The Game Changers documentary review

Being a Clinical Nutritionist and Naturopath means seeing many clients with a variety of health conditions and helping them to improve their health by reducing symptoms and enabling healing. In almost every case, there needs to be some improvements to their food intake in order to get the successful results that the client is looking for.

To help clients achieve their goals requires a lot of knowledge of the anatomy and physiology of all body systems, biochemistry, metabolic pathways, pathophysiology of many diseases, and all the interactions between these. I am very evidence-based as a practitioner, in order to make good recommendations of nutrients and/or products and advice to help the client. There is also an amount of anecdotal evidence being in practice too, which is evidence from personal observations as a practitioner and from the patient. While this is not considered as "scientific evidence" it is still very important, as not everyone is the same or has the same experiences with the same treatments, which is often not reflected in scientific studies.

I am fully aware of the seemingly conflicting advice and recommendations about foods and diets - which diet is best, or whether coffee, chocolate, red wine, dairy, butter, soy or grains are good for you this week or not! Then next week they are bad again... Hence I like to keep on top of the nutritional advice which is given to the public. Which is why I frequently review food-related news stories, articles and documentaries to see what recommendations they say, and whether they are in fact, evidence based.

This review is for the new "plant-based" documentary called "The Game Changers". The documentary is produced by James Cameron (also the producer of Titanic, and Avatar movies and others), Arnold Schwartzenegger, Jackie Chan (actor, martial artist), Lewis Hamilton (F1 driver), and mostly hosted by James Wilks, a UFC martial arts fighter. The trailer for the documentary showed short snippets of several sporting stars and athletes allegedly improving their performance on a "plant-based" (read as "vegan") diet. Even bodybuilder Arnold Schwartzenegger is in favour, despite him not actually being a vegan at the time of his greatest successes! He achieved that on a very high animal protein diet with a side of anabolic steroids! Arnold said in the trailer and in the movie: "the marketing at the time was that real men ate meat, and lots of it", and "but that was marketing. It's not based on reality".

The very same could be said about this documentary - it's not based on reality, certainly not a scientific reality!

By the way, the word "vegan" or description of a vegan diet recommended in this documentary is never used! It's as if the producers know that the word "vegan" has such negative perceptions that they deliberately didn't use this word because they were embarrassed to do so! And there's many good reasons why the word "vegan" has deserved negative perceptions, not least of which is the tendency of the cult-like followers to suspend logic and science in their arguments

Instead of the word "vegan", they repeat the term "plant-based" on and on and on. If the producers and contributors to the film are so pro-vegan, they should use the term, and not hide behind the confusion of whatever "plant-based" really means. This confusion will grow, particularly as some commonly promoted diets which prevent or improve health issues are "plant-based" but they contain meat and animal products, such as the Mediterranean diet! (Lăcătus, Grigorescu, Floria, Onofriescu & Mihai, 2019). Make no mistake, this documentary is NOT about a moderate "plant-based" diet with some animal products. It is talking about and promoting a VEGAN diet!

The main concept of the documentary is about protein, and that animal protein is not necessary for athletes to perform at the highest level. And that plant-based protein can not only help athletes, but reverse heart disease and diabetes. Or does it?!

As with my other food-related documentary reviews, this is a bit long. Very long, really! Sorry! But it needs to be, but will be very informative, scientific, with a more balanced point of view, and pointing out the errors or holes in their arguments with referenced articles and published studies!

The film quoted wisdom from the martial artist Bruce Lee:

1. "Research your own experience
2. Absorb what is useful
3. Reject what is useless
4. Add what is essentially your own."

This was Bruce Lee's way of life. And this is good advice, as we are all different!

Yet the aim of the documentary is the opposite - to get everyone to be the same.

This review might sound at this point to be anti-vegan. No it isn't! I am happy for people to look into this way of life and use it themselves, but what is missing in the documentary is balance! Or science. The documentary is extreme in its beliefs and information, and in many parts is completely lacking in good science on human physiology, metabolism, biochemistry and their effect on diseases. The purpose of this review is to perhaps fill in the holes or correct many aspects of science which were lacking in the documentary, and provide more balance, all fully referenced with published scientific studies.

The story

The documentary followed James Wilks and his journey to recovery after tearing ligaments in both knees after a sporting injury. In his search to finding ways to heal more quickly, he came across a book about the Roman Gladiators that found they had mostly a "plant-based" diet, which greatly surprised him. Researchers have found that the gladiators were referred to as *hordearii* or "barley men", because of their diet. Yet researchers analysed their bones and found them to be fairly strong,

and seemed to recover from injuries quickly. So he set about looking into this more for a quicker recovery from his injuries.

My comments - Gladiators were slaves. They had short lives and were not fed well by their owners. They had very nutrient deficient diets, lacking in calcium that is needed for strong bones. Historical accounts showed that the gladiators downed vile brews of charred wood or bone ash or similar, to keep their bones strong. Gladiators were fed a lot of barley, because it made them fat! And they needed subcutaneous fat to protect them from cut wounds that would otherwise damage nerves and blood vessels! A skinny gladiator was "dead meat", and would not have made for a good show. So their plant-based and very high carb diet was done deliberately to make them fat (Curry, 2008). We know this today, that a high carb diet becomes blood sugar, which then gets turned into triglycerides or fat. A major point ignored in this film.

Protein for energy

A big assumption or belief throughout the documentary is the belief that we need protein for energy, and if you decide to go "meat free" as many athletes in the documentary have done, then people will ask "where will they get their energy from if they don't eat meat?!". And if one can get protein from plants, then we don't need meat!

My comments - Our bodies can use the macronutrients of carbohydrates, proteins and fats for fuel for energy. Depending on your typical food intake, the priority of which macronutrients get used first can differ. If you eat a typical Western diet or predominantly vegetarian or vegan diet that is high in carbs, then you will use these macronutrients in this order (Patton & Thibodeau, 2013):

1. Carbs -> glucose
2. Fats -> ketone bodies and glycerol
3. Protein -> amino acids.

If you are on a more ketogenic diet and are "fat adapted", your body's order of preference of fuel will be different (Freeman, Veggiotti, Lanzi, Tagliabue & Perucca, 2006, p153):

1. Fats -> ketone bodies and glycerol
2. Carbs -> glucose
3. Protein -> amino acids.

If you are an athlete, your body's order of preference of fuel can be different, depending on whether you are a distance athlete or a sprinter. Metabolising carbs is a quicker process, but not very efficient, and produces lots of lactic acid as a by-product, which makes muscles sore and burning during exercise, and you run out of energy or strength quickly. Metabolising fats for energy is slower, but MUCH more efficient in producing energy, but doesn't produce lactic acid, so you will have a lot more stamina and less sore muscles later. Hence for sprinters, a higher carb diet (not protein!) can be best for more explosive power in short events. For distance athletes, fats are the best fuel - not carbs and certainly not protein!

It is important to note that protein is always last in the order of preference for energy metabolism! This is important to note, as proteins have many more important functions, being used to make thousands of other proteins in the body, for repair of tissues and organs, and many other metabolic functions. Proteins are very important for your body, and your body doesn't want to "waste" protein to make energy, unless it has to. However, your body will use stored protein if you do not get enough protein in your diet. If you don't eat enough protein where will your body get protein from?

Your muscles.

Muscle tissue will be broken down to provide your body with the protein it desperately needs. You do not want this to happen. Especially if you are an athlete. Hence protein for energy is irrelevant. You need it for repair and recovery afterwards.

Back to the story...

More energy

Many anecdotal comments by the many athletes in the documentary suggested that they had an improved level of energy after going vegan. Great!

And this often mentioned, but completely false, quote - "the brain can only use energy from carbohydrates (or glucose)".

My comments - There wasn't a lot of investigation or mention of the meals that these athletes used to have before they turned vegan. But there were some comments and examples, with elite sportspeople eating junk foods like burgers, fried chicken and the like, and all the other poor choices that usually come with these meals - chips, soft drinks etc.

I'm not surprised by the inprovements in their energy! ANY change to your diet that improves your nutrient intake, reduces excesses, and reduces inflammation, is going to be noticed as a reduction of symptoms - whether that is improved energy, or improved performance, or a clearer head, etc. I see this all the time in my clients when I improve their nutrient intake. Getting off junk food will improve how you feel! You don't need to go vegan to get these benefits.

I'm surprised that many of these athletes were able to actually get to their levels while eating junk foods before!

