

Chapter 13

Wholistic nutrition

Faced with the choice between changing one's mind and proving that there is no need to do so, almost everybody gets busy on the proof.

William Bridges

When you are about to cross the street, there are literally millions of bits of information that your five senses take in. Unconsciously, you notice everything: every pedestrian, every cyclist, car and bird. It would be easy to get lost if you focussed on all of it. Instead, you press the 'crosswalk' button and wait by the traffic light, and then simply cross when the walk signal flashes you to do so.



Just as in this “crossing the street” example, every day we are bombarded with conflicting information. Television, magazines, radio, fitness professionals, doctors, the internet, word of mouth, the list goes on. We want to get healthier, more toned and more muscular while all the time trying to make conscious choices that have a positive impact the environment. Which perspective, then, is going to help us progress and evolve?

From whatever perspective you decide to look from, there is always research to support a specific scientific claim. Having been both ends of the spectrum, the benefits of a plant-based diet were undeniable.

*The greatest enemy of knowledge is not ignorance;
it is the illusion of knowledge.*

Stephen Hawking

Protein

Initially the words ‘vegan bodybuilding’ seemed like an oxymoron to me. I thought that you needed animal protein to build muscle and be healthy. It was only after I read Robert Cheeke’s book *Vegan Bodybuilding and Fitness* that I realised that not only was it actually possible to build muscle on a plant-based diet but it was also healthier. Further, getting certified in plant-based nutrition (through eCornell University and the Matthew Kenney Culinary School) was the best thing I did to further support this paradigm shift in my thinking.

The word *protein* comes from the Greek word *proteios*, which means ‘of prime importance’. Initially I simply associated protein with meat/poultry/seafood and nothing else. To me, animal-based proteins were far superior to plant-based sources because they contained the full spectrum of essential amino acids, and they also promoted Insulin Growth Factor 1 (IGF1 – an anabolic hormone) levels, which would ultimately aid in muscle gains. According to research, we need similar ratios of amino acids that animal-based protein sources provide.^[23] But animal based proteins promote more production of IGF 1, which means we are able to utilise these proteins more efficiently.

However, for every pro there is a con. Along with tissue/cell regeneration, muscle growth/repair and recovery, IGF 1 has also been proven to boost cancer cell activity. The findings of Dr T Colin Campbell have formed the backbone of plant-based nutrition. In an overview of the research, Dr Campbell has shown that:

- 1 If animal based protein concentrations are more than 20% of caloric intake, cancer cell activity is boosted, whereas plant proteins do not have any effect at all on cancer cell development.^[24]
- 2 You can turn cancer cell development ‘on’ and ‘off’ by altering the animal based protein concentrations – less than 10% protein halts cancer activity while more than 20% promotes activity.^[25]

With this in mind, looking at the western diet shows that greater than 20% of our calories come from protein from animal-based sources. At my meat-eating 'prime' 45% of my calories came from animal-based sources.

The recommended daily intake (RDI) for protein according to the World Health Organization is 0.8g per kilogram of bodyweight.^[23] See calculations below:

Average 80kg male:

$0.8 \times 80\text{kg} = 64\text{g}$ of protein (1 g of protein is equivalent to 4 calories)

$64\text{g} \times 4\text{cal} = 256$ calories

Based on an average 2000 calorie diet:

$256/2000 \times \% = \mathbf{12.8\% \text{ of calories come from protein}}$

So in essence, an average person (bar the athletic population) does not need to consume a great amount of protein to meet nutritional requirements.

I used to think that plant proteins were inferior because they were 'incomplete'. Thinking that animal protein was the be-all and end-all for cell growth/repair/recovery... I was wrong.

Protein molecules are made out of 22 amino acids, and out of those 22, 9 are considered essential amino acids (Valine, Threonine, Histidine, Leucine, Isoleucine, Lysine, Phenylalanine, Methionine, Tryptophan). Through my research, I realised that the reason why animal proteins are deemed 'complete' is simply that they contain all 9 essential amino acids in the right ratios/proportions for utilization. For example, plant foods like grains and cereals are high in the amino acid Lysine but do not contain Methionine and Cysteine, while legumes are also high in Lysine but low in Methionine and Cysteine.^[22]

Although it is not absolutely necessary to combine proteins, I personally do so by combining food items such as rice and beans/tofu/tempeh, and combining my salads with a variety of nuts, seeds and some 'complete' plant protein sources:

- Quinoa, buckwheat, hempseeds, chia seeds, soy, chlorella/spirulina, maca, goji berries^[22]

Top plant-based sources of protein

Legumes

Legumes are a group of plant foods that contain high levels of protein content. They are also a good source of fibre, zinc, magnesium and iron. Examples of legumes include: lentils, beans (eg: kidney, black beans, red beans, chickpeas, lima beans, etc.) and peas. A cup of cooked legumes yields approximately 13-18 grams of protein.

