needs glucose, but you don't need to eat carbohydrates to get glucose.

Half-truth number six: Athletes are even stronger and even healthier on a plant-based diet. Now, the whole truth is — so I have no reason to dispute this claim. I think, depending on how you construct your diet, I'm sure you could have an amazing workout. I — it's not — is not my area of expertise, but my nutritional expertise suggests to me that that is possible. But muscular health, it does not equal total health. Physical fitness does not equal total health. What about gut health? What about heart health? What about sexual and reproductive health, which is not just about circumference gentlemen, it is — What about mental health? I've treated — I can't — countless athletes over my 20 years of clinical experience who have mental health issues. And what about metabolic health? I mean, this is — insulin resistance is public health enemy number one. If you don't know where you stand on the insulin resistance spectrum, you don't know whether or not you're actually healthy. And cholesterol levels and weight are not going to tell you the whole story.

So now, this last half-truth is an implied half truth. They never come right out and say this, and Zoë Harcombe also did a lovely job describing this. They would have you believe, I mean, you could easily walk away from this film if you weren't paying really close attention thinking that a vegan diet is the diet they're recommending,

that that's the best diet, the healthiest diet. That's the drum beat in the film. You don't have to eat animal foods, and in fact, if you do, it will be dangerous to your health. So, but there's this very slippery rhetoric that's being used in the film. And so, if you listen really carefully, you realize we actually have no idea what any of these athletes were eating. So they use terms like, you know, vegetarian diet, limiting or eliminating animal products, more — I love this one — "We started going more in a direction of the vegetarian kind of diet." It just couldn't be more vague, and then of course, Dr. David Katz: "A plant-food predominant diet."

Now, the whole truth is that if you're using the term "plant-based diet," all you really mean is high in plants, and really, almost every diet in the world is predominantly plants — not just vegan and vegetarian diets, but the U.S. Dietary Guidelines diet is mostly plants. The standard junky American diet is mostly plants. So really, how do we know if a vegan diet is really a game changer if they keep changing the name of the game?

And so this leads me to something that Gary's been talking about this morning is, you know, what do you not see? What are you not hearing? What is being left out? Because even if some of the things they say are true, and I can acknowledge that some of the things they say are true, what is left? What I call these frequently unanswered or frequently unasked questions: the FUQs. So I think that when you're reading articles or listening to videos about, you know, somebody saying that a plant-based diet made them healthier, it's not — you know, you really have to watch for these questions.

So here are some of the questions that were not addressed in the film that are really important: Are they eating anything other than plant foods? Are they taking any supplements? Do they have any physical or mental health problems? Are they taking any medications? Did they make any other diet and lifestyle changes in order to improve their performance?

So, this film — I was here a couple of months ago giving a talk about nutrition science propaganda, and I recognized a lot of hallmarks of propaganda in this film. Their arguments are often incomplete or vague or black and white. They present opinions as fact. They make unverifiable claims. They make often no citations for their boldest claims. They do not acknowledge areas of uncertainty, and they do not acknowledge risk. They use psychological manipulation of our hopes and fears to persuade us to stop eating animals. They distort or emit evidence to the contrary of their hypothesis, and they overwhelm us with information, or you see, you know, reams of papers going by in the background so fast you can't even read all of the citations, but then they oversimplify the outcome as if all the science is settled and we understand everything, and it's just crystal clear as day.

So, you know, again, you know is — I do completely agree with this statement that, you know, that this film should not be a substitute for professional medical advice. So here is my professional medical advice: I advise people about their diet every single day, all different kinds of people eating all different kinds of diets. Again, I'm nutritionally pro-choice. I just want you to have the information you need to make your — the best choice for your personal goals. And so my advice is: Educate yourself about the risk. If you want to eat a plant-based diet, that's your choice, but know the risks. Supplement very, very carefully, and most chronic diseases are driven not by how much animals — how many animal or plant foods you eat but whether or not you have insulin resistance. So, no matter what diet you choose, get tested for insulin resistance, and if you have it, modify your diet to get your blood sugar and insulin levels under control. So, because I think the real game changer is not how much animal — how many animal or plant foods you need but whether or not you're eating foods that are not whole foods. So regardless of what kind of diet you eat, whole foods is best every single time, because there's absolutely no evidence that a plant-based diet is healthier for us, and there's clear evidence that there are risks involved. Thank you.