Eating less bad fats from fried foods, less sugary foods and drinks, and less grain products, will reduce inflammation, improve repair, and improve sporting performances anyway!

If anyone is having junk foods, why is only the meat of those meals being blamed for being unhealthy?! What about the sugary drinks (no mention), bread rolls or grains (no mention), sugary sauces (no mention), or the unhealthy vegetable or seed oils/fats used in junk foods (no mention)?! Because sugar, grains and vegetable/seed oils are plant-based! We must not let these inconvenient little facts get in the way of our pro-plant documentary!

Many decades ago researchers found the the brain CAN actually use other sources of fuel for energy, other than glucose from carbohydrates. They found that brain cells can use ketones as an alternate

energy source. Ketones are much more efficient in producing energy, and without the metabolic issues of metabolising carbs producing lactic acid. Ketones are made in your body as a natural metabolic process of oxidising (or breaking down) FATS! (Erdman, 2011). The fact that there is still a belief in the film that the brain can only run on glucose really shows how out of date their science knowledge is!

Where does protein come from?

There were comments by the host that "all protein comes from plants".

And that meat-eating people are just getting their protein from eating vegans like cows, chickens, fish etc. As such, animals are the "middle men' in converting plants into protein, so why not just cut out the middle men and eat plants for protein instead?!

And "plant eaters get 70% more protein than they need"!

And... "There is a belief that plant proteins are inferior to animal proteins as plant proteins are not complete. This is a fallacy, as all plants contain all amino acids"!

My comments - There is a lot of misinformation in these statements! Plants convert nutrients they take in, into animo acids and then into proteins they need for the plant to grow and to reproduce. Humans can take in protein in either the form of animal protein or plant protein, digest them into their building blocks of amino acids, then build them up again into many proteins that we need for our cells, organs and tissues. So we DO make proteins! There are 9 amino acids classed as "essential amino acids" (MedlinePlus, 2019), meaning that we cannot make them and these must be taken into the body in the form of food. We DO make all the other amino acids! They lied in the documentary.

All animal foods proteins contain ALL the 20 animo acids. As such, animal foods are said to be "complete proteins".

Very few plant foods contain all the 20 amino acids. Hence very few are actually "complete proteins". Some of the only plant foods which are complete proteins are: chia, soy, quinoa, buckwheat, spirulina (algae), hemp, and not very many more (PETA, 2019).

Plant proteins are not superior to animal proteins as:

1) plant foods are mostly not complete proteins

2) plant foods contain much less protein per gram

3) plant foods are much less bioavailable than animal proteins! Plants contain anti-nutrients or binders which can prevent or reduce the body's ability to utilise the plant proteins by 25-50% (Nutrition Advance, 2019)

4) once digested, an amino acid will be used in exactly the same way in the body as the same amino acid from an animal source! Hence, individual amino acids are the same and are indistinguishable as to their original source. So once digested, plant proteins are no better than animal proteins.

Also not mentioned in the film is that you need a good digestive system function, especially in the stomach to break down proteins into their amino acids. I see a LOT of clients with poor stomach function from low stomach acid, and many other digestive issues which reduces the body's ability to absorb and utilise protein from the diet.

Blood quality and flow

Three male college athletes had blood samples taken, after eating a meat based burrito, and the following day after eating a plant-based burrito. The blood samples were spun in a centrifuge to separate the red cells from platelets and white cells and the liquid plasma, and the results were compared.

The doctor (Dr Robert Vogel) was only comparing the colour and opaqueness of the plasma in the samples as a measure of how "healthy" the athletes were.

The blood plasma from samples taken after the plant based meal was fairly clear, but the plasma of the meat based meal was a little cloudy - due to the fat in the plasma. This was made out to be a very bad thing, as fat in the blood apparently causes issues with "endothelial function" or the walls of your blood vessels to not dilate when needed. Allegedly, the endothelial wall functions well if there is no fat in the blood! But the fat from the avocado in the meal was ok though!

Another doctor, Dr Aaron Spitz, performed another experiment on three college (male) athletes - to measure the circumference and number of their erections while they slept after consuming, again, a meat-based burrito, and a plant-based one! The results suggested that after eating the plant-based burrito that their erection circumference increased as did the number of erections they had afterwards! This was due to improved "blood flow".

My comments - Just measuring the colour of the plasma in the blood samples is not a great nor scientific way to check for how healthy someone is! Many other laboratory tests should have been done for this "test".

Good endothelial wall function is not dependent on how much (or little) fat one has in their blood, but by nerve function, neurotransmitters and hormones, and various other nutrients and minerals (magnesium, zinc, sodium, calcium, potassium etc).

It is perfectly natural and normal to have fats in the blood! We need them! The fats have only got there as the body deemed it necessary to absorb the fats from the digestive tract, and into the blood so the body can use them.

These doctors in the documentary, and the athletes, and much of the general public, still think that fats are bad, especially aminal fats. Good quality studies over the past 50 years have shown that animal fats and cholesterol are NOT associated with a reduction of health, or associated with heart disease at all, and the reverse is actually true.

The Dr Vogel seems to have forgotten comments he made on the effects of fats on endothelial function, in one of his own studies! In looking at the effects of olive oil on endothelial function, he found that olive oil constricted blood flow "by a whopping 31% after a meal" (Vogel, 2019).

These doctors aren't telling the whole truth, or perhaps some convenient editing of the film caused some of their information to be removed, as it didn't fit the plant-based bias the movie was trying to promote. The studies they performed were badly designed and did not take into account many factors which could also explain the results, or perhaps even negate the results. The results could be explained by many other non-plant caused factors. The fact that they were only performed on 3 very fit young men, and not on a larger and wider variety of males (or females too) to see if the same results applied. As one doctor said after the experiments, "this is not a scientifically validated study". Yes, perhaps the only truthful thing he said in the movie.

Other bad compounds in animal foods

There was mention of several other damaging or dangerous compounds found in animal foods which should be avoided because of their effects to health:

1. Neu5gc - A metabolic sugar compound believed to trigger an immune response and inflammation in the body that can lead to chronic diseases including cancer
2. TMAO - a compound made in the body that is associated with atherosclerosis (plaque and narrowing of blood vessels) and heart disease by increasing levels of inflammation in the body
3. Heme iron - a form of iron found in animal foods, and was said to cause a 27% increase in heart disease risk
4. Heterocyclic amines - are carcinogenic compounds formed from the cooking of certain foods, such as meats.

My comments - Some of their arguments are just pathetic or laughable, as explained:

1. Neu5gc - Humans are one of the few mammals that does not make this compound, and it is believed we used to, but a genetic mutation stopped that. Hence we no longer make this compound, but instead we develop antibodies to it instead. Because Neu5Gc exposure can be from any meat or animal products, including from breast milk (!), almost every human will have these anti-Neu5Gc antibodies (Soulillou, Süsal, Döhler & Opelz, 2018). Studies have shown that the Neu5Gc compound is expressed in many types of cancer cells, not as a result of dietary intake of meats containing Neu5Gc, but due to the metabolic changes in a cancer cell as a result of hypoxia – a lack of oxygen to cells, so the deprived cells undergo physiological and metabolic changes to adapt, for your long term survival. Neu5Gc is not found in detectable levels in normal healthy cells, but is found in cells which are already cancerous (Dorvignit et al., 2019). Other studies show that Neu5Gc is not the cause of cancers resulting from inflammation (Soulillou, Süsal, Döhler & Opelz, 2018).
2. TMAO - is naturally made in our bodies by our digestive bacteria and our liver! We are lead to believe in some media articles (and pro-vegan resources) that red meat causes inflammation, and red meat does increase TMAO levels. We also get told that fish is a much healthier source of animal protein, and that fish oils (omega-3s) are good because they are anti-inflammatory and reduce inflammation, and reduce your heart disease risk. But eating

fish actually raises TMAO levels higher than red meat! (Sardi, 2017). And TMAO production is not just restricted to animal foods, but many plant foods also make TMAO! High carb foods like potato, grains, beans, cereals and more, especially when cooked and then eaten cooled (as resistant starch) also get turned into TMAO by gut bacteria and the liver. In another study, these plant foods and more (carrots, peanuts, soy, tomatoes) actually generated far more TMAO than beef! (Masterjohn, 2013). Some plant-based foods Elevated TMAO is also caused by kidney conditions too, which may be more of a cause of high TMAO levels in some people than just from the diet, as TMAO is exreted in the urine (Sardi, 2017). The issue with TMAO being blamed for heart disease is also questionable, as this belief is based on animal studies using very high amounts of carnitine (an amino acid found in meats) in supplements, and not from meat itself or from plant foods (Masterjohn, 2013)

