

The China Study

By T Colin Campbell

Book Report

Introduction

Americans are confused about nutrition. Many of the common notions you've been told about food, health and disease are wrong:

- Synthetic chemicals in the environment and in your food, as problematic as they may be, are not the main cause of cancer.
- The genes that you inherit from your parents are not the most important factors in determining whether you fall prey to any of the ten leading causes of death
- The hope that genetic research will eventually lead to drug cures for diseases ignores more powerful solutions that can be employed today.
- Obsessively controlling your intake of any one nutrient, such as cholesterol or omega-3 fats, will not result in long-term health.
- Vitamins and nutrient supplements do not give you long-term protection against disease. (After the book was written, Prof. Campbell learned about the clinical research supporting Juice Plus+[®] and he believes it is a good product.)
- Drugs and surgery don't cure the diseases that kill most Americans
- Your doctor probably does not know what you need to do to be the healthiest you can be.

Some of the findings published in the most reputable scientific journals, show that:

- Dietary change can enable diabetic patients to go off their medication
- Heart disease can be reversed with diet alone
- Breast cancer is related to levels of female hormones in the blood, which are determined by the food we eat.
- Consuming dairy foods can increase the risk of prostate cancer.
- Antioxidants, found in fruits and vegetables, are linked to better mental performance in old age.
- Kidney stones can be prevented by a healthy diet.
- Type 1 diabetes, one of the most devastating childhood diseases, is convincingly linked to infant feeding practices.

Our nutritional confusion is killing us:

- Two Thirds of Americans are overweight
- Half of Americans have a health problem that requires taking a prescription drug every week, and over 100 million Americans have high cholesterol.
- One third of the young people in this country are overweight, or at risk of becoming overweight.

These problems come down to three things: Breakfast, Lunch, and Dinner

My career began coordinating technical assistance for a nationwide project in the Philippines working with malnourished children. Part of the project became an investigation of the unusually high prevalence of liver cancer, usually an adult disease, in Filipino children. It was thought that high consumption of aflatoxin, a mold toxin found in peanuts and corn, caused this problem. Aflatoxin has been called one of the most potent carcinogens ever discovered.

For ten years our primary goal in the Philippines was to improve childhood malnutrition among the poor, a project funded by the US Agency for Int'l Development. The aim was simple: make sure that children were getting as much protein as possible. It was widely thought that much of the childhood malnutrition in the world was caused by a lack of protein, especially from animal-based foods.

So we had to tackle two closely related topics within one project: alleviate childhood malnutrition, and resolve the liver cancer problem caused by Aflatoxin contamination.

In this project, however, I uncovered a dark secret. Children who ate the highest-protein diets were the ones most likely to get liver cancer! They were the children of the wealthiest families. This information countered everything I had been taught. It was heretical to say that protein wasn't healthy, let alone say it promoted cancer. It was a defining moment in my career.

Faced with a difficult decision, I decided to start an in-depth laboratory program that would investigate the role of nutrition, especially protein, in the development of cancer. By carefully following the rules of good science, I was able to study a provocative topic without provoking knee-jerk responses that arise with radical ideas. Eventually, this research became handsomely funded for 27 years by the best-reviewed, and most competitive funding sources, (NIH, American Cancer Society, and American Institute of Cancer Research). Then our results were reviewed (a second time) for publication in many of the best scientific journals.

What we found was shocking. Low-protein diets inhibited the initiation of cancer by aflatoxin, regardless of how much of this carcinogen was administered to these animals. After cancer initiation was completed, low-protein diets also dramatically blocked subsequent cancer growth. In other words, the cancer-producing effects of this highly carcinogenic chemical were rendered insignificant by a low-protein diet. In fact, dietary protein proved to be so powerful in its effect that we could turn on and turn off cancer growth simply by changing the level of protein (similar to our own diets) consumed.

But that's not all. We found that not all proteins had this effect. Which protein consistently and strongly promoted cancer? Casein, which makes up 87% of cow's milk protein, promoted all stages of the cancer process. What type of protein did not promote cancer, even at high levels of intake? The safe proteins were from plants, including wheat and soy. As this picture came into view, it began to challenge and then to shatter some of my most cherished assumptions.

These experimental animal studies didn't end there. I went on to direct the most comprehensive study of diet, lifestyle and disease ever done with humans in the history of biomedical research. It was a massive undertaking arranged through Cornell University, Oxford University, and the Chinese Academy of Preventive Medicine. The NY Times called it the "Grand Prix of Epidemiology."

What made this project, called the China Study, especially remarkable is that, among the many associations that are relevant to diet and disease, so many pointed to the same finding: People who ate the most animal-based foods got the most chronic disease. People who ate the most plant-based foods were the healthiest and tended to avoid chronic disease. These results could not be ignored.

These findings show that heart disease, diabetes and obesity can be reversed by a healthy diet. Other research shows that various cancers, autoimmune diseases, bone health, kidney health, vision, and brain disorders in old age (like Alzheimer's) are convincingly influenced by diet. Most importantly, the diet that has time and again been shown to reverse and/or prevent these diseases is the same whole foods, plant-based diet that I found to promote optimal health in my laboratory research and in the China Study. The findings are consistent.

Part 1 The China Study

Problems We Face, Solutions We Need

If you're male in America, the American Cancer Society says you have a 47% chance of getting cancer. If you're female, you fare a little better, but you still have a whopping 38% lifetime chance of getting cancer. American rates of death from cancer are among the highest in the world and getting worse.

Both diabetes and obesity are symptoms of poor health in general. They rarely exist in isolation of other diseases, and often forecast deeper, more serious health problems, such as heart disease, cancer and stroke. One of 13 Americans now has diabetes, and that ratio continues to rise. Two of the most frightening statistics show that diabetes among people in their thirties has increased 70% in less than ten years, and the percentage of obese people has nearly doubled in the past thirty years.

But the most pervasive killer in our culture is not obesity, diabetes or cancer. It is heart disease. Heart disease will kill one out of every three Americans. According to the American Heart Assn, over 60 million Americans currently suffer from some form of cardiovascular disease, including high blood pressure, stroke and heart disease. The most dramatic recent finding is that heart disease can be prevented and reversed by a healthy diet. By embracing this revolutionary information, we can collectively defeat the most dangerous diseases in this country.

From three perspectives- disease prevalence, medical care efficacy, and economics- we have a deeply troubled medical system. Other countries spend only about one-half of what the US spends per capita on health care. Shouldn't we expect our system to rank above theirs? Unfortunately, among the 12 developed countries surveyed, the US system is consistently among the worst performers.

Americans need to know the truth. Although many of us think we're well-informed on nutrition, we're not. We tend to follow one faddish diet after another. Far too often, we scientists focus on details while ignoring the larger context. Whether it's vitamin A to prevent cancer or vitamin E to prevent heart attacks, we oversimplify and disregard the infinite complexity of nature. Often, investigating minute biochemical parts of food and

trying to reach broad conclusions about diet and health leads to contradictory results. Contradictory results lead to confused scientists and policy makers, and to an increasingly confused public.

Have you seen the “health” books at your local bookstore? These books have made health information more confusing, more difficult to grasp, and ultimately more elusive. Most of them are fad diets. The information in one book contradicts the information in another. This is not health.

So what is my prescription for good health? In short, it is about the multiple health benefits of consuming plant-based foods, and the largely unappreciated health dangers of consuming animal-based foods, including all types of meat, fish, dairy and eggs. The scientific basis for my views is largely empirical, obtained through observation and measurement. It’s not hypothetical or anecdotal. Much of my evidence comes from human studies. I did not begin my life’s research with the preconceived idea to prove the worthiness of plant-based diets. I started at the opposite end of the spectrum growing up as a meat-loving dairy farmer, and began my career as an “establishment” scientist. I proved, to my own dismay, that an animal-based diet is not only unnecessary, but also harmful.

When all was said and done, my colleagues and I were honored to have received a total of seventy-four grant years of funding. From this research I have authored or co-authored over 250 scientific articles. Numerous awards were extended to me and my students and colleagues for this long series of studies and publications.

House of Proteins

Protein comes from the Greek word “proteios” meaning “of prime importance”. Protein, the most sacred of all nutrients is a vital component of our bodies and there are hundreds of thousands of different kinds. They function as enzymes, hormones, structural tissue and transport molecules, all of which make life possible. Proteins are constructed as long chains of hundreds or thousands of amino acids, of which there are fifteen to twenty different kinds. Proteins wear out on a regular basis and must be replaced. This is accomplished by consuming foods that contain protein. When digested, these proteins give us a whole new supply of amino acid building blocks to use in making new protein replacements for those that wore out. Various food proteins are said to be of different quality, depending on how well they provide the needed amino acids to replace our body proteins.

One hundred years ago, scientists chose to judge the quality of protein found in a specific food by seeing how fast animals would grow while consuming it. Some foods, namely those from animals, emerge with a very high protein efficiency ratio and value. Among animal foods, the proteins of milk and eggs represent the best amino acid matches for our proteins. While the “lower quality” plant proteins may be lacking in one or more of the essential amino acids, as a group they do contain all of them. This focus

on efficiency of body growth, as if it were good health, encourages the consumption of protein with the highest “quality”.

The basis for this concept of protein quality is not well known among the public, but its impact was- and still is- highly significant. When we consider a diet low in animal products, our minds often go to the question “Where will I get my protein?” as if plants don’t have protein. We now know that through enormously complex metabolic systems, the human body can derive all the essential amino acids from the natural variety of plant proteins that we encounter every day. It doesn’t require eating higher quantities of plant protein or meticulously planning every meal for correct combinations of amino acids. Unfortunately, the enduring concept of protein quality has greatly obscured this information.

Turning Off Cancer

There are three stages of cancer: Initiation, promotion and progression. To use a rough analogy, the cancer process is similar to planting a lawn. Initiation is when you put the seeds in the soil, promotion is when the grass starts to grow, and progression is when the grass gets completely out of control, invading the driveway and sidewalk.

So what is the process that successfully implants the cancer “seeds” in the first place? Chemicals called carcinogens can do this, such as industrial byproducts, naturally formed toxins, and pesticides.

