

# Plantastic Life

## Frequent Topics of Discussion

**Dietary change is powerful medicine. If you are currently under a physician's care and/or are on prescription meds, notify your physician on your plans to follow a low-fat, plant based/strong diet. Very often certain prescription meds can be reduced or even eliminated!**

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## POWERFUL PROTEIN

One of the first questions a person that is following a Whole Food Plant Based Diet gets asked is, “Where do you get your protein?” You can tell them you get protein from the same place that horses, hippos, rhinos, giraffes, and elephants get their protein from, PLANTS! These animals are among some of the strongest animals on earth, and they obviously get plenty of protein.

All the nutrients we get from food are either part of the macronutrient group or the micronutrient group. The macronutrients are the calorie providing nutrients your body requires including carbohydrates, protein and fat. Micronutrients are all the vitamins, minerals trace elements and antioxidants..

Protein is considered the superhero of macronutrients because of its important role in our body. This powerhouse is part of every cell in the body—muscles, organs, hair, nails, skin, teeth, ligaments, cartilage and tendons. It’s also a component of enzymes, membranes, antibodies, hemoglobin and some hormones. Protein does everything from compose muscle tissue to fight illness. Although not as efficient as carbohydrates, protein is also a source of energy.

Just because protein is vital to our health, more doesn’t mean better. Americans are obsessed with getting enough protein, even though research shows we require only about 10% of our daily total calories to come from protein.

People assume that protein comes from only animal products and that anyone avoiding them will be deficient. This is simply NOT TRUE. Not only does the plant kingdom provide abundant protein, but we don’t need to eat massive amounts of the nutrient to maintain superior health. For example, the fact that the very first food created specifically to nourish an infant during the stage in life when humans grow the most and at the fastest rate is low in protein—human breast milk contains only 5% of its total calories from protein.

There is plenty of research out there from The China Study and the World Health Organization’s Food and Agricultural Organization that shows we only need 5 or 6% of our total calories from protein to replace what we lose every day. To take this one step further, plenty of research shows that once protein intake increases to levels about 10% from animal sources, the disease processes begin.

If you’re eating enough calories from whole foods, having a diet too low in protein is impossible. Virtually all whole-plant foods include protein. For example, bananas contain 5% of their total calories from protein, white potatoes have 8% and brown rice has about 9%. These foods are categorized as carbs, but they meet the requirements to replace necessary protein.

Foods that are high in protein include beans, legumes, nuts and seeds. Lentils have about 31%, and believe it or not, leafy green vegetables have almost half their total calories coming from protein! The only way to become deficient in protein is either not to eat

enough calories or to eat primarily processed and refined foods. If you are eating whole-plant foods, you do not need to worry about getting enough protein.

## **EXCELLENT PLANT PROTEIN SOURCES**

### **FOOD %CALORIES FROM PROTEIN PER SERVING**

Banana, 1 medium 4.6% 1.2 g

Brown rice, 1 cup cooked 8.5% 4.9 g

Barley, 1 cup cooked 9.4% 16.4 g

Quinoa, ½ cup cooked 14.0% 11.1 g

Whole wheat bread, 1 slice 15.7% 2.4 g

Chickpeas, 1 cup cooked 21.6% 14.5 g

Lentils, 1 cup cooked 31.0% 17.9 g

Broccoli, raw, ½ cup 43.3% 1.3 g

Tofu, raw, firm, ½ cup 43.5 % 19.9 g

Spinach, raw, ½ cup 44.4% 3.0 g

Including excessive amount of protein from animal products not only is unnecessary, but it also can be dangerous. The kidneys, which metabolize protein, have to work hard to break down the nitrogenous waste that accumulates with high protein intake. Overworking the kidneys with large quantities of protein can lead to kidney stones and other, more serious diseases.

To get your protein needs, eat an adequate amount of calories to maintain a healthful weight. If you are eating a variety of plant foods everyday, your protein requirement will be met without even having to think about it. Remember, beans and legumes are excellent sources of protein, as well as nuts and seeds. Aim for a few servings in your daily menu and your protein requirement will be covered.

## CALCIUM

Unfortunately, we have been “taught” by the powerful Dairy Association that we must drink milk, eat yogurt, cheese, ice cream, etc., in order to meet our calcium requirements. This is a myth. We do need calcium, BUT, we do not have to get it with animal products. As a matter of fact, research proves that the more animal products we consume, the more we LOSE calcium through urine excretion. The Eskimos are a perfect example—they consume a huge amount of calcium, over 2,000 mg a day from all the soft fish bones they eat, yet have the highest hip-fracture rate in the world because they consume so much animal protein from fish.

If you were to send a cup of milk to a laboratory, the results would astound most people. Its nutrition is perfect for calves and terrible for humans! First of all, milk is loaded with fat to help a calf grow rapidly—most of that fat is “bad” fat—saturated fat.

Cheesemakers take advantage of all that fat. They remove the water and concentrate the remaining fat and protein. The result is a cake composed of animal fat with as much cholesterol, ounce for ounce, as steak. And remember, the more animal protein we are consuming, (cheese is concentrated protein as well as fat), the more calcium we are excreting out.

Now, because health officials are concerned about dairy fat, the dairy manufactures offer reduced-fat products. Getting rid of the fat sounds like a good idea, but what are you left with? The most abundant nutrient in nonfat milk, believe it or not, is sugar. Lactose sugar makes up the majority of the calories in nonfat milk.

The protein in dairy is a problem too. Dairy products are triggers for arthritis pain, migraines and other conditions. Because the problem in this case is the dairy protein, not the fat, (the fat is removed but the protein remains), nonfat versions are just as bad as whole milk.

When you drink milk, it does in your body what it does in a calf’s body—it causes the amount of insulin-like growth factor, or IGF-1, in your bloodstream to rise. IGF-1 makes things grow. This is great if you are a calf, but not so good if you are an adult human. In your body, rapid growth can mean the growth of cancer cells.

Harvard studies have shown men with higher amounts of IGF-1 in their blood have a higher risk of prostate cancer—women have a higher risk of breast cancer. This does not mean you cannot put milk on your morning cereal—just use rice milk, almond milk, oat milk or any other plant-based milk that you can find in the market today.

Green vegetables, beans, tofu, seeds and even oranges contain a lot of usable calcium, without all the problems associated with dairy---saturated fat and cholesterol. Many green vegetables have calcium absorption rates of over 50%, compared with about 32% for milk. Remember, whole and minimally processed plant foods provide calcium AND the “mortar” nutrients that are essential to bone health. These nutrients include:

**Vitamins** – Vitamin C, Vitamin K, Vitamin A, Vitamin B6, Folic Acid, Vitamin D

**Minerals** – Boron, Copper, Fluoride, Magnesium, Manganese, Phosphorous, Silica, and Zinc

**Macronutrients** – essential fatty acids and plant protein

Any healthy diet containing a reasonable amount of unrefined plant foods will have sufficient calcium without milk. Researchers have found that people who eat the most **fruits and vegetables** have denser bones.

## Oil's not well with oil – even Olive Oil!

Most people I encounter are thoroughly confused about what constitutes an overall healthy diet. This doesn't surprise me as there is so much misinformation and conflicting information in regards to "healthy" eating.

The most disconcerting thing to me is that the "healthy" eating practices people seem most certain about are flat out wrong. My vote for the top 3 are:

1. You've got to eat meat, fish, poultry and eggs to get enough protein
2. You've got to consume dairy products to get enough calcium
3. Olive Oil is a health food – especially for your heart.

If you believe # 1 and # 2 are true, you need to seek out the resources and experts listed in the "Resources" page on the "Wholefoodplantbasedrd.com" web site. If you still believe # 1 and # 2 are true after conducting a thorough investigation of the research, then I suggest that you have your head examined.

# 3 seems to be permanently imprinted on the brains of Americans. During my small group sessions when discussing processed foods, people appear as if they want to cry when I inform them that all oils – including olive oil - are the most highly processed and calorically dense foods that we can eat. There is no getting around that all oils are pure junk. As an Italian American brought up in a household that always had enormous containers of olive oil close at hand, it didn't give me great pleasure when the evidence (and common sense) made me conclude that ALL added oils should be avoided.

Use the following web resources and the article beginning on the next page to get the real scoop on olive and other oils. I think you'll agree that there is no way that the most calorically dense substance we can eat could ever be considered a health food.

Jeff Novick RD

<http://www.youtube.com/watch?v=GfBKauKVi4M>

Dr. John McDougall MD

<http://www.drmcDougall.com/misc/2013other/news/oil.htm>

Dr. Caldwell Esselstyn MD

[http://heartattackproof.com/spanish\\_study.htm](http://heartattackproof.com/spanish_study.htm)

## **Pritikin Longevity Center abridged article (Olive Oil)**

Rarely does the media miss a chance to report that olive oil is a “good” fat. A recent 2006 study praised olive oil as heart-healthy – and extra virgin olive oil as especially healthy (1). The problem, though, is that many journalists do not fully dissect the scientific studies on which they’re reporting. Facts get distorted. Qualifiers disappear. Headlines turn sensational. And so does the truth about olive oil. In this article, Former Director of Nutrition at the Pritikin Longevity Center, Jeffrey Novick, MS, RD, responds to the hype about olive oil to help us better understand what’s true about this so-called “healthy” fat – and what’s not.

**The Hype:** Olive oil will protect you from a heart attack.

**The Truth:** Olive oil is not heart-healthy. Yes, foods rich in monounsaturated fats like olive oil are healthier than foods full of saturated and trans fats, but just because something is “healthier” does not mean it is good for you.

Several human studies have questioned olive oil’s heart-health claims. When researchers from the University of Crete recently compared residents of Crete who had heart disease with residents free of the disease, they found that the residents with heart disease ate a diet with “significantly higher daily intakes” of monounsaturated fats (principally olive oil) as well as all fats.(2)

Data from the Nurses Health Study, an on-going study from Harvard Medical School analyzing the habits and health of nearly 90,000 female nurses, found that those who consumed olive oil were only marginally healthier than those eating a typical high-in-saturated-fat American diet.

Another study investigated how well subjects’ arteries were dilating to accommodate blood flow after they had eaten several meals. Each meal emphasized a different component of the Mediterranean diet. After the meal rich in olive oil, dilation in the arteries was impaired.(3) The meal caused severe constrictions, which can injure the endothelium, the inner lining of arteries, contributing to heart disease. No such problems occurred with the other meals. “The beneficial components of the Mediterranean diet,” concluded Robert Vogel, MD, and colleagues at the University of Maryland School of Medicine, “appear to be antioxidant-rich foods...” These foods, he continued, “appear to provide some protection against the direct impairment in endothelial function produced by high-fat foods, including olive oil.” So if you’re not eating fruits and veggies, you’re not getting protection. If you’re pouring olive oil on an already bad diet – one devoid of protectors and full of destroyers like cheeseburgers – you’ve only made that diet worse.

Research recently published in the Journal of the American College of Cardiology also found that “dilation was worse” after 24 people, 12 healthy and 12 with high cholesterol levels, consumed olive oil. Five teaspoons of olive oil



swallowed after salami-and-cheese meals did not help the arteries relax and expand.(4) According to Dr. Robert Vogel, this research and other data indicate that olive oil is not heart protective.

Finally, and most fundamentally, pouring a lot of olive oil means you're consuming a lot of fat. And eating a lot of any kind of fat, including "healthier" ones, means you're eating a lot of calories, which leads to excess weight, which leads to increased risk of diabetes, high blood pressure, stroke, many forms of cancer, and yes, heart disease.

**The Hype:** Extra virgin olive oil is especially heart-healthy because it's rich in polyphenols.

**The Truth:** All plant foods are rich in polyphenols, and many deliver far more polyphenols (and far fewer calories) than olive oil.

Let's take a look at this new study on extra virgin olive oil: Researchers from Italy and other European countries directed 200 healthy men to use three different olive oils for three weeks a piece. One was an extra virgin olive oil high in antioxidant plant compounds called polyphenols; the other two were more heavily processed "non-virgin" varieties with moderate to low polyphenol levels. At the end of the study, the scientists found that the virgin olive oil showed better heart-health effects – higher HDL "good" levels as well as greater declines in markers that may indicate oxidative stress.

Oxidative stress is a process that inflames the arteries and heightens the risk of plaque rupture and heart attacks. The researchers credited the virgin oil's high polyphenol content for the better results. **But the problem is: If you're relying on olive oil for your polyphenols, you've got to eat a lot of calories to get a decent amount of polyphenols, and eating lots of calories is just what Americans, with our epidemic rates of obesity, do not need. A hefty 120 waist-expanding calories of olive oil delivers 30mg of phyosterols, a group of polyphenols. By contrast, a mere 11 calories of green leafy lettuce gets you the same number of polyphenols – 30mg, and so much more.**

Keep in mind what mountains of research over the past several decades have told us. Consistently, the foods linked with healthier, longer, disease-free lives are foods rich in all kinds of nutrients – vitamins, minerals, fiber, polyphenols, beta carotene, and so on. Yes, foods like leafy greens. Olive oil, by comparison, tallies up a whole lot of zeros when it comes to most nutrients.

**The Hype:** Olive oil will lower your "bad" LDL cholesterol.

**The Truth:** Olive oil, in and of itself, does not lower LDL cholesterol. In just about every study showing that people lowered their LDL cholesterol levels after starting to use olive oil, including this latest study on extra virgin olive oil, the people used olive oil in place of other dietary fats, often saturated fats like

butter, cheese, and fatty meats. Of course LDL is going to go down. You've gotten rid of the LDL-raising fats.

The point is: It's not the addition of olive oil that's improving LDL cholesterol levels. It's the subtraction of artery-clogging fats like saturated fats and trans fats. That's precisely what the official health claim allowed by the Food and Drug Administration states. Here are the claim's exact words: "Limited and not conclusive scientific evidence suggests that eating about 2 tablespoons (23 grams) of olive oil daily may reduce the risk of coronary heart disease due to the monounsaturated fat in olive oil. To achieve this possible benefit, olive oil is to replace a similar amount of saturated fat and not increase the total number of calories you eat in a day." Unfortunately, what we usually hear in the media and see on olive oil bottles are only the words "heart healthy."

**The Hype:** The Mediterranean diet is a heart-healthy diet, and it's rich in olive oil, so olive oil must be heart-healthy.

**The Truth:** The people on this planet with the longest life expectancy and the least heart disease do not eat diets rich in olive oil. They do eat a diet rich in whole, natural foods like vegetables, fruits, whole grains, and beans.

