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It was growing up on one of the many dairy farms of the rural American landscape that the young T. Colin Campbell formed the views that would shape the early portion of his career. Cow's milk, "Nature's most perfect food," was central to the existence of his family and community. Most of the food that Campbell's family ate they produced themselves. Campbell milked cows from the age of five through his college years. He studied animal nutrition at Cornell, and did his PhD research on ways to make cows and sheep grow faster so the American food supply could be pumped up with more and more protein.¹

Fast forward to the present. Campbell is now on the advisory board of the Physicians' Committee for Responsible Medicine,² which describes itself as "a nonprofit organization that promotes preventive medicine, conducts clinical research, and encourages higher standards for ethics and effectiveness in research,"³ but whose pro-vegan agenda reflects its ties to [People for the Ethical Treatment of Animals \(PETA\)](#) and other animal rights groups.⁴

Campbell's new book *The China Study: Startling Implications for Diet, Weight Loss, and Long-Term Health* hit the bookstores in January 2005 and details the turning points in his post-graduate research that led Campbell to become a famed opponent of animal foods and an advocate of the vegan diet. It takes the reader on a tour through Campbell's early animal experiments, which he interpreted to implicate animal protein as a primary cause of cancer, through the massive epidemiological study after which the book was named. Only 39 of 350 pages are actually devoted to the China Study. **The bold statement on page 132 that "eating foods that contain any cholesterol above 0 mg is unhealthy,"⁵ is drawn from a broad--and highly selective--pool of research. Yet chapter after chapter reveals a heavy bias and selectivity with which Campbell conducted, interpreted, and presents his research.**

[Protein and Cancer](#)

The first strike against the pro-protein mantra Campbell had inherited from his nutritional forbears came while he was studying the relationship between aflatoxin (AF), a mold-related contaminant often found in peanut butter, and cancer in the Philippines. Campbell was informed by a colleague that, although the areas with the highest consumption of peanut butter had the highest incidence of liver cancer, it was the children of the "best-fed families," who consumed the most protein, who were getting liver cancer. **Whether the best-fed Philippino families ate the many staples of modern affluent diets like refined breads and sugars isn't mentioned.**⁶

This observation was corroborated by a study published in "an obscure medical journal," that fed AF to two groups of rats, one consuming a 5 percent protein diet, one consuming a 20 percent protein diet, in which every rat in the latter group got liver cancer or its precursor lesions, and none in the former group got liver cancer or precursor lesions.⁷

Campbell went on to investigate the possible relationship between nutritional factors, including protein, and cancer, a study that proceeded for 19 years with NIH funding.⁸ His conclusion was revolutionary and provocative: while chemical carcinogens may initiate the cancer process, dietary promoters and anti-promoters control the promotion of cancer foci,⁹ and it is nutritional factors, not chemical carcinogens, that are the ultimate deciding factors in the development of cancer.¹⁰ **Yet the 19 years of research into this project leave us with more questions than answers, and have left T. Colin Campbell with a foundation of unsupported conclusions upon which he has built his tower of vegan propaganda.**

Campbell began his studies using AF as an initiator of cancer foci and the milk protein casein as the promoter protein of study. His results corroborated the earlier results of other researchers: a dose-response

curve existed for AF and cancer on a 20 percent casein diet, but disappeared on a 5 percent protein diet.¹¹ He found that adjusting the protein intake of the same rats could turn cancer promotion on and off as if with a switch,¹² and found casein to have the same effect when other cancer initiators, such as the hepatitis B virus, were used.¹³

Rather than throwing a blanket accusation at all protein, Campbell acknowledged that the study of other proteins would be required before generalizing, just as the study of other cancer initiators would be required before generalizing to them. **Wheat and soy protein were both studied in lieu of casein, and both were found not to have the cancer-promoting effect of casein.**¹⁴ Amazingly, Campbell's reluctance to make **unwarranted generalizations ends here.** After briefly describing some research finding a protective effect of carotenoids against cancer, Campbell concludes the chapter on his animal research by noting the following overarching pattern: "*nutrients from animal-based foods increased tumor development while nutrients from plant-based foods decreased tumor development.*"¹⁵ (His italics.)

The generalization from the milk protein casein to all "nutrients from animal-based foods" is clearly unwarranted. If Campbell took caution to study the issue further before generalizing from casein to all proteins, why didn't he take the same caution before generalizing from casein to *all animal proteins or all animal nutrients*? Indeed, Campbell later acknowledges that he is making this generalization: ". . . casein, and very likely all animal proteins, may be the most relevant cancer-causing substances that we consume."¹⁶ **Why this generalization is "very likely" to be true is left unexplained.**

Campbell is aware that casein has been uniquely implicated in health problems, and dedicates an entire chapter to casein's capacity to generate autoimmune diseases.¹⁷ Whey protein appears to have a *protective* effect against colon cancer that casein does not have.¹⁸ Any effect of casein, then, cannot be generalized to other milk proteins, let alone all animal proteins. Other questions, such as what effect different types of processing have on casein's capacity to promote tumor growth, remain unanswered. Pasteurization, low-temperature dehydration, high-temperature spray-drying (which creates carcinogens), and fermentation all affect the structure of casein differently and thereby could affect its physiological behavior. **What powdered, isolated casein does to rats tells us little about what traditionally consumed forms of milk will do to humans and tells us nothing that we can generalize to all "animal nutrients."** Furthermore, **Campbell fails to address the problems of vitamin A depletion from excess isolated protein, unsupported by the nutrient-dense fats which accompany protein foods in nature.**