Just like seeds in the soil, initial cancer cells will not grow and multiply unless the right conditions are met. This is the most profound feature of the second stage of cancer, promotion. Promotion is reversible, depending on whether the early cancer growth is given the right conditions in which to grow. This is where certain dietary factors become important. These dietary factors, called promoters, feed cancer growth. Other dietary factors, called anti-promoters, slow cancer growth. Cancer flourishes when there are more promoters than anti-promoters; when anti-promoters prevail cancer growth slows or stops. The importance of this reversibility cannot be overemphasized.

Cancer growth may escalate to the third phase, called progression, by damaging or invading neighboring organs and tissues. Eventually this damage interrupts the organs’ ability to perform their necessary functions, and will result in death.

A low-protein diet reduces cancer initiation. Through our research, we came to discover that low-protein diets, or their equivalents, reduce initiation of tumors by the following mechanisms:

- Less carcinogen entered the cell
- Cancerous cells multiplied more slowly

A low protein diet reduces cancer promotion. Foci are precursor clusters of cancer cells that grow into tumors. Although most foci do not become full-blown tumor cells, they are predictive of tumor development. We found that foci development was almost entirely dependent on how much protein was consumed, regardless of how much carcinogen was consumed.

Our project to resolve malnutrition and liver cancer problems in the Philippines led us to experiment with different diet programs. Here is the step by step sequence of experiments which we carried out. We began with a large number of rats. All animals were dosed with the same amount of carcinogen, then they were split into two groups, and alternately fed either 5% or 20% dietary protein for 12 weeks.

Every single rat fed 20% protein got liver cancer or its precursor lesions, but not a single animal fed a 5% protein diet got liver cancer or its precursor lesions. It was not a trivial difference; it was 100% versus 0%. This was very much consistent with my observations of the Philippine children. Those who were most vulnerable to liver cancer were those from wealthy families who consumed diets higher in protein.

Later, we performed similar experiments to test the variables. Just like the first experiment, a large group of rats was dosed with the carcinogen and then split into two groups. When the animals were fed the 20% protein diet foci continued to enlarge, as expected. Then, halfway through, the animals were switched to the low-protein diet and we observed a sharp decrease in foci development. And when animals were subsequently switched back to the 20% protein diet, foci development was turned on once again. This experiment was performed again reversing the percentages of protein in the diet, and the findings were consistent that the higher protein diet enables, if not encourages, foci development.

These experiments are quite profound. Foci growth could be reversed, up and down, by switching the amount of protein being consumed, and at all stages of development! This also demonstrates that the body can “remember” early carcinogen insults, even though they might lie dormant with low protein intake. In other words, it suggests that if we were exposed in the past to a carcinogen that initiated a bit of cancer that remains dormant, this cancer can still be reawakened by bad nutrition some time later.

So how much protein is too much? Using various groups of rats, we investigated a range of 4% to 24% dietary protein. Foci did not develop with up to about 10% dietary protein. Beyond 10%, foci development increased dramatically in relation with increases in dietary protein.

According to the recommended daily allowance (RDA) for protein consumption, we humans should be getting about 10% of our energy from protein. This is considerably more than the 5-6% actually required. But because requirements may vary from individual to individual, 10% protein is recommended to insure adequate intake for virtually all people. What do most of us routinely consume? The average American consumes 15-16% protein. Does this place us at risk for getting cancer? These animal studies show that it does.

The national average of 15-16% is about 70-100 grams of protein per day, with men at the upper part of the range, and women at the lower end. In food terms, there are about 12 grams of protein in 100 calories of spinach (15 ounces) and 13 grams of protein in 100 calories (or ½ ounce) of porterhouse steak.

Does protein intake modify the relationship between greater carcinogen exposure and cancer tumor formation? For example, as the aflatoxin dose becomes greater, foci and tumor growth should be correspondingly greater. To investigate this dose-response question, ten groups of rats were administered increasing doses of aflatoxin, then fed either regular levels (20%) or low levels (5-10%) of protein. In the animals fed the 20% level of protein, foci increased in number and size, as expected, as the aflatoxin dose was increased. The dose-response relationship was strong and clear. However, in the animals fed 5% protein, the foci development stayed at the same low rate regardless of the higher aflatoxin dose. There was no foci response from the 5% group, even when the animals were given the maximum tolerated aflatoxin dose. This was yet another result demonstrating that a low-protein diet could over-ride the cancer-causing effect of a very powerful carcinogen.

Are all proteins alike? For all of these experiments, we were using casein, which makes up 87% of cow's milk protein. So the next logical question was whether plant protein, tested in the same way, has the same effect on cancer promotion as casein. The answer is an astonishing "NO!" In these experiments, plant protein did not promote cancer growth, even at the higher levels of intake. Rats fed 20% soy or wheat protein diets did not form early foci, contrary to the rats fed 20% casein protein diets.

The grand finale: We organized a very large study of several hundred rats and examined tumor formation over their 2-year lifetimes using several different approaches. The effects of protein feeding on tumor development were nothing less than spectacular. Rats generally live for about two years, thus the study was 100 weeks in length. All animals that were administered aflatoxin and fed the regular 20% levels of casein either were dead or near death from liver tumors at 100 weeks. All animals administered the same level of aflatoxin but fed the low 5% casein-protein diet were alive, active, and thrifty with sleek hair coats at 100 weeks. This is a virtual 100 to 0 score, something almost never seen in research.

In the same experiment, we switched the diets of some rats at either forty or sixty weeks, to again investigate the reversibility of cancer promotion. Animals switched from a high-protein to a low-protein diet had significantly less tumor growth (35-40% less) than animals fed a high-protein diet. Animals switched from a low-protein diet to a high-protein diet halfway through their lifetime started growing tumors again.

Let there be no doubt: The findings show that cow's milk protein is an exceptionally potent cancer promoter in rats dosed with aflatoxin. The fact that this promotion effect occurs at dietary protein levels (10-20%) commonly used both in rodents and humans makes it especially provocative.

The depth and consistency of these findings strongly suggest that they are relevant for humans for four reasons:

1. Rats and humans have an almost identical need for protein
2. Protein operates in humans virtually the same way it does in rats
3. The level of protein intake causing tumor growth is the same level that humans consume

4. In both rodents and humans, the initiation stage is far less important than the promotion stage of cancer. This is because we are very likely “dosed” with a certain amount of carcinogens in our everyday lives, but whether they lead to full tumors depends on their promotion or lack thereof.

Can we generalize these findings to other cancers and other carcinogens? At the University of Illinois Medical Center, a research project showed that increasing intakes of casein promoted the development of breast cancer.

So much consistency is impressive, but still, we remained cautious. We need direct evidence from human research. Ideally, this evidence would be gathered with rigorous methodology, and would investigate dietary patterns comprehensively, using large numbers of people who had similar lifestyles, and genetic backgrounds, and yet had widely varying incidences of disease. That opportunity came. We have now taken these principles to the next level. We completed the China Study.

In the early 1970's the premier of China, Chou EnLai was dying of cancer. In the grips of this terminal disease, he initiated a nationwide survey to collect information about a disease that was not well understood. It was to be a monumental survey of death rates for twelve different kinds of cancer for more than 2,400 Chinese counties, and 880 million (96%) of their citizens. The result was a beautiful, color-coded atlas showing where certain types of cancer were high, and where they were nonexistent. This atlas made it clear that in China cancer was geographically localized. It is also a country where 87% of the population is the same ethnic group of Hans.

In 1981 a few of the Western world's prominent scientists had already reached the conclusion that genetics only determines about 2-3% of total cancer risk.

The data behind the China Cancer Atlas were profound. The counties with the highest rates of some cancers were more than 100 times (10,000%) greater than counties with the lowest rates of the same cancers. By way of comparison, we in the US see, at most, two to three times the cancer rates from one part of the country to another. Even 10-20% higher than national average cancer rates in two counties in Long Island made front page news here in the US and scared citizens to relocate, and politicians into action.

The China cancer atlas raised a number of critical questions:

- Why was cancer so high in some areas and not in others?
- Why were these differences so incredibly large?
- Why was the overall cancer, in aggregate, less common in China than in the US?

To answer these questions, we assembled a world-class team:

- Dr. Chen, deputy of the most significant government health laboratory in all of China
- Dr. Hunyao Li, one of the authors of the Cancer Atlas Survey

- Richard Peto of Oxford University, who has since been knighted.
- T. Colin Campbell (our author)

We started with information from the China Cancer Atlas, and went into 65 counties across China and administered questionnaires and blood tests on 6,500 adults. We took urine samples, directly measured everything families ate over a three day period, and analyzed food samples from marketplaces across the country. We gathered data on 367 variables and then compared each variable with every other variable. We found that roughly 90% of the adult subjects in each county still lived in the same county where they were born.

This is the first large study to compare within the Chinese range, diets rich in plant-based foods to diets very rich in plant-based foods. In almost all other studies, all of which are Western, scientists are comparing diets rich in animal-based foods to diets very rich in animal-based foods. It is this distinction, as much as any other, which makes this study so important.

Here's what we found:

	China	America
Calories per day	2641	1989
Total Fat % of cal	14.5	34-38
Fiber per day	33g	12g
Protein per day	64g	91g
Animal Protein per day	6g	63g
Animal protein % of total cal	.8	10
Total iron	34	18

In every category, there are massive dietary differences between the Chinese and American diets: Much higher overall calorie intake, less fat, less protein, much less animal foods, more fiber and much more iron are consumed in China.

Diseases of Affluence (nutritional extravagance):	Cancer (colon, lung, breast, etc) Diabetes, Heart Disease
Diseases of Poverty (nutritional inadequacy and poor sanitation):	Pneumonia, intestinal obstruction, peptic ulcer, digestive disease, pulmonary tuberculosis, parasitic disease, rheumatic heart disease, metabolic disease, diseases of pregnancy

We found that one of the strongest predictors of Western diseases (diseases of affluence) was blood cholesterol. There are two main categories of cholesterol. Dietary cholesterol is present in the food we eat. It is a component of food, much like carbohydrates or minerals. This cholesterol is found only in animal-based food and is the one we find on food labels. How much dietary cholesterol you consume is NOT something your doctor can know when he or she checks your cholesterol levels. Instead,

the doctor measures the amount of cholesterol present in your blood. This second type of cholesterol, blood cholesterol, is made in the liver. Blood cholesterol and dietary cholesterol, although chemically identical, do not represent the same thing. Dietary fats and cholesterol don't necessarily turn into body fat and blood cholesterol. The way the body makes body fat and blood cholesterol is extremely complex. Because of this complexity, the health effects of eating dietary fat and dietary cholesterol may be very different from the health effects of having high blood cholesterol or having too much body fat.