Yes, in the 1950s Ancel Keys and fellow scientists observed that people living in the Mediterranean, especially on the isle of Crete, were lean and heart disease-free. And true, their diet consisted of olive oil, but it also had an abundance of fruits, vegetables, herbs and spices, coarse whole-grain breads, beans, and fish. And they walked about nine miles daily, often behind an ox and plow.

But much has changed on Crete – and throughout the Mediterranean – since then. Today, the people of Crete still eat a lot of olive oil, but their intake of whole, natural foods has gone way down, as has their physical activity. The island's new staples are meat, cheese, and television. Today, more than 60% of Crete's adult population and an alarming 50% of its children are overweight. And has maintaining an olive oil-rich diet saved them from disease? Not at all. In recent years, rates of heart disease, diabetes, and hypertension have skyrocketed. The point here is that olive oil is not the magic bullet that made populations along the Mediterranean in the 1950s so healthy. Olive oil was simply a bellweather, or marker, for other features of the Mediterranean diet, like plenty of fruits, vegetables, whole grains, and exercise, that were in fact healthful.

**The Hype:** Olive oil raises "good" HDL cholesterol.

**The Truth:** Many people with high HDLs have diseased arteries, and many with low HDLs have very clean arteries. One of the "heart healthy" effects of extra virgin olive oil, wrote the authors of the recent study on olive oil varieties, is that it raised levels of HDL good cholesterol more than the non-virgin oils. But HDL is just one number in a risk group of many, and it's not the most

important one. LDL is. Ultimately, we should focus on the big picture – on all the numbers that contribute to heart health. And the fact is: the populations who have the lowest incidences of heart disease in the world, the people living in Okinawa and in other rural regions of Japan, have very low levels of HDL – in the 20s.

**The Hype:** Certainly, monounsaturated fats are better than saturated fats.

**The Truth:** “Better than” is not “good in and of itself.” The human body has no essential need to consume monounsaturated fat. The only fat our body has an essential need to consume is omega 6 and omega 3 fat. People worry about getting enough omega 3. Olive oil is a poor source of omega 3. **You’d have to drink seven ounces of olive oil to get sufficient omega 3. Seven ounces of olive oil is 1,800 calories and 30 grams of saturated fat (yes, a percentage of the fat that makes up olive oil is saturated.) Is olive oil better than butter? Yes. But is it good in and of itself? No.**

REFERENCES: (1) Annals of Internal Medicine, 2006; 145: 333. (2) British Journal of Nutrition, 2004; 91: 1013. (3) Journal of the American College of Cardiology, 2000; 36: 1455. (4) Journal of the American College of Cardiology, 2006; 48: 1666.

# Novick's Nutrition

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## Marketing Junk Food: Don't Go Cuckoo Over Coconut Oil

<http://www.jeffnovick.com/RD/Home.html>

It seems as if everywhere I go, everyone I talk to is either already consuming coconut oil, or intending to because they have heard about the remarkable health benefits of coconut oil. It is also the topic of many questions I get both from clients and audiences. A quick Google search for "health benefits" and "coconut oil" returns over 100K hits.

Is all of this really true? Is coconut oil a health food? Is it a highly nutritious food?

Let's take a closer look at these claims and see if any of them are actually true.

Marketing Junk Food: Don't Go Cuckoo Over Coconut Oil

The best way to analyze a food is by nutrient density.

(As a reminder before we go any further, and because this is so key to understanding these issues, let us first review the basic principles of nutrient density).

**Nutrient density is defined as a ratio of nutrient content (in grams) to the total energy content (in calories). According to the Dietary Guidelines for Americans 2005, nutrient-dense foods are those foods that provide substantial amounts of vitamins and minerals and relatively few calories.**

The formula would look like this:  $ND = N/C$

ND= Nutrient Density

N= Nutrient Content

C-=Calories

The nutrient density of any food can be calculated for a single nutrient (i.e., calcium) or for the overall nutrient density. **I prefer to look at the overall nutrient density of a food as this gives us a better picture of how well a food's overall nutrient composition meets the nutrient requirements of the human body.** By defining nutrient density this way, a nutrient-dense food is a food that delivers a complete nutritional package.

**Let's look at the nutrient density of coconut oil and compare it to a food that is well known and accepted to be a junk food, sugar.** In fact, when I ask audiences to name a junk food, sugar is almost always the most common answer. We could even say that sugar is the epitome of a junk food and the reason is because sugar

supplies nothing but empty calories, which are calories without any nutrients (essential amino acids, essential fats, vitamins, minerals, fiber, etc.).

So, when we look at coconut oil, regardless of the marketing of coconut oil and the claims made for it, if the nutrient numbers in coconut oil are worse than sugar, **then clearly, coconut oil is nothing more than a cleverly marketed junk food.** The numbers don't lie.

To make the comparison easy and equal, I will compare the nutrients in terms of 100 calories of each. I will list each of the common nutrients and below it, will record the value for sugar (SUGR) and then the value for coconut oil (COCO), respectively. For the record, 100 calories of coconut oil is 2.58 tsps. and 100 calories of sugar is 6.15 tsps.

In addition, I will list what percentage of the Dietary Reference Intakes/Recommended Dietary Allowance (DRI/RDA) that equals. For some nutrients the DRI/RDA varies depending on gender and age. When this is the case, I will just use the higher value to make things easier on me (and tougher on the comparison.)

Here is an example of the model we will use.

Nutrient (DRI/RDA)

SUGR = Nutrient Amount In Sugar (% DRI/RDA)

COCO = Nutrient Amount in Coconut Oil (% DRI/RDA)

See Table beginning on next page.

<b>Nutrient</b>	<b>Sugar</b>	<b>Coconut Oil</b>
Protein (56g)	0	0
Carbohydrate (130mg**)	26	0

(\*\* NOTE: The 130 grams has been recommended by the Food and Nutrition Board, Institute of Medicine, National Academies, in their Dietary Reference Intakes (DRIs): Recommended Intakes for Individuals, Macronutrients, 2004, as the minimum amount of carbohydrate needed for proper brain function.)

<b>Nutrient</b>	<b>Sugar</b>	<b>Coconut Oil</b>
Fat	0 grams	11.6 grams
Fiber (38g)	0 grams	0 grams
Vitamin A (3000 IU)	0%	0%
Folate (400 mcg)	0%	0%
Vitamin B1 (1.2 mg)	0%	0%
Vitamin B2 (1.3 mg)	0%	0%
Vitamin B3 (16 mg)	0%	0%
Vitamin B5 (5 mg)	0%	0%
Vitamin B6 ( 1.7 mg)	0%	0%
Vitamin C (90 mg)	0%	0%
Vitamin E (15 mg)	0%	0%
Vitamin K (120 mcg)	0 mcg (0%)	.1 mcg (< .1%)
Calcium (1200 mg)	.3 mg (< .03 %)	0 mg (0%)
Copper (.9 mg)	0 mg (0%)	0 mg (0%)
Iron (18 mg)	0 mg (0%)	0 mg (0%)
Magnesium (420 mg)	0 mg (0%)	0 mg (0%)
Manganese (2.3 mgs)	0 mg (0%)	0 mg (0%)
Phosphorus (700 mg)	0 mg (0%)	0 mg (0%)
Potassium (4700 mg)	.5 mgs (< .01%)	0 mg (0%)
Selenium (55 mcg)	.2 mcg (.4%)	0 mg (0%)
Zinc (11 mg)	0 mg (0%)	0 mg (0%)
Sat. Fat (< 5 - 7% of Calories***)	0 gm (0%)	10 grams

(\*\*\*NOTE: The American Heart Association recommends we limit the amount of saturated fat in our diets to less than 7% of calories. I believe, based on long-lived populations and other published data, that less than 5% is a better goal. On a 2000 calorie diet, 7% is equal to 15.5 grams and 5% is equal to 11.1 grams. Just three tsps of coconut oil contain 11.8 grams of saturated fat which exceeds the 5% goal, and just 4 tsps of coconut oil contain 15.6 grams of saturated fat which exceeds the more liberal 7% goal).

Nutrient	Sugar	Coconut Oil
Omega 3 FA (1.6 mg)	0 gm (0%)	0 gm (0%)
Omega 6 FA	0 gm (0%)	.2 gm

There are the numbers. Not only are the numbers eye-opening and enlightening, we can learn several things from them.

First, as we can see, sugar is truly a junk food. Outside of the calories, sugar contains virtually no protein, vitamins or minerals, fiber, or essential fats. It does however, supply some carbohydrates, which are needed for energy and brain functioning.

Second, for the same calories as sugar, coconut oil supplies as little or less than most every vitamin and mineral, basically making no nutritional contribution to your health.

Third, just 100 calories (3 tsps.) of coconut oil has enough saturated fat (basically the only nutrient in it), by itself, to surpass the limit recommended by my guidelines and just 4 tsps. (which is 155 calories) surpasses the limit recommended by the American Heart Association.

So, if coconut oil supplies no protein, no carbohydrates, no vitamins, no minerals, no essential fats, and no fiber, then what exactly makes it a health food? What exactly is it contributing to your health?

Nothing.

Well, nothing but saturated fat, that is. And that, as we will now see, is not a good thing.

A study in 2001 compared death rates between Hong Kong and Singapore (1). The reason is, while the majority of inhabitants in Hong Kong and Singapore are both ethnic Chinese, the all-cause and cardiovascular death rates in these two regions are very different. The study looked at the differences in these death rates and the role nutrition plays in explaining these differences. They found:

"The most pronounced finding was that ischemic heart disease mortality in 1993-1995 was 2.98 and 3.14 times higher in Singapore than in Hong Kong in men and women, respectively."

**"These differences can be most reasonably and plausibly explained by their differences in dietary habits, for example, a higher consumption of coconut and palm oil, mainly containing saturated fat, in Singapore."**

In addition, another recent study looked at the effects of even just one high fat meal, where the fat came from coconut oil, on HDL, inflammation, and blood flow (2). Subjects were fed a meal high in fat from coconut oil and the effects were evaluated at 3 and 6 hours after the meal. The meal containing coconut oil impaired the anti-inflammatory action of HDL at both 3 and 6 hours. In addition, blood flow was significantly reduced 3 hours after the meal containing coconut oil and remained slightly reduced at 6 hours.

Now, you may have heard that coconut oil has a **"special" type of fat** that is not harmful. However, once again, we will see that while this has some basis in truth, these claims are not only false, but the opposite of the truth.

It is true that a small portion of the fatty acids in coconut oil are what are called **"medium chain triglycerides" (MCT)** and these fats do get oxidized more quickly and appear slightly less fattening than other longer chain fatty acids. They also appear to have less impact on LDL levels.

However, while this is all true, it is basically **IRRELEVANT** to you and your health. These medium chain triglycerides only make up a small part of the saturated fatty acids in coconut oil. And, because these MCTs are used in the medical and cosmetic industry, they are often removed from coconut oil which leaves an even higher concentration of the other harmful fatty acids that do raise LDL. The reason these MCTs are used in the medical and cosmetic industry because at least one of them (lauric acid) is known to have anti-microbial properties (3).

In addition, you may have read on the internet that the traditional Polynesian diet contained lots of coconut, and that they had low rates of heart disease. It is true that some studies of people on traditional Polynesian diets have found that they have relatively low rates from heart disease in spite of their high intake of coconut and their higher levels of blood cholesterol (4).

But, once again, that is only part of the picture as there are many other aspects of the native Polynesian diet and lifestyle that were very healthy and helped counteract the negative effects of the coconut. The traditional Polynesian diet is very high in fiber from locally grown fresh fruits, veggies and root vegetables, high in the protective plant sterols, high in the protective omega 3 fats, and very low in sodium. In addition, since their main source of calories and fat was coconut, in spite of the coconuts high saturated fat intake, they also had a very low intake of dietary cholesterol as coconuts are devoid of dietary cholesterol.

They were also very physically active and tended to not smoke. Few, if any, were overweight or obese, or had diabetes or high blood pressure. So, in the big picture, they may have had fewer deaths from heart disease but this was mainly because they had only one risk factor, a higher blood cholesterol level which was likely a result of their higher intake of saturated fat from coconuts.



Well, here you have it:

- 1) Coconut oil has virtually NO nutritional value. It has no protein, carbohydrates, vitamins, minerals, or fiber.**
- 2) Like all oils, coconut oil is pure fat. Of the fat in coconut oil, over 90% is saturated fat.**
- 3) All oils, including coconut oil, are the most calorie dense food on the planet.**
- 4) While there may be a rare example of some healthy and fit native population that managed to be healthy in spite of their consumption of coconut, this does not make coconut oil into a health food, or a food that Americans should consume with complete abandon as part of their already unhealthy American lifestyles. The coconuts may have been the only risk factor in the otherwise healthy lifestyle of these native populations. However, recent studies have shown the harmful effects of even one high fat meal when the fat comes from coconut oil.**
- 5) While it is true that coconut oil may have some antimicrobial properties, this is not why we consume food, especially one that has so many other negative aspects to it. Remember, our main nutritional and health problems are not bacteria, microbes and infections, but being overfed and undernourished with too many calories and too few nutrients and the resulting weight and lifestyle related diseases. Coconut oil, which is extremely high in calories and void of any nutrients, only makes this already unhealthy situation worse.**
- 6) You are welcome to add all the coconut and/or coconut oil you would like to you diet, on one condition; you keep the total amount of saturated fat in your diet below 7% of your total calories (with below 5% being optimal). :)**

1) Differences in all-cause, cardiovascular and cancer mortality between Hong Kong and Singapore: role of nutrition. *Eur J Epidemiol.* 2001;17(5):469-77

2) Consumption of Saturated Fat Impairs the Anti-Inflammatory Properties of High-Density Lipoproteins and Endothelial Function *J Am Coll Cardiol*, 2006; 48:715-720.

3) Pharmaceutical and cosmetic uses of palm and lauric products. *Journal of the American Oil Chemists' Society.* Volume 62, Number 2 / February, 1985

4) Cholesterol, coconuts, and diet on Polynesian atolls: a natural experiment: the Pukapuka and Tokelau Island studies. *Am. J. Clin. Nutr.* 34: 1552-1561, 1981.

## The Truth about Coconut Oil

### Is It Really Healthy?

-- By [Becky Hand, Licensed and Registered Dietitian](#) (From [Sparkpeople.com](#))

Conduct a quick Google search, and you'll find miraculous claims about a tropical fat that has become increasingly popular among health-conscious consumers in recent years: coconut oil. Health claims about the oil's ability to help you burn fat, boost your memory, improve your heart health—and even prevent sunburn—abound. Many trusted talk-show hosts and "wellness experts" have touted coconut oil as nature's "miracle" food.

