

## The Benefits of Integrating Nutrition into Clinical Medicine

Thomas M. Campbell II BA<sup>1</sup> and T. Colin Campbell PhD<sup>2</sup>

<sup>1</sup>University at Buffalo (State University of New York), School of Medicine and Biomedical Sciences, Buffalo, New York, USA

<sup>2</sup>Jacob Gould Schurman Professor Emeritus of Nutritional Biochemistry, Division of Nutritional Sciences, Cornell University, Ithaca, New York, USA

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Even by conservative estimates, poor diet and physical inactivity are the second leading modifiable cause of death in the United States, trailing only tobacco use [1]. Despite the established importance of diet and physical activity, clinical medicine has yet to embrace the idea that encouraging proper diet and physical activity are important avenues to both promote health and treat disease. For decades it has been known that most medical education programs do not include much more than the most cursory biochemical treatment of nutrition in their curriculum. The importance of dietary patterns to promote health and prevent and treat disease is largely ignored, and the art and skill of engaging patients in meaningful behavior modification is often not respected as 'real' medicine. A summary [2] of a 2002 report from the Royal College of Physicians asserts:

...teaching of nutrition to undergraduates in medical school has suffered from lack of co-ordination between the different disciplines involved and nutrition is therefore not recognized as a clinical entity. This has arisen because many clinical teachers themselves have had little or no training in the subject and so tend not to teach it. The result is that many doctors neglect clinical nutrition through lack of awareness of its potential benefits.

Our experiences as a medical student (T.M.C.) and researcher (T.C.C.) support the notion that many health professionals are either unimpressed or unaware of the clinical benefits achieved by promoting optimal nutrition. But there are many demonstrable benefits, a few of which are worth highlighting here.

### Cardiovascular

There have now been at least two clinicians who have published data on reversing heart disease largely through dietary advocacy. In 1995 Dr. Caldwell Esselstyn et al. [3] published data on 22 patients with documented severe cardiovascular disease who he enrolled in a study to follow a plant-based, very low fat diet and take cholesterol-lowering medication, most frequently cholestyramine 4 mg twice daily and lovastatin 40–60 mg daily. Five patients dropped out but the remaining patients remained adherent. In the study's 5 year report [3], mean arterial stenosis

had decreased from 53.4% to 46.2% as documented by angiogram. Total cholesterol levels dropped from 6.36 mmol/L (246 mg/dl) to 3.42 mmol/L (132 mg/dl). In a dramatic fashion, patients had not only ameliorated their symptoms, but also reversed their disease.

Similarly, Ornish and colleagues [4] conducted a randomized clinical trial in which 28 patients in the experimental diet were treated with a very low fat plant-based diet and exercise and relaxation techniques and 20 were treated with the usual care. As documented by angiography, the experimental group showed a regression of mean coronary artery stenosis from 40% to 37.8% in only one year while the control group showed mean arterial stenosis progression from 42.7% to 46.1%. Within just one year even severe disease could be reversed by lifestyle change alone.

### Cancer

Much of our own views on diet and cancer comes from evidence obtained by one of us (T.C.C.) and his colleagues in a relatively large experimental research program (with both epidemiological and laboratory components) over more than 40 years that was funded by public money (mostly National Institutes of Health) along with approximately 20 years of diet and health policy development (T.C.C.). This research found, among many other things, that the type and amount of protein fed to experimental animals (rats and mice) could dramatically promote or reverse hepatocellular carcinoma after initiation by either aflatoxin or hepatitis B virus. On these lower protein diets less aflatoxin passed through the cell membrane, fewer mutagens formed DNA adducts, and the cell cycle slowed, inhibiting tumorigenesis. Further, our group found that cancer, once initiated and promoted, demonstrated reversibility upon dietary intervention [5].

In humans a vast body of research supports a dietary influence on cancer. Three separate reviews have found that compared to the people who consume the least fiber, the people who consume the most fiber have 40–50% reduced risk of colorectal cancer [6–8]. Similarly, those who consume the most vegetables have a 52% lower risk of colon cancer [6]. A 2001 review found that men with the highest dairy intakes had double the risk of getting prostate cancer and quadruple the risk of metastatic prostate cancer relative to low consumers [9]. In one interventional trial [10] a strict plant-based diet with lifestyle changes appeared to stop and perhaps reverse the progression of prostate cancer

with documented [11] down-regulation of insulin-like growth factor pathway genes and oncogenes.

## Diabetes

Diabetes is well known to be amenable to dietary treatment. One trial [12] enrolled 60 non-insulin dependent diabetics in a low fat, plant-based diet and exercise program over 26 days and got dramatic results. Ninety-one percent of patients taking oral hypoglycemic medication were able to discontinue their medication and 76% of patients taking insulin were able to discontinue their insulin. Concurrently, their serum glucose, total cholesterol, triglycerides and weight all plummeted. Supporting data have been documented elsewhere [13,14].

## Other conditions

Demonstrating a powerful systemic effect, diet has been shown to affect several other disease processes, including autoimmune diseases. Dr. Roy Swank [15] published results from a dietary intervention of lowered saturated fat intake for multiple sclerosis patients over a period of 34 years [15]. Those patients who strongly adhered to this plant-enriched diet had far fewer multiple sclerosis-related deaths and far less progression of neurologic degeneration, regardless of the severity of disease at the start of the study. In fact, 95% of adherent dieters who started the program with only mild disease remained only mildly disabled for the next 30 years. In patients with rheumatoid arthritis a 4 week trial of a very low fat, strictly plant-based diet resulted in significant improvement in symptoms of pain, functional limitations, morning stiffness and joint tenderness [16].

Regarding kidneys, vegetarians have been found to have a 40–60% lower incidence of kidney stones [17], and a clinical trial [18] investigating dietary intervention of less animal