3. Heme iron - this form of iron is found in animal products. Plants contain non-heme iron, and this form is ALSO found in animal products. Heme iron from animals is very bioavailable - meaning very easily absorbed and at a much greater rate or percentage than non-heme iron from plants. Approximately 20-25% of all heme iron in animal products is absorbed, as opposed to just 4-10% of the non-heme iron in plant foods. The amount of non-heme iron is heavily regulated by the digestive tract, but heme iron is not, hence iron deficiency is less common in those who eat meat (Council for Responsible Nutrition, 2013). Sure, humans who eat meat can still be iron deficient, as I see this in clinical practice, as iron levels require other factors to stay at healthy levels. Vegans have another disadvantage to meat eaters when it comes to iron absorption - that various anti-nutrients in plants (phytates and polyphenols for example) can bind to iron in the same meal and prevent the iron being absorbed (Council for Responsible Nutrition, 2013). It is thought in pro-vegan circles that high iron levels (by testing ferritin levels) might be assocated with an increased risk of heart disease, and since heme iron can raise iron levels higher, then meat must be the cause of heart disease! But ferritin levels (checked in blood tests) are also a marker of systemic inflammation especially when elevated. So really it is inflammation which causes heart disease, not heme iron and not meat

4. Heterocyclic amines - these dangerous compounds are formed on cooked foods, but more from specific types of cooking, especially high temperature cooking, and exposure to flames such as on a BBQ (Nutrition Facts, 2019a). The blackening or charring of meats, really from over-cooking, forms these compounds. So the issue of heterocyclic amines really isn't caused by the meat itself, but from how it is cooked. Cooking meat by other methods, or simply not overcooking them, can greatly reduce or prevent formation of these compounds! Issues with overcooking foods to create carcinogenic compounds is also not restricted to animal foods, as the charring or burning, frying or baking of plant foods creates similar a carcinogenic compound called acrylamide (Nutrition Facts, 2019b). Smoking tobacco (ok, it's not a food as such, but it IS a plant!) also generates heterocyclic amines! (Nutrition Facts, 2019a).

Improved tissue repair and nutrient deficiencies of a plant-based diet

Going plant-based in your diet improves repair of tissues and cells. Because a plant-based diet provides all the nutrients you need.

"Eating well accelerates healing".

My comments - Changing and improving ones diet, and eating ANYTHING which reduces inflammation, or improves nutrient intake, or which promotes cellular or tissue repair is going to quicken recovery and healing. Having an meal plan which is sufficient in a wide variety of nutrients is ideal!

Sadly, vegan diets are deficient in the following nutrients: (Fields, Ruddy, Wallace, Shah, Millstine & Marks, 2016)

- Zinc
- Iron
- Calcium
- Vitamin D
- Vitamin B12
- Protein
- Essential fats (Omega-3).

These deficiencies will have implications to overall health, repair, and performance of anyone, but athletes more so. Deficiencies can be mitigated with good meal planning and supplementation. But a good, healthy diet should not require supplements. If it does, like a vegan diet, then it's not a healthy diet!

Antioxidants almost entirely found in plant foods

It was said that plant foods are better as they contain more antioxidants than animal foods.

My comments - Sure, many plant foods contain a wide variety of antioxidant compounds, but then so do animal foods!

Antioxidant vitamins and minerals include these in animal foods: (Department of Health & Human Services, 2018).

- copper - seafood, red meat, milk
- manganese - seafood, red meat, milk
- selenium - seafood, offal, red meat
- vitamin A - eggs
- zinc - seafood, red meat, milk

Antioxidants are not exclusive to plant foods.

Inflammation

Eating one hamburger increase inflammation markers by 70%.

My comments - I'm not sure what study (f any) that this comment came from, but basically EVERYTHING we eat causes inflammation! (Provenza, Kronberg & Gregorini, 2019).

What is inflammation? It is a normal part of our immune system to repair damaged cells and tissues. Inflammation processes and inflammation compounds in the body open up the blood vessels to make them wider and "leakier" to let more red blood cells to the area to supply more oxygen to help heal or replace damaged cells. Inflammation also brings more white blood cells to the area of damage, so they can deal with possible infections or to remove damaged cells.

Inflammation is a GOOD thing to have happen in your body! But only if it is short-term such as to repair a cut finger or a bruise for example.

If inflammation goes on for a longer time (weeks, months and years) because inflammation is constantly being triggered, then the repair processes become dysfunctional as does the immune system, and this can lead to chronic disease symptoms.

Don't blame meat for the damage to the body and inflammation symptoms, that are really caused from any number of foods or ingredients.

Ironically, the most inflammation-causing foods are plant-based! Sugar in all its many forms in sweet foods and drinks, grain based products especially those that are GMO and laced with agricultural chemicals, soy (again almost totally GMO and laced with chemicals, and a highly processed junk food), "vegetable" or seed oils especally when used for cooking, and legumes which many cannot tolerate or are intolerant to (de Punder & Pruimboom, 2013).

There are some studies which suggest that processed meats can cause inflammation and contribute to health issues. But this does not apply to all meat! Many studies are poorly designed (and many are deliberately so) as they do not take into consideration the type of meat consumed, or more importantly, what those animals actually ate! Because you effectively eat what the animals eat!

For example, there are major differences in the nutrition content and health effects of grain-fed meats as compared to grass-fed meat. Grain-fed meat is high in omega-6 fats which can cause inflammation if omega-3 levels are low. Grass-fed meat, however, is high in omega-3 fats which are ANTI-inflammatory, meaning that they reduce inflammation! Omega-3 fats in fish and fish oil products are promoted and recommended by many health practitioners, doctors and specialists because omega-3 reduces inflammation. Just because it's meat doesn't mean it will cause inflammation (Provenza, Kronberg & Gregorini, 2019). It is the ratio of omega-6 to omega-3, which if imbalanced towards a high omega-6 intake which increases inflammation and increases the risk of heart disease, cancer, autoimmune and neurodegenerative conditions. Plant-based diets are low in omega-3 by default, and high in omega-6 from a high grain based diet, so being a vegan may not actually protect you from inflammation and these chronic conditions (Provenza, Kronberg & Gregorini, 2019).

Another study (Hodgson, Ward, Burke, Beilin & Puddey, 2007) found that eating lean meat actually lowered many inflammation and oxidative stress markers in pathology test results in humans. They also found that REDUCING plant-based carbohydrates in the diet and replacing them with lean red meat also reduced inflammation and of oxidative stress! The study suggested that their results

showed that the belief that meat causes inflammation was not correct, and also that a higher red meat intake does NOT increase the risk of heart disease or type 2 diabetes.

In a hamburger, the most inflammation-causing foods or ingredients, I believe would be:

1. The high-carbohydrate and sugary bun
2. The oil used to cook the burger meat
3. The high amount of inflammatory omega-6 fats in the grain-fed meat. You can't blame the meat or the cows, but the farmer (or feedlot companies) for feeding the animals with grains (not their natural food) to make them fat!
4. The sugary sauces used on the burger
5. Or is it really the extra-large sugary soft drink (ie "soda"), or the fries cooked in the toxic seed oils, which are really causing the cell and tissue damage and inflammation?!

Eating a hamburger with some antioxidant-rich spices and polyphenols (in some vegetables and red wine) can reduce the inflammation caused by components of the hamburger and also reduce the endothelial dysfunction caused by the meal (also an issue blamed on meat in this film) (Provenza, Kronberg & Gregorini, 2019).

If you are going to point the blame at someone else, make sure your backyard is clean (and innocent) first!

Heart disease

A Dr Columbus Baptiste claimed that the primary cause of heart disease is cholesterol. Other doctors interviewed in the film also referred to aspects of heart disease such as atherosclerosis (arterial plaques) also being related to animal foods, animal fats and cholesterol.

And this gem of a quote by the host "the only diet to reverse heart disease is a plant based diet"!

My comments - The belief that saturated fats and cholesterol was linked to heart disease came from a series of studies very poorly performed and published by ONE main researcher (Dr Ancel Keys, an epidemiologist) way back in the 1950s (Keys, 1980). He suggested that it was saturated fats which were associated with (note, not actually causative!) of heart disease in men.

Many decades of good quality research since then has shown the opposite to his findings, that higher cholesterol is more protective of the heart and reduces heart disease and all-cause mortality, than having low cholesterol! In fact it is having LOW cholesterol which greatly increases heart disease risks (DuBroff & de Lorgenil, 2015).