An inconvenient truth:

Since legumes contain certain fibres and sugars that are only digested in the gut rather than the small intestine, consumption of legumes has been associated with bloating and gas. In addition, legumes also contain anti-nutrients such as phytates/phytic acid which prevent proper digestion and absorption.

To prevent and minimise these occurrences, try sprouting legumes, or begin with small amounts and slowly increase your portions. Do not mix legumes with simple sugars in the same meal. Wait at least 30-45 minutes before consuming any fruits if you are planning to eat legumes, because the sugars in the fruits will interact with the legumes to produce more gas. Additionally, soak beans overnight and discard the soaking water before rinsing and cooking them (lentils do not need to be soaked). Try adding a strip of organic seaweed to the pot while cooking legumes – this will help improve digestibility, and reduce gas.

Soy

Soy is one of nature's best sources of protein. Since soy is a legume that is quite often genetically modified, opt for organic and GMO free sources. Tempeh, natto (fermented soy beans), edamame and tofu are some examples of soy products.

Protein content (approximate):

- 125 grams of tempeh – 25 grams of protein
- 1 cup of edamame beans – 16 grams of protein
- 125 gram of firm tofu – 20 grams of protein

Note: Some people are allergic or have a sensitivity (cramping, bloating and excessive gas) to soy products. Check to see if you are one of these people. I tend to exclude soy from the diets of individuals who have a poor detoxification system (excess fluid retention, fat stores in the thighs and legs). I tend to limit soymilk consumption as well, as it is

highly refined and processed. Almond, oat, rice or quinoa milk, or any other plant-based milk substitute would be better alternatives.

Whole grains

Not only do grains provide a great source of carbohydrates for energy, they are also a little-known source of protein.

Protein content:

- 1 cup of brown rice – 5 grams of protein
- 1 cup of wild rice – 6 grams of protein
- 1 cup of quinoa – 11 grams of protein
- 1 cup of oatmeal – 6 grams of protein

Note: Oatmeal on its own, though gluten free, may contain traces of gluten through cross-contamination in its processing. If possible, always opt for gluten-free choices for all foods. Gluten is high on the allergenic scale and is one of the main sources of food sensitivities and intolerances.

Nuts and seeds

Nuts and seeds are an alternate protein source. They also provide the ‘good’ fats that your body needs for brain and cell development. Nuts and seeds also help induce a feeling of satiety (feeling full) in the body.

Protein content:

- ¼ cup of raw almonds – 6 grams of protein
- ¼ cup of walnuts – 5 grams of protein
- 2 TBSP of natural peanut butter (unsweetened) – 8 grams of protein
- 2 TBSP of flaxseed – 7 grams of protein
- 2 TBSP of chia seed – 6 grams of protein

Note: For some individuals, nuts are high on the allergen scale. Check with your medical practitioner before consuming them if you suspect that you are allergic.

Naturally, nuts have hard outer casings when they’re fresh off the tree. It takes effort to crack the shell and get to the nuts, one-by-one. When they’re available in supermarkets in bags, pre-shelled, I believe that it is easy to over-consume them. As nuts are calorically dense (e.g. 1 cup of almonds = 550 calories), it’s wise to moderate your portions.

Opt for organic, raw and activated varieties where possible. The nut roasting process reduces the concentration of B vitamins in the nuts

because they are not heat stable. Activated (pre-soaked, then dried) nuts provide higher nutrient value as well as breaking down compounds in the skin of the nuts that prevent digestibility and assimilation.

Supplements

Even though a plant-based diet provides significant amounts of nutrients at levels that are just not present in an animal-protein-based diet, it is still wise to have a few supplements on hand for times when you might be busy or when you feel you need a boost. Remember, though, that all supplements cannot replace a balanced diet, and that if you are going to create a supplement regime for yourself, do so under the supervision of a competent medical practitioner or dietician.

