

Colin Campbell ¹ was a nutritional biochemist at Cornell University. In the 1960s, he was involved in nutritional programs in the Philippines to help families provide for their critically undernourished children. Peanuts were one of their preferred sources of protein. It is a legume— great for improving the soil, easy to grow, and is nutritious and tasty.

At the same time, children younger than 10, were dying at alarming rates from liver cancer. Normally liver cancer is an adult disease— and the children dying from the disease were from the most affluent suburbs in Manila. These are the families that could afford the best housing and the best food.

Whilst in the Philippines, he read a paper in an obscure medical journal. Rats were fed aflatoxin— one of the deadliest carcinogens known. One group of rats was given a diet of 20% protein —and they all died of liver cancer. The second group was given a diet of 5% protein— and they all lived. 100% deaths compared to zero deaths. They were all fed aflatoxin— but only those rats that had a high protein diet died.

A 20% diet of wheat protein, gluten, or pea protein did not result in liver cancer deaths whereas casein, which comprises of 80% of the protein found in cow's milk, and albumin, which is found in egg white, did result in liver cancer deaths. Plant-based diets are often considered to be lysine deficient. However, adding the amino acid lysine to the wheat protein to match the level found in casein also resulted in cancer deaths.

Significantly, peanuts and corn in the Philippines were often contaminated by aflatoxin— and the wealthy ate Western-style diets, one rich in protein.

A few years later, in the early 1970s, the premier of China, Chen En-lai, was dying of cancer. Late in his life, he instigated a survey of cancers, heart disease, and infectious diseases throughout China. As a result, the China Atlas was produced, which shows the mortality rates in more than 2,400 counties. Some regions showed cancer rates over 100 times greater than the counties with the lowest rates.

To study these results, the *China-Cornell-Oxford Project* was formed. The principle researchers were: Colin Campbell, professor of nutritional biochemistry at Cornell; Chen Junshi, Deputy Director of Institute of Nutrition and Food Hygiene at the Chinese Academy of Preventive Medicine in Beijing; Li Junyao of the China Cancer Institute; and the epidemiologist Sir Richard Peto from the University of Oxford. Li Junyao was one of the authors the China Atlas. Richard Peto is one of the world's leading epidemiologists.

Surveys were conducted in 1983- 1984 and 1989- 1990. The study consisted of 6,500 people in 65 counties. In each county, two villages (xiang) were selected with 25 men and 25 women from different families selected from each village. Blood, urine, and food samples were obtained for analysis, questionnaires were completed, and three-day diet information was recorded.

They looked at over 360 different health, lifestyle, and nutrition factors and found over 8,000 significant correlations. Below are some comparisons of diets in rural China with average American diets. ^{2 3}

Nutrient	China				U.S. Percentiles				
	Mean	Min	Median	Max	Mean	5	50	95	1
Energy Intake (kcal/day) M	2609	1707	2608	3578	2567				
Energy Intake (kcal/day) F	2406	1579	2433	3066	1834				
Carbohydrate (g/day) M	476	292	467	740	305	193	324	491	
Carbohydrate (g/day) F	429	256	433	588	228	135	233	364	
Fiber (g/day) M	17	4.8	14	44.7	20.3	8.1	17.8	30.1	
Fiber (g/day) F	12.7	4.8	11	38.8	16.1	6.3	13.1	25.3	
Total Protein (g/day) M	64.6	42.2	64.3	98.7	98.8	67	103	151	2
Total Protein (g/day) F	59.1	40.7	58.1	82.8	68.1	14	66	101	
% Animal / Total Protein M	8.4	0.3	6.8	32.8	70				3
% Animal / Total Protein F	12.2	0	8.6	47.5	66				
% Fat / kcal M	14.6	5.9	14.3	25.4	33				
% Fat / kcal F	18.3	7.4	18.4	32.6	32.9				
% Saturated / Total Fat M	11.85	3.27	11.67	28.26	32				
% Saturated / Total Fat F	13.91	5.18	13.23	28.18	32				
Vitamin C (mg/day) M	142.5	10.4	128.3	429.4	92.1	29	89	225	
Vitamin C (mg/day) F	120.2	28.9	111.4	344.9	77.8	26	68	158	
Calcium (mg/day) M	543	241	514	923	1116	446	961	1802	
Calcium (mg/day) F	543	352	519	1056	868	414	722	1206	
Iron (mg/day) M	34.3	17.1	34.3	59.3	18.1	10.4	17.7	29.3	
Iron (mg/day) F	32.5	14.7	32.5	50.6	15.8	7.6	12.4	20.7	

(1) For the China statistics, the minimum and maximum values represent the average of the counties with the lowest and highest values. A percentile of 5% indicates the value, below which 5% of the observations may be found.

(2) The U.S. values calculated from g/ kg body weight values using 76 kg weight for males and 61 kg for females.

(3) Of the 65 counties, 42 counties had plant / animal protein ratio of 90% or greater, 27 counties were 95% or greater and 14 counties were 98% or greater.

Even allowing for greater physical activity in China, the Chinese consume more calories but weigh significantly less.

Total energy intake in rural China was about 30% higher per kg of body weight than in the U.S. Despite this, obesity was far less prevalent in China than in the U.S.

Iron consumption was much greater in the Chinese population, despite consuming less animal products. Fiber intake is significantly higher whilst fat, protein, and animal-based foods are less.

Breast cancer is much less common in rural China. It was significantly associated with dietary fat and higher levels of reproductive hormones such as estrogen and testosterone as a result of high meat and dairy rich diets found in Western countries.

The *China-Cornell-Oxford Project*⁴ shows that a higher level of dietary fat and animal-based foods is associated with higher blood cholesterol. These factors are associated with a higher life-time exposure to female hormones, which are associated with more breast cancer and earlier age of menarche. The range for the villages in the study was fifteen to nineteen years, with an average of seventeen years. The U.S. average was about eleven years.

These findings also support the idea that young girls on Western-style diets reach menarche more quickly due to increased growth rates. They sustain higher levels of steroid hormones during their reproductive years, extend their time for menopause, and incur a higher risk of breast cancer.

Colon and rectum cancers in China are much less common than in the United States. These cancers are associated with lower intakes of a wide variety of dietary fiber components only found in plant based foods.

Stomach cancer is much more common in China than in the U.S. because of the effects of *Helicobacter pylori* infection upon the stomach wall. This bacteria is also associated with stomach ulcers.

Liver cancer is about 30 times more common in China than the U.S. due to hepatitis infections.

The consumption of animal products and subsequent increase of blood cholesterol levels result in a higher level of IGF-1 related cancer risk.

One of the chief findings was its significant correlation with breast cancer mortality with dietary fat over a range of 6-24% of calories consumed, although this range is much less than that of Western countries. Even at this relatively low range, the greater the consumption of fat, the higher the incidence of breast cancer.

Other significant findings are the positive association of animal protein with blood cholesterol (both total and LDL) and the inverse association with blood cholesterol and with plant protein.

Other Links

[Nutrition Studies Website](#)
[Forks Over Knives](#)

Footnotes

1. Campbell, T. C. & Campbell, T. M. (2016) *The China Study: Revised and Expanded Edition*. Dallas, Texas: BenBella Books.
2. Doll, R. & Li, L. (1993) *The China Project-Summary Statistics, Full Names and Abbreviations for all 639 Variables*. p.19-103.
3. U.S. Department of Agriculture (2014) *What We Eat in America, NHANES 2011-2012 Tables 1-40*.
4. Campbell, T. C. & Campbell, T. M. (2016) *The China Study: Revised and Expanded Edition*. Dallas, Texas: BenBella Books.