Our bodies NEED cholesterol! We make a lot of it every day in our liver, as we need it for energy production, to make our hormones and neurotransmitters for whole body function, and for making the walls of hundreds of millions of new cells each day! We can only perhaps provide 20% of our daily cholesterol requirements in the form of foods, and cholesterol is only found in animal foods

such as meat, dish, and dairy. If you are a vegan, you will take in no cholesterol, so your body will have to make all the cholesterol it needs.

Stress alone, even with a prefect diet, will increase cholesterol levels, as a survival mechanism!

Vegans also have some issues with making cholesterol, due to common nutrient deficiencies of iron and zinc, which are needed to make the cholesterol they need (Winston, 2009).

In addition, plant-based vegetable and seed oils have been shown again and again to increase heart disease risk, despite them not containing cholesterol or saturated fats (Ransden et al, 2013).

The alleged issue with cholesterol being linked to arterial plaques and atherosclerosis is that cholesterol is found in the plaques. But cholesterol DIDN'T cause the plaques. The anology is of a fireman being found at the scene of a fire, with the fireman actually protecting the property around the fire and trying to get rid of the fire. That's what cholesterol is doing. Cholesterol is patching up the damage to the arterial walls caused by inflammation, particularly caused by high blood sugar levels. Blood sugar is raised by... a diet high in carbohydrates, particularly of sugary foods and drinks, grains and alcohol.

We shouldn't be worried about higher cholesterol as a heart disease risk. Be far more concerned with having low cholesterol levels, as this is a much higher risk of heart disease than high cholesterol!

The movie claimed that only a plant-based diet can reverse heart disease. This is not correct!

Any studies have shown many different diets to reverse heart disease, including:

- Mediterranean diet – There is no true definition of a Mediterranean diet, but its general guidelines are loosely based on people eating a "plant-based" traditional fare of vegetables, fruits, nuts, legumes, with a variety of animal meats, fish and dairy, and olive oil and typically, red wine. This diet includes a moderate amount of quality animal meats, eggs, cheese and milk, and many studies over many decades have affirmed the benefits in preventing and reversing the many symptoms and conditions of heart disease by 35% or more (Lăcătus, Grigorescu, Floria, Onofriescu & Mihai, 2019).

- Dietary Approaches to Stop Hypertension (DASH) diet – Is a scientifically-proven diet for reducing blood pressure (hypertension), which is one of the symptoms of and factors involved in the development of heart disease. The DASH diet is rich in fruits, vegetables, low fat products, and a low salt intake. This study showed that it was carbohydrates in the form of sugar and alcohol (hint: plant based!) which contributed greatly to high blood pressure and heart disease (Bazzano, Green, Harrison & Reynolds, 2013; Kerley, 2018).

- The Optimal Macronutrient Intake Trial for Heart Health (OmniHeart) diet – This diet is siimlar to the DASH diet but replaces some dietary carbohydrates with more protein (equally from animal and plant sources) and some more non-saturated fats. Interestingly, this diet with less carbohydrates (from plant sources) but more protein and fats yielded greater results in reducing markers of heart health than the DASH diet (Appel et al., 2005).

- Paleo diet – The perhaps poorly named or misunderstood Paleo diet is said to resemble the human hunter-gatherer diet of Paleolithic times, based on quality grass-fed meats, vegetables, fruits, healthy fats, fermented foods, but lacking in grains, dairy, and legumes for their tendency to cause inflammation or intolerance issues in many people. The Paleo diet in clinical trials has been shown to reduce many risk factors of heart disease, including total cholesterol and reduce or normalise blood lipid markers (HDL, LDL, and triglycerides) to a greater extent than traditional heart-healthy guidelines (Pastore, Brooks, John & Carbone, 2015). Another study found the Paleo diet improved many cardiovascular risk factors in just 2 weeks in those already with heart disease conditions (Boers et al., 2014).

- Ketogenic diet - A ketogenic diet is one which reduces refined and processed carbohydrates to reduce blood sugars, reduce blood insulin response, and reduce the body's reliance on glucose as the primary source of energy and replace it with ketones instead, which are metabolic byproducts of the oxidation of fats. It is well known in published studies that a diet high in refined sugars and fructose (note - only found in PLANT foods!) is a cause of Metabolic Syndrome (a complex and multifactorial condition comprising many symptoms of heart disease). Ketogenic diets have been shown to significantly reduce cholesterol levels, increase the HDL cholesterol (the "good" one!), reduce triglycerides (a major heart disease marker, which ironically is greatly increased from a high carbohydrate plant-based diet!), reduces LDL levels (the "bad" cholesterol), reduces weight (a heart disease factor), reduces blood pressure, reduces insulin resistance, and other benefits! (Kosinski & Jornayvaz, 2019).

A plant-based or vegan diet is not necessary nor the only diet which can reverse heart disease! The documentary lied about this. Or should I be a little more diplomatic and say "they didn't research this enough"? Or "at all".

Our digestive tracts and teeth are adapted for eating plants

Allegedly, our teeth are more adapted for eating plants. And our incisors and canine teeth are not for eating meat.

Our digestive systems are longer than other animals that are carnivores.

Our bodies aren't built for eating meat.

Other animals do actually make vitamin C in their bodies, but humans cannot. Hence we are dependent on plant foods for vitamin C.

My comments - this is a common point which comes up again and again in pro-vegan debates!

Our bodies have not adapted to have a complete plant-based nor a complete meat-based diet. Our teeth are neither the same as plant-based animals nor meat-bsed animals. Our digestive system is similarly not adapted to one way or the other. But our teeth and digestive tracts have adapted to eating BOTH animal and plant foods! We have some similar characteristics to the teeth of herbivores AND carnivores, and the same for our digestive tracts. BOTH. Deal with it.

Yes it is true that humans cannot make vitamin C in our bodies. Vitamin C can be obtained from animal foods, from raw eggs, liver and other offal, and fish roe (National Health Research Institutes, 2019).

The elephant in the room - Vitamin B12

Vitamin B12 doesn't come from animals, but is made by our digestive bacteria.

Meat eaters are often low in vitamin B12 also.

If you are on a “plant-based” diet, just take a B12 supplement.

My comments - If a vegan diet is the true diet that we humans have eaten in the past and should also follow in the future, then we shouldn't be relying on a supplements! Any diet that requires supplements to "top up" or prevent or treat deficiencies caused by the diet is not a healthy nor sustainable diet to follow.

Vitamin B12 is indeed made by bacteria, and only a select few strains of bacteria at that, and the vitamin is then concentrated in animal meats, which have always been the highest sources for this vitamin (Watanabe, Yabuta, Tanioka & Bito, 2013).

If vitamin B12 is made ‘by our digestive bacteria”, then a vegan shouldn’t need to supplement with this essential vitamin. Unfortunately vegans and some vegetarians are very deficient in vitamin B12 and must supplement, as despite trillions of gut bacteria, they simply do not make enough B12 for their daily requirements.

Yes, I do see a lot of meat-eating clients with very low vitamin B12 too, but B12 levels in vegetarians and vegans who do not supplement are almost always much lower!

Vitamin B12 is stored and recycled in the body and used again as much as possible. However, the first signs of a vitamin B12 deficiency can occur within 2 years from not consuming meat, fish and dairy foods (Rizzo et al., 2016). So when someone goes vegan in this "honeymoon period", they may feel improved in their health, but if they do not test for or manage their declining vitamin B12 levels over time, their health may plateau and start to decline.

Yes even meat-eaters can be deficient in vitamin B12 – I see it regularly in my clients. The digestion, absorption, and utilisation of vitamin B12 is a long and complex process, which has many steps that can fail for many reasons. Some factors which can reduce vitamin B12 levels include low stomach acid, gastritis, use of many medications (H2 blockers, PPIs, metformin, antibiotics, and more), digestive issues (including IBS, IBD, Crohn’s disease, Ulcerative Colitis etc), how foods are cooked (as microwaving animal foods destroys most of the vitamin B12) (Watanabe, Yabuta, Tanioka & Bito, 2013) and other causes. But vegetarians and vegans have a much higher risk of vitamin B12 deficiency and its complications (Watanabe, Yabuta, Tanioka & Bito, 2013).

Artificial meat - using soy products

There are some misunderstandings in general about the consumption of soy products. But soy products are good and recommended for vegans, as it is a very versatile product, and often used in place of dairy and meats, in the form of soy milk, and tofu and textured "meat" products.