I recommend the following supplements for a plant-based diet:

- Rice/pea isolate or plant blends.
 - Great alternative to whey protein (which is dairy-based). Plant-based proteins are also less allergenic and more alkaline forming than whey sources.
 - Shaken, stirred or mixed into food, they provide a convenient protein boost to your diet.
 - Each serving (depending on the scoop size) contains approximately 25-30 grams of protein.
 - Opt for raw, sprouted and organic sources of plant-based proteins where possible.
- Branched Chain Amino Acids (BCAA) – taken pre-, intra-, and post-workout.

Being plant-based and putting on muscle

Since the body's priority is to achieve a state balance, putting on muscle mass requires you to consume a substantial amount of protein and calories for muscle growth. To calculate how much protein you need per day based on your muscle mass goals, use the following formula:

Protein needed (as a guide)

$(1.3g - 2.2g) \times \text{bodyweight (in kg)}$

= amount of protein in grams needed per day

Beyond these values, excess protein puts your liver under unnecessary load/stress. I am of the belief that it is not how much protein you are

consuming, but how much you are actually assimilating. I used to consume between 250-300 grams of protein from animal based sources. These days, I consume 1/2 the amount (130 grams) through plant based sources.

In summary, these are the four keys to putting on lean muscle mass while on a plant-based diet:

- 1 Volume and variety of foods should be within an ideal range.
- 2 Frequency of meals (5-7 meals a day – including protein shakes/supplements).
- 3 Limit processed food (veggie patties, veggie sausages etc.) if you can, and consume predominantly whole and natural foods. However, if you do eat processed food, try to opt for a gluten/wheat free alternative.
- 4 Modulate your caloric intake relative to what your individual goals are, or body type is (*mesomorph, endomorph, ectomorph).

How many calories do I need?

The caloric model has its limitations because foods differ widely. Although it is not necessary to calculate your caloric needs while on a plant-based diet, I do use this system to work out my own and my clients' requirements as a reference point for comparison.

To work out the recommended overall daily intake of calories based on an individual's Basal Metabolic Rate (BMR), I use this formula:

Women

$655 + (4.35 \times \text{weight in pounds}) + (4.7 \times \text{height in inches}) - (4.7 \times \text{age}) = (\text{Approximate BMR in calories required})$

Men

$66 + (6.23 \times \text{weight in pounds}) + (12.7 \times \text{height in inches}) - (6.8 \times \text{age}) = (\text{Approximate BMR in calories required})$

* Note – Since the formula is based on the imperial system, workout your weight and height through the metric system first:
1kg = 2.2 pounds, 1 inch = 2.54cm

* Mesomorph – Athletic built, gains muscle easily
Endomorph – Stockier built, gains muscle/fat easily
Ectomorph – Skinnier built, fast metabolism, hard to gain weight

Example:

Metric system

Person weighing **76kg** with a height of **180cm**

Imperial system

Same person weighing **167.2 pounds** with a height of **70.86 inches**

The next step is factoring in the activity level of the individual using the Harrison Benedict method:

Sedentary – no exercise	BMR x 1.2
Light activity – exercising 1 – 3 times a week	BMR x 1.375
Moderate activity – exercising 3 – 5 times a week	BMR x 1.5
Active – intense exercise 6 – 7 times a week	BMR x 1.725
Extreme – intense exercise twice per day, 6 – 7 times per week, or very physical occupation	BMR x 1.9

For example:

Jill, 32, is an office worker and trains three times a week at the gym.
Height 165cm, Weight 60 kg

1 inch = 2.54cm and 1 kg = 2.2 pounds

Jill is: $165/2.54 = 65$ inches, $60 \times 2.2 = 132$ pounds

Applying the formula:

$655 + (4.35 \times 132) + (4.7 \times 65) - (6.8 \times 30) = 1330.7$ calories for BMR

(BMR = Amount of calories required for breathing, digestion and daily function)

1330×1.375 (activity level) = **1829.71 calories** required factoring in activity

Bear in mind that this calculation acts only a guideline. When you follow a whole food plant-based diet and focus on eating nutrient-dense calories, you do not need to calculate your calorie intake to achieve healthy and sustainable fat loss.

Where do I get my protein?

Based on my training goals, I opt for a higher protein approach. I manage to hit approximately 130g of protein each day from mainly raw, plant-based sources.