As blood cholesterol levels in rural China rose in certain counties, the incidence of Western diseases (diseases of affluence) also increased. What made this so surprising is that Chinese levels were far lower than we had expected. The average level of blood cholesterol was only 127 mg/dL, which is almost 100 points less than the American average of 215 mg/dL. In other words, our low values are near the high values for rural China. Lower blood cholesterol levels are linked to lower rates of heart disease, cancer and other Western diseases, even at levels far below those considered "safe" in the West.

The statistics showed that as blood cholesterol levels decreased from 170 mg/dL to 90 mg/dL, cancers of the liver, rectum, colon, lung, breast, etc. decreased. Most Americans know that if you have high cholesterol you should worry about your heart, but they don't know that you might want to worry about cancer as well.

So which foods are associated with high blood cholesterol? Studies show that as intake of meat, milk, eggs, fish, fat and animal protein go up, blood cholesterol goes up.

In rural China, animal protein intake averages only 7 g/day, whereas Americans average a whopping 50-70g/day. To put this into perspective, seven grams of animal protein is found in about three chicken nuggets from McDonald's.

What about Dietary Fat? There's good reason for the average consumer to be confused. The details that underlie this question, when considered in isolation, are very misleading. As you shall see, considering how networks of chemicals behave instead of isolated single chemicals is more meaningful. With few exceptions, animal-based foods contain considerably more fat than plant-based foods. This is well illustrated by comparing the amount of fat in the diets of different countries. The correlation between fat intake and animal protein intake is more than 90%.

There is a distinct relationship between dietary fat and breast cancer. Numerous studies show that the amount of dietary fat consumed is closely associated with breast cancer, large bowel cancer, and heart disease. However, the best known study, done by the late Ken Carroll, included not only correlations of dietary fat and breast cancer, but other charts which were largely, almost totally ignored. They show that breast cancer was associated with animal fat intake, but not with plant fat.

This connection of breast cancer with dietary fat, thus with animal based foods, brought into consideration other factors that also place a woman at risk for breast cancer:

- Early age of first menstruation (menarche),
- high blood cholesterol,
- late menopause,
- high exposure to female hormones.

What does the China Study show regarding these risk factors? Higher dietary fat is associated with higher blood cholesterol and both of these factors, along with higher female hormone levels, are associated, in turn, with more breast cancer and earlier age of menarche.

The much later age of menarche in rural China is remarkable. Twenty-five women in each of the 130 villages in the survey were asked when they had their first menstrual period. The villagers' average was seventeen years. The US average is roughly eleven years!

Many studies have shown that earlier menarche leads to higher risk for breast cancer. Menarche is triggered by the growth rate of the girl. Early age of menarche, both in Chinese and in Western women, also leads to higher levels of blood hormones such as estrogen. These hormone levels remain high throughout the reproductive years if consumption of a diet rich in "high-quality" animal-based foods is maintained.

When hormone levels among Chinese women were compared with those of British women, Chinese estrogen levels were only about one-half those of the British women, who have an equivalent hormone profile to that of American women. Because the length of the reproductive life of a Chinese woman is only about 75% of that of the British (or American) woman, this means that with lower estrogen levels, the Chinese woman only experiences about 35-40% of the lifetime estrogen exposure of British (and American) women. This corresponds to Chinese breast cancer rates that are only one-fifth of those of Western women.

Our investigation of breast cancer is a perfect example of what makes the China Study so convincing. Rather than a single, simple association of fat and breast cancer, we were able to construct a much more expansive web of information about how diet affects breast cancer risk. We were able to examine in multiple ways the role of diet and cholesterol, age of menarche and female hormone levels, all of which are known risk factors for breast cancer. When each new finding pointed in the same direction, we were able to see a picture that was convincing consistent and biologically plausible.

The late Professor Denis Burkitt, of Trinity College in Dublin, made dietary fiber the subject of his life work. In 1993, Dr. Burkitt was awarded the prestigious Bower Award, the richest award in the world next to the Nobel Prize. He asserted that even though fiber was not digested, it was vital for good health. Fiber was able to pull water from the body into the intestines to keep things moving along. These undigested fibers, like sticky paper, also gather up nasty chemicals that find their way into our intestines and that might be carcinogenic. If we don't consume enough fiber, we are susceptible to constipation based diseases. According to Burkitt, these include large bowel cancer, diverticulosis, hemorrhoids, and varicose veins.

The China Study provided evidence corroborating the link with fiber intake and certain cancers. The results showed that high-fiber intake was consistently associated with lower rates of cancers of the rectum and colon. High fiber intakes also were associated with lower levels of blood cholesterol. Of course, high fiber consumption was correlated to high plant-based food consumption.

A 2001 Harvard review of research can hardly be more convincing in encouraging a plant-based diet: they found that "men with the highest dairy intakes had approximately double the risk of total prostate cancer, and up to a fourfold increase in the risk of

metastatic or fatal prostate cancer relative to low dairy consumers”. Harvard review found this to be “one of the most consistent dietary predictors for prostate cancer in the published literature”. Their choice of words is critical: this is a distinction that isn’t made lightly, and leaves little room for dissent; it represents analysis of over a dozen individual studies, providing an impressive bulk of convincing literature.

Antioxidants: Our beautiful protectors.

Living plants illustrate nature’s beauty, both in color and in chemistry. They take the energy of the sun and transform it into life through the process of photosynthesis. In this process, the sun’s energy is first turned into simple sugars, and then into more complex carbohydrates, fats and proteins.

This complex process amounts to some pretty high-powered activity within the plant, all of which is driven by the exchange of electrons between molecules. Electrons are the medium of energy transfer. The site at which photosynthesis takes place is a bit like a nuclear reactor. The electrons zooming around in the plant that are changing the sunlight into chemical energy must be managed very carefully. If they stray from their rightful places in the process, they may create free radicals, which can wreak havoc in the plant. It would be like the core of a nuclear reactor leaking radioactive material that can be very dangerous to the surrounding area.

So how does a plant manage these complex reactions and protect against errant electrons and free radicals? It puts up a shield around potentially dangerous reactions that sponges up these highly reactive substances. The shield is made up of antioxidants that intercept and scavenge electrons that might otherwise stray from their course.

Antioxidants are usually colored because the same chemical property that sponges up excess electrons also creates visible colors. Some of these antioxidants are called carotenoids, of which there are hundreds. They vary in color from yellow beta-carotene of squash, to the red lycopene of tomatoes.

What makes this remarkable process relevant for us animals, however, is that we produce low levels of free radicals throughout our lifetime. Simply being exposed to the sun’s rays, to certain industrial pollutants, and to improperly-balanced nutrient intakes creates a background of unwanted free radical damage. Free radicals are nasty. They can cause our tissues to become rigid and limited in their function. It is a bit like old age, when our bodies become creaky and stiff. To a great extent, this is what aging is. This uncontrolled free radical damage is also part of the process that gives rise to the hardening of arteries, cataracts, emphysema, arthritis, and many other ailments that become more common with age.

But here’s the kicker: We do not naturally build shields to protect ourselves against free radicals. As we are not plants, we do not carry out photosynthesis and therefore do not produce any of our own antioxidants. Fortunately, the antioxidants in plants work in our bodies the same way they work in plants. It is a wonderful harmony. The plants make the antioxidant shields, and at the same time make them look appetizing with their colors.

Then we animals, in turn, are attracted to the plants, and eat them and borrow their antioxidant shields for our own health.

In the China Study, we assessed antioxidant status by recording the intakes of vitamin C and beta-carotene and measuring the blood levels of vitamin c, vitamin E and carotenoids. Among these antioxidant biomarkers, vitamin C provided the most impressive evidence.

The most significant vitamin C association with cancer was its relationship with the number of cancer-prone families in each area. When levels of vitamin C in the blood were low, these families were more likely to have a high incidence of cancer.

Can we say that vitamin C, beta-carotene and dietary fiber are solely responsible for preventing these cancers? In other words, can a pill containing these supplements create the desired health effects? No. The triumph of health lies not in the individual nutrients, but in the whole foods that contain those nutrients: plant-based foods. In a bowl of spinach salad, for example, we have fiber, antioxidants and countless other nutrients that are orchestrating a wondrous symphony of health as they work in concert within our bodies. The message could not be simpler: eat as many whole fruits vegetables and whole grains as you can, and you will probably derive all of the benefits noted above as well as many others.

What about weight loss? With regard to this, there are some surprising findings from the China study that shed light on the weight loss debate. When we started the China Study, I thought that China had the opposite problem from that of the US. I had heard that China could not feed its population, that it was prone to famines and that malnutrition prevented people from attaining their full adult height. Very simply, there were not enough calories to go around. Although China has, during the last fifty years, had its share of nutritional problems, we were to learn that these views on calorie intake were dead wrong.

We found that most Chinese are far more physically active than the average American. So we ranked the Chinese into 5 groups according to their levels of physical activity. After figuring out the caloric intakes of the least active Chinese, the equivalent of office workers, we then compared their calorie intake with the average American. What we found was astonishing.

Average calorie intake, per kilogram of body weight, was 30% higher among the least active Chinese than among the average Americans. Yet body weight was 20% lower. How can it be that even the least active Chinese consume more calories yet have no overweight problems? What is their secret?

This is what our China Study data show. Diets low in protein and fat cause calories to be “lost” as body heat. This means “burning more calories”.

Chinese consume more calories both because they are more physically active (even the office workers ride their bicycle to work) and because their consumption of low-fat, low-protein diets shifts conversion of these calories away from body fat to body heat. This is true even for the least physically active Chinese.