In contrast, many other health and nutrition experts disagree. Coconut oil has long been on the [list of "unhealthy" fats](#) due to its high saturated fat content.

So, whom should you believe?

Before you twist off the lid on a new jar, here are the real, unbiased—and research-supported—facts about coconut oil.

#### **In a (Coco)nut Shell: The Condensed Story of Coconut Oil**

People make a lot of claims about coconut oil, **but there is no well-designed, peer-reviewed, credible scientific evidence to show that coconut oil speeds metabolism, promotes weight loss, cures Alzheimer's disease, improves brain function, or improves heart health.** In addition, no evidence exists to prove that "virgin" coconut oil is any less damaging to your heart than other varieties.

Nutritionally speaking, coconut oil contains 9 calories per gram, as do all other fats, making it a calorie-dense food. Dietary fat from all sources should make up no more than [35% of your daily calorie intake](#). Probably more importantly—and where the controversy lies—is that more than 90% of the fat in coconut oil is saturated fat. Decades of research have determined that saturated fat is detrimental to the health of your heart and blood vessels (more on that later). That's why healthy adults are advised to consume no more than 10% of their calories in the form of saturated fats. (For people with heart disease--or at high risk for developing it--that amount is even lower: Less than 7% of their calories should come from saturated fat each day.)

So, how would coconut oil fit into those guidelines? For a SparkPeople member following a diet of 1,200-1,550 calories per day, their upper limit of saturated fat is 17 grams daily. A single tablespoon of coconut oil contains about 12 grams of saturated fat (and 117 calories) and would bring someone very close to that upper limit—without eating any other sources of saturated fat.

#### **Coconut Oil Can Be Confusing If You're Not a Chemist**

When we consume plant and animal sources of fat, we also eat their fatty acids, all of which are structurally different. For example, some of the fatty acids in butter and milk fat have a short chain length of 4-6 carbons. Coconut oil contains fats with 12-14 carbons, animal fats have some longer carbon chains with 16-20

carbons, and peanut oil has 20-22 carbons in some of its fatty acid chains. While there is no exact definition as to the number of carbons needed to be classified as a short-, medium- or long-chain fatty acid, most researchers define "medium-chain" as somewhere between 6 and 14 carbons.

We know that fats with medium chains (called medium-chain triglycerides or "MCTs") are metabolized much differently than fats with shorter and longer carbon chains. When consumed, MCTs are transported directly from your intestines to the liver, where they are more likely to be burned as fuel, as opposed to shorter and longer chains, which typically get stored as fat in the body. MCTs require fewer enzymes and bile acids for digestion, too.

So, where can you get these amazing MCTs? Many people claim they're found in coconut oil, but that is only a half-truth. No source of food is "purely" any single type of fat. Even olive oil, touted for its heart-healthy monounsaturated fat content, also contains small amounts of saturated fat, for example; it's just that most of the fat is the healthy kind. Similarly, foods contain a blend of short-, medium- and long-chain fats. No single source of MCT is available—it's only manufactured and used in medical or research settings.

Many people who make positive health claims about coconut oil are actually using research on medical-grade MCT oil, which is not available as a dominant source of fat in any food. It's true that MCT can be *distilled from* coconut oil, but it is not the same thing as the coconut oil you buy in a jar at the store. Chemically speaking, these two oils are very different.

MCT oil comprises **caprylic acid** (8 carbons) and **capric acid** (10 carbons). Therefore 99.9% of MCT oil composition comes from medium chain fats. On the other hand, coconut oil only **contains about 10%-15% of these MCTs (caprylic acid and capric acid)**. **Lauric acid** (a 12-carbon chain) makes up 45%-50% of coconut oil. The remaining fatty acids in coconut oil include **caproic acid (6 carbons)**, **myristic acid (14 carbons)**, **palmitic acid (16 carbons)**, and **stearic acid (18 carbons)**.

### **The Research on MCT**

Some research done on humans shows that substituting the distilled MCT oil for long-chain fats found in meats, fish oils, and vegetable oils can result in a short-term increase in metabolic rate and increased satiety for the calories consumed. This is one factor that could result in weight loss. So, MCT oil does appear to be slimming when used with other weight-loss interventions.

However, to imply that the research data from a study on MCT also applies to coconut oil is erroneous and a misinterpretation of the data. The carbon chain make-up of MCT oil and coconut oil is entirely different, as shown in the chemistry lesson above. Caprylic acid and capric acid make up 99.9% of MCT oil, and only 10%-15% of coconut oil.

**Also, coconut oil's main fatty acid is lauric acid. This fatty acid, along with coconut oil's myristic and palmitic acids, have been shown to markedly raise LDL ("bad") cholesterol.**

### **A Word on Saturated Fat**

More and more people are questioning what we once thought about saturated

fat: that all saturated fat is bad for you. It's true that nutrition science is ever-evolving; the research and knowledge regarding saturated fat has really grown in recent years. So, who is right?

We now know that different types of saturated fat can affect the body differently. Previously, all saturated fats were considered the same, but research now shows that the saturated fats in coconut oil are somewhat different from the saturated fats in meat and butter, and might therefore affect the body differently. However, researchers still don't know for sure that this makes coconut oil *good* for your heart. Some studies suggest that some types of saturated fat might lower risk factors for heart disease, and other studies show the exact opposite. Until we know for certain, it is still best to be cautious and keep your total saturated fat intake at or below 10% of your daily calories.

### **What about Populations That Eat Diets High in Coconut Oil?**

One study conducted many years ago on two Polynesian islands (Pukapuka Islands and Tokelau Islands) found that the consumption of coconuts was remarkably high, making up 34%-63% of the total calories of the populations. Since coconut oil is highly saturated, it is not surprising that the blood cholesterol levels in the islanders were elevated. Yet, the researchers noted that cardiovascular disease was uncommon.

However, this claim was based on a single electrocardiogram (ECG) test, not on death or autopsy. And it is important to note that the ECG is not considered a reliable way to assess cardiovascular health. Also realize that these populations had a low intake of sugar, cholesterol and salt in their diets, and consumed far more fiber, [plant sterols](#), and [omega-3 fatty acids](#) from fish. They also had a more active lifestyle and used little tobacco. This study is often used to promote the use of coconut oil, but the study is very limited in its actual application, and it was not a well-controlled study. Plus, as we all remember from sixth-grade science: Correlation does not prove causation. If these islanders were, in fact, healthier and at low risk of heart disease (which wasn't necessarily proven, remember), there is no possible way an uncontrolled study like this can attribute that result to their consumption of coconut oil. **A myriad of other diet and health behaviors that impact heart health were not isolated and controlled for in this observational study.**

### **Other Coconut Products**

Coconut oil isn't the only source of saturated fat. As the popularity of coconut oil increases as the result of "paleo" or "caveman" diet trends, we're seeing more and more coconut products on grocery shelves, too. You'll need to keep a handle on other coconut products, too, as many are also high in saturated fat.

- **Coconut milk**, which contains the meat and liquid of coconuts and often comes canned, is rich in calories and fat. A 1/2-cup serving contains 223 calories and 24 grams of fat, 21 of which are saturated—well over one's typical upper limit for saturated fat.
- **Raw, shredded coconut meat**, which can be purchased as-is or cut up from a whole coconut, is often used in tropical fruit salads. A small 1/4-cup serving contains 71 calories and 7 grams of fat (6 of which are saturated).
- **Dried, shredded coconut** is most often found in the baking aisle or in bulk at natural foods stores. Often used in baking, smoothies or desserts, a 1/4-cup serving contains 150 calories, 15 grams of fat and 13 grams of saturated fat. You'll most often find dried and sweetened coconut at conventional grocers. Sweetened coconut is actually lower in calories and fat, since some of the fat is displaced by sweeteners. A 1/4-cup serving contains 116 calories and 8 grams of fat (7 of which are saturated).
- **Coconut water**, on the other hand, does not use the "meat" of the coconut—only the watery liquid inside. Therefore, it does not contain the calories and fat found in coconut oil or shredded coconut meat. Many athletes and fitness enthusiasts are [using coconut water to rehydrate the body](#) during exercise and endurance events. A 1-cup serving of coconut water contains 46 calories, 0.5 grams of fat, 0.4 grams of saturated fat, 600 milligrams of potassium and 252 milligrams of sodium, according to data from the USDA. But beware: Recent reports are saying that [coconut water is no better than plain old water](#) when it comes to hydration.

## The Newest Food-Cure: Coconut Oil for Health and Vitality

**Dr. John McDougall MD**

(<http://www.drmcDougall.com/misc/2006nl/may/coconut.htm>)

Coconut oil is the newest miracle food promoted on the Internet and at health food stores for rejuvenation and cure of “whatever ails you.” Advocates of coconut oil claim this sensational food has anti-microbial, anti-heart disease, anti-cancer, and anti-obesity benefits. Furthermore, this fat is sold as a cure for low thyroid function (hypothyroidism). This is a huge turnaround for a substance that has traditionally been thought of as an artery-clogging saturated fat. Testimonials provide most of the evidence for the miraculous effects these oils have on people, rather than well thought out and carefully designed experiments. Thus, **most of these claims are based on a little truth overblown into a sales pitch for sellers of coconut oil. You and your family will not find salvation by buying these products. Claims Found on the Internet for Coconut Oil**

Improves thyroid function—“The new thyroid cure.”

Inactivates HIV, herpes, cytomegalovirus, hepatitis, measles, and influenza viruses

Destroys listeria monocytogenes, H pylori and other bacteria

Kills Giardia lamblia parasites

Reduces risk of atherosclerosis and related illnesses (heart disease)

Reduces risk of cancer

Supports immune system function

Helps prevent osteoporosis

Helps control diabetes

Promotes weight loss

Helps prevent premature aging and wrinkling of the skin

Helps protect against skin cancer and other blemishes

Protects against alcohol liver damage

This oil is 92% saturated (it does contain a small amount of the unsaturated oils).

Coconut oil is unusually rich in short and medium chain fatty acids, like **lauric and capric acid**. Most commonly it has been used as cooking oil and in baking. The oil has a high smoke point - higher than butter - and is resistant to oxidation and rancidity. Hydrogenated or partially-hydrogenated coconut oil is a prominent ingredient in non-dairy creamers and in snack foods. Nonfood uses for coconut oil include soaps, cosmetics, Bio-diesel fuel, hair styling gels, and as a skin moisturizer.

## Common Coconut Products

**Raw coconut (meat):** This is coconut right out of the shell. Eating raw coconut would clearly be most healthful—or least damaging.

**Coconut milk and light coconut milk** is usually bought in cans and used to make soups and curries. It is less concentrated in fat than coconut oil.

**Coconut butter and coconut oil** are the same. We generally think of oil as being liquid, which coconut oil is above approximately 76°F (20-25°C). Below that temperature it would be more solid and the consistency of “butter.”

**Virgin, cold pressed, and DME (Direct Micro Expeller) coconut oils** are made with the least amount of processing. Fresh coconut meat is grated, pressed and then the oil is separated from the other components by various mechanical processes (squeezed, filtered, and/or expeller).

**RBD (Refined, Bleached & Deodorized) oil** is produced from dried coconut meat (copra) after drying, refining, bleaching and deodorizing. The final product is yellowish-white with a thick texture and no taste or odor. This form is the commercial product used in baked goods and for popping corn.

### Artery Disease and Coconut

Even though coconut oil is high in saturated fat, populations consuming large quantities of coconut products (such as in the Philippines), have low rates of heart disease—but this is likely due to their overall diet—with a very low consumption of meats (cholesterol) and processed foods and high intakes of rice and vegetables—rather than the coconut.

The damaging effects of processed (hydrogenated) oils are shown in animal models.<sup>1</sup> Hamsters fed hydrogenated coconut oil with or without cholesterol in their diet quickly develop lipid rich lesions (early atherosclerosis) in their arteries with rapid progression of artery disease when the diet is continued.<sup>1</sup> Studies on rats demonstrate that highly processed coconut oils, as opposed to virgin coconut oils, have the most adverse effects on cholesterol.<sup>2</sup> Thus, foods that have been altered from their natural state the most by processing have the most adverse effects.

When coconut oils were fed to forty-seven Pacific Islanders, along with their regular diet of fish, meat, cheese, chicken and fruits and vegetables, their cholesterol levels were found to be significantly lower than when they were fed a similar diet with similar amounts of butter fat.<sup>3</sup> However, when polyunsaturated safflower oil was used then the cholesterol levels were even lower than with the coconut oils. Thus, coconut fat seems to be slightly better than butter—but not much. And as most of you know, safflower and other free vegetable oils are a health hazard even if they do lower cholesterol. (See my article “Vegetable Fat as Medicine” [http://www.drmcDougall.com/vegetable\\_fat.html](http://www.drmcDougall.com/vegetable_fat.html).)

## Pacific Islanders' Cholesterol Levels on Various Dietary Oils/fats:

Butter	213 mg/dl (5.61 IU)
Coconut	208 mg/dl (5.47 IU)
Safflower	194 mg/dl (5.10 IU)

In another study on 83 people, coconut oil was found to raise cholesterol by 10% when coconut oil supplied about 75% of calories – now that is a high fat diet.<sup>4</sup>

### Weight Loss and Coconut

Medium chained fats, like those found in coconut oils, are promoted for their ability to increase energy expenditure and to improve appetite satisfaction—resulting in weight loss.<sup>5</sup> Coconut oil is 100% fat that the body will store effortlessly. The original purpose of this fat is to supply energy for the sprouting nut so that it can begin growing into a tree. This same concentrated energy is effortlessly stored into your body fat as the “metabolic dollar” to be spent the day food is no longer available (hasn't happened yet).

### McDougall's Thoughts:

My conclusion is that coconut is a natural plant food which can have a small place in most people's diets. As a whole food the oils are combined with the fiber, vitamins, minerals, and other plant components in a way that makes them safe. When the oil is removed by processing from its natural surroundings then it becomes a medicine at best and a toxin at worst—just like other oils (corn oil removed from corn, olive oil removed from olives, etc.) The more processing— the worse the oil.