The following is a sample meal plan for a typical day:

Meal 1: green smoothie consisting of different greens, fruits and vegetables – 10g of protein

Meal 2: mid-morning protein shake poured over my bowl of quinoa porridge, blended with berries, banana and coconut water – 38g of protein

Meal 3: large lentil salad consisting of various greens, nuts/seeds and a homemade dressing – 15g of protein

Meal 4: large lentil salad consisting of various greens, nuts/seeds and a homemade dressing – 15g of protein

Meal 5: post-workout protein shake mixed with rice milk – 30g of protein

Meal 6: vegetable stir-fry with tofu consisting of various greens, tofu, stir-fried with spices – 30g of protein

Total protein count: **138g**

Not only am I able to achieve my protein goals on a plant-based diet, but I am able to stay leaner all year round with less training. I have experienced phenomenal recovery, strength gains and increased endurance since changing over to this lifestyle.

The big picture

Along with Dr Campbell's hypothesis on the effects of animal protein in the promotion of cancer development, he was also one of the key researchers for an observational study, *The China Study*, which is the largest epidemiological study on diet ever conducted:

“It looked at mortality rates from cancer and other chronic diseases from 1973–75 in 65 counties in China; the data was correlated with 1983–84 dietary surveys and blood work from 100 people in each county. The research was conducted in those counties because they had genetically similar populations that tended, over generations, to live and eat in the same way in

the same place. The study concluded that counties with a high consumption of animal-based foods in 1983–84 were more likely to have had higher death rates from ‘Western’ diseases as of 1973–75, while the opposite was true for counties that ate more plant foods.”^[24]

When I think about the leanest populations around the world, I think of places like Thailand, Cambodia, Laos, Indonesia, Vietnam and Japan. However, when we think of the ‘obesity epidemic’, we tend to associate it with countries like the US, Australia, Canada, New Zealand, and UK. What are the dietary differences between these countries? One of the answers is the consumption of processed and highly refined foods. Digging even deeper, a large proportion of these highly refined and processed foods are derived from animal-based products and by-products.

Blue Zones

When I was younger and travelling to different parts of South East Asia, the standard fare was a plate of rice or noodles with lots of veggies and little strips of meat or fish with absolutely no dairy products.

Dan Buettner, in his book *The Blue Zones: 9 lessons for Living Longer* and in his TED talk, *How to live to 100*, discovered the secrets of longevity. Along with a team of longevity researchers and National Geographic magazine, in 2004 the Blue Zone Study researched communities living to 90 and even 100 years of age. Individuals in these communities were living healthily, without disability or medication.

The following table shows the top five ‘blue zone’ locations – where they are and their common features. Notably, people living in these blue zones all followed a plant-based diet that was high in beans and nuts:

Blue Zones

Where:	What they had in common:
1. Loma Linda, California 2. Greek Islands, Ikaria 3. Okinawa, Japan 4. Sardinia, Italy 5. Nicoya Peninsula, Costa Rica	<ul style="list-style-type: none">• An active lifestyle, moving naturally in their environment• Positive outlook towards life• Connection, purpose and a sense of community• Following a predominantly plant-based diet revolving around beans and nuts

Diseases of Poverty vs Diseases of Affluence

In developing nations certain diseases are more prevalent due to crowded living conditions, improper sanitation, lack of education and contraception, and inadequate health care (just to name a few). In developed nations however, a large proportion of diseases stem from dietary excesses.

The following table shows the top four diseases for countries that have a high proportion of people living in poverty and third-world conditions vs. first-world affluent developed countries:

Diseases of Poverty

Disease:	Linked to:
Aids	Unprotected sex, mother-to-child transmission in pregnancy, sharing of hypodermic needles
Malaria	Anopheles mosquito
Gastroenteritis and Diarrhoea	Contaminated food/water
Marasmus	Malnutrition

Diseases of Affluence

Disease:	Linked to:
Type II Diabetes	Dietary excess
Heart disease	Dietary excess
Cancer	Dietary excess, environmental toxicity
Peripheral vascular disease	Dietary excess