We saw the same phenomenon in our experimental animals fed the low-protein diets. They routinely consumed slightly more calories, gained less weight, disposed of the extra calories as body heat and voluntarily exercised more, while still having far less cancer than animals on standard diets. We found that calories were “burned” at a faster rate, and transformed into body heat as more oxygen was consumed.

We now know that eating a low-fat low-protein diet high in complex carbohydrates from fruits and vegetables will help you lose weight. But what if you want to become bigger? The good news is this: Greater plant protein intake was closely linked to greater height and body weight. Body growth is linked to protein in general and both animal and plant proteins are effective. The China Study findings support the idea that body stature can be achieved by consuming a low-fat, plant-based diet, provided that the public health conditions effectively control the diseases of poverty. Under these conditions, the diseases of affluence (heart disease, cancers, diabetes, etc) can be simultaneously minimized.

The same low-animal protein, low fat diet that helps prevent obesity also allows people to reach their full growth potential while working other wonders as well. It points to a new world view, a new paradigm. It defies the status quo, promises new health benefits and demands our attention.

Here’s how this all pulls together: Almost all of us in the US will die of diseases of affluence. In our China Study, we saw that nutrition has a very strong effect on these diseases. Plant-based foods are linked to lower blood cholesterol; animal-based foods are linked to higher blood cholesterol. Animal-based foods are linked to higher breast cancer rates; plant-based foods are linked to lower rates. Fiber and antioxidants from plants are linked to a lower risk of cancers of the digestive tract. Plant-based diets and active lifestyles result in a healthy weight, yet permit people to become big and strong. Our study was comprehensive in its design and comprehensive in its findings. From the labs of Virginia Tech and Cornell University to the far reaches of China, it seemed that science was painting a clear, consistent picture: we can minimize our risk of contracting deadly diseases just by eating the right food.

The detractors of this study, and mainstream scientific thought, think that science is best done when investigating single- mostly known- factors in isolation. An array of largely unspecified factors doesn’t show anything, they say. It’s okay to measure the specific effect of, say, selenium on breast cancer, but it’s not okay to measure multiple nutritional conditions in the same study, in the hope of identifying important dietary patterns.

I prefer the broader picture, for we are investigating the incredible complexities and subtleties of nature itself. I wanted to investigate how dietary patterns related to disease, now the most important point of this book. Everything in food works together to create health or disease. The more we think that a single chemical characterizes a whole food, the more we stray into idiocy. As we shall see in part IV of this book, this way of thinking has generated a lot of poor science.

So I say we need more, not less, of the “shotgun approach.” We need more thought about overall dietary patterns and whole foods. Does this mean that I think the shotgun approach is the only way to do research? Of course not. Do I think that the China Study findings constitute absolute scientific proof? Of course not. Does it provide enough information to inform some practical decision making? Absolutely.

At the end of the day, the strength and consistency of the majority of the evidence is enough to draw valid conclusions. Namely, whole, plant-based foods are beneficial, and animal-based foods are not. Few other dietary choices, if any, can offer the incredible benefits of looking good, growing tall and avoiding the vast majority of premature diseases in our culture.

Part II Diseases of Affluence

The results of the China Study, in addition to a mountain of supporting research, convinced me to turn my own dietary lifestyle around. I stopped eating meat fifteen years ago (at age 55), and I stopped eating almost all animal-based foods, including dairy, within the past six to eight years, except on very rare occasions. My cholesterol has dropped, even as I've aged (now 70); I am more physically fit now than when I was twenty-five, and I'm forty-five pounds lighter now than when I was thirty years old. I am now at an ideal weight for my height. My family has also adopted this way of eating, thanks to my wife Karen, who has managed to create an entire new dietary lifestyle that is attractive, tasty and healthy. This has all been done for health reasons, the result of my research findings telling me to wake up. From a boyhood of drinking at least two quarts of milk a day to an early professional career of scoffing at vegetarians, I have taken an unusual turn in my life. However, it has been more than my own research that has changed my life. Over the years, I have gone well beyond my own research findings to see what other researchers have found regarding diet and health. As our research findings expanded from the specific to the general, the picture has continued to enlarge. We now can look at the work of other scientists to put the China Study findings into a larger context. As you will see, it is nothing short of astonishing.

Here in America, we are affluent, and we die certain deaths because of it. We eat like feasting kings and queens every day of the week, and it kills us. You probably know people who suffer from heart disease, cancer, stroke, Alzheimer's, obesity, or diabetes. There's a good chance that you yourself suffer from one of these problems, or that one of these diseases runs in your family. As we have seen, these diseases are relatively unknown in traditional cultures that subsist mostly on whole plant foods, as in rural China. But these ailments arrive when a traditional culture starts accumulating wealth, and starts eating more and more meat, dairy and refined plant products (such as crackers, cookies and soda).

The evidence now amassed from researchers around the world shows that the same diet that is good for the prevention of heart disease, works just as well to prevent obesity, diabetes, cancer, cataracts, macular degeneration, Alzheimer's, cognitive dysfunction, multiple sclerosis, osteoporosis, and other diseases. Furthermore, this diet can only benefit everyone, regardless of his or her genes or personal dispositions.

For me, the consistency of evidence regarding such a disparate group of diseases has been the most convincing aspect of this argument. When a whole-foods, plant-based diet is demonstrably beneficial for such a wide variety of diseases, is it possible that humans were meant to consume any other diet? I say no, and I think you'll agree.

Heart Disease:

If you were to ask most women what disease poses the greatest risk to them, heart disease or breast cancer, many women would undoubtedly say breast cancer. But they would be wrong. Women's death rate from heart disease is eight times higher than their death rate from breast cancer. If there is an American game, it's baseball; if there's an American dessert, it's apple pie; if there's an American disease, it's heart disease.

A group of doctors in Northern California took a larger group of patients with advanced heart disease and put them on a low-fat, low-cholesterol diet. These doctors found that the patients who ate the prescribed diet died at a rate four times lower than patients who didn't follow the diet.

We now know that the attention paid to fat and cholesterol was misguided. The possibility that no one wanted to consider was that fat and cholesterol were indicators of total animal food intake. This study suggests that the more animal protein you eat, the more heart disease you have.

Other studies in humans show that eating plant protein has even greater power to lower cholesterol levels than reducing fat or cholesterol intake. While some of these studies implicating animal products in general were conducted in the past thirty years, others were published well over fifty years ago when the health world was first beginning to discuss diet and heart disease. Yet somehow animal protein has remained in the shadows while saturated fat and cholesterol have taken the brunt of the criticism. These three nutrients (fat, cholesterol and animal protein) constitute animal-based food in general. So isn't it perfectly reasonable to wonder whether animal-based food, and not just these isolated nutrients, causes heart disease?

Of course, no one pointed a finger at animal-based foods in general. It would have led immediately to professional isolation and ridicule (see part IV for more on this topic)

Despite the potential of diet and disease prevention, most of the attention given to heart disease has been on mechanical and chemical intervention for those people who have advanced disease. Diet has been pushed aside in favor of flashy surgery, drugs, electronic devices, and new diagnostic tools.

The mechanical interventions that we use in this country are much less effective than most people realize. In spite of the risks, bypass surgery has become particularly popular. The most pronounced benefit of this procedure is relief of angina, or chest pain. About 70% of patients who undergo bypass surgery remain free of this crippling chest pain for one year. But this benefit doesn't last. Within three years of the operation, up to one-third of patients will suffer from chest pain again. Within ten years half of the bypass patients will have died, had a heart attack, or had their chest pain return. Furthermore, studies demonstrate that patients who undergo bypass operations do not have fewer heart attacks than those who do not have surgery.

Some great advances have been made, to be sure, which may account for the fact that our death rate from heart disease is a full 58% lower than what it was in 1950. A 58% reduction in death rate seems a great victory for chemicals and technology. One of the greatest strides has come from better emergency room treatment of heart attack victims. In 1970, if you were older than sixty five years, had a heart attack, and were lucky enough to make it to the hospital alive, you had a 38% chance of dying. Today, your chances of dying are only 15%. The hospital's emergency response is much better, and consequently huge numbers of lives are being spared.

However, heart disease is still our number one cause of death. In fact, the incidence rate (not death rate) for heart disease is about the same as it was in the early 1970's. In other words, while we don't die as much from heart disease, we still get it as often as we used to.

Dr Dean Ornish has been a giant in the field of dietary treatment of heart disease. He put his heart-disease patients on a low-fat, plant-based diet for at least a year. Only about 10% of their calories were to come from fat. They could eat as much food as they wanted, as long as it was on the acceptable food list, which included fruits, vegetables and grains. As researchers noted, "no animal products were allowed except egg white and one cup per day of non-fat milk or yogurt". In addition to diet, the group was to practice various forms of stress management, including meditation, breathing exercises and relaxation exercises three hours per week at levels customized to the severity of their disease. To help the patients make these lifestyle changes, they met as a group twice a week for four hours at a time for mutual support. Dr. Ornish and his research group did not use any drugs, surgery or technology to treat these patients.

In all, 82% of the patients in the experimental group had a regression in their heart disease over the course of a year. As a group, they experienced a 91% reduction in the frequency of chest pain, while the control group experienced a 165% increase in frequency of chest pain. Dr. Ornish demonstrated that the lifestyle intervention program cut costs by an average of \$30,000 per patient.

Much work remains to be done. The health care establishment is structured to profit from chemical and surgical intervention. Diet still takes the back seat to drugs and surgery. One criticism that is constantly leveled at the dietary argument is that patients will not make such fundamental changes. One doctor charges that the researcher's patients change their eating habits simply because of their researcher's "zealous belief." This criticism is not only wrong and insulting to patients, but it is also self-fulfilling. If doctors do not believe that patients will change their diets, they will neglect to talk about diet, or will do it in an off-handed, disparaging way. There is no greater disrespect a doctor can show a patient than that of withholding potentially lifesaving information based on the assumption that patients do not want to change their lifestyle.