Soy contains phyto-oestrogens which actually opposes oestrogen in the body by blocking oestrogen receptors on cell walls.

By comparison. chicken, eggs and dairy products have been shown to increase oestrogen levels by over 20%, and reduce testosterone by 18%.

My comments - Yes soy contains phyto-oestrogens, or plant-based chemicals which mimic oestrogen in the body. But there's some very selective recommendations of soy in the documentary, and carefully planned ignorance of a lot of other facts about the effect soy has in humans.

All soy products are highly processed, and soy should be treated similarly to other processed foods - at an absolute minimum, or preferably avoided for health reasons. Soy foods are not health foods!

The effects soy has on the body is not all good for everyone, as it is made out to be in the film. Yes soy can provide the body with phyto-oestrogen chemicals that can have differing effects in your body, depending on your hormone levels and your gender! Soy has a "modulating" effect on oestrogen in the body, which can be good in SOME people, but very bad in most.

If you are male, you mostly have testosterone as your main sex hormone, and a very small amount of oestrogen. However when a male ingests soy, he will have MORE oestrogen and less testosterone in the their bodies, which will cause hormone imbalance and many health effects - weight gain, man boobs, enlarged prostate gland and even prostate cancer (Reger, Zollinger, Liu, Jones & Zhang, 2017). While the oestrogenic compounds in soy can benefit men with enlarged prostates or prostate cancer, by blocking oestrogen receptors to effectively reduce their effect on the prostate, a high intake of soy can cause the issues in healthy men in the first place (Dillingham, McVeigh, Lampe & Duncan, 2005).

If you are female and have hormone imbalance symptoms such as with "oestrogen dominance" causing many cycle symptoms and period issues (irregular, heavy bleeding, pain and cramps, sore breasts, menstrual migraines and more) then some soy can be beneficial by having a "toning down" effect on the body's high oestrogen, by blocking oestrogen receptors on the cell walls to reduce the effects of oestrogen on the cells and the body as a whole. This is the effect mentioned in the film.

However, if you have a "normal" period (which is basically 4-5 day bleed every 28 days or so, and NO other symptoms) then introducing soy has the opposite effect - it will actually add to your oestrogen levels and have an oestrogenic effect on your cells (ie, NOT an oestrogen blocking effect). Hence soy products can cause and progress the oestrogen dominance effect in both women AND men (Dillingham, McVeigh, Lampe & Duncan, 2005). Oestrogen dominance can lead to many types of cancers which are driven by the female hormones (breast cancer, uterine cancers and others) and prostate cancer in men (Doerge & Sheehan, 2002).

Then there's also the issue with 94% of soy being genetically modified (GMO), with over 70% of all soy in the US being produced for animal feed - mainly for cows, pigs, chickens and fish etc (USDA, 2015). As soy isn't a natural food for animals, it is given to them by farmers and in feedlots because it makes them grow faster (compared with eating their natural foods of grass!), and makes them FAT! This makes the farmer a lot more money.

Many vegan activists claim that the growth of GMO plant crops like soy for animal feed is an environmental issue, with forests being destroyed and farms being used to feed animals instead of humans. But it isn't the animals' choice to eat soy, as it is more or less forced on them as there's very little of their natural food available to eat. You can't blame the animals or meat eaters for the environmental damage of such crops and the chemicals used for their production - blame the farmers and the agricultural departments who allow this.

Soy is not a natural food for animal crops to eat, and the hormone effects it has on these animals is similar to what it is doing in you... and the meat can be high in hormones can also have an indirect effect on your hormones, on top of the effects soy is directly doing to you, as explained above.

Soy (being a GMO and highly processed plant crop), is the cause of hormone issues with animal crops, and human "crops" as well. Soy is fed to animals to fatten them up before slaughter, yet most people don't get the irony, that it is also fattening them up too.

Soy is a disaster for the environment too, with the agricultural chemicals it relies on for growth, particularly the carcinogenic Roundup (glyphosate). Most of the world's soy is GMO soy, and the genetic modification of soy allows the plant to survive benig sprayed with Roundup when it's still young. Many weeds are becoming resistant to RoundUp and this requires more herbicides to be used for weed control (USDA, 2015), thus damaging the environment further.

Soy also contains phytates and oxalates which bind to other nutrients to prevent their absorption, including calcium, magnesium, iron and zinc - many which are deficient in plant-based diets anyway, hence soy will worsen these deficiencies, as well as causing other conditions such as kidney stones (Al-Wahsh et al., 2005).

Soy also contains yet more antinutrients, called trypsin inhibitors (TI), which as the name suggests, are protein inhibitors. Trypsin is a critical pancreatic enzyme, and the TIs in soy products can strongly affect the pancreatic enzymes, reduce protein digestion and protein absorption, to cause adverse health effects in animals and humans (Chen at al., 2019). Such health effects can include enlarged pancreas, pancreatitis, reduced growth rates, and other health issues (Hoffmann, Thurner, Ankerst, Damme, Windisch & Brugger, 2019). This study found that health issues of Tis were below recommended limits, and concluded that TIs from soy products should be removed from farmed animal diets as much as possible. Has this been done? No, of course not. As this documentary is mainly about the benefits of plant protein over animal protein, this is a major oversight in the promoting the benefits of soy.

Soy also contains goitrogenic compounds which affect thyroid function. Some active constituents in soy can inactivate natural thyroid hormones and reduce overall thyroid production by 50%, as well

as causing hypothyroid states, thyroid gland goiters, and a higher incidence of autoimmune thyroid conditions (Doerge & Sheehan, 2002).

The only "good" soy, and even then only in small amounts because of the many above health issues, is fermented soy. Such fermented soy products include tempeh, miso and natto. Fermenting soy does remove most of the antinutrients in it but will still have some negative effects on the body.

Stress and cortisol and weight gain

The film said that cortisol, the stress hormone, increases body fat and reduces muscle mass. But a plant-based diet lowers cortisol.

My comments - When you and your body are under stress, more cortisol is produced in your adrenal glands to help you fight the stress, or to get away from from it. Cortisol causes a sudden increase in cholesterol, blood sugar levels and blood lipids, so these can be used for a quick getaway or a sustained energy burst to fight or flee the stress - the "flight or fight" response.

The stress response of high cortisol does cause weight gain in a couple of ways (Harvard Health, 2018):

1. Stress causes emotional eating and poor food choices to favour eating more foods that are higher in sugar or fat, or both. This overeating and high carbohydrate intake will be converted into fat and stored, so weight increases.

2. Stressed people also tend to not sleep well, exercise less, and drink more alcohol, all of which cause more storage of body fat

3. With stress causing high blood sugar, blood lipids and cholesterol, if these fuels are not used for the "flight or fight" response, they will be converted to fat again and stored.

Cortisol is made from cholesterol, which is only found in animal foods! Or if you are vegan, your liver will make all the cholesterol your body needs, providing all the nutrients are available to do so (Stachowicz & Lebiedziński, 2016).

Yes, stress causes an increased cortisol hormone secretion, and this does have a negative effect on muscle mass by breaking some muscle down. How this may affect the body would depend on whether the stress is acute (ie, short-term or temporary) or long-term or severe. Short term stress is actually a good thing for your body, but long-term stress is not, and is the cause of many chronic health conditions from heart disease, hormone imbalances, poor immune system (and increased infections and illnesses), weight gain and all its related complications.

Stress causes cortisol to rise. Lack of stress causes cortisol to lower. Cortisol also rises from other factors, such as excessive exercise, normal diurnal rhythms, low blood sugar levels, and more (Stachowicz & Lebiedziński, 2016). Some foods, supplements and herbals, and lifestyle improvements can also reduce cortisol, but the key is to actually reduce your stress exposure or your response to stress that will actually stop the high cortisol in the long term!

Plant foods are not the only way to reduce cortisol! Improving the quality and quantity of sleep can reduce cortisol, as can exercise, socialising, sun exposure during the day, reducing coffee, having pets, and other factors can all reduce cortisol (Healthline, 2019).

Even animal-based foods can reduce cortisol, such as from phospholipids (fats from fish oil, phosphatidylserine from eggs, and tryptophan from meats. Other cortisol-lowering nutrients include those high in GABA (or its precursor amino acids) such as fermented milk products (Stachowicz & Lebiedziński, 2016).

High carbohydrate plant foods actually reduce body fat (and therefore cause weight loss)

The host mentioned that there was a misbelief that diets high in carbohydrates cause weight gain, when in fact, diets high in these foods, such as white flour, sugar, oats and bananas for example, actually cause weight ***loss***!