[Lessons from China](#)

In the early 1980s, along with Chen Junshi, Li Junyao, and Richard Peto, T. Colin Campbell presided over the mammoth epidemiological study referred to as the China Project, or China Study. The *New York Times* called it "the Grand Prix of epidemiology," and it gathered data on 367 variables across sixty-five counties and 6,500 adults. Amazingly, from over 8,000 *statistically significant associations*, Campbell was able to draw a single unifying principle: "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."¹⁹

The study utilized recall questionnaires, direct observation and measurement of intakes over a three-day period, and blood samples.²⁰ **The blood samples were combined into large pools for each village and each sex.**²¹ **This had the drawback of dramatically decreasing the number of data points relative to the enormous number of correlations being generated, and the advantage of allowing the blood to be tested for many, many more variables than would be testable using individual samples.**

One of the benefits of the China Study's design was that the genetic stock of the study subjects had little variation, while there was wide variation among cancer and other disease rates. **While the dietary surveys**

were conducted in the autumn of 1983,²² the mortality rates were taken a decade earlier in 1973 through 1975.²³ Rural areas were thus deliberately selected to ensure that the people in the area had for the most part lived in the area all their lives and had been eating the same foods native and traditional to that area, so that the mortality data would reliably match the dietary data.

One of the drawbacks of the study was that nutrient intakes were determined from food composition tables, rather than measured directly from foods.²⁴ This disallowed any consideration of differences in nutrient composition of foods within the area due to soil quality, which was a primary theme of Weston Price's research. Another drawback was that the questionnaire did not adequately account for the diversity of animal foods in the Chinese diet. Questions about the frequency of consumption of sea food, meat, eggs, and milk were included, but questions about organ meats and insects were not included on the questionnaire, nor was fish differentiated from shell fish, despite the very different nutrient profiles of these foods.²⁵ Additionally, the autumn dietary survey could not take into account foods that were not in season at the time.

What is most shocking about the China Study is not what it found, but the contrast between Campbell's representation of its findings in *The China Study*, and the data contained within the original monograph. Campbell summarizes the 8,000 statistically significant correlations found in the China Study in the following statement: "people who ate the most animal-based foods got the most chronic disease."²⁶ He also claims that, although it is "somewhat difficult" to "show that animal-based food intake relates to overall cancer rates," that nevertheless, "animal protein intake was convincingly associated in the China Study with the prevalence of cancer in families."²⁷

But the actual data from the original publication paints a different picture. Figure 1 Below, shows selected correlations between macronutrients and cancer mortality. Most of them are not statistically significant, which means that the probability the correlation is due to chance is greater than five percent. It is interesting to see, however, the general picture that emerges. Sugar, soluble carbohydrates, and fiber all have correlations with cancer mortality about seven times the magnitude of that of animal protein, and total fat and fat as a percentage of calories were both negatively correlated with cancer mortality. The only statistically significant association between intake of a macronutrient and cancer mortality was a large protective effect of total oil and fat intake as measured on the questionnaire. As an interesting aside, there was a highly significant negative correlation between cancer mortality and home-made cigarettes!²⁸

Campbell's case for the association between animal foods and cancer within the China Study is embedded within an endnote. Campbell states: "Every single animal protein-related blood biomarker is significantly associated with the amount of cancer in a family."²⁹ Following the associated endnote, these biomarkers were "plasma copper, urea nitrogen, estradiol, prolactin, testosterone, and, inversely, sex hormone binding globulin, each of which has been known to be associated with animal protein intake from previous studies."³⁰

Since Campbell does not cite these "previous studies," the reader is left in the dark regarding the reliability of his assumptions. Blood biomarkers are generally associated with food intake *patterns*, rather than specific foods. Since food intake patterns differ in different populations, an association found between a biomarker in one population cannot be necessarily generalized to another.³¹ For example, people who eat more whole grains might have higher levels of vitamin C, even though whole grains do not contain vitamin C. This might be true in one population where people who eat whole grains tend to eat more fruits and vegetables, but untrue in another population. It isn't at all clear why this roundabout way of measuring animal protein consumption is superior to the direct methods of the study, such as the food questionnaire and the dietary observations.

Additionally, of the biomarkers measured, estradiol only had a statistically significant relationship with

animal protein in women under 45, as is true for sex hormone-binding globulin, both of which had negative correlations in women aged 55-64. There was no statistically significant relationship between animal protein and testosterone in men of any age, which were negatively correlated in all age groups, nor in females except those aged 55-64. Plasma prolactin was only statistically significantly related to animal protein consumption in the oldest group of females, and was negatively correlated in other age groups.³² Only urea nitrogen and copper were consistent and significant indicators of animal protein consumption, and of these two only copper was significantly related to cancer mortality.³³

It is difficult to see how Campbell can so emphatically draw the conclusion that animal foods are the cause of most diseases from this data.