Well-meaning institutions are not exempt from such closed-mindedness. The American Heart Association recommends a diet for heart disease that favors moderation, rather than scientific truth. These venerable organizations are not giving the American public the most up-to-date scientific information. While we are told that a total blood cholesterol level of 200 mg/dL is "desirable" studies show that 35% of heart attacks strike Americans who have cholesterol levels between 150 and 200 mg/dL. We also know that the most aggressive reversal of heart disease ever demonstrated occurred when fat was about 10% of total calorie intake, not the AHA recommended 30%. Studies have clearly demonstrated that many patients who follow the more moderate recommended diets see a progression of the disease. The innocent victims are health-conscious Americans who follow these recommendations, thinking that they are doing all it takes to remain healthy.

Our leading organizations fear that if they advocate more than modest changes, no one will listen to them. But the establishment-recommended diets are not nearly as healthy as the diets proven to reverse advanced disease. The fact is that a blood cholesterol level of 200 mg/dL is not safe, a 30% fat diet is not "low-fat" and eating foods containing any

cholesterol at all is unhealthy. Our health institutions are intentionally misleading the public about heart disease, all in the name of moderation.

In the seminal paper regarding the landmark Lifestyle Heart Trial, the authors, Dr. Ornish and his colleagues write, “The point of our study was to determine what is true, not what is practicable.”

Diabetes

In the eight years from 1990 to 1998, the incidence of diabetes increased 33%. Over 8% of American adults are diabetic, and over 150,000 young people have the disease. That translates to 16 million Americans.

What is Diabetes, and how does it work? In both types, the disease begins with dysfunctional glucose metabolism. Normal metabolism goes like this:

- We eat food
- The food is digested and the carbohydrate part is broken down into simple sugars, much of which is glucose.
- Glucose (blood sugar) enters the blood, and insulin is produced by the pancreas to manage its transport and distribution around the body.
- Insulin, acting like an usher, opens doors for glucose into different cells for a variety of purposes. Some of the glucose is converted to short-term energy for immediate cell use, and some is stored as long-term energy (fat) for later use.

As a person develops diabetes, this metabolic process collapses. Type 1 diabetics cannot produce adequate insulin because the insulin-producing cells of their pancreas have been destroyed. This is the result of the body attacking itself, making Type 1 diabetes an autoimmune disease. Type 2 diabetics can produce insulin, but the insulin doesn't do its job. This is called insulin resistance, which means that once the insulin starts “giving orders” to dispatch the blood sugar, the body doesn't pay attention. The insulin is rendered ineffective, and the blood sugar is not metabolized properly.

Can the incurable be cured? James Anderson, MD is one of the most prominent scientists studying diet and diabetes today, garnering dramatic results using dietary means alone. One of his studies examined the effects of a high-fiber, high-carbohydrate, low-fat diet on twenty-five Type 1 diabetics and twenty-five Type 2 diabetics in a hospital setting. None of his fifty patients were overweight and all of them were taking insulin shots to control their blood sugar levels.

His experimental diet consisted mostly of whole plant foods and the equivalent of only a cold cut or two of meat a day. He put them on the conservative American-style diet recommended by the American Diabetic Association for one week and then switched them over to the experimental “veggie” diet for three weeks. He measured their blood sugar levels, cholesterol levels, weight and medication requirements. The results were impressive.

Type 1 diabetics cannot produce insulin. It is difficult to imagine any dietary change that might aid their predicament. But after just three weeks, the Type 1 diabetic patients were able to lower their insulin medication by an average of 40%! Their blood sugar profiles improved dramatically. Just as importantly, their cholesterol levels dropped by 30%. Remember, one of the dangers of being diabetic is the secondary outcome of heart

disease and stroke. Lowering risk factors for those secondary outcomes by improving the cholesterol profile is almost as important as treating the high blood sugar.

Type 2 diabetics, unlike Type 1, are more “treatable” because they haven’t incurred such extensive damage to their pancreas. So when Anderson’s Type 2 patients ate the high-fiber, low-fat diet, the results were even more impressive. Of the twenty-five Type 2 patients, twenty-four were able to discontinue their insulin medication! Let me say that again, All but one person were able to discontinue their insulin medication in a matter of weeks!

These results have been duplicated in many other studies. Another group of scientists at the Pritikin Center achieved equally spectacular results by prescribing a low-fat, plant-based diet and exercise to a group of diabetic patients. Of forty patients on medication at the start of the program, thirty-four were able to discontinue all medication after only twenty-six days. This study also demonstrated that the benefits of a plant-based diet will last for years if the same diet is continued.

There is much emerging evidence that cow’s milk consumption is causally related to Type 1 diabetes. A study published in Diabetes Care in 1991 shows that cow’s milk consumption by children zero to fourteen years of age in twelve countries shows an almost perfect correlation with Type 1 diabetes. The greater the consumption of cow’s milk, the greater the prevalence of Type 1 diabetes. In Finland, Type 1 diabetes is thirty-six times more common than in Japan. Large amounts of cow’s milk products are consumed in Finland, but very little is consumed in Japan. These correlations have been shown to be even stronger in children of families where diabetes is more common.

Yes, changing your lifestyle may seem impractical. It may seem impractical to give up meat and high-fat foods, but I wonder how practical it is to be obese and have Type 2 diabetes at the age of fifteen, like so many American children today. I wonder how practical it is to have a lifelong condition that can’t be cured by drugs or surgery’ a condition that often leads to heart disease, stroke, blindness or amputation; a condition that might require you to inject insulin into your body every day for the rest of your life.

Radically changing our diets may be “impractical,” but it might also be worth it.

Cancer

We have already presented much information on diet and cancer. Why haven’t we heard this before? This shows that our institutions and information providers are failing us. Even cancer organizations are reluctant to discuss or even believe this evidence. Food as a key to health represents a powerful challenge to conventional medicine, which is fundamentally built on drugs and surgery. The communities of nutritional and medical professionals and researchers as a whole, either are unaware of this evidence or reluctant to share it. Because of these failings, Americans are being cheated out of information that could save their lives. There is enough evidence now that doctors should be discussing the option of pursuing dietary change as a potential path to cancer prevention and treatment. There is enough evidence now that the US government should be discussing the idea that the toxicity of our diet is the single biggest cause of cancer. There is enough evidence now that local breast cancer alliances and prostate and colon cancer institutions should be discussing the possibility of providing information to

Americans everywhere on how a whole foods, plant-based diet may be an incredibly effective anti-cancer medicine.

If these discussions were to happen, it is possible that, next year fewer than 500,000 people would go to the doctor's office and be told they have cancer. The year after that, even fewer friends, coworkers and family members would be given the most dreaded of all diagnoses. And the following year, even fewer.

The possibility that this future could be our reality is real, and as long as this future holds such promise for the health of people everywhere, it is a future worth working for.

Multiple Sclerosis and other Autoimmune Diseases

No group of diseases is more insidious than autoimmune diseases. They are difficult to treat, and progressive loss of physical and mental function is a common outcome. Even though the immune system is designed to protect against foreign invaders, it is also capable of attacking the same tissues that it is designed to protect. Unlike heart disease, cancer, obesity and Type 2 diabetes, with autoimmune diseases the body self-destructs, systematically attacking itself. The afflicted patient is almost guaranteed to lose. It is as if the body were committing suicide.

What does this have to do with what we eat? It so happens that the culprits tricking our bodies into attacking our own cells may be in food. During the process of digestion, for example, some proteins slip into our bloodstream from the intestine without being fully broken down into their amino acid parts. The remnants of undigested proteins are treated as foreign invaders by our immune system, which sets about making molds to destroy them and sets into motion the self-destructive autoimmune response.

One of the foods that supply many of the foreign proteins that mimic our own body proteins is cow's milk.

The most studied autoimmune diseases are multiple sclerosis (MS), rheumatoid arthritis, lupus, and Type 1 diabetes. These are also the primary autoimmune diseases that have been studied in reference to diet.

The initial research showing an effect of diet on MS goes back more than half a century to the research of Dr. Roy Swank, who began his work in Norway during the 1940's. Dr. Swank conducted his best-known trial on 144 MS patients recruited from the Montreal Neurological Institute. He kept records on these patients for the next 34 years. He advised his patients to consume a diet low in saturated fat, most of whom did, but many of whom did not. He then classified them as good dieters or poor dieters, based on whether they consumed less than 20g/day or more than 20g/day of saturated fat. (For comparison, a bacon cheeseburger with condiments has about 16 g of saturated fat.)

As the study continued, Dr. Swank found that the progression of disease was greatly reduced by the low-saturated fat diet, which worked even for people with initially advanced condition. He summarized his work in 1990 concluding that for the sub-group of patients who began the low-saturated fat diet during the earlier stages of their disease, "about 95% remained only mildly disabled for approximately thirty years". Only about 5% of these patients died. In contrast, 80% of the patients with early stage MS who consumed the "poor" diet higher in saturated fat, died of MS.

What about other autoimmune diseases? Can we say anything about autoimmune diseases as a whole? We can hypothesize that MS, Type 1 diabetes, rheumatoid arthritis,

lupus and other autoimmune diseases may share a similar cause since they exhibit similar characteristics.

Unfortunately, today almost no indication of the dietary connection to these diseases has reached public awareness. The website of the Multiple Sclerosis International Federation, for example, reads “There is no credible evidence that MS is due to poor diet or dietary deficiencies.” They warn that dietary regimens can be “expensive” and can alter the “normal nutritional balance”. If changing your diet is expensive, I don’t know what they would say about being bedridden and incapacitated. As far as altering the “normal nutritional balance” is concerned, what is “normal”? Does this mean the diet that we now eat is “normal”- the diet that is largely responsible for diseases that afflict millions of Americans every year? Are massive rates of heart disease, cancer, diabetes and obesity “normal”? If this is normal, I propose we start seriously considering the abnormal.

Osteoporosis

Americans consume more cow’s milk and its products per person than most populations in the world. So Americans should have wonderfully strong bones, right? Unfortunately not. A recent study showed that American women age fifty and older have one of the highest rates of hip fractures in the world. The only countries with higher rates are in Europe and the south Pacific (Australia and New Zealand) where they consume even more cow’s milk than the US. What’s going on?