Food for thought

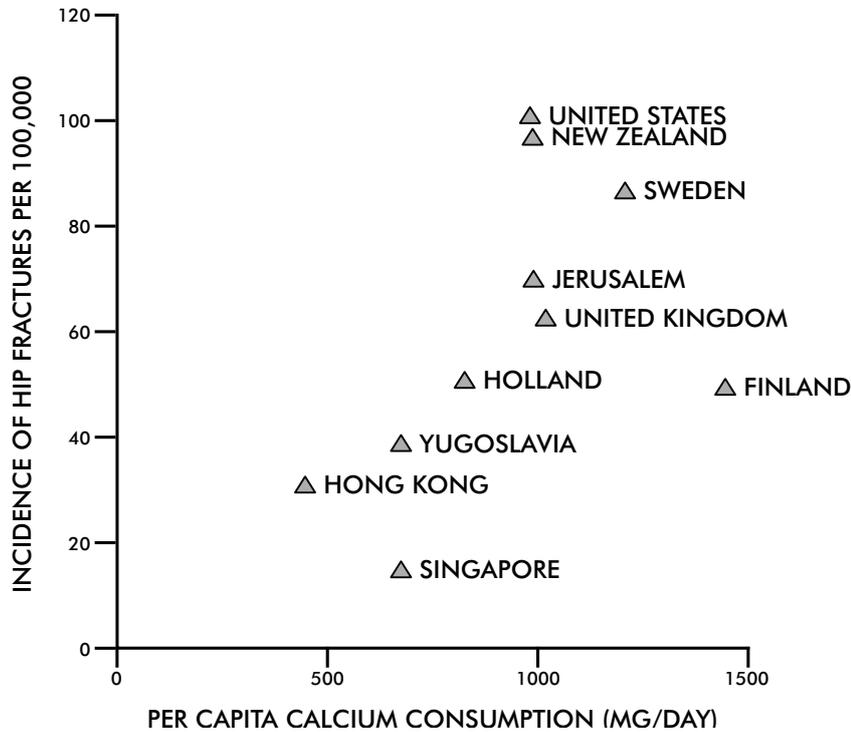
Neutralising acidity and calcium

When I first arrived in Melbourne, one thing that I noticed was the great push by the dairy industry for dairy consumption and calcium supplementation... and the coincidental incidence of osteoporosis. I had never noticed this condition when I was in Singapore in my younger days. As I was growing up we hardly consumed any dairy products, and instead drank soya bean milk – sparingly.

Other than Australia, the US, Scandinavia and New Zealand have the highest rates of hip fractures.^[26] These regions also have the highest

rates of dairy consumption in the world. Though dairy is high in calcium, it has the potential to acidify the body, thereby negating any beneficial effects that the calcium content may have.

The following table plots on a graph, by country, the correlation between calcium consumption and the incidence of hip fracture:^[26]



Animal based, processed and refined foods are more acid forming. According to research, “animal protein, unlike plant protein, increases the acid load in the body. An increased acid load means that our blood and tissues become more acidic. The body does not like this acidic environment and begins to fight it. In order to neutralize the acid, the body uses calcium, which acts as a very effective base. This calcium, however, must come from somewhere. It ends up being pulled from the bones, and the calcium loss weakens them, putting them at greater risk of fracture.”^[27]

So where do I get my calcium?

Calcium can easily be obtained through plant-based sources which are also highly alkaline forming. This further regulates the natural pH of the body, and ensures that calcium is available for the body to use.

Some great plant sources of calcium include: leafy greens (Chinese cabbage, bok choy, kale, collard greens), tofu set with calcium

salts (E509 or E516), tempeh, legumes, oranges, figs, dates, un-hulled sesame seeds and tahini.

Getting your daily dose of vitamin D from sunlight will also help improve calcium absorption. If you live/work in an environment where there is little sunlight (e.g. in the office, or countries close to/above the polar circle), or you have a known deficiency, supplement with vitamin D.

Iron

When Popeye was wanting to save his girlfriend, the appropriately-named (for this book) Olive Oyl, he always reached for his can of spinach to get an energy boost. There is some truth in this, though it's doubtful as to whether canned spinach would do the trick!

Research has shown that iron deficient anaemia is prevalent in both meat eaters and non-meat eaters alike.^[28] Anaemia is a condition where the body is unable to produce enough red blood cells that are high in oxygen, leaving an individual lethargic, weak and easily fatigued. Anaemia can also lead to depression.