Only Half the Story?

By the title, one would expect *The China Study* BOOK to contain objective and complete information derived from the China Study. Page one touts "real science" above "junk science" and "fad diets." Yet Campbell consistently presents only half the story at best through the duration of the book. In Part II, Campbell presents the evidence incriminating animal products as the cause of nearly every disease. He cites several health care practitioners, including Dr. Caldwell Esselstyn Jr. and Dr. Dean Ornish, who claim to have been able to reverse heart disease with plant-based diets,³⁴ and cites the Papua New Guinea Highlanders as an example of a traditional society without the occurrence of heart disease, but makes no mention of George Mann's and other researcherS' extensive study of the Masai or the healthy primitives of Weston Price. That the programs of Ornish and Esselstyn involved more than abstention from animal foods--especially the program of Ornish, of which diet is only a small part--is not seen as a confounding factor that detracts from our ability to incriminate animal foods in heart disease. Nor does he bother to mention the cannibalism or the swollen bellies of children that accompanies the protein-starved diet of the New Guinea Highlanders.³⁵

In Campbell's discussion of diabetes, he concludes that "high-fiber, whole, plant-based foods protect against diabetes, and high-fat, high-protein, animal-based foods promote diabetes."³⁶ He discusses the possible role of cow's milk in causing Type 1 diabetes via an autoimmune reaction,³⁷ but makes no mention that wheat gluten has been implicated in Type 1 diabetes by a similar process.³⁸ He similarly fails to mention the role of fructose consumption in causing insulin resistance,^{39,40} and the increase in high fructose corn syrup consumption that has paralleled the increase in diabetes.

Campbell discusses the role of animal foods in causing prostate cancer,⁴¹ but makes no mention of the potent preventative role current research is attributing to vitamin A, a nutrient found only in animal foods.⁴² He devotes 19 pages to discussing the role of cow's milk in causing autoimmune diseases,⁴³ but zero pages to the role of wheat gluten in causing autoimmune diseases.⁴⁴ Campbell suggests that dietary fat and cholesterol contribute to Alzheimer's and discusses the potential protective effects of plant foods,⁴⁵ but makes no mention of the protective effect of DHA, an animal-based nutrient, currently under investigation.⁴⁶

The China Study frequently ignores the contribution of animal foods to certain classes of nutrients, such as B vitamins and carotenes. Both classes of nutrients are assumed to come from plant foods, despite egg yolks and milk from pastured animals being a good source of carotenes, and the high B vitamin content of liver. But the most curious of such statements is one found on page 220, where Campbell declares, "Folic acid is a compound derived exclusively from plant-based foods such as green and leafy vegetables."⁴⁷ This is a fascinating statement, considering that chicken liver contains 5.76 mcg/g of folate, compared to 1.46 mcg/g for spinach!⁴⁸ A cursory look through the USDA database reveals that the most folate-dense foods are organ meats.

The China Study contains many excellent points in its criticism of the health care system, the overemphasis on reductionism in nutritional research, the influence of industry on research, and the necessity of obtaining

nutrients from foods. But its bias against animal products and in favor of veganism permeates every chapter and every page. Less than a page of comments are spent in total discussing the harms of refined carbohydrate products. Campbell exercises caution when generalizing from casein to plant proteins, but freely generalizes from casein to animal protein. He entirely ignores the role of wheat gluten, a plant product, in autoimmune diseases, so he can emphasize the role of milk protein, an animal product. The book, while not entirely without value, is not about the China Study, nor is it a comprehensive look at the current state of health research. It would be more aptly titled, *A Comprehensive Case for the Vegan Diet*, and the reader should be cautioned that the evidence is selected, presented, and interpreted with the goal of making that case in mind.

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[Figure 1: Associations of Selected Variables with Mortality for All Cancers](#)

<u>Total Protein</u>	+12%	<u>Carbohydrates</u>	+23%
<u>Animal Protein</u>	+ 3%	<u>Total Calories</u>	+16%
<u>Fish Protein</u>	+ 7%	<u>Fat % Calories</u>	- 17%
<u>Plant Protein</u>	+12%	<u>Fiber</u>	+21%
<u>Total Lipids</u>	- 6%	<u>Fat (questionnaire)</u>	- 29%*

*** statistically significant**

**** highly significant**

***** very highly significant**

About the Author

Chris Masterjohn is the author of several *Wise Traditions* articles and the creator and maintainer of Cholesterol-And-Health.Com, a website dedicated to extolling the virtues of cholesterol and cholesterol-rich foods. He has authored two items accepted for publication in peer-reviewed journals: a letter in an upcoming issue of the *Journal of the American College of Cardiology* criticizing the conclusions of a recent study on saturated fat and a full-length feature in an upcoming issue of *Medical Hypotheses* proposing a molecular mechanism of vitamin D toxicity. Masterjohn holds a Bachelor's degree in History and is preparing to pursue a PhD in Molecular and Cellular Biology. He is also a Weston A. Price Foundation Local Chapter Leader in West Brookfield, Massachusetts