One possible explanation is found in a report authored in 1992 by researchers at Yale School of Medicine showing an impressively strong association between animal protein intake and bone fracture rate for women in different countries. This research explained that animal protein, unlike plant protein, increases the acid load in the body. An increased acid load means that our blood and tissues become more acidic. The body does not like this acidic environment and begins to fight it. In order to neutralize the acid, the body uses calcium, which is alkaline (the opposite of acid). This calcium must come from somewhere. It ends up being pulled from the bones, and the calcium loss weakens them, putting them at greater risk for fracture.

When animal protein increases metabolic acid and draws calcium from the bones, the amount of calcium in the urine is increased. This effect has been established for over eighty years, and has been studied in detail since the 1970’s. Doubling protein intake from 35 to 78 g/day causes an alarming 50% increase in urinary calcium. Most Americans consume an average intake of 70-100 g of protein per day. Incidentally, a six month study funded by the Atkins center (which encourages a high animal protein diet) found that those people who adopted the Atkins Diet excreted 50% more calcium in their urine after six months on the diet.

These observations raise a serious question about the widely advertised claim that protein-rich dairy foods protect our bones. And yet still we are warned almost daily about our need for dairy foods to provide calcium for strong bones.

Mental Health in Old Age

Worldwide, the prevalence patterns of cognitive disorders appear to be similar to other Western diseases. Rates of Alzheimer's are lower in less developed areas. A recent study compared Alzheimer's rates to dietary variables across eleven different countries and found that populations with a high fat intake and low cereal and grain intake had higher rates of the disease.

We seem to be on to something. Clearly diet has an important voice in determining how well we think in our later years. But what exactly is good for us?

With regard to the more mild cognitive impairment condition, recent research has shown that high vitamin E levels in the blood are related to less memory loss. Less memory loss also is associated with higher levels of Vitamin C and selenium, both of which reduce free radical activity. Vitamins E and C are antioxidants found almost exclusively in plant foods. Selenium is found in both in plant and animal foods.

In a study of 260 elderly people (age 65 to 90) it was reported that "A diet with less fat, saturated fat and cholesterol, and more carbohydrate, fiber, vitamins (especially C, E and beta-carotenes) and minerals (iron and zinc) may be advisable not only to improve the general health of the elderly but also to improve cognitive function". This conclusion advocates plant-based foods and condemns animal-based foods for optimum brain function.

Six additional studies all show that one or more nutrients found almost exclusively in plants are associated with a lower risk of cognitive decline in old age. No study has ever found that consuming more dietary antioxidants increases memory loss. The best source for antioxidants are the vibrantly colored vegetables in your salads.

Alzheimer's disease is also related to diet and is often found in conjunction with heart disease, which suggests that they share the same causes. We know what causes heart disease, and we know what offers the best hope for reversing it: a plant-based diet. The famous Framingham study concluded that for every three additional servings of fruits and vegetables per day the risk of stroke will be reduced by 22%.

Experimental animal studies show that a high-cholesterol diet (animal products are the only source of dietary cholesterol) will promote the production of the beta-amyloid common to Alzheimer's. In confirmation of these results, a study of more than 5,000 people found that greater dietary fat and cholesterol intake tended to increase the risk of Alzheimer's disease specifically, and all dementia in general.

Eating Right: Eight Principles of Food and Health

1. Nutrition represents the combined activities of countless food substances.

The whole is greater than the sum of its parts.

The chemistry of nutrients available in plants is highly complex- a biochemical bonanza. It is literally impossible to understand precisely how each chemical interacts with every other chemical, and with the body's processes. We will never discover exactly how it all fits together.

Our bodies have evolved with this infinitely complex network of reactions in order to derive maximal benefit from whole foods, as they appear in nature. The misguided may trumpet the virtues of one specific nutrient or chemical, but this thinking is too simplistic.

Our bodies have learned how to benefit from the chemicals in food as they naturally occur, discarding some and using others as they see fit. I cannot stress this enough, as it is the foundation of understanding good nutrition.

2. Vitamin supplements are not a panacea for good health.

In spite of the marketing to the contrary, our research shows that the dangers of a Western diet cannot be overcome by consuming nutrient pills. So why are they so popular? Americans want to continue eating their customary foods, and popping a few supplements makes people feel better about the potentially adverse health effects caused by their diet. The vitamin makers capitalize on this, and propagate the idea by duping consumers into believing that they are buying health.

This strategy of gaining and maintaining health with nutrient supplements, however, started to unravel in 1994 with the large-scale investigation of the effects of beta-carotene supplements on lung cancer and other diseases. After four to eight years of supplement use, lung cancer had not decreased as expected, in fact, it increased! No benefit was found from Vitamins A and E for the prevention of heart disease either.

It is not that these nutrients aren't important. They are- but only when consumed as food, not as supplements. Isolating nutrients and trying to get benefits equal to those of whole foods reveals an ignorance of how nutrition operates in the body.

3. There are virtually no nutrients in animal-based foods that are not better provided by plants.

There are four nutrients which animal-based foods have that plant-based foods, for the most part, do not: Cholesterol and vitamins A and D and B-12. Three of these are nonessential nutrients. Cholesterol is made by our bodies naturally. Vitamin A can be readily made by our bodies from beta-carotene (available in fruits and vegetables) and vitamin D can be readily made by our bodies by exposing our skin to about fifteen minutes of sunshine every couple of days.

Vitamin B-12 is more problematic. It is made by microorganisms found in the soil and by microorganisms in the intestines of animals, including our own. The amount made in our intestines may not be adequately absorbed, so it is recommended that we consume B-12 in food. Research has convincingly shown that plants grown in healthy soil that has a good concentration of vitamin B-12 (on organic and biodynamic farms) will readily absorb these nutrients. Plants grown in the lifeless soil of the average commercial farm will not.

So, if you can grow your own vegetables, or buy from organic and biodynamic farms, you will likely obtain enough B-12. It is estimated that we hold a three-year store of B-12 in our bodies. If you do not eat any animal products for three years or more, or are pregnant or breast-feeding, you should consider taking a small B-12 supplement on occasion, or have your doctor check your blood levels of B vitamins annually.

4. Genes do not determine disease on their own. Genes function only by being activated, or expressed, and nutrition plays a critical role in determining which genes, good or bad, are expressed.

The China Study showed that the people of roughly the same ethnic (genetic) background have hugely varying disease rates. The primary difference among them is their environment, namely their nutrition.

In the US we have seen disease rates change over the past 25 years so drastically that it is biologically impossible to put the blame on genes. The percentage of our population that is obese has doubled from 15% to 30%. In addition, diabetes, heart disease and many other diseases of affluence were rare until recent history, and our genetic code simply could not have changed that much in the past 25, 100 or even 500 years.

So while we can say that genes are crucial to every biological process, we have some very convincing evidence that gene expression is far more important, and gene expression is controlled by environment, especially the nutritional environment. Regardless of our genes, we can all optimize our chances of ongoing health through expressing the right genes by providing our bodies with the best possible environment—that is, the best possible nutrition.

5. Nutrition can substantially control the adverse effects of noxious chemicals.

Stories of cancer-causing chemicals regularly appear in the press: artificial sweeteners, aflatoxins, plastic bottles leaching, etc.

There is a widely held perception that cancer is caused by toxic chemicals that make their way into our bodies and cause the cells to mutate. The fact is, that long before modern chemicals were introduced into our food, people began to experience more cancer and more heart disease when they started to eat more animal-based foods. So many of us seem to want a scapegoat. We don't want to hear that our favorite foods are a problem simply because of their nutritional content.

As seen in my early research with the rats and their diets with varied percentages of animal protein and plant protein, you aren't doing yourself much good by eating organic beef instead of conventional beef that's full of hormones and chemicals. The organic beef might be marginally healthier, but I would never say that it was a safe choice. Both types of beef have a similar protein/cholesterol/fat profile.

6. The same nutrition that prevents disease can also halt or reverse disease.

It is worth repeating that chronic diseases like cancer, diabetes and heart disease take years to develop. As we saw by doing the animal studies, cancer that is already initiated and growing in experimental animals can be slowed, halted or even reversed by good nutrition. Luckily, it is the same good nutrition that maximizes health at every stage of a disease. Recall the research showing that even Type 1 (insulin dependent) diabetics can lower or end their medication requirements by eating the right food. Evidence also shows that rheumatoid arthritis can be slowed by diet, as can multiple sclerosis.

7. Nutrition that is truly beneficial for one chronic disease will support health across the board.

This cannot be emphasized enough. Even if a whole food, plant-based diet is more effective at treating heart disease than treating cancer, you can be sure that this diet will not promote one disease while it stops another. It will never be “bad” for you. This one diet can only help across the board.

8. Good nutrition creates health in all areas of our existence. All parts are interconnected.

Some people wonder if they can erase bad eating habits by being a runner. The answer to this is no. The benefits and risks of diet are crucially important, and more sizable than the benefits and risks of other activities. Why would anyone want to try and balance benefits and risks when they can have all the benefits working together? It all works together to promote or derail health.

Furthermore, it turns out that if we eat the way that promotes the best health for ourselves, we promote the best health for the planet. By eating whole foods, plant-based diet, we use less water, less land, fewer resources and produce less pollution. John Robbins has done much to bring this issue to the front of American consciousness with his book *The Food Revolution*.

Our food choices have an incredible impact not only on our metabolism, but also on the initiation, promotion, and even reversal of disease, on our energy, on our physical activity, on our emotional and mental well-being and on our world environment. All of these seemingly separate spheres are intimately interconnected.

Part IV Why haven't you heard this before?

The American public is constantly seeking more and more nutritional guidance, and is finding more and more confusion as a result. The reason for this is simple: It is nearly impossible to distinguish science from industry, government from science or government from industry. Here are some examples of the darker side of science and the "science" of industry which explain why we so rarely get a straight story, and why as a consequence the American public is so confused about what kind of diet is good for us.

In 1976 Senator George McGovern had convened a committee that drafted dietary goals recommending decreased consumption of fatty animal foods and increased consumption of fruits and vegetables. The first draft of this report, linking heart disease and food, caused such an uproar that a major revision was performed before it was released for publication. In a personal conversation McGovern told me that he and five other powerful senators from agricultural states lost their respective elections in 1980 in part because they had dared to take on the animal foods industry. In 1980, in spite of its scientific credibility, this study with its modest recommendations was denounced by another government panel whose 17 of 18 members had ties to the commercial world of food and drug companies.