The main difference between the different sources of iron is that some is heme iron (from meat based sources) and the other is non-heme iron (from both meat and plant-based sources). It is true that heme-iron is more absorbable than non-heme iron, but there are ways to mitigate the difficulty of absorbing non-heme iron from plant-based sources. A great article was written on ways to boost iron absorption through plant-based sources, and the suggestions included:

- 1 Increasing vitamin C intake through citrus fruits and leafy greens. Combining food sources that are high in iron with vitamin C will boost absorption (e.g. having a salad with citrus fruits, topped with sesame/pumpkin seeds).
- 2 Increasing intake of the amino acid L-Lysine which is highly bioavailable in legumes (peanuts, beans, lentils, peas) and quinoa.
- 3 Cooking food with a cast iron pan increases iron content, and absorption.
- 4 Not consuming tea, coffee or cocoa during meal times. Tannins contained in these inhibit absorption.^[28]

Some plant sources of iron include: soybeans, tofu, tempeh, sesame seeds, spinach, legumes, kale, and dried apricots.

Those little carbohydrate devils

When I started working as a trainer in the fitness industry, I was guilty – like many of my peers – of posting photos of my breakfasts, lunches and dinners on Instagram. Steak with some sautéed veggies on the side topped with a knob of butter and a handful of nuts; bacon and eggs; chicken breast with some greens; and I believed that starchy carbohydrates were going to prevent me from getting lean. If I went to an Asian restaurant, I would order a chicken stir-fry (with an extra serve of chicken) and reluctantly pick at a few grains of rice. Deep down I really wanted to eat the whole bowl.

Some people believe that excess carbohydrates in the diet cause elevated blood glucose levels. Insulin, a hormone secreted by the pancreas to regulate these blood sugar ‘spikes’ works by transporting excess glucose into cells for energy. According to other studies, excess dietary fat and animal protein are what contribute to insulin resistance, a precursor to Type 2 diabetes.

The lawyer’s office

Imagine there is a filing cabinet sitting in a lawyer’s office that is under lock and key. The cabinet is meant to contain different documents for admin, accounts, marketing, and legal. The only issue is that the keyhole is clogged with gum and rust.

A case comes in and the legal assistant has to file all the appropriate paperwork in the cabinet. She has issues opening the filing cabinet with her key because of the jammed keyhole. The first documents arrive as she is still trying to open the cabinet.

Hours pass and still no luck opening the drawer. There is paperwork everywhere and office is in utter chaos.

The filing cabinet are your cells and the key is insulin.

“Like a key sliding into a lock, insulin attaches to a receptor on the cell’s surface and causes the cell membrane to permit glucose to enter. Insulin does the same thing for the next cell, and the next, and the next. It attaches to a receptor on the cell’s surface, opens the door and ushers glucose in.

In Type 2 diabetes, this system does not work properly. Your pancreas makes insulin, and insulin travels to each cell, but when it arrives, it has trouble opening the door. It is as if the lock has somehow become jammed, and the key no longer

works – this is insulin resistance. Yes, the insulin “key” is there but it has trouble doing its job, because glucose cannot get into the cells and it builds up in the blood stream.

Imagine the workings of a lock on a typical door. What if someone were to jam chewing gum into the lock? There is nothing wrong with your key and really nothing wrong with the lock except that it is now filled with gum. To make it work again, we need to clean it out.”^[29]

In other words, a high animal protein and fat diet blunts glucose metabolism. I have experienced individuals blaming ‘carbs’ such as fruits and starches as a potential cause of fat gain. I have even heard statements like, “you need to deserve your carbohydrates.” Logically speaking, carbohydrates have been around for centuries and have been the foundation of civilisations (see below), so how can this statement be true?

I believe that when the bulk of an individual’s calories come from high animal protein/fat sources, anything else that is consumed concurrently has the potential to cause issues.

A study was done on twenty men suffering from Type 2 diabetes. Each of them was taking an average of 26 units of insulin per day. Part of the study required them to eat a diet consisting mainly of vegetables, fruits, whole grains and beans. The diet was high in fibre and carbohydrates, and low in any fats. Sixteen days after the program, more than half of the study group had been able to stop their insulin use. Their blood sugar levels were lower than before. The remaining participants reduced their doses of insulin significantly.^[30]

I used to equate high carbohydrate foods with things such as doughnuts, ice cream, chocolate, croissants and French fries. Carbs had a negative association with all the junk foods out there.