My comments - Really?! If you believe that then you haven't looked at a human biochemistry or physiology textbook.

These very high carbohydrate foods, make no mistake about it, CAUSE weight gain in the average non-athletic person. Carbohydrates in the diet get digested to become glucose, which raises blood glucose levels, which triggers an insulin hormone response from the pancreas, which does 4 main things (National Institutes of Health, 2019; Colorado State University, 2019):

1. Insulin tells cells to start taking up the blood glucose so the cells can use it for energy or other functions, some 60 times more than when insulin levels are reduced
2. Insulin also tells the fat cells to take in glucose to be stored
3. Insulin tells the liver to convert the glucose into triglycerides to be stored as fat
4. Insulin stops the body from utilising fat stores as an energy source (so you won't lose weight).

Hence insulin is a fat storage hormone, caused from high intake of glucose, in turn from a diet high in carbohydrates. The highest carbohydrate foods are all plant-based.

Ketogenic diets cause a reduction in muscle mass

My comments - I have briefly described the ketogenic (or ketosis, or keto) diet above. It works amazingly well to help with reducing body fat, and improving or eliminating many health conditions. Ketosis is a natural metabolic process that all of our bodies go through. Even babies go into ketosis, and actually do so more often and much quicker than adults do. For the film to suggest that ketosis is a bad thing is again based on misinformation or bias.

Like many other diets, there are lots of variations of the ketogenic diet, and in my opinion, some dangerous or extreme forms of this way of eating. A keto diet doesn't have any set rules or percentages of the macronutrients of carbohydrates, fats or proteins, hence the diet is open to misinterpretation to extreme. A typically promoted keto diet is one which has a carb intake of less

than 130 grams per day, with some recommending less than 50 grams or less than 20 grams. This is too low, and over time potentially leading to nutrient deficiencies. The bulk of most ketogenic diets is made up of high fat foods, to about 70-80% of total intake, which again is not necessary to get into ketosis, and can also cause further nutrient deficiencies, especially of protein which should be around 30% of total intake, but this isn't possible if you are eating 80% fats and a tiny amount of carbs. As your body needs a lot of protein for normal metabolism and repair, a deficiency of protein can develop quickly. If you aren't eating enough protein, your body will instead break down your muscles for protein, which will contribute the most to your weight loss. But you don't want to lose your muscle mass as this is needed in order for you to lose body fat.

So, yes extreme ketogenic diets (of 70-80% fats) can cause muscle loss.

A better ketogenic way of eating is a more moderate plan and making sure you get approximately 30% of your diet from protein, from animal and plant sources. This will still keep you in ketosis to lose weight with body fat and not from muscle loss!

Eating meat is the new smoking

The film went back in history to the early and mid-1900s to look at cigarette advertising at the time. Many brands included slogans that their particular brand was recommended by or smoked by more doctors than other brands! Then the film started comparing eating meat to smoking cigarettes - as more research studies came out about the health impacts of smoking and especially of cancer, people started to wise up and cut out smoking. And based on alleged new research that meats are unhealthy or cause cancer, they were encouraging people to follow suit and reduce or avoid meats to avoid getting cancer.

My comments - Cancer is a SYMPTOM of chronic and systemic (ie, whole body) dysfunction, toxicity and disease (Walter, 2019). Cancer itself is not a disease - it is the result of multiple factors and causes, not just from one cause. And certainly not from just eating meat!

In October 2015, the World Health Organisation (WHO) issued a press release saying that a high consumption of red meat and processed meat may increase the risk of some cancers (WHO, 2015). The media went wild with this with varying degrees of truth that "red meat causes cancer" or that "red meat is as cancer-causing as smoking".

Their decision to classify red meat as "probably carcinogenic to humans" was based on a review of existing studies only looking at the "association" of meat and cancer, and not on any other factors which are also known to cause cancer. These studies also did not differentiate between grass-fed and grain-fed meat, which is also a very important factors as I have mentioned above. Also, no mention of how the meat was cooked, such as with what oils or fats, or lightly cooked vs. charred on the BBQ, which is a huge cancer risk.

In the resulting confusion of the WHO announcement, they did release a Q&A to further clarify some of the details about their decision. In this they did say that "eating meat hast known health benefits", and that cooking or processing of meats was how the cancer risk is increased (WHO, 2015).

I am happy with recommending good quality, organic, free range or grass-fed animal meats, as they are a very low risk of causing cancer. And avoid grain-fed, farmed animal meats as well as avoiding cooking meat on a BBQ or with GMO or plant-based oils (which do not tolerate heat well) .

Ironically, cancer cells have a major priority for carbohydrates as a fuel for energy and replication. Where does most of our dietary carbohydrate come from - plant foods, such as sugary foods and drinks, grains, and alcohol. And of course there was no mention of this little fact in the film, nor any other negative fact mentioned about any plant-based food.

Cancer is NOT caused by meat, red or any other colour, but more from other factors such as the food the animals ate (such as grain-fed) and how the meat was cooked or processed.

Vegan, plant-based or processed foods?

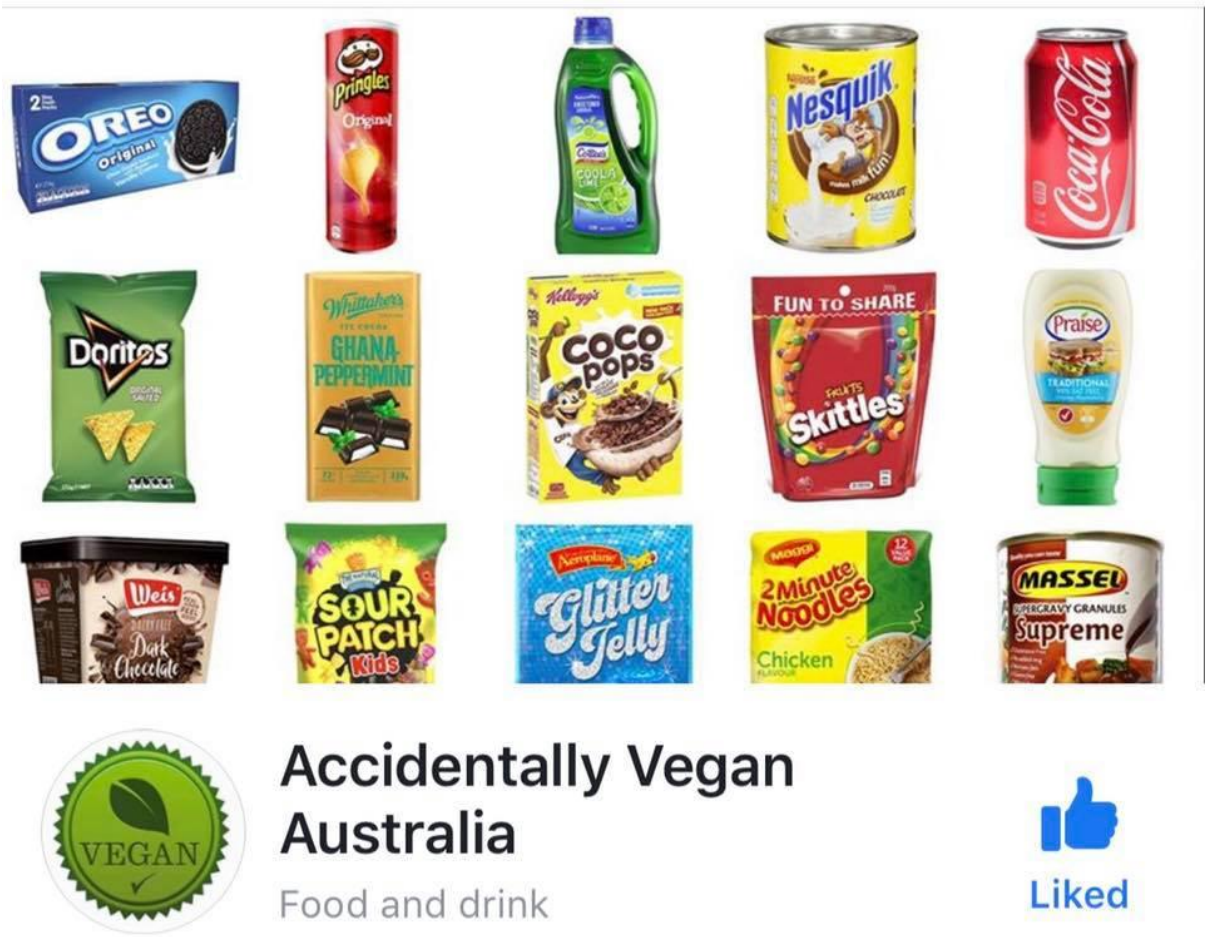
The film included a segment of a vegan chef who prepares meals for her NFL footballer husband and many of his fellow players. These players all reported that they felt better being vegan, after changing from their high intake of junk food that they used to eat - chicken wings, burgers, fries, sugary drinks etc.