Another organization, called American Council on Science and Health which claims to be an "independent, nonprofit, tax exempt organization" in spite of receiving 76% of their funding from corporations and corporate donors, has claimed in their reports that cholesterol is not related to coronary heart disease, "endocrine disruptors" such as PCB's and dioxins are not a human health problem, and saccharin is not carcinogenic. How can that be?

My career led me to become involved in a different organization called the National Academy of Sciences (NAS). In June of 1982 our efforts produced a report on diet, nutrition and cancer. Principally, we were encouraging the consumption of fruits,

vegetables and whole grain cereal products, while decreasing total fat intake. The fact that this report was concerned with cancer elevated emotions to even higher levels than the McGovern report on heart disease did. There is a far greater fear of cancer than heart disease.

Within two weeks of the publication of this report, some powerful enemies came out of the woodwork. The meat and dairy industry lobbyists and associations created a contrary report created by 56 “experts” which was quickly published and placed into the hands of all 535 US congressional members. I was required to testify at congressional hearings; People magazine featured me in a prominent article, and an endless series of news media reports continued over the next year. A smear campaign of false accusations arose that the researchers were a group of discredited physicians, several of whom had spent time in prison.

When the NAS report concluded that a lower intake of fat and a higher intake of fruits, vegetables and whole grains would make for a healthier diet, I had betrayed, in the eyes of some, the nutrition research community. Supposedly, as one of the two diet and cancer experimental researchers on the panel, it was my job to protect the reputation of the American diet as it was.

In the world of nutrition and health, scientists are not free to pursue their research wherever it leads. Coming to the “wrong conclusions” even through first-rate science, can damage your career. Luckily, mine was not destroyed, but it could have gone much worse. It begs the question: do you believe that those funding the research are interested in pursuing scientific investigation, no matter what the conclusions may be?

I truly believe the vast majority of scientists are honorable, intelligent and dedicated to the search for common good rather than personal gain. However, there are a few scientists who are willing to sell out. They may not be many in number, but their influence is vast. They can corrupt the good name of institutions of which they are a part and, most importantly, they can create vast confusion among the public, which often cannot know who is who. Very few, if any, illegal acts need to occur. It doesn’t involve large payoffs being delivered to secret bank accounts. It is not a Hollywood story; it’s just day-to-day government, science and industry in the US.

The Dark Side of Science

You may turn on the TV one day to see an expert praising McDonald’s hamburgers, and then read a magazine the same day that you should eat less high-fat red meat to protect yourself against cancer. Who is to be believed?

The NAS 1982 report mentioned before was organized into separate chapters for fat, protein, carbohydrate, vitamins and minerals. I am now convinced that it was a great mistake on our part. We did not stress enough that our recommendations were concerned with *whole* foods because many people still regarded the report as cataloging the specific effects of individual nutrients.

The nutrient that our committee focused on the most was fat. The report explicitly stated that high fat consumption is linked to cancer, and recommended reducing our fat intake from 40% to 30% of calories, although this goal of 30% was an arbitrary cutoff point. The accompanying text said “The data could be used to justify an even greater reduction. However, in the judgment of the committee, the suggested reduction is a

moderate and practical target and is likely to be beneficial.” One of the committee members, who was also acting as the director of the USDA Nutrition Laboratory, told us that if we went below 30% consumers would be required to reduce animal food intake and that would be the death of the report.

At the time of this report, all of the human-based studies showing fat to be related to cancer were actually showing that the populations with more cancer consumed not just more fat, but more animal based foods and less plant-based foods. This meant that these cancers could just as easily be caused by animal protein, dietary cholesterol, or a lack of plant-based foods. I argued against putting the emphasis on fat, or any other specific nutrients in the committee meetings, but only with modest success.

Americans eat more total protein than most developing countries. Americans’ average protein intake (as % of 2,000 calories) is around 16% (91 g/day), and 70% (63 g/day) of that comes from animal products. In rural China, they eat about 8% (65 g/day) of their 2,600 total calories from protein, and only about 10% (6 g/day) of that protein comes from animal foods. Between these two dietary groups, large differences were found in disease patterns.

The widely referenced Nurse’s Health Study participants have an average protein intake around 19% of total calories- compared to the USRDA of 9-10%. Even more importantly, of the protein consumed by the nurses, from 78% to 86% comes from animal-based foods! In other words, virtually all of these nurses are more carnivorous than an average American woman.

Because the women in the Nurse’s Health Study are so far from a plant-based diet, there is no way to study the diet and breast cancer relationship originally suggested by the international studies.

The group of nurses who consume the least fat eat about 22% of their calories as fat, and the group of nurses who consume the most fat eat about 50% of their calories as fat. At a casual glance, this range appears to indicate substantial differences in their diets, but this is just not true, as almost all the women uniformly eat a diet very rich in animal-based foods. You might ask: how can their fat intake vary dramatically while they all uniformly consume large amounts of animal-based foods?

Low-fat technology has hit the marketplace. Now you can eat mostly the same foods as always, while substantially reducing your fat intake. In fact, following this trend, people have been increasing their total meat intake to record high amounts while trying (and largely failing) to reduce their fat intake.

Here is an illustration of the low-fat result:

	Low Fat Meal	High Fat Meal
Dinner	8 oz roasted turkey	4.5 oz pan-seared steak
	Low-fat gravy	Green beans almonidine
	Roasted potatoes	Herbed Potato packets
Beverage	1 cup skim milk	Water
Dessert	Nonfat Yogurt	Apple Crisp
	Reduced-fat cheesecake	
Total Meal Calories	1,000	1,000
Fat (% of total calories)	22%	54%

Protein	36%	16%
Animal protein (as % of total protein)	93%	86%
Cholesterol	307	165

As you can see, the low-fat meal has more animal-based protein, and more cholesterol, both of which the China Study has shown to have unfavorable health consequences.

Other results from the Nurse's Health Study (NHS):

- The NHS did not detect a relationship between dietary fat and fiber and breast cancer risk.
- The NHS did not detect a breast cancer association with fat even when women reduced their fat consumption all the way down to 20% of calories
- The NHS did not detect a relationship between meat and dairy consumption and breast cancer risk.
- The NHS did not detect a relationship between fruits and vegetables and breast cancer risk.

In other words, from the NHS findings, we might as well conclude that diet is completely unrelated to breast cancer.

Make no mistake about it: virtually all of the nurses in the study are consuming a high-risk diet. Most people who look at this miss this flaw. Furthermore, this problem of studying a population that uniformly consumes a high-risk diet and looking at the differences in consumption of one nutrient at a time is not unique to the Nurse's Health Study. It is common to virtually all studies using Western subjects.

More contradictions amongst health research:

Studies have shown that men who moderately consume alcohol have a lower heart attack risk, but another study shows alcohol consumption increases breast cancer incidence.

Harvard scientists report that there is an increased risk of breast cancer associated with omega-3 fats from fish- while another collection of data suggests that consumption of fish at least once per week may reduce the risk of sudden cardiac death as well as ischemic stroke in men.

What are we to believe? One minute we're told something is good for us, and the next we're told it may hurt. Apparently the husband can have fish and wine for dinner, but should never share it with his wife. This is absurd.

What's missing here is a larger context. What you have without that context is just a lot of confusion. Here is the key: Every study failed to take into account a broader range of dietary choices- including those which demonstrated positive effects on breast cancer risk in the past.

This method of investigating individual nutrients as opposed to the nutritional big picture is what I call reductionism. And trying to judge complex relationships from the results is deadly. These problems are especially egregious in the investigation of vitamin supplements.

More than 15 years of hard work, after hundreds of millions of dollars of research the US Preventive Services Task Force recently concluded:

“The evidence is insufficient to recommend for or against the use of supplements of A, C or E; multivitamins with folic acid or antioxidant combinations for the prevention of cancer or cardiovascular disease.”

How many more billions of dollars must be spent before we understand the limitations of reductionist research? The most conclusive research has shown that a whole-food plant-based diet will reduce the incidence of all the diseases of affluence.

The Science of Industry

Over a trillion dollars every year is riding on what we choose to eat and how we choose to treat sickness and promote health. That’s a lot of money.

There are powerful players that compete for your food and health dollars. Individual companies market their particular products, but they have nowhere near the power that the industry groups wield in increasing general demand for their products. Some industry groups have budgets in the hundreds of million dollars at their disposal to find ways to influence your buying decisions. The food companies and associations use nutritional benefit claims for their food products to help them sell. At the same time, they protect their products from being considered unhealthy. In this process, the “science” of nutrition becomes the “business” of marketing.

Few people are aware of the dairy industry’s presence in our schools. Make no mistake: on nutrition information the dairy industry reaches young children more effectively than any other. They use nutrition education programs such as “Pyramid Explorations” to teach 12 million American students that dairy products are a key part of a healthy diet. Another such program called “Chef Combo’s Fantastic Adventures” reached 76% of preschool kindergarten sites nationally. In addition, the popular “got milk” campaign continues to reach children through such kid-focused media outlets as Nickelodeon and Cartoon Network.

One of the Pyramid Explorations lesson plans for fourth graders teaches the students the five food groups and their health benefits as follows:

- Milk Group (Build strong bones and teeth)
- Meat Group (Build strong muscles)
- Vegetable Group (help you see in the dark)
- Fruit Group (Help heal cuts and bruises.)
- Grain Group (Give us energy)

America is entrusting the important task of educating our children about nutrition and health to the dairy industry. Obviously, neither kids, nor their teachers are learning about how milk has been linked to Type 1 diabetes, prostate cancer, osteoporosis, multiple sclerosis, and high cholesterol.

The industry has been doing such a good job of this for the past few decades, that many adults, when they hear about the potential adverse effects of dairy foods, immediately say “milk can’t be bad”. Usually these people don’t have any evidence to support their

position, they just have a feeling (established during childhood) that milk is good. Two plus two equals four, there are seven continents, and milk is healthy.