Looking at the energy yield for the 3 macronutrients:

Protein 1g = 4 calories, Carbohydrate 1g = 4 calories, Fat 1g = 9 calories

With this in mind, I realised that quality carbohydrates give the same calories as proteins. The difference lies in the fats, as you can see in the table below:

Item/100g Serve	Protein	Carbohydrates	Fat	%Calories from fat
Ice cream	3.4g(13.6cal)	29g(116cal)	13.6g(122.4cal)	48%
Chocolate	7.5g(30cal)	42.5(170cal)	47.5(427.5cal)	68%
Doughnut	6g(24cal)	48g(192cal)	23g(207cal)	48%

Are carbohydrates really causing the obesity epidemic and health crisis that we are facing, or is it dietary fat? According to archaeological research, Dr McDougall pointed out that starches were the primary food source that grew civilisations:^[31]

- Barley: eaten in the Middle East for 11,000 years
- Corn (maize): used as a food in various forms in North, Central and South America for 7,000 years
- Legumes: sustained the Americas, Asia and Europe for 6,000 years
- Millet: fed Africa for 6,000 years
- Oats: present in the Middle East for 11,000 years
- Potatoes: of a great variety were eaten in South America (Andes) for 13,000 years
- Sorghum: grown and consumed in East Africa for 6,000 years
- Sweet potatoes: enjoyed in South America and Caribbean for 5,000 years
- Rice – a staple in Asia for more than 10,000 years
- Rye – used as a food in Asia for 5000 years
- Wheat – fed the Near East for 10,000 years

Knowing how integral wholefood carbohydrates have been to developing and growing our civilisations, are carbohydrates really the enemy?

Fruits – friend or foe?

I loved all sorts of tropical fruits while growing up in Singapore. We ate durian, mangosteen, jackfruit, lychees, rambutans, and dragon fruit – the list of nature’s goodness just goes on and on. With a basket of longans and an empty bowl, I loved slowly peeling off the skin and biting into the soft juicy sweetness of the two-inch wide fruit. It was only when I became a trainer in the fitness industry that I adopted the prevailing mind-set that ‘fruits make you fat’, or ‘there is too much

sugar in fruits'. Fruits such as mangoes, pears, and grapes contain high levels of fructose (fruit sugar). The question I should have been asking is: are the patients in hospital who are suffering from diabetes, heart disease and obesity really gorging on fruits?

These days, there is also the ongoing debate of whether we are carnivores, omnivores, herbivores or frugivores (fruit eaters). I came across this comparison chart adapted from Dr Milton Mills^[32] which shows the differences in mouths, jaws, teeth, chewing methods, saliva, gut length and nails/claws between carnivores, omnivores, herbivores and humans. It shows that we are more akin to being herbivores, based on our biological make up:^[33]

	Carnivores	Omnivores	Herbivores	Humans
Mouth opening vs head	Large	Large	Small	Small
Jaw motion	Shearing: minimal side to side motion	Shearing: minimal side to side motion	No shearing: good side-side, front-back	No shearing: good side-side, front-back
Teeth: molars	Sharp, jagged and blade-shaped	Sharp blades and/or flattened	Flattened with cusps vs. complex surface	Flattened with nodular cusps
Chewing	None: swallows food whole	Swallows food whole and/or simple crushing	Extensive chewing necessary	Extensive chewing necessary
Saliva	No digestive enzymes	No digestive enzymes	Carbohydrate digesting enzymes	Carbohydrate digesting enzymes
Length of small intestine	3-6 times body length	4-6 times body length	10-12+ times body length	10-11 times body length
Kidney	Extremely concentrated urine	Extremely concentrated urine	Moderately concentrated urine	Moderately concentrated urine
Nails	Sharp claws	Sharp claws	Flattened nails or blunt hooves	Flattened nails

Debilitate, rehabilitate

To me it was becoming apparent that a plant-based diet was the elixir to life and vitality, and is the solution to chronic degenerative diseases that plague society today. I gained a lot from reading:

Dr Neal Barnard – physician, author, clinical researcher and founding president of the Physicians Committee for Responsible Medicine (PCRM)

- *Dr Neal Barnard's Program for Reversing Diabetes* (2007)
- www.pcrm.org

Dr Dean Ornish – physician, author, clinical researcher and founding president of Preventive Medical Research Institute

- *Dean Ornish's Program for Reversing Heart Disease* (1996)
- www.pmri.org

Dr Caldwell Esselstyn – heart surgeon, author

- *Prevent and Reverse Heart Disease* (2007)
- www.heartattackproof.com