Similarly, the vegan weightlifter in the film, Patrik Baboumian, was shown eating a LOT of take-away junk food in his diet! In just ONE meal, he had a whole pizza, a large amount of pasta, and a couple of burgers too.

My comments - While their reported health improvements are very anecdotal and subjective, meaning there was no scientific evidence provided, I have no doubt that their health improved not because they went vegan, but more so because they STOPPED eating non-nutritious crap! I also have no doubt that if they had gone full carnivore, instead of a vegan diet, they would have noticed similarly huge improvements in their health, because they would have stopped eating their previous junk foods! So it wasn't going vegan that made them feel better!

The vegan chef is quite proud of her meat-less versions of the same or similar meals they used to eat, such as pizza, meatless "chicken wings" and burgers, dairy-less "mac and cheese" or cheesecake, etc. These highly processed plant-based foods are really not that much different to what they were eating before. It would have been a much harder task to get someone off a take-away junk food diet onto a real "whole foods plant-based" diet of mainly salads, vegetables, fruit, nuts and seeds etc. So it makes sense perhaps to create similar foods, but using less junk in them. But these similar foods are still highly processed, and are far removed from a "whole foods plant-based" diet that the movie appears to want to promote.

The vegan weightlifter, Patrik, was eating a lot of vegan food, but it was still take-away junk food! Just because it contains no meat or animal products, doesn't mean it is actually healthy or good for you! No wonder he had a massive belly and looks very overweight. Just because a food contains no animal products doesn't mean that it is really healthy! I've seen this a lot with PeTA and other vegan groups or individuals promoting highly processed and packaged foods as being healthy, when they really are not. An example is in the following graphic.



Patrik kindly advertises his typical daily diet online (Barbend, 2019). My observations of his daily diet are:

- Almost all of his protein is in the form of a protein powder supplement in 4 smoothies per day. That's not real or whole food!
- He also adds other nutritional supplements to his smoothies - creatine, beta-alanine, glutamine, and Branch Chain Amino Acids (BCAA), all of which are isolated amino acids, or building blocks of proteins. Again, not real food!
- He has 6 meals per day, with a massive calorie content of over 5300 calories, with a typical recommended average calorie intake of just 2000 calories. Not that I am concerned with calories, as they are irrelevant as an indicator of how healthy a food nutrient is, or how healthy one's diet is
- He consumes 265 grams of protein powder and protein isolates in his diet daily, because you simply cannot eat this much protein on a vegan diet. Red meat contains just 25-30% protein, so his protein intake would be the equivalent of a human omnivore or carnivore eating 795-1060 grams (3/4 to 1 kilo!) of red meat per day, or a 350 gram steak for reakfast, lunch and dinner every day!
- His macronutrient percentages are: carbohydrates - 43%, protein - 38%, fats - just 18%

- The only real food he eats are - sausages, falafel, fruit, juices, fries, various vegies, tofu, peanuts - and even then, some of these are not real or healthy foods
- Very little fresh food, and no salad in sight!

Vegan food should be about a variety of organic, whole, fresh, seasonal, chemical-free, unprocessed, and non-GMO plant foods, not highly processed junk foods topped up with a huge amount of nutritional supplements.

Genes

The documentary said that a healthy plant-based diet will turn on genes for good health.

My comments - The concept of turning on good or protective genes, and conversely, turning on disease-causing genes, is a new area of science called "epigenetics". Our genes do not determine our health or our fate on their own, in fact they contribute only to about 5-10% of our health. The remaining 90-95% of our health results from environmental factors of how our bodies interact with our environment. Such factors include our diet, stresses, lifestyle, exercise, pathogens and infections, toxins and chemicals, and more.

A healthy plant-based diet won't turn on genes for good health any more than a healthy meat-based or moderate omnivore diet will! Or alternatively, you can eat an amazing plant-based diet with all nutrients needed, and still not turn on those healthy genes, if you still smoke, are stressed, or have an unhealthy lifestyle!

Environmental stuff

Towards the end of the film, they start talking about the environment, and throwing out all sorts of statistics that make the animal agriculture industry look really bad, and make the plant agriculture industry into an angel that can do no wrong.

The biggest threat to the environment is the meat industry, apparently. Some statistics quoted:

- Allegedly 75% of all agriculture land is used for farming livestock
- 83% of farmland is used for animal agriculture
- Animals consume 6 times more protein in foods than they produce (as protein in meat)
- Lots more water is needed to raise animals than plant crops
- 1/4 of available water goes to animal agrculture
- Animal waste is 50 times that of all human waste
- 15% of greenhouse gas emissions comes from animals
- Meat consumption in the USA is 3 times that of other countries
- Eating more plants will save African ecosystems
- And more...

My comments - protecting our environment is essential, and should be an essential part of any industry or business practice or even personal practices too. If our environment is damaged too much, then we won't be able to feed ourselves, drink clean water, or breathe clean air. And that will be the end of us, and most of the life on our planet.

However, some of the statistics mentioned in the film are a little questionable:

- Cows consume only 2.6 pounds of grain per pound of butchered carcass weight, which was comparable to pork and poultry - being HALF than the protein intake alleged by the documentary writers (Rotz, Asem-Hiabliea, Place, Thoma, 2019)
- Cows were previously blamed for being a major contributor to "global warming" or "climate change" through their emissions of methane (a major "greenhouse" gas, and a MUCH more potent greenhouse gas than the lowly carbon dioxide!). This was a result of some poor early studies which over-estimated the methane emissions of cattle. But cattle production in the USA accounts for only 3.3% of their greenhouse gas emissions in 2016. In comparison, transportation and electricity production create 56% of the total USA emissions! (Rotz, Asem-Hiabliea, Place, Thoma, 2019)
- Animal agriculture actually gives back to the environment far more than plant agriculture. Cows and other animal crops fertilise the soil, adding more nutrients to it, and adding to the microbiome of the soil. Conversely, large scale plant agriculture mostly takes nutrients away from the soil and can deplete the soil of nutrients so the farmer either uses artificial fertilisers and chemicals, or keeps the land fallow for some seasons to allow it to recover.
- Animal agriculture actually sequesters carbon dioxide from plants and the air to reduce carbon dioxide levels, if you believe that carbon dioxide has anything to do with global warming (as unmanipulated weather records show no correlation between CO2 and rising temperatures)! (Rotz, Asem-Hiabliea, Place, Thoma, 2019)
- A recently published study (Rotz, Asem-Hiabliea, Place, Thoma, 2019) over a 4-year investigation, concluded that emissions from animal agriculture were offset COMPLETELY by the sequestration of carbon dioxide back into the soil, which can help to mitigate climate change!

Other issues with vegan diets

Due to the vegan bias in this documentary, there were no negatives of a vegan diet mentioned, so here is a little more balance to the reality:

- Plant foods are high in "anti-nutrients" like TIs, oxalates and phytates, which bind to a lot of vitamins and minerals and other nutrients in the same meal, and prevent the body from being able to absorb and use those nutrients. Hence these plant anti-nutrients reduce the bioavailability of other nutrients, or in other words, the antinutrients can cause nutrient deficiencies
- Many plant-based foods actually INCREASE inflammation in the body. Plant based foods such as sugar in sugary foods and drinks, processed foods, vegetable/seed oils (especially when heated), and grain products (and they chemicals they are sprayed with) all cause inflammation (de Punder & Pruimboom, 2013). As inflammation reduces the function of the immune system, and is the main driver of chronic disease conditions like arthritis, dementia,

diabetes, heart disease and cancer, inflammation-causing foods should be avoided or reduced

- Many people have undiagnosed or unknown intolerances or sensitivities to different foods. While this is not restricted to just plant foods, some of the biggest culprits include wheat, gluten in wheat, rye and barley, lectins in legumes, soy, and corn, although an individual can be intolerant to any food

- Sadly, modern plant agriculture and farming relies on toxic agricultural chemicals, which often cover the plant foods exposed to them, and which doesn't come out in the processing of those foods, so you end up eating them and having these chemicals affect your health. Genetically modified (GMO) corn actually produces its own toxins in the plant (from a toxin-producing bacterial genes being spliced into the corn genes). So you end up eating these toxins and they have a terrible effect on your digestive system, microbiome and your health

- There is a belief that all humans of all cultures and ethnicities are all the same. We are not. We do not have the same genetics, and hence there is no one diet which is ideal for each and every one of us.