How about another basic tenet: Oranges are a good source of vitamin C. You may be surprised to know that many other plant foods have considerably more: one cup of peppers, strawberries, broccoli or peas all have more. Who first established these assumptions? Orange merchants. Did they justify their claims on the basis of careful research? No. It's a mixture of conjecture and assumptions about out-of-context evidence. Would I eat an orange just to get my vitamin C? No. Would I eat an orange because it is a healthy plant food with a complex network of chemicals that almost certainly offer health benefits? Absolutely.

Our kids are often the most coveted targets of marketing. The American government has passed legislation preventing cigarette and alcohol companies from marketing their products to children. Why have we ignored food? Even though it is accepted that food plays a major role in many chronic diseases, we allow food industries not only to market directly to children, but also to use our publicly funded school systems to do it. The long-term burden of our short-sighted indiscretion is incalculable.

Government- is it for the people?

The Food and Nutrition Board as part of the National Academy of Sciences, has the responsibility every five years or so to review and update the recommended consumption of individual nutrients. The FNB has been making recommendations since 1943 when it established a plan for the US Armed Forces wherein it recommended daily allowances for each individual nutrient. Here is a quote from the news release announcing this massive 900-page report:

To meet the body's daily energy and nutritional needs while minimizing risk for chronic disease, adults should get 45%-65% of their calories from carbohydrates, 20% to 35% from fat, and 10% to 35% from protein.

Further we find:

...added sugars should comprise no more than 25% of total calories consumed.

The critical assumption of the report is this: the American diet is not only the best there is, but you should now feel free to eat an even richer diet and still be confident that you are "minimizing risk for chronic disease".

Pg 307 Sample menu that fits into the Acceptable Nutrient Ranges:

Breakfast: 1Cup Fruit Loops
1 Cup skim milk
1 package M&M's
Fiber and vitamin supplements
Lunch Grilled cheeseburger
Dinner 3 Slices Pepperoni pizza
1 16 oz soda
1 serving Archway cookies

Here's now it stacks up:

Nutrient	Appx.Sample Menu content	Recommended Range
Total Calories	1800	Varies by height/weight

Protein (% of total cal)	18%	10-35%
Fat (% of total cal)	31%	20-35%
Carbohydrates (% of ttl cal)	51%	45-65%
Added Sugars	23%	Up to 25%

At this point, I don't need to tell you that when we eat a diet like this day in and day out, we will be not just marching, but sprinting into the arms of chronic disease. In sad fact, this is what a large proportion of our population already does.

When I first saw the FNB panel's protein recommendation, I honestly thought that it was a printing error. Their press release clearly states "protein intake recommendations are the same [as previous reports]" I know of no report that has even remotely suggested a level as high as this. I know several people on the panel who wrote this report and decided to give them a ring. One of them, a long-time acquaintance, said this was the first time he had even heard about the 35% protein limit! This important recommendation slipped through the panel without much notice and made the first sentence of the FNB news release!

At about the time this FNB report was being released, an expert panel from the World Health Organization (WHO) was completing a new report on diet, nutrition, and prevention of chronic diseases. Early rumors of the report's findings indicated that they were on the verge of recommending an upper safe limit of 10% for added sugar, far lower than the 25% established by the American FNB. Politics had entered the discussion, and was threatening to change the results. According to the Guardian newspaper of London, the US sugar industry was threatening to "bring the WHO to its knees" unless it abandoned these guidelines on added sugar. The US based group even publicly threatened to lobby the US Congress to reduce the \$406 million US funding of the WHO if it persisted in keeping the upper limit so low. Despite this pressure, the WHO went forward with its scientifically supported lower recommendation. So, for added sugars, we now have two different upper "safe" limits: a 10% limit for the international community, and a 25% limit for the US.

The School Lunch Program feeds 28 million children every day. With officially recommended consumption patterns like these, we are at liberty to put any agricultural commodity we want into the hungry mouths of children already suffering from unprecedented levels of obesity and diabetes. The Women, Infants and Children Program affects the diets of another 7 million Americans, and the Medicare hospital programs feed millions of people every year. It is safe to say that the food provided by these three government programs directly feeds at least 35 million Americans a month.

Almost all of the wide-ranging effects of this 2002 FNB report will be profoundly harmful. In school, our children can be fed more fat, more meat, more milk, more animal protein, and more sugar. They will also learn that this food is consistent with good health. The ramifications of this are serious, as a whole generation will walk the path of obesity, diabetes and other chronic illness, all the while believing that they are doing the right thing.

It is surprising that the dairy industry, which must be ecstatic with the panel's protein and fat findings, also helped to finance the report? You might be surprised to learn that academic scientists can receive personal compensation from industry while simultaneously undertaking government-sponsored activities of considerable public importance. Ironically, they can even help set the agenda for the same government authorities who have long been restricted from such corporate associations. It is a huge "conflict-of-interest" loophole allowing industries to exercise their influence through the side door of academia. In effect, the entire system is essentially under the control of industry.

Seven of the eleven committee members of the FNB, including its chair, were shown to have ties to the dairy industry.

It seems curious that while government scientists are now allowed to receive personal compensation from the private sector, their colleagues in academia can receive all that they can get. In turn, these conflicted individuals then run the show in collaboration with their government counterparts. However, restricting academics from receiving corporate consultancies is not the answer. That would only drive it underground. Rather, the situation would best be handled by making everyone's industry connections a matter of public disclosure.

The industries' influence is compounded by our government's lack of attention to the topic of nutrition. The NCI (of the NIH) calls the "5-A-Day" dietary campaign a "major" effort. The organization had a total of \$2.93 billion in their budget in 1999. What was the amount allocated to this "major" campaign to educate the public to consume five or more servings of fruits and vegetables per day? \$500,000 to \$1 million, or three hundredths of one percent of its budget. If this is a major campaign, I pity its minor campaigns!

Our tax dollars are being used to make the pharmaceutical industry more profitable. The pharmaceutical industry enjoys extraordinary government protections and subsidies. Much of the early basic research that may lead to drug development is funded by the NIH. One could argue that this is justified by gains in public health, but the alarming fact is that this litany of research into drugs, genes, devices and technology research will never cure our chronic diseases. Our chronic diseases are largely the result of infinitely complex assaults on our bodies resulting from eating bad food. There is no danger to eating a healthy diet, and there are far more benefits, including massive cost savings both on the front end of preventing disease and on the back end of treating disease. So why is our government ignoring the abundant scientific research supporting a dietary approach in favor of largely ineffective, potentially dangerous drug and device intervention?

I have come to the conclusion that when it comes to health, government is not for the people. It is a systemic problem where industry, academia and government combine to determine the health of this country. It is a system built by people who play their isolated parts, oftentimes unaware of the top decision makers and their ulterior motivations. This system is a waste of taxpayer money and is profoundly damaging to our health.

Big Medicine- Whose Health are they Protecting?

The medical status quo relies heavily on medication and surgery, at the exclusion of nutrition and lifestyle. Doctors have virtually no training in nutrition and how it relates to health. In 1985 the US National Research Council funded an expert panel report that investigated the quantity and quality of nutrition education in US medical schools. The committee's findings were clear: "The committee concluded that nutrition education programs in the US medical schools are largely inadequate to meet the present and future demands of the medical profession.

This situation is dangerous. Nutrition training of doctors is not merely inadequate; it is practically nonexistent. The 1985 report found that physicians receive on average only twenty-one classroom hours of nutrition training during their four years of medical school. By comparison, registered dietitians will have more than 500 contact hours.

It gets worse. The bulk of these nutrition hours are taught in the first year of medical school, as part of other basic science courses. In other words, nutrition is often not taught in relation to public health problems, like obesity, cancer, diabetes, etc.

It gets even worse! When nutrition education is provided in relation to public health problems, guess who is supplying the "educational material"? The Dannon Institute, Egg Nutrition Board, and other industry sources. These organizations are creating CD-ROMs and giving them away to medical schools for free. As of late 2003, 112 medical schools were using the curriculum.

You should not assume that your doctor has any more knowledge about food and its relationship to health than our neighbors and coworkers. It's a situation in which nutritionally untrained doctors prescribe milk and sugar-based meal-replacement shakes for overweight diabetics, and high-meat, high-fat diets for patients who ask how to lose weight. The health damage that results from doctors' ignorance of nutrition is astounding.

In Closing

Here is what we've been told all of our lives:

- Follow the food pyramid, and USRDA guidelines for optimum health.
- Milk is good for us.
- We need meat to get protein.
- Cancer and heart disease are all in the genes.
- Chemicals and environmental factors are the biggest cause of cancer.
- Taking vitamin supplements can make up for our poor dietary habits.
- Once you have a chronic disease, you're stuck with it.

Here is the effect of these things we've been told:

- 82% of American adults have at least one risk factor for heart disease.
- 81% of Americans take at least one medication during any given week.
- 65% of American adults are overweight.
- At least 16 million American have diagnosed diabetes, and another 16 million have it, but do not know it yet.

- Over 550,000 Americans died from cancer in 2000

We can change these statistics. To do this, we must change our tactics. We must change our habits on a daily basis. We must embrace the information that is so plainly before us:

- We now have a deep and broad range of evidence showing that a whole foods, plant-based diet is best for the heart and can reverse heart disease.
- We now have a deep and broad range of evidence showing that a whole foods, plant-based diet is best for cancer, and can stop cancer growth.
- We now have a deep and broad range of evidence showing that a whole foods, plant-based diet is best for diabetes and other autoimmune diseases and can reverse the progress of these diseases.
- We now have a deep and broad range of evidence showing that a whole foods, plant-based diet is best for our kidneys, bones, eyes and brains.

I believe that the world is finally ready to accept it. More than that, I believe the world is finally ready to change. We have reached a point in our history where our bad habits can no longer be tolerated. We, as a society, are on the edge of a great precipice: we can fall to sickness, poverty and degradation, or we can embrace health, longevity and bounty. And all it takes is the courage to change. How will our grandchildren find themselves in 100 years? Only time will tell, but I hope that the history we are witnessing and the future that lies ahead will be to the benefit of us all.