If you decide to include this high fat food in your diet; then realize that coconut is very rich, packed with calories and fats. You will likely gain weight if this becomes a big part of your diet. People with weight-dependent diseases, like type 2 diabetes and degenerative arthritis of the lower extremities should be very careful about including coconut in any form. Otherwise, as a condiment—like other nuts and seeds—coconut will add unique flavors to your meals and provide quality nutrients. Just think of it as a treat. Have you ever tried to open a coconut? One reason they are packaged in such hard shells may be to keep people from eating too much of a good thing.

### References:

- 1) [Mangiapane EH](#), [McAteer MA](#), [Benson GM](#), [White DA](#), [Salter AM](#). Modulation of the regression of atherosclerosis in the hamster by dietary lipids: comparison of coconut oil and olive oil. *Br J Nutr*. 1999 Nov;82(5):401-9.
- 2) [Cox C](#), [Sutherland W](#), [Mann J](#), [de Jong S](#), [Chisholm A](#), [Skeaff M](#). Effects of dietary coconut oil, butter and safflower oil on plasma lipids, lipoproteins and lathosterol levels. *Eur J Clin Nutr*. 1998 Sep;52(9):650-4.
- 3) [Nevin KG](#), [Rajamohan T](#). Beneficial effects of virgin coconut oil on lipid parameters and in vitro LDL oxidation. *Clin Biochem*. 2004 Sep;37(9):830-5.
- 4) [Ng TK](#), [Hassan K](#), [Lim JB](#), [Lye MS](#), [Ishak R](#). Nonhypercholesterolemic effects of a palm-oil diet in Malaysian volunteers. *Am J Clin Nutr*. 1991 Apr;53(4 Suppl):1015S-1020S.
- 5) [St-Onge MP](#), [Jones PJ](#). Physiological effects of medium-chain triglycerides: potential agents in the prevention of obesity. *J Nutr*. 2002 Mar;132(3):329-32.



## VITAMIN B12

Vitamin B12—This is needed for cell division and formation of healthy red blood cells. It is also needed to produce myelin, the protective sheath around nerve fibers. Deficiencies in B12 can result in nerve damage and may increase the risk for certain chronic conditions like heart disease.

All of the B12 in the world is made by bacteria, and that includes bacteria living in the digestive tracts of animals and humans. So, why can't we use what these bacteria produce in our body? The reason is the bacteria are too far down in the intestines to be of any use to us. We absorb Vitamin B12 in our small intestine, the bacteria producing it live in our large intestine.

Most people get Vitamin B12 by eating animal products. Animals such as cows and other true herbivores are able to absorb the vitamin B12 produced in their intestines by bacteria. When people eat the animal, they get the animal's B12. However, with the B12, they also get all the saturated fat, cholesterol, antibiotics, and whatever other chemicals the animal received. Plants have no need for B12 which is why they usually don't contain any.

Vitamin B12 deficiency usually doesn't have acute symptoms—it does its damage over time and is only detected through medical tests. When B12 levels in the blood start to drop, levels of an amino acid called homocysteine begin to rise. Homocysteine may damage blood vessels and nervous tissue and many studies have linked high levels to an increased risk for heart disease and stroke.

Other symptoms of B12 deficiency can include decreased sensation, dementia, difficulty in walking, loss of bladder or bowel control, weakness, optic atrophy and depression. Early detection is key to preventing irreversible neurological damage. The liver is very efficient at storing B12 for many people, and these people can go years without a deficiency.

Researchers have shown that people who supplement with Vitamin B12 have healthy levels of homocysteine. B12 is not a big problem for people following a WFPB diet. It is an issue that's so easily resolved it should not be a concern. People simply need to have their B12 level checked through a simple blood test. If the B12 level comes back low, taking a supplement will bring the level back up to a healthy level. There is no reason not to take a B12 supplement—they are inexpensive and safe.

When choosing a supplement, research shows that the supplement should be either chewable or sublingual (under the tongue), since in some people B12 isn't well absorbed from pills that are swallowed whole. Studies show taking a supplement of at least 25 mcg a day will meet most people's needs for Vitamin B12.

## **VITAMIN B12 FACTS**

- Vitamin B12 comes from microorganisms in the soil—animals do not make B12
- B12 pills should be either chewable or sublingual (under the tongue)
- Vitamin B12 and Vitamin D are the only two vitamins we cannot get through food (Food sources of vitamin D are very limited)

## **Vitamin D**

### **How important is it?**

- Functions as a hormone in our bodies
- Vit D2 – ergocalciferol (Fungi, plants, fortified foods/supplements)
- Vit D3 – cholecalciferol – synthesized in skin, oily fish, fortified foods/supplements
- Processed in liver to 25 hydroxy vit D (calicidiol)
- Processed in kidneys to active form 1,25 dihydroxy vit D (calcitriol)

### **What does vit D do?**

- Vit D is responsible, directly and indirectly for regulating over 200 genes in the human body
- Vit D receptors are found in many cells throughout the body (Brain, heart, kidney, bones, intestines, skin, gonads, prostate, breasts, parathyroid, immune system etc..)
- Vitamin D functions range from regulating calcium and phosphorous levels in blood (bone growth and remodeling) to acting as an immune modulator able to both suppress the immune system and fight conditions like RA, Lupus and MS as well as activate the immune system to fight CA and infections like tuberculosis, pneumonia and influenza, to decreasing CV risk, to preventing diabetes by modifying the release of and response to insulin.

### **How is Vit D measured?**

- To most accurately measure vit D status, its MAJOR circulating metabolite (the storage form prior to activation to 1, 25 hydroxy vit D or Calcidol is measured)
- Calcitriol level is constant whether calcidiol level is high or low.

### **How much Vit D do we need?**

- Normal range from 30-70 ng/ml with ideal levels being between 50 to 70 ng/ml
- Vit D deficiency is when calcidiol is < 20 ng/ml
- Vit D insufficiency is when calcidiol is between 21-29 ng/ml
- Levels often fluctuate due to geographic location, UV Index, temperature, etc..
- Our bodies make vitamin D through exposure to the sun's ultraviolet rays (UV rays)
- Adequate exposure entails 50-75% of your skin exposed (shorts and sleeveless t-shirt, or swimsuit) between 10:30 AM and 2:00 PM about 3-4 times per week. (UV Index 3 or greater)

\*Early in the day and late in the day, sunlight provides only UVA which does not help us make vitamin D, but still can cause skin damage.

- Amount of time is dependent on the UV index and skin type.
- Over 50 years old – need more exposure.

### **Where can we get vit D?**

- Best source of vit D is what we make in our skin from sunlight exposure (UV index is 3 or greater) (After 10,000 IU made, the rest is degraded )

### What is the UV Index

- Measurement of how strong the UV radiation from the sun is at a particular place on a particular day.
- For six months in Chicago, the UV Index never gets above 2
- When the UV index is < 3, wear sunscreen as you can't make vit D anyway.
- <http://www.epa.gov/sunwise/uvindex.html>

### What Contributes to Vitamin D deficiency?

- Lack of or inadequate sunlight exposure is the main issue
- Due to geography – (living above latitudes of 35 degrees or higher – North of Atlanta and Los Angeles)
- Skin color (dark skinned people)
- Sunscreen
- Personal preference (staying out of sun)
- Inadequate intake from fortified foods or supplements
- Diseases of liver and kidneys
- Obesity – vit D gets sequestered into fat cells and not available in circulation
- Old Age – harder to synthesize

### How Common is Vitamin D Deficiency?

- Up to 50% of young adults and kids are vit D deficient
- 25-57% of US adults are vit D deficient (NHANES III)

### What does vit D deficiency lead to?

- Associated with increased rate of overall death, myalgias, (non-specific muscle aches and pains), cancer, DM, HBP, CHF, impaired bone mineralization, rickets (kids), osteomalacia (adults), osteoporosis  
Several autoimmune diseases (RA, Lupus, MS), depression, Seasonal Affective Disorder
- Moms must have ample vit D in Breastmilk to provide sufficient vit D for babies
- A metaanalysis of 5 studies showed 50% lower risk of colorectal CA associated with serum vit D level of greater than or equal to 33ng/ml compared to less than or equal to 12ng/ml
- Others have shown similar results with Breast CA
- **Mechanism – Vit D's effect on cell growth, differentiation and death**  
Other studies show vit D's positive role in protection against heart disease
- **Journal of Circulation** – People with low levels less than or equal to 15ng/ml of vit D a 53-80% higher risk for a CV event.
- Another study of 150 patients with non-specific musculoskeletal pains found that vit D levels were insufficient in 93% of people and severely deficient in 28%.
- Low vit D levels with increases in all cause mortality
- NHANES III – Levels of < 17.8ng/ml were associated with a 26% increase in all-cause mortality  
(Not necessarily a causal relationship) There is NO proof that vit D supplementation will help

### Can we get vit D toxicity?

- Upper limit believed to be 10,000 IU per day
- Toxicity can occur
- Overexposure to UV 3 or higher CANNOT cause toxicity
- Although supplementation can lead to toxicity, it's not very common

### What About Cancer?

- UV light can damage cellular DNA, which may lead to cancer
- Some sun exposure is actually protective against cancer
- Burning = cancer promotion
- No sun exposure = cancer promotion
- **People should get adequate exposure to UV 3 or higher, and then use sunscreen**

### What about Tanning Booths?

- Some use UVA, UVA and UVB or UVA, UVB and UVC
- **Only UVB light can stimulate vit D production**
- % of UVB light can vary from bulb to bulb
- Tanning booth users have an increased risk of Cancer

### The Verdict on Vitamin D

- Whenever possible – sunlight exposure with UV 3 or higher
- If above is not possible, Supplemental vit D may be necessary, although normal blood levels brought about by supplementation may not bring about the same health benefits as normal levels achieved naturally
- When vit D is low, PTH is increased and releases calcium from bone to normalize levels.
- The truth is that the avg. American probably needs about 20-25 IU of vitamin D per pound of bodyweight to get their levels up to 50-70 ng/ml and 10-15 IU per pound to get level up to 30 ng/ml (much more than currently recommended)
- Currently, Dr. Matthew Lederman recommends that people get their levels up as high as they can with sunlight without getting sunburn
- If levels are still <30ng/ml, use supplements to get their levels to 30 ng/ml (low level of normal)
- If still having symptoms (Autoimmune disease, SAD, musculoskeletal, etc..) may benefit from higher dose to blood levels of 50 to 70 ng/ml
- Vit D supplementation is treated like medication
- If symptoms don't subside after 50-70 ng/ml are reached – reduce amount to get levels back to 30ng/ml.

NEVER GROW COMPLACENT WITH SUPPLEMENTATION!

### Conclusion (vit D)

- Vit D deficiency is a sign of sunlight deficiency
- Low levels are associated with: CA, DM, CAD, Rickets, Osteoporosis
- Vit D is necessary for optimal function of many organ systems
- We need adequate sunlight – just like plants.

## WFPB DIET FOR CHILDREN

Eating habits are set early in childhood. Choosing a WFPB diet can give your child, and your whole family the opportunity to enjoy delicious, nutritious foods.

Studies have shown children raised on fruits, vegetables, whole grains, and legumes grow up to be slimmer and healthier and even live longer than their meat-eating friends. It is much easier to have a nutritious diet made up of plant foods than a diet made from animal products. Animal products come packaged with saturated fat and cholesterol, as well as chemicals and hormones—no one needs saturated fat and cholesterol, chemicals and hormones in their diet. Plant foods will provide all the essential nutrients children require as well as other health-promoting nutrients such as fiber, antioxidant vitamins, minerals and phytochemicals—phytochemicals and fiber are found only in plant foods.

A WFPB diet provides excellent nutrition for all stages of childhood, from birth right through adolescence. Of course, breast milk is optimal for infants—it's nature's way of boosting the baby's immunity.

Given the chance, toddlers and young children usually love eating a wide variety of fruits, vegetables, grains and legumes. When they become involved in the preparation of foods, they are even more interested in trying different dishes. Studies have shown adolescents raised on a WFPB diet often have a much easier time in maintaining a healthy weight and have fewer issues with acne, allergies and GI problems.

Some studies suggest that the growth of children raised on a WFPB diet may be more gradual than that of meat-eating children, but tend to catch up later on. But, what most people don't realize is, this is a GOOD thing. Rapid growth speeds up the aging process and several studies have shown a slower growth rate “produces” much healthier cells in our body. Final heights and weights for WFPB children are comparable to those of meat-eating children. Interestingly, breast-fed babies also grow more slowly than bottle-fed babies. Again, this is a good thing—slower rate of growth during the early years is thought to decrease disease risk later in life.

On the other hand, studies show diets rich in animal protein, found in meat, eggs and dairy products, appear to reduce the age of puberty—this was shown in a 2000 study from the Harvard School of Public Health. The study showed that girls who consumed higher levels of animal protein compared to vegetable protein between 3 and 8 years old went through menarche earlier. Nature designed the human body to grow up more gradually, to reach puberty later, and to last longer than most people raised on meat-eating diets.

## NUTRIENT NEEDS

The complex carbohydrates found in whole grains, beans and vegetables provide the ideal energy for a child's busy life. Starting children early with foods such as brown rice, whole wheat breads and pastas, and rolled oats, as well as the less common grains such as barley, quinoa and millet, will give them a boost of fiber and nutrients not found in the SAD. Also, steering children away from sweets, sugary drinks, sweet cereals and processed baked products, will help them to avoid overeating and gaining unwanted weight.

Children need protein to grow, but they do not need high-protein, animal-based foods. Many people don't realize that a variety of grains, beans, vegetables and fruits supply plenty of protein. The "protein deficiencies" that people worry about happen in impoverished countries where people are literally starving from lack of food. Protein deficiency does not exist when eating a diet made up of a variety of plant foods.

Very young children may need a slightly higher fat intake than adults do. Healthier fat sources include avocados and nut butters. However, the need for fat should not be taken too far—American children often have fatty streaks in their arteries, (the beginning of heart disease), before they finish high school. On the other hand, Japanese children traditionally grow up on diets much lower in fat and have fewer problems with diabetes, heart disease, obesity and other chronic diseases.

Parents will want to make sure their child's diet includes a regular source of Vitamin B12 and Vitamin D. B12 is needed for healthy blood and nerve function. B12 can be found in some commercial cereals and fortified rice and nut milks as well as nutritional yeast. Children who do not eat these supplemented products should take a b12 supplement of 3 or more micrograms a day. Some common children's vitamins contain more than enough B12.

Vitamin D can be obtained simply by playing in outdoors in the sunshine. Fifteen to twenty minutes a day of sunlight on the hands and face is enough sun exposure for the body's skin cells to produce the necessary Vitamin D.

To get adequate amount of calcium, beans, dried figs, sweet potatoes, green vegetables including kale, collards, broccoli, mustard greens and Swiss chard are excellent sources. In addition, eating lots of fruits and vegetables, excluding animal products, and limiting salt intake all help the body retain calcium.

Children also need iron which can be found in beans and green, leafy vegetables. The vitamin C in vegetables and fruits helps to absorb the iron found in these foods, especially when eaten together. One example can be an iron-rich bean burrito eaten with vitamin-C packed tomato salsa. People are unaware that cow's milk is very low in iron and can cause mild, chronic blood loss in the digestive tract, which can reduce iron and cause an increased risk of anemia.

The most important consideration for feeding children is this: Lifelong dietary habits are established at a young age. Children who acquire a taste for chicken nuggets, hamburgers, French fries and soda today are the cancer patients, heart patients and

diabetes patients of tomorrow. Children who are raised on whole grains, vegetables, fruits and legumes will have a much lower risk of heart disease, stroke, diabetes, cancer and many obesity-related illnesses compared to children raised on the Standard American Diet (SAD). Because of this, they will also live longer, healthier lives.



## **PLANT-BASED PREGNANCY**

Whether or not this is your first pregnancy, get set for the journey into the unknown—it's an exciting roller-coaster ride that comes with making another human being. Your body will go through miraculous changes and all you can do is ride the waves and provide your body and the body of your growing baby with excellent nutritional support.

Your baby's health is predetermined months before conception. Both what you eat and what you avoid directly impacts the future well-being of your baby. A WFPB diet during pregnancy is a gift that continues to give for the entirety of your child's life.

Millions of processes are going on during the nine months of your developing baby. Except for the nausea, heartburn, constipation, discomfort and weight gain, you're unaware of all the events taking place inside of you. So, what can you do to help your body have everything it needs for the ultimate creation?

First, you should avoid certain things that are harmful to the developing baby:

- **Caffeine:** Limit your total caffeine intake from tea, coffee, soda and chocolate. Be careful of herbal teas as many contain medicinal effects. Mint and ginger teas, however, are safe and may help ease some of the digestive issues during pregnancy.
- **Alcohol:** No amount of alcohol during pregnancy is considered safe.
- **Nicotine:** Cigarette smoke, directly or indirectly, is dangerous.
- **Medications, herbs and supplements:** Be sure to tell your OB about every medication, herb and supplement you may be taking. Even over-the-counter medications like pain killers, anti-inflammatories, and cough suppressants can be harmful to your baby.
- **Artificial sweeteners:** Use of any artificial sweeteners during pregnancy has not been proven safe.
- **Nitrates and nitrites:** These cancer-causing compounds are found in processed meats, hot dogs, and bacon. Read the ingredient lists.
- **Fish, raw dairy, raw eggs and soft cheeses:** If you're on a WFPB diet, you are already avoiding these. However, your OB will tell you to steer clear of these foods.

## **GAINING WEIGHT WISELY**

The extra calories needed during pregnancy go toward creating new tissue in the fetus, placenta, uterus and breasts, and also to make amniotic fluid and blood. Gaining the right amount of weight creates an ideal condition for both you and your baby. Not gaining enough can lead to poor growth or nutrient deficiencies for your baby. However, gaining

too much weight puts you at risk for gestational diabetes and discomfort during pregnancy.

Gestational diabetes is a degree of glucose intolerance that's discovered during pregnancy. Usually the condition resolves after delivery, but it does increase your risk of developing type 2 diabetes. Children of moms with gestational diabetes are at an increased risk of obesity, glucose intolerance and diabetes in late adolescence.

Calorie needs will increase throughout the trimesters. Your first trimester is typically when you will feel nauseated and fatigued—this is the time to find ways of consuming adequate amount of nutrients. When the second trimester begins, you will need to increase your intake by about 340 calories a day. During this time, you will probably be adjusting to pregnancy and feeling better. Typically, nausea and fatigue should subside before any discomfort of weight gain begins. To get the extra calories needed, you should be increasing your intake of more vegetables and fruits. When you reach the third trimester, your baby's weight gain occurs more rapidly. At this point, add about 450 more calories a day to your diet to support your baby's growth.

These numbers are merely a guideline—allow your body to be your guide. When you're hungry eat, but be careful not to overeat. Your focus should be on taking in the most nutrient-dense foods to meet your needs throughout your pregnancy.

## **NECESSARY NUTRIENTS**

Getting necessary nutrients during pregnancy is in high demand. Your body takes some nutrients directly out of its own storage; others you need to consume regularly from your diet. To prevent deficiencies in both yourself and your baby, be sure to get the following nutrients:

- Protein
- DHA
- Iron
- Vitamins A, C, B6 and B12
- Folate
- Niacin
- Riboflavin
- Thiamin
- Iodine
- Zinc

- Selenium

Protein needs increase during the second and third trimesters to support tissue and fluid production. You need to consume approximately 25 grams more protein per day at this time. Great protein sources include beans, leafy greens, nuts and seeds.

Omega-3 fatty acids are critical for fetal brain development. The fetus will take about 50-60 mg (from DHA) during the last trimester. You can easily maintain your stores of DHA by eating walnuts, flaxseeds, and chia seeds daily. In Chinese medicine, daily intake of walnuts is recommended to meet these DHA needs.

Many women become iron deficient for the first time during pregnancy. Iron needs are nearly double what they are normally. During pregnancy you require 27 mg per day as opposed to the usual 15 mg. Eat lots of green leafy vegetables, and when you eat them with a Vitamin C rich source like tomatoes or citrus fruits, your body will be able to absorb the iron more efficiently. However, while being pregnant getting enough iron might not be possible—supplementing might be necessary temporarily. Iron deficiency almost always resolves after delivery.

If you must take an iron supplement based on your OB's recommendations, drink plenty of water and eat extra fiber to compensate for the constipation effects of iron. Also, take the iron supplements between meals and separate from tea, coffee, calcium supplements and legumes.

Folate is essential prior to pregnancy and in the first few weeks of pregnancy to prevent neural tube defects. If you consume beans and greens, you'll never have to worry about having enough folate. A cup of raw greens, cooked greens and lentils can provide more than enough folate to meet your daily needs.

To stay on top of all your nutrient levels throughout pregnancy, eat a wide variety of vegetables and fruits. Be sure your Vitamin B12 and D levels are up to par, (a simple blood test will give you your levels), and speak with your OB about supplementing if necessary. Part of routine prenatal care includes blood tests to check for any deficiencies. If you were deficient prior to pregnancy, then chances are you will become even more deficient while pregnant. It takes a village of nutrients to create a little human—be sure your village is well stocked!

## What types of food are humans built to eat?

### **The Comparative Anatomy of Eating** **Milton Mills MD**

Humans are most often described as "omnivores." This classification is based on the "observation" that humans generally eat a wide variety of plant and animal foods. However, culture, custom and training are confounding variables when looking at human dietary practices. Thus, "observation" is not the best technique to use when trying to identify the most "natural" diet for humans. While most humans are clearly "behavioral" omnivores, the question still remains as to whether humans are anatomically suited for a diet that includes animal as well as plant foods.

A better and more objective technique is to look at human anatomy and physiology. Mammals are anatomically and physiologically adapted to procure and consume particular kinds of diets. (It is common practice when examining fossils of extinct mammals to examine anatomical features to deduce the animal's probable diet.) Therefore, we can look at mammalian carnivores, herbivores (plant-eaters) and omnivores to see which anatomical and physiological features are associated with each kind of diet. Then we can look at human anatomy and physiology to see in which group we belong.

### **Oral Cavity**

Carnivores have a wide mouth opening in relation to their head size. This confers obvious advantages in developing the forces used in seizing, killing and dismembering prey. Facial musculature is reduced since these muscles would hinder a wide gape, and play no part in the animal's preparation of food for swallowing. In all mammalian carnivores, the jaw joint is a simple hinge joint lying in the same plane as the teeth. This type of joint is extremely stable and acts as the pivot point for the "lever arms" formed by the upper and lower jaws. The primary muscle used for operating the jaw in carnivores is the temporalis muscle. This muscle is so massive in carnivores that it accounts for most of the bulk of the sides of the head (when you pet a dog, you are petting its temporalis muscles). The "angle" of the mandible (lower jaw) in carnivores is small. This is because the muscles (masseter and pterygoids) that attach there are of minor importance in these animals. The lower jaw of carnivores cannot move forward, and has very limited side-to-side motion. When the jaw of a carnivore closes, the blade-shaped cheek molars slide past each other to give a slicing motion that is very effective for shearing meat off bone.

The teeth of a carnivore are discretely spaced so as not to trap stringy debris. The incisors are short, pointed and prong-like and are used for grasping and shredding. The canines are greatly elongated and dagger-like for stabbing, tearing and killing prey. The molars (carnassials) are flattened and triangular with jagged edges such that they function like serrated-edged blades. Because of the hinge-type joint, when a carnivore closes its jaw, the cheek teeth come together in a back-to-front fashion giving a smooth cutting motion like the blades on a pair of shears.

The saliva of carnivorous animals does not contain digestive enzymes. When eating, a mammalian carnivore gorges itself rapidly and does not chew its food. Since proteolytic (protein-digesting) enzymes cannot be liberated in the mouth due to the danger of

autodigestion (damaging the oral cavity), carnivores do not need to mix their food with saliva; they simply bite off huge chunks of meat and swallow them whole.

According to evolutionary theory, the anatomical features consistent with an herbivorous diet represent a more recently derived condition than that of the carnivore. Herbivorous mammals have well-developed facial musculature, fleshy lips, a relatively small opening into the oral cavity and a thickened, muscular tongue. The lips aid in the movement of food into the mouth and, along with the facial (cheek) musculature and tongue, assist in the chewing of food. In herbivores, the jaw joint has moved to position above the plane of the teeth. Although this type of joint is less stable than the hinge-type joint of the carnivore, it is much more mobile and allows the complex jaw motions needed when chewing plant foods. Additionally, this type of jaw joint allows the upper and lower cheek teeth to come together along the length of the jaw more or less at once when the mouth is closed in order to form grinding platforms. (This type of joint is so important to a plant-eating animal, that it is believed to have evolved at least 15 different times in various plant-eating mammalian species.) The angle of the mandible has expanded to provide a broad area of attachment for the well-developed masseter and pterygoid muscles (these are the major muscles of chewing in plant-eating animals). The temporalis muscle is small and of minor importance. The masseter and pterygoid muscles hold the mandible in a sling-like arrangement and swing the jaw from side-to-side. Accordingly, the lower jaw of plant-eating mammals has a pronounced sideways motion when eating. This lateral movement is necessary for the grinding motion of chewing.

The dentition of herbivores is quite varied depending on the kind of vegetation a particular species is adapted to eat. Although these animals differ in the types and numbers of teeth they possess, the various kinds of teeth when present, share common structural features. The incisors are broad, flattened and spade-like. Canines may be small as in horses, prominent as in hippos, pigs and some primates (these are thought to be used for defense) or absent altogether. The molars, in general, are squared and flattened on top to provide a grinding surface. The molars cannot vertically slide past one another in a shearing/slicing motion, but they do horizontally slide across one another to crush and grind. The surface features of the molars vary depending on the type of plant material the animal eats. The teeth of herbivorous animals are closely grouped so that the incisors form an efficient cropping/biting mechanism, and the upper and lower molars form extended platforms for crushing and grinding. The "walled-in" oral cavity has a lot of potential space that is realized during eating.

These animals carefully and methodically chew their food, pushing the food back and forth into the grinding teeth with the tongue and cheek muscles. This thorough process is necessary to mechanically disrupt plant cell walls in order to release the digestible intracellular contents and ensure thorough mixing of this material with their saliva. This is important because the saliva of plant-eating mammals often contains carbohydrate-digesting enzymes which begin breaking down food molecules while the food is still in the mouth.

### **Stomach and Small Intestine**

Striking differences between carnivores and herbivores are seen in these organs. Carnivores have a capacious simple (single-chambered) stomach. The stomach volume of a carnivore represents 60-70% of the total capacity of the digestive system. Because meat

is relatively easily digested, their small intestines (where absorption of food molecules takes place) are short; about three to five or six times the body length. Since these animals average a kill only about once a week, a large stomach volume is advantageous because it allows the animals to quickly gorge themselves when eating, taking in as much meat as possible at one time which can then be digested later while resting. Additionally, the ability of the carnivore stomach to secrete hydrochloric acid is exceptional. Carnivores are able to keep their gastric pH down around 1-2 even with food present. This is necessary to facilitate protein breakdown and to kill the abundant dangerous bacteria often found in decaying flesh foods.

Because of the relative difficulty with which various kinds of plant foods are broken down (due to large amounts of indigestible fibers), herbivores have significantly longer and in some cases, far more elaborate guts than carnivores. Herbivorous animals that consume plants containing a high proportion of cellulose must "ferment" (digest by bacterial enzyme action) their food to obtain the nutrient value. They are classified as either "ruminants" (foregut fermenters) or hindgut fermenters. The ruminants are the plant-eating animals with the celebrated multiple-chambered stomachs. Herbivorous animals that eat a diet of relatively soft vegetation do not need a multiple-chambered stomach. They typically have a simple stomach, and a long small intestine. These animals ferment the difficult-to-digest fibrous portions of their diets in their hindguts (colons). Many of these herbivores increase the sophistication and efficiency of their GI tracts by including carbohydrate-digesting enzymes in their saliva. A multiple-stomach fermentation process in an animal which consumed a diet of soft, pulpy vegetation would be energetically wasteful. Nutrients and calories would be consumed by the fermenting bacteria and protozoa before reaching the small intestine for absorption. The small intestine of plant-eating animals tends to be very long (greater than 10 times body length) to allow adequate time and space for absorption of the nutrients.

## **Colon**

The large intestine (colon) of carnivores is simple and very short, as its only purposes are to absorb salt and water. It is approximately the same diameter as the small intestine and, consequently, has a limited capacity to function as a reservoir. The colon is short and non-pouched. The muscle is distributed throughout the wall, giving the colon a smooth cylindrical appearance. Although a bacterial population is present in the colon of carnivores, its activities are essentially putrefactive.

In herbivorous animals, the large intestine tends to be a highly specialized organ involved in water and electrolyte absorption, vitamin production and absorption, and/or fermentation of fibrous plant materials. The colons of herbivores are usually wider than their small intestine and are relatively long. In some plant-eating mammals, the colon has a pouched appearance due to the arrangement of the muscle fibers in the intestinal wall. Additionally, in some herbivores the cecum (the first section of the colon) is quite large and serves as the primary or accessory fermentation site.

## What About Omnivores?

One would expect an omnivore to show anatomical features which equip it to eat both animal and plant foods. According to evolutionary theory, carnivore gut structure is more primitive than herbivorous adaptations. Thus, an omnivore might be expected to be a carnivore which shows some gastrointestinal tract adaptations to an herbivorous diet.

This is exactly the situation we find in the Bear, Raccoon and certain members of the Canine families. (This discussion will be limited to bears because they are, in general, representative of the anatomical omnivores.) Bears are classified as carnivores but are classic anatomical omnivores. Although they eat some animal foods, bears are primarily herbivorous with 70-80% of their diet comprised of plant foods. (The one exception is the Polar bear which lives in the frozen, vegetation poor arctic and feeds primarily on seal blubber.) Bears cannot digest fibrous vegetation well, and therefore, are highly selective feeders. Their diet is dominated by primarily succulent lent herbage, tubers and berries. Many scientists believe the reason bears hibernate is because their chief food (succulent vegetation) not available in the cold northern winters. (Interestingly, Polar bears hibernate during the summer months when seals are unavailable.)

In general, bears exhibit anatomical features consistent with a carnivorous diet. The jaw joint of bears is in the same plane as the molar teeth. The temporalis muscle is massive, and the angle of the mandible is small corresponding to the limited role the pterygoid and masseter muscles play in operating the jaw. The small intestine is short (less than five times body length) like that of the pure carnivores, and the colon is simple, smooth and short. The most prominent adaptation to an herbivorous diet in bears (and other "anatomical" omnivores) is the modification of their dentition. Bears retain the peg-like incisors, large canines and shearing premolars of a carnivore; but the molars have become squared with rounded cusps for crushing and grinding. Bears have not, however, adopted the flattened, blunt nails seen in most herbivores and retain the elongated, pointed claws of a carnivore.

An animal which captures, kills and eats prey must have the physical equipment which makes predation practical and efficient. Since bears include significant amounts of meat in their diet, they must retain the anatomical features that permit them to capture and kill prey animals. Hence, bears have a jaw structure, musculature and dentition which enable them to develop and apply the forces necessary to kill and dismember prey even though the majority of their diet is comprised of plant foods. Although an herbivore-style jaw joint (above the plane of the teeth) is a far more efficient joint for crushing and grinding vegetation and would potentially allow bears to exploit a wider range of plant foods in their diet, it is a much weaker joint than the hinge-style carnivore joint. The herbivore-style jaw joint is relatively easily dislocated and would not hold up well under the stresses of subduing struggling prey and/or crushing bones (nor would it allow the wide gape carnivores need). In the wild, an animal with a dislocated jaw would either soon starve to death or be eaten by something else and would, therefore, be selected against. A given species cannot adopt the weaker but more mobile and efficient herbivore-style joint until it has committed to an essentially plant-food diet test it risk jaw dislocation, death and ultimately, extinction.

## What About Me?

The human gastrointestinal tract features the anatomical modifications consistent with an herbivorous diet. Humans have muscular lips and a small opening into the oral cavity. Many of the so-called "muscles of expression" are actually the muscles used in chewing. The muscular and agile tongue essential for eating, has adapted to use in speech and other things. The mandibular joint is flattened by a cartilaginous plate and is located well above the plane of the teeth. The temporalis muscle is reduced. The characteristic "square jaw" of adult males reflects the expanded angular process of the mandible and the enlarged masseter/pterygoid muscle group. The human mandible can move forward to engage the incisors, and side-to-side to crush and grind.

Human teeth are also similar to those found in other herbivores with the exception of the canines (the canines of some of the apes are elongated and are thought to be used for display and/or defense). Our teeth are rather large and usually abut against one another. The incisors are flat and spade-like, useful for peeling, snipping and biting relatively soft materials. The canines are neither serrated nor conical, but are flattened, blunt and small and function like incisors. The premolars and molars are squarish, flattened and nodular, and used for crushing, grinding and pulping non-coarse foods.

Human saliva contains the carbohydrate-digesting enzyme, salivary amylase. This enzyme is responsible for the majority of starch digestion. The esophagus is narrow and suited to small, soft balls of thoroughly chewed food. Eating quickly, attempting to swallow a large amount of food or swallowing fibrous and/or poorly chewed food (meat is the most frequent culprit) often results in choking in humans.

Man's stomach is single-chambered, but only moderately acidic. (Clinically, a person presenting with a gastric pH less than 4-5 when there is food in the stomach is cause for concern.) The stomach volume represents about 21-27% of the total volume of the human GI tract. The stomach serves as a mixing and storage chamber, mixing and liquefying ingested foodstuffs and regulating their entry into the small intestine. The human small intestine is long, averaging from 10 to 11 times the body length. (Our small intestine averages 22 to 30 feet in length. Human body size is measured from the top of the head to end of the spine and averages between two to three feet in length in normal-sized individuals.)

The human colon demonstrates the pouched structure peculiar to herbivores. The distensible large intestine is larger in cross-section than the small intestine, and is relatively long. Man's colon is responsible for water and electrolyte absorption and vitamin production and absorption. There is also extensive bacterial fermentation of fibrous plant materials, with the production and absorption of significant amounts of food energy (volatile short-chain fatty acids) depending upon the fiber content of the diet. The extent to which the fermentation and absorption of metabolites takes place in the human colon has only recently begun to be investigated.

In conclusion, we see that human beings have the gastrointestinal tract structure of a "committed" herbivore. Humankind does not show the mixed structural features one expects and finds in anatomical omnivores such as bears and raccoons. Thus, from comparing the gastrointestinal tract of humans to that of carnivores, herbivores and omnivores we must conclude that humankind's GI tract is designed for a purely plant-food diet.



## Summary

<p><b>Facial Muscles</b>            CARNIVORE: Reduced to allow wide mouth gape            OMNIVORE: Reduced            HERBIVORE: Well-developed            HUMAN: Well-developed</p> <p><b>Jaw Type</b>            CARNIVORE: Angle not expanded            OMNIVORE: Angle not expanded            HERBIVORE: Expanded angle            HUMAN: Expanded angle</p> <p><b>Jaw Joint Location</b>            CARNIVORE: On same plane as molar teeth            OMNIVORE: On same plane as molar teeth            HERBIVORE: Above the plane of the molars            HUMAN: Above the plane of the molars</p> <p><b>Jaw Motion</b>            CARNIVORE: Shearing; minimal side-to-side motion            OMNIVORE: Shearing; minimal side-to-side            HERBIVORE: No shear; good side-to-side, front-to-back            HUMAN: No shear; good side-to-side, front-to-back</p> <p><b>Major Jaw Muscles</b>            CARNIVORE: Temporalis            OMNIVORE: Temporalis            HERBIVORE: Masseter and pterygoids            HUMAN: Masseter and pterygoids</p> <p><b>Mouth Opening vs. Head Size</b>            CARNIVORE: Large            OMNIVORE: Large            HERBIVORE: Small            HUMAN: Small</p> <p><b>Teeth: Incisors</b>            CARNIVORE: Short and pointed</p>	<p><b>Saliva</b>            CARNIVORE: No digestive enzymes            OMNIVORE: No digestive enzymes            HERBIVORE: Carbohydrate digesting enzymes            HUMAN: Carbohydrate digesting enzymes</p> <p><b>Stomach Type</b>            CARNIVORE: Simple            OMNIVORE: Simple            HERBIVORE: Simple or multiple chambers            HUMAN: Simple</p> <p><b>Stomach Acidity</b>            CARNIVORE: Less than or equal to pH 1 with food in stomach            OMNIVORE: Less than or equal to pH 1 with food in stomach            HERBIVORE: pH 4 to 5 with food in stomach            HUMAN: pH 4 to 5 with food in stomach</p> <p><b>Stomach Capacity</b>            CARNIVORE: 60% to 70% of total volume of digestive tract            OMNIVORE: 60% to 70% of total volume of digestive tract            HERBIVORE: Less than 30% of total volume of digestive tract            HUMAN: 21% to 27% of total volume of digestive tract</p> <p><b>Length of Small Intestine</b>            CARNIVORE: 3 to 6 times body length            OMNIVORE: 4 to 6 times body length            HERBIVORE: 10 to more than 12 times body length            HUMAN: 10 to 11 times body length</p> <p><b>Colon</b>            CARNIVORE: Simple, short and smooth            OMNIVORE: Simple, short and smooth            HERBIVORE: Long, complex; may be sacculated            HUMAN: Long, sacculated</p>
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<p>OMNIVORE: Short and pointed  HERBIVORE: Broad, flattened and spade shaped  HUMAN: Broad, flattened and spade shaped</p> <p><b>Teeth: Canines</b>  CARNIVORE: Long, sharp and curved  OMNIVORE: Long, sharp and curved  HERBIVORE: Dull and short or long (for defense), or none  HUMAN: Short and blunted</p> <p><b>Teeth: Molars</b>  CARNIVORE: Sharp, jagged and blade shaped  OMNIVORE: Sharp blades and/or flattened  HERBIVORE: Flattened with cusps vs complex surface  HUMAN: Flattened with nodular cusps</p> <p><b>Chewing</b>  CARNIVORE: None; swallows food whole  OMNIVORE: Swallows food whole and/or simple crushing  HERBIVORE: Extensive chewing necessary  HUMAN: Extensive chewing necessary</p>	<p><b>Liver</b>  CARNIVORE: Can detoxify vitamin A  OMNIVORE: Can detoxify vitamin A  HERBIVORE: Cannot detoxify vitamin A  HUMAN: Cannot detoxify vitamin A</p> <p><b>Kidney</b>  CARNIVORE: Extremely concentrated urine  OMNIVORE: Extremely concentrated urine  HERBIVORE: Moderately concentrated urine  HUMAN: Moderately concentrated urine</p> <p><b>Nails</b>  CARNIVORE: Sharp claws  OMNIVORE: Sharp claws  HERBIVORE: Flattened nails or blunt hooves  HUMAN: Flattened nails</p>
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## Why are we so confused about nutrition?

T. Colin Campbell PhD, the author of *The China Study* released his latest book in the spring of 2013. It's called "*Whole*" and was co-authored by Howard Jacobson PhD. Dr. Campbell states that *The China Study* focused on the evidence that tells us a whole food plant based diet is the healthiest human diet. "*Whole*" focuses on why it's been so hard to bring that evidence to light – and on what still needs to happen for **real** change to take place.

**Real** change requires a shift from a **reductionist** to a **wholistic** paradigm in the world of nutrition research.

The reductionist paradigm focuses on minute details taken out of context from the whole system of which they are a part. The reductionist worldview believes that "The whole is equal to the sum of its parts".

Campbell and Jacobson argue that we must discard the assumption that nutrition is the summation of activity of single nutrients.

Scientists with a reductionist worldview believe that the most reliable approach to establish a causal relationship between diet and disease is a randomized control trial. Dr. Campbell's view is exactly the opposite. Dr. Campbell writes "A randomized control study design focuses on one factor, one outcome and generally one mechanism at a time. **"This is not nutrition; it is pharmacology"**. Such studies often create more confusion than clarification.

The "Wholistic" worldview believes that "The whole is greater than the sum of its parts". The correlations-based ecological study design is a wholistic research approach. These types of studies are often trashed by reductionist scientists. They often state that correlations tell us nothing about diet and disease associations.

Dr. Campbell writes "it is true that nothing conclusive about causation can be established because of the way that these studies are done, but this criticism depends on the assumption that investigators are trying to identify single factor causation, again defying what nutrition is". Dr. Campbell states "the fault line in these studies is the formulation of hypotheses. **If these hypotheses are formulated to truly reflect the wholistic characteristic of nutrition where multiple nutrients, biomarkers, and outcomes are simultaneously measured, then assessing causation is much more reasonable**".

An example of research with a reductionist study design is a study by *PW Parodi "A role for milk proteins and their peptides in cancer prevention", (Current Pharmaceutical Design 13: 813-828, 2007)*.

Dr. Campbell responds to this study by writing "I am not opposed to doing reductionist experiments. Indeed, we did a lot of such experiments and published the results in the very best scientific journals. We worked on the details of carcinogen metabolism, used single nutrients (casein, selected antioxidants, etc.) in (primary liver cancer). **The difference is that we tried not to make global conclusions unmindful of the far larger context.** As we proceeded from study to study in our research, we sought an ever wider context and attempted to define nutritional principles that were consistent within this wider context. These principles arose from a variety of studies

involving multiple nutrients, multiple mechanisms, and multiple outcomes. We also used more than one species (rats, mice, humans) and looked for consistency between different types of experimental study designs. Only by doing this could we establish reliable principles that had **breadth and depth**".

I agree with Dr, Campbell in that **this is how nutrition science should work!**

You can access Dr. Campbell's full response to this study by conducting a Google search for: "*T Colin Campbell research methodology in cancer research*".

As mentioned earlier, the "Wholistic" worldview believes that "The whole is greater than the sum of its parts".

You may ask "The whole what?"

The "whole" is the food, but not just the individual food. All foods together consumed by a whole human being as part of a whole lifestyle in a whole environment....

There is always a bigger "whole".

### **Profit Motive and Reductionism**

The **profit motive** demands the use of a reductionist paradigm in nutrition research. If a specific nutrient can be identified as affecting a specific mechanism, it could lead to the creation of a drug that could be patented. If our motive is solely based on finding out the **truth about the relationship between diet and human health**, then nutrition research demands a wholistic paradigm.

For decades nutritional scientists have focused on studying one nutrient or food and its effect on one biological or biochemical mechanism. They do this without the knowledge or concern of what other nutritional scientists are doing.

The findings don't do much to add to our understanding of healthy diets if the authors are blind to the work of thousands of other scientists conducting nutrition research.

### **The Elephant in the Room**

The old Hindu story about the elephant and six blind men helps to explain why the reductionist paradigm in nutrition research is failing us.

In the story, six blind men touch an elephant. Although each man touches the same animal, his determination of the elephant is based only on what he is able to perceive.

- The man touching the elephant's side concluded that the elephant was a *wall*
- The man touching the elephant's tusk concluded that the elephant was a *spear*
- The man touching the elephant's trunk concluded that the elephant was a *snake*
- The man touching the elephant's leg concluded that the elephant was a *tree*
- The man touching the elephant's ear concluded that the elephant was a *fan*
- The man touching the elephant's tail concluded that the elephant was a *rope*

Each man argued loud and long over whose assessment of the elephant was correct. Each was partly right, yet all were wrong.

If my elephant knowledge was dependent on the conclusions of the six blind men, I'd be thoroughly confused - much like Americans feel when it comes to nutrition.

How often have we heard the media report on a study that showed an association between a certain nutrient and protection against a certain disease, then a few weeks later, we hear about a different study that suggests the same nutrient increases the risk of developing a different disease?

How does this help someone figure out the healthiest way to eat?

### **The Folly of Recommended Daily Allowances**

Reducing nutrition to the study of individual nutrients taken out of context results in Recommended Daily Allowances (RDAs) for some nutrients. The RDAs form the basis of much of the confusing and essentially meaningless information on Nutrition Facts Labels. RDAs are pretty much useless as they don't do much to help people to move towards a healthier diet.

In reality, we can never know the ideal amount of a specific nutrient a person needs. The need for a nutrient is dependent on so many complex variables (ie. digestion, absorption, storage, excretion etc...).

We will never be able to determine the amount of a nutrient that gets to the functional part of a cell.

We can't even be confident in the amount of specific nutrients that are in whole plant foods. Variations among individual plant foods can significantly affect nutrient content. Pre-harvest factors such as the location of the fruit on the tree or whether or not a vegetable was grown in an open field instead of under glass or in plastic tunnels can greatly affect nutrient content.

Due to the tremendous variation in nutrition content of fruits and vegetables, it is extremely difficult to scientifically quantify the nutritional value of whole plant foods.

Yet most people associate certain plant foods with one specific nutrient.

Some examples include:

- Carrots and beta carotene
- Oranges and Vitamin C
- Tomatoes and Lycopene
- Bananas and Potassium

Associating various foods with specific nutrients limits our knowledge of nutrition and does not help to steer people towards a health promoting diet.

### **Dr. Rui Hai Liu**

Dr. Rui Hai Liu of Cornell University led researchers in the study of the antioxidant effect of apples.

The researchers found that vitamin C from apples is only responsible for a small portion (0.4%) of the apple's anti-oxidant activity. Instead, almost all of this activity in apples is from phytonutrients.

The Cornell researchers found that eating 100 grams of fresh apple with skins provided the total anti-oxidant activity equal to 1,500 milligrams of vitamin C.

What this study shows is the **combination** of phytochemicals plays a very important role in anti-oxidant and anti-cancer activity, and the real health benefits may come from a **phytochemical mixture** (found in foods).

Says Liu, "Scientists are interested in isolating single compounds -- such as vitamin C, vitamin E and beta carotene -- to see if they exhibit anti-oxidant or anti-cancer benefits. It turns out that none of those works alone to reduce cancer. It's the combination of flavonoids and polyphenols doing the work."

It's the combination of phytochemicals, which are only found in whole and minimally processed plant foods, that provides protection against chronic disease. The results of this study are consistent with many similar studies and help to confirm the importance of eating a **diet dominated by whole and minimally processed plant foods**.

A researcher with a reductionist worldview would respond to the results of the study by conducting further studies to see if a specific nutrient in apples (out of thousands of phytonutrients) is responsible for the antioxidant activity. As mentioned earlier in this article, this attempt will prove futile. A researcher with a wholistic mindset would ask the question, "Why is it important, from a health perspective, to identify a specific nutrient to explain the antioxidant activity"?

### **How Nutrition is Taught Adds to Confusion**

During Howard Jacobson's presentation at Plant Stock 2013, he asked, "Imagine if we taught catching a ball the way we teach nutrition"?

Scientists really don't know how we catch a ball. At the very least, catching a ball involves "*physics, engineering control theory, kinaesthesiology, ethology, perception and the study of expertise*".

Imagine if various aspects of these disciplines were learning prerequisites for all catching instruction classes. Jacobson joked that people would be grabbing for their calculators, computers and text books whenever they were asked to catch a ball. We would have an epidemic of bad catching! People would not have any confidence in the proper way to catch a ball.

Learning nutrition by focusing on specific nutrients and their specific effects has resulted in a lack of confidence among Americans, on what constitutes the ideal human diet.

Healthy, trim, long-lived populations eat diets dominated by whole plant foods with small amounts of meat and fish and little to no processed junk. These people don't need or care to know that the monounsaturated fatty acids in olive oil raise HDL levels or that dairy calcium improves bone density.

I doubt that traditional Okinawans would be very interested in Dr. Campbell's research that shows casein (major dairy protein) to be a potent tumor promoter.

Dr. Campbell questions these and all such studies because they usually miss the larger context. The China Project became the larger context within which casein, perhaps animal protein in general, relates to human health. Reductionist research results were tested for relevance to the bigger picture.

### **Should We Ignore All Nutrition Research Studies?**

We'll continue to be bombarded with nutrition studies. Should they all be ignored until a wholistic paradigm shift occurs? No, but they all should be questioned.

Howard Jacobson recommends asking and answering these three questions when evaluating scientific studies.

1. Is it true?
2. Is it the whole truth?
3. Does it matter?

#### *Is it true?*

Some studies are so flawed that doubt is cast on any and all conclusions.

#### *Is it the whole truth?*

A study may reveal associations between a single nutrient and a specific biochemical mechanism, but the study may not have accounted for some critical confounding variables.

A study could establish strong correlations between a single nutrient and a specific biochemical mechanism or biomarker and the authors' conclusion assumes cause and effect when none has been shown.

Conclusions may be biased based on funding sources

Conclusions may ignore known detrimental effects of supplementation of the studied nutrient.

#### *Does it Matter?*

One should take into account the **rapidity**, **breadth** and **depth** of the effect.

**Rapidity** – How long does it take for the effects to occur?

**Breadth** – How many things are affected? (biomarkers, disease states and body states)

**Depth** – How powerful is the effect?

Research by Dr. T Colin Campbell, Dr. Caldwell Esselstyn, Dr. Neal Barnard Dr. Dean Ornish, and many others has shown that WFPB

diets result in fast, powerful, and positive effects in the prevention and treatment of a variety of chronic diseases.

The “*Resources*” page on “plantasticle.com” web site provides links to the web pages of the above researchers and many other experts on WFPB research.

Very few research studies on pharmaceuticals answer the “Does it Matter?” question as well as studies on WFPB diets.

That is because pharmaceuticals treat symptoms of chronic disease and not the root cause of chronic disease. When you **treat the cause**, the results are often **fast, far reaching and profound**.

Dietitians, physicians and researchers who are so focused on one nutrient/one disease, ignore (intentionally or unintentionally) the vast knowledge that we already have on the ideal diet for human beings.

### **The Reductionist Paradigm’s Effect on how Chronic Disease is Treated**

Dr Campbell states that many scientists scoff at wholistic nutrition and biomedical research often referring to it as a “scattershot” or “messy” approach.

I contend that the existing reductionist research paradigm has resulted in a **“scattershot” and “messy” approach to treating chronic disease**.

Medications are usually prescribed and are targeted at specific symptoms and/or biomarkers. It’s often a hit or miss proposition. If the medication is not effective - no worries - there are plenty more medications available. A patient may have to try multiple medications, often in combination, before symptoms subside. Sometimes as the primary symptom subsides, the patient begins experiencing symptoms caused by the initial treatment, prompting the prescription of additional medication. This can eventually lead to a long list of medications that a patient has to juggle every single day. When I worked as a telephone Nutrition Consultant for an insurance company, it was not uncommon to encounter members on more than 15 daily medications.

This is how chronic disease is treated! To paraphrase Dr. John McDougall – “No patient gets healthier – they’re still sick, but now they drag around a bag of pills with them.”

### **We Must Focus More on the Forest**

Reductionist studies are like the trees in a forest. I believe that wholistic studies allow us to make some sense of the trees by allowing us to see the forest. Dr. Campbell and his colleagues have stepped out from among the trees in order to get a clearer picture of the forest.

Those of us interested in nutrition and health need to do the same.

Once done, more and more researchers, dietitians and physicians will begin to see that the picture clearly shows that a WFPB diet combined with reasonable exercise is the best way to prevent and treat chronic disease.



## Different Variations of Whole Food Plant Based Diets

(Information taken from Dr. John McDougall's August 2012 Newsletter)

**Healthy diets based on plants foods have been advocated for millenniums. Here are a few of the important players (please note the lack of originality, in other words, the commonality):**

**Barnard Diet** (by Neal Barnard, MD, founder of Physicians Committee for Responsible Medicine): Based on starches, vegetables and fruits. Diet is low-fat. Emphasis is on no animal foods, ever.

**Biblical Daniel Diet:** More than 2500 years ago a diet of vegetables and water was found to improve the health of men in 10 days, compared to men eating meat (the king's food).

**China Study Diet** (by T. Colin Campbell, PhD): Based on starches, vegetables, and fruits. Animal foods may account for 10% or fewer of foods consumed.

**CHIP Program** (The Complete Health Improvement Program by Dr. Hans Diehl): Based on starches, vegetables, and fruits. Emphasis is on eating low-fat.

**Esselstyn Diet** (by Caldwell Esselstyn, MD): Based on starches, vegetables, and fruits. No nuts, seeds, avocados, or other fatty plant foods are allowed. Emphasis is on eating very low-fat.

**Engine 2 Diet** (by Rip Esselstyn): Based on starches, vegetables, and fruits. Emphasis is on eating very low-fat.

**Fuhrman Diet** (by Joel Fuhrman, MD): Based on green and yellow vegetables, beans, nuts, and seeds. Not always low in fat. Small amounts of animal foods allowed. Emphasis is on eating "nutrient-dense" greens.

**Hallelujah Diet** (by Rev. George Malkmus): Consists of 85% raw, uncooked, and unprocessed plant-based food, and 15% cooked, plant-based foods.

**Kempner Rice Diet** (by Walter Kempner, MD): Based on rice and fruits. More plant foods and a few animal foods are allowed after recovery. Emphasis is on eating very low sodium.

**Macrobiotic Diet:** Based on grains (rice) and vegetables. Fish, seafood, seeds, and nuts may be eaten occasionally.

**McDougall Diet** (by John McDougall, MD): Based on starches, vegetables, and fruits. Healthy, trim people can eat some nuts, seeds, and avocados. Animal foods for holidays, at most. Emphasis is on eating starches.

**Natural Hygiene Diet** (by Herbert M. Shelton, ND): Advocates a raw food diet of vegetables, fruits, and nuts; and also periodic fasting and food combining.

**Ornish Diet** (by Dean Ornish, MD): Based on starches, vegetables and fruits. Low-fat dairy, some fish, and fish oils are used at times. Emphasis is on eating very low-fat.

**Popper Diet** (by Pam Popper, PhD): Based on starches, vegetables, and fruits. Emphasis is on eating very low-fat.

**Pritikin Diet** (by Nathan Pritikin): The original diet was based on starches, vegetables and fruits. Small amounts of meat, poultry, fish, and low-fat dairy are allowed. Emphasis is on eating very low-fat.

\*This list is incomplete

# Essential Fatty Acids

## Essential Fatty Acid Basics

The body can synthesize some of the fats it needs from the foods you eat. However, **two essential fatty acids** cannot be synthesized in the body and can be taken in the diet from plant foods. Their names—**alpha – linolenic (ALA)** and **linoleic acid (LA)**—are not important. What is important is that these basic fats are used to build specialized fats called omega-3 and omega-6 fatty acids.

Omega-3 and Omega-6 fatty acids are important in the normal functioning of all tissues of the body. Deficiencies are responsible for a host of symptoms and disorders including abnormalities in the liver and kidney, changes in the blood, reduced growth rates, decreased immune function, depression, and skin changes, including dryness and scaliness. Adequate intake of the essential fatty acids results in numerous health benefits. Prevention of atherosclerosis, reduced incidence of heart disease and stroke, and relief from the symptoms associated with ulcerative colitis, menstrual pain, and joint pain have also been documented.

Good sources of omega-3 and omega-6 fats should be included daily. **It is important to take these two fats in the proper ratio as well.** Omega-6 fatty acids compete with omega-3 fatty acids for use in the body, and therefore excessive intake of omega-6 fatty acids can be a problem. **The U.S. diet has become heavy in omega-6 fats and low in omega-3 fats, secondary to a reliance on processed foods and oils.** It is necessary to balance this by eating a low-fat diet that is low in processed foods and with fat mainly coming from omega-3 fatty acids. **It has been estimated that the ratio of omega-6 to omega-3 fatty acids in the diet of early humans was 1:1,** but the ratio in the typical Western diet is now **almost 10:1** due to increased use of vegetable oils rich in LA.

## Omega-6 Fatty Acids

Omega-6 fats are found in leafy vegetables, seeds, nuts, grains, and vegetable oils (corn, safflower, soybean, cottonseed, sesame, sunflower). The parent fatty acid of the omega-6 series is **linoleic acid (LA)**. Human beings, like other mammals, can convert LA into two longer chained Omega 6 fatty acids dihomogamma-linolenic acid (DGLA) and arachidonic acid,(AA)

## Omega-3 Fatty Acids

It is important for vegetarians to include foods that are rich in omega-3 fatty acids on a daily basis. **Alpha-linolenic acid (ALA)** is the parent fatty acid of the omega-3 series and is in many vegetables, beans, nuts, seeds, and fruits. **The best source of alpha-linolenic acid is flaxseeds.** Omega-3 fatty acids can be found in smaller quantities in nuts, seeds, and soy.

A tablespoonful of **ground flaxseed** will supply the daily requirement of alpha-linolenic acid. To protect it from oxygen damage, ground flax seed must be stored in the refrigerator or the freezer. **For you to absorb what you need from flaxseeds, they must be ground.** Simply put fresh flaxseeds in a spice or coffee grinder for a few seconds. Some people grind a cup every week or so and store it in the freezer. A spoonful can be added to a smoothie or sprinkled on breakfast cereal, a salad, or other dish.

Human beings, like other mammals, can convert **Alpha-linolenic acid (ALA)** to two longer chained Omega 3 fatty acids - docosahexanoic acid (DHA) and eicosapentanoic acid (EPA).

The high Omega 6:Omega3 ratio in the typical western diet has been shown to interfere with the conversion of ALA to EPA and DHA, particularly DHA.

Vegans are told to take DHA and EPA supplements – **THIS IS NOT NECESSARY IF YOU FOLLOW A BALANCED WFPB DIET!!!** A balanced WFPB diet will provide a lower Omega 6:Omega 3 ratio.

Dr. Matthew Lederman MD recommends - **not** to add ALA, EPA and/or DHA supplements, **but to eliminate all oils and limit fatty whole plant food consumption so ALA can be effectively converted to DHA and EPA.**

The problem for most people is not a deficiency of Omega – 3, but an excess of Omega – 6 **This is another great reason to eliminate added oils.**

## Seven Dietary Guidelines to reduce your risk for developing Alzheimer's Disease

The seven dietary principles to reduce the risk of Alzheimer's disease were prepared for presentation at the [International Conference on Nutrition and the Brain](#) in Washington on July 19 and 20, 2013.

The guidelines are as follows:

1. **Minimize your intake of saturated fats and trans fats.** Saturated fat is found primarily in dairy products, meats, and certain oils (coconut and palm oils). Trans fats are found in many snack pastries and fried foods and are listed on labels as “partially hydrogenated oils.”
2. **Vegetables, legumes (beans, peas, and lentils), fruits, and whole grains** should be the primary staples of the diet.
3. **One ounce of nuts or seeds (one small handful)** daily provides a healthful source of vitamin E.
4. **A reliable source of vitamin B12**, such as fortified foods or a supplement providing at least the recommended daily allowance (2.4 mcg per day for adults) should be part of your daily diet.
5. When selecting multiple vitamins, choose **those without iron and copper, and consume iron supplements only when directed by your physician.**
6. While aluminum's role in Alzheimer's disease remains a matter of investigation, it is prudent to **avoid the use of cookware, antacids, baking powder, or other products that contribute dietary aluminum.**
7. **Include aerobic exercise** in your routine, equivalent to 40 minutes of brisk walking three times per week.

### Discussion

As Alzheimer's rates and medical costs continue to climb, simple changes to diet and lifestyle may help in preventing cognitive problems.

#### 1. Saturated and Trans Fats

In addition to reducing the risk of heart problems and overweight, avoiding foods high in saturated and trans fats may also reduce the risk of Alzheimer's disease. Saturated fat is found in dairy products and meats; trans fats are found in many snack foods.

Researchers with the Chicago Health and Aging Project followed study participants over a four-year period. Those who consumed the most saturated fat (around 25 grams each day) were two to three times more likely to develop Alzheimer's disease, compared with participants who consumed only half that amount.<sup>1</sup>

Similar studies in New York and in Finland found similar results. Individuals consuming more “bad” fats were more likely to develop Alzheimer's disease, compared with those who consumed less of these products.<sup>2,3</sup> Not all studies are in agreement. A study in the Netherlands found no protective effect of avoiding “bad” fats,<sup>4</sup> although the study population was somewhat younger than those in the Chicago and New York studies.

The mechanisms by which certain fats may influence the brain remains a matter of investigation. Studies suggest that high-fat foods and/or the increases in blood cholesterol concentrations they may cause can contribute to the production beta-amyloid plaques in the brain, a hallmark of Alzheimer's disease. These same foods increase the risk of obesity and type 2 diabetes, common risk factors for Alzheimer's disease.<sup>5-7</sup>

#### Cholesterol and APOEε4

High cholesterol levels have been linked to risk of Alzheimer's disease. A large study of Kaiser Permanente patients showed that participants with total cholesterol levels above 250 mg/dl in midlife had a 50 percent higher risk of Alzheimer's disease three decades later, compared with participants with cholesterol levels below 200 mg/dl.<sup>8</sup> The APOEε4 allele, which is strongly linked to Alzheimer's risk, produces a protein that plays a key role in cholesterol transport. Individuals with the APOEε4 allele may absorb cholesterol more easily from their digestive tracts compared with people without this allele.<sup>9</sup>

### **2. Nutrient-Rich Foods**

Vegetables, legumes (beans, peas, and lentils), fruits, and whole grains have little or no saturated fat or trans fats and are rich in vitamins, such as folate and vitamin B6, that play protective roles for brain health. Dietary patterns that emphasize these foods are associated with low risk for developing weight problems and type 2 diabetes.<sup>10</sup> They also appear to reduce risk for cognitive problems. Studies of Mediterranean-style diets<sup>11</sup> and vegetable-rich diets have shown that reduced risk of cognitive problems, compared to other dietary patterns.<sup>12</sup> The Chicago Health and Aging Project tracked study participants ages 65 and older, finding that a high intake of fruits and vegetables was associated with a reduced their risk of cognitive decline.<sup>13</sup>

### **3. Vitamin E**

Vitamin E is an antioxidant found in many foods, particularly nuts and seeds, and is associated with reduced Alzheimer's risk.<sup>14,15</sup> A small handful of typical nuts or seeds contains about 5 mg of vitamin E. Other healthful food sources include mangoes, papayas, avocados, tomatoes, red bell peppers, spinach, and fortified breakfast cereals.

### **4. The Role of B-Vitamins in Reducing Homocysteine**

Three B-vitamins—folate, B6, and B12—are essential for cognitive function. These vitamins work together to reduce levels of homocysteine, an amino acid linked to cognitive impairment. In an Oxford University study of older people with elevated homocysteine levels and memory problems, supplementation with these three vitamins improved memory and reduced brain atrophy.<sup>16,17</sup>

Healthful sources of folate include leafy greens, such as broccoli, kale, and spinach. Other sources include beans, peas, citrus fruits, and cantaloupe. The recommended dietary allowance (RDA) for folic acid in adults is 400 micrograms per day, or the equivalent of a bowl of fortified breakfast cereal or a large leafy green salad topped with beans, asparagus, avocados, sliced oranges, and sprinkled with peanuts.

Vitamin B6 is found in green vegetables in addition to beans, whole grains, bananas, nuts, and sweet potatoes. The RDA for adults up to 50 is 1.3 milligrams per day. For adults over 50, the RDA is 1.5 milligrams for women and 1.7 milligrams for men. A half cup of brown rice meets the recommended amount.

Vitamin B12 can be taken in supplement form or consumed from fortified foods, including plant milks or cereals. Adults need 2.4 mcg per day. Although vitamin B12 is also found in meats and dairy products, absorption from these sources can be limited in older individuals, those with reduced stomach acid, and those taking certain medications (e.g., metformin and acid-blockers). For this reason, the U.S. government recommends that B12 supplements be consumed by all individuals over age 50. Individuals on plant-based diets or with absorption problems should take vitamin B12 supplements regardless of age.

## **5. Hidden Metals**

Iron and copper are both necessary for health, but studies have linked excessive iron and copper intake to cognitive problems.<sup>18,19</sup> Most individuals meet the recommended intake of these minerals from everyday foods and do not require supplementation. When choosing a multiple vitamin, it is prudent to favor products that deliver vitamins only. Iron supplements should not be used unless specifically directed by one's personal physician.

The RDA for iron for women older than 50 and for men at any age is 8 milligrams. For women ages 19 to 50 the RDA is 18 milligrams. The RDA for copper for men and women is 0.9 milligrams.

## **6. Aluminum**

Aluminum's role in Alzheimer's disease remains controversial. Some researchers have called for caution, citing aluminum's known neurotoxic potential when entering the body in more than modest amounts<sup>20</sup> and the fact that aluminum has been demonstrated in the brains of individuals with Alzheimer's disease.<sup>21,22</sup> Studies in the United Kingdom and France found increased Alzheimer's prevalence in areas where tap water contained higher aluminum concentrations.<sup>23,24</sup>

Some experts hold that evidence is insufficient to indict aluminum as a contributor to Alzheimer's disease risk. While this controversy remains unsettled, it is prudent to avoid aluminum to the extent possible. Aluminum is found in some brands of baking powder, antacids, certain food products, and antiperspirants.

## **7. Physical Exercise and the Brain**

In addition to following a healthful diet and avoiding excess amounts of toxic metals, it is advisable to get at least 120 minutes of aerobic exercise each week. Studies have shown that aerobic exercise—such as running, brisk walking, or step-aerobics—reduces brain atrophy and improves memory and other cognitive functions.<sup>25</sup>

A recent study published in *Annals of Internal Medicine* found that adults who exercised in midlife, around age 40, were less likely to develop dementia after age 65 compared with their sedentary peers.<sup>26</sup> A similar study in New York found that adults who exercised and followed a healthy diet reduced their risk for Alzheimer's by as much as 60 percent.

## **Conclusion**

**Satisfactory treatments for Alzheimer's disease are not yet available. However, evidence suggests that, with a healthful diet and regular exercise, many cases could be prevented.**

## Getting Started on your Whole Food Plant Based Journey

**Dietary change is powerful medicine. If you are currently under a physician's care and/ or are on prescription meds, notify your physician on your plans to follow a low-fat, plant based/strong diet. Very often certain prescription meds can be reduced or even eliminated!**

**Eat whole and minimally processed fruits.** Lots of them. (Do not add sugar or fats to them)

Canned Fruits in own juice is OK, but not with added syrup

**Eat Whole and minimally processed veggies.** Lots of them (Do not add fats or sugar)  
Fresh, frozen and even canned are OK as long as no oils, cheese or sauces are added.

**Don't be afraid of starch!** Eat whole potatoes, sweet potatoes, peas and corn. I encourage any corn that you purchase be organically grown. Most non-organic corn now is genetically modified.

Intact grains like **rice, barley, quinoa etc..and hot cereals like oatmeal and cream of wheat, are low calorie foods**, compared to breads, bagels and cold cereals.

When preparing intact grains, avoid adding fat of any kind, including so-called healthy oils. All oils are the most calorically concentrated food in existence.

You can get all the fat you need from plant foods. I recommend that you consume some ground flax seed every day or a few walnuts. These are high in the essential fatty acid called alpha-linolenic acid. Remember not to overdo it with nuts and seeds

**Legumes are beans, peas or lentils.** Feel free to be liberal with these as well. Do not add any fat when preparing. I recommend buying organic soybeans because most non-organic soybeans are genetically modified.

If you are to eat meat, fish, poultry, eggs and dairy, eat them sparingly. Think of them as condiments. Certain fish like talapia, cod , haddock, and pollock are low-fat options.

If you ever decide to go 100% Whole Food Plant Based, you should take a daily B-12 supplement.

Significant dietary change can be difficult. You may have some bumps in the road on your way to a Plantastic Life. Don't forget that all the resources and services you may need to help you on your journey can be found at [www.wholefoodplantbasedrd.com](http://www.wholefoodplantbasedrd.com).

Plantastic Life



## Resources on Web

### **Dr. John McDougall Interviews Dr. Denis Burkitt**

<http://www.youtube.com/watch?v=GA1fkVLqhmE> (or Google “Dr. McDougall Interviews Dr. Burkitt”)

### **Dr. John McDougall Interviews Nathan Pritikin**

<http://www.youtube.com/watch?v=qOj4rzSkqok> (or Google “Dr. McDougall Interviews Nathan Pritikin”)

### **Dr. John McDougall**

<http://www.drmcDougall.com/>

### **Dr. Dean Ornish** (Coronary Artery Disease and Prostate Cancer)

<http://www.ornishspectrum.com/>

### **Dr. Caldwell Esselstyn Jr.** (Coronary Artery Disease)

<http://www.heartattackproof.com/>

[http://www.youtube.com/watch?v=AYTf0z\\_zVs0](http://www.youtube.com/watch?v=AYTf0z_zVs0) (or Google “Make Yourself Heart Attack Proof”)

### **Ann Esselstyn: What To Eat**

<http://www.youtube.com/watch?v=q6OGmcRSsm0> (or Google “Ann Esselstyn – What To Eat”)

### **Dr. Robert Ostfeld**

<http://www.montefiore.org/cardiacwellnessprogram>

### **T. Colin Campbell PhD.**

<http://nutritionstudies.org/>

<http://www.youtube.com/watch?v=1CN7PF10Rko> (or Google T. Colin Campbell – TED xEast)

### **Dr. Neal Barnard** (Diabetes, Cancer, Alzheimers)

<http://pcrm.org/>

<http://www.youtube.com/watch?v=ktQzM2IA-qU> (or Google Dr. Neal Barnard - TEDxFremont)

### **Dr. Roy Swank** – (Multiple Sclerosis)

<http://www.swankmsdiet.org/About%20The%20Diet> (or Google Dr. Swank low fat diet for MS)

**Amy Joy Lanou PhD** (Osteoporosis)

<http://buildingbonevitality.com/page2/page2.html>

(or Google Amy Joy Lanou – Building Bone Vitality Synopsis)

**Dr. Michael Greger** (Stay up-to-date on nutrition research)

<http://nutritionfacts.org/>

**Jeff Novick RD**

<http://www.jeffnovick.com/RD/Home.html>

Video on Olive Oil - <http://www.youtube.com/watch?v=lbALgjmZUek> (or Google Novick – Oil to Nuts)

**George Eisman RD**

<http://www.all-creatures.org/health.html> (Variety of Diseases)

<http://www.all-creatures.org/ccp/> (Cancer)

<http://www.all-creatures.org/health/sub-dairy.html> (Dairy is Scary)

**Janet Stanger PhD**

<http://www.youtube.com/watch?v=2R07FL1wVo4> (Or Google Janet Stanger – The Dangerous Truth About Protein)

**Dr. Michael Klaper PhD** (Digestive Health)

<http://www.youtube.com/watch?v=QiLHGe9euuA> (Or Google Dr. Klaper – Digestive Health)

**Dr. William Li**

<http://www.youtube.com/watch?v=B9bDZ5-zPtY> (Cancer)

**Jeff Novick RD** -

This link will give you access to information about WFPB programs that have produced and/or are producing published peer-reviewed credible research.

[http://www.jeffnovick.com/RD/Articles/Entries/2013/12/5\\_The\\_Spectrum\\_Of\\_Health\\_\\_The\\_Evidence\\_For\\_A\\_Whole\\_Food\\_Plant\\_Base\\_Diet\\_-\\_Pt\\_1.html](http://www.jeffnovick.com/RD/Articles/Entries/2013/12/5_The_Spectrum_Of_Health__The_Evidence_For_A_Whole_Food_Plant_Base_Diet_-_Pt_1.html)

**Dominic Marro RD CDN**

<http://www.wholefoodplantbasedrd.com/> or [www.plantasticlifecdn.com](http://www.plantasticlifecdn.com)

**Deborah Bellerose Nutrition Educator**

<http://www.asouperhealthy.com/index.html> or [www.plantasticlifecdn.com](http://www.plantasticlifecdn.com)