Follow the money

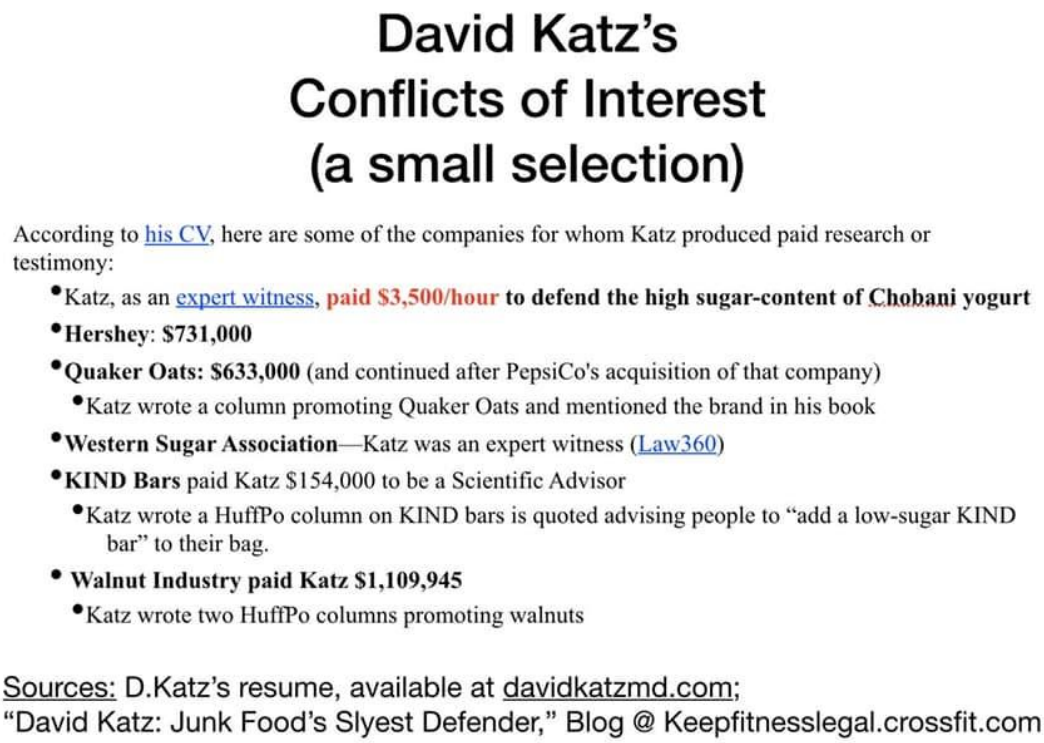
As the old Russian proverb says, "When money speaks, the truth keeps silent". Or the more modern catchphrase "follow the money" to find the truth.

James Cameron, one of the directors and contributors to the film, wants you to buy into a plant-based protein eating plan because... he and his wife own many plant-based food industry companies, from which they want to make even more money from gullible people who believe what they see in this documentary, without really checking the scientific facts. The Camerons founded Verdient Foods, a US-based company, and have other similar plant-based food companies and joint ventures with other plant-based companies around the world. His opinion in this film is extremely biased as a result of his financial interests in these food industry companies (Bloomberg, 2019).

Dr David Katz is a medical doctor in the USA, and author of several books and many peer-reviewed studies, mainly on the topic of nutrition (Sboros, 2018). He was a contributor and interviewee in the film, possibly as he is well known as an outspoken voice on nutrition science in the USA. Yet he has faced controversy in his beliefs and articles, and even faced being sacked from some publications due to undeclared conflicts of interest. He was being paid by various companies and appearing to write articles on favour of those companies, and not disclosing his financial benefits from those companies, which would rightly be seen as a conflict of interest (Sboros, 2018).

Dr Katz has been caught out many times in previous publications with similar conflicts of interest, writing favourable reviews but not declaring a financial interest, biased writing, defending manufacturers of unhealthy or junk foods, or even writing favourable product reviews using a pseudonym. He has ties to many producers of sugary foods and drinks, and he promotes or defends

their products, for a fee of course. He has denied these conflicts of interest (Sboros, 2018; Greene, 2019).



Other contributors to the documentary include:

- Dr Walter Willet - a Harvard University scientist, who has a long list of affiliations and conflicts of interest with vegetarian and vegan groups (The Nutrition Coalition, 2019)

- Dr Micael Greger - a medical doctor specialising in nutrition, but vegan nutrition only. He promotes veganism with a religious fervour and will cherry-pick studies promoting the benefits on plant-based diets while never saying anything positive about animal foods (Schwarcz, 2017).

Conclusion

The overall message of the documentary was good, that for athletes to get the best personal or team results, they must do more than just train and practice, but focus on eating healthy meals which provide all of the nutrients that their bodies need to:

1) provide energy for training and in events

2) provide nutrients for repair and recovery

3) provide the right nutrients needed for many metabolic processes

4) have a good digestive system function to digest, absorb and assimiliate the nutrients (this was actually completely missed in this documentary!)

The vegan bias of this documentary was particularly evident, with deliberately withheld information, incorrect assumptions or beliefs, misinformation, selective blaming of animal propducts when plant products cause the same issues, and in some cases, outright lies with regard to human physiology or biochemistry in favour of a plant-based approach vs. a healthy balanced animal and plant based diet! In particular is the completely wrong message in the film that protein is used for energy, when protein metabolism is the last resort for energy production!

Again, everyone is different! SOME people can do fairly well on a vegan diet (perhaps only in the beginning of a vegan diet, as mentioned above), while I see many (as clients) who do not do well at all due to the many inherent nutrient deficiencies of this approach. Athletes need to be very, very careful on a vegan diet to make sure they are getting even more of the nutrients they need. I would highly recommend that anyone considering a vegan diet to working with an experienced Nutritionist to make sure your nutrient needs are being met! As a practitioner, I have never suggested to a vegan to start eating animal products again to rectify any deficiencies which may be causing their health issues. I respect their decisions to be vegan, and I help them address their issues.

There is a lot of blind faith, word of mouth or perception that a vegan diet is healthier, when scientific studies show that some vegans can be healthy (if their diet is done well), and omnivores can be healthy too! But conversely, there are a lot of vegans and omnivores who are not healthy. The problem is not which diet someone is following, but how that diet affects the individual! As we are not the same in our genetics, there is no one diet which is good for all of us. Find what works for you, and seek professional help from experienced nutritional medicine practitioners if any symptoms arise from any change of diet, as it means there is something not right. Having a blind faith in a vegan diet as being perfect for you isn't scientific, but is akin to following a new religion because it's trendy.

Similar to other vegan documentaries I've reviewed in the past, if the producers really want people to follow their way of life or see the health benefits that they claim, then they should at least tell the truth or the full story, and not repeat common misbeliefs based on poor quality science or old science to "prove" their arguments. None of the producers of the documentary have any scientific or nutritional background to completely understand the information they obtained in the making of this, nor were they able to look at the many health consequences of what they are trying to promote. But I guess that was their plan.

The documentary concluded with a disclaimer, "the information in this film is not intended to be medical advice". Yep, they got that right. Sadly too many will buy into the biased and incorrect information in this film, and not see this disclaimer at the end.

Even as a Clinical Nutritionist, and an evidence-based one at that, I have determined that being vegan is not for me. Not because I perceive it as being too difficult, but simply as I know my body better than anyone else. I know what it needs, how it reacts to various foods, and how it works. I am very aware of many quality published studies showing that a vegan diet is deficient in many nutrients, and the health consequences of these. And I'd rather just eat real food and not rely on supplements to get my daily requirements! If being vegan worked, no supplements should be needed, and I shouldn't see any vegans as clients, but sadly that is not the reality.

This more balanced look at this documentary should show that BOTH animal foods and plant foods are needed for a healthy body and healthy life! Too much of one or the other can cause health consequences. However of equal importance to the quanty of nutrients being needed, the quality of those nutrient sources is also as important, as well as other factors such as your own genetics and uniqueness, digestive system function, how foods are cooked, and more.

Wishing you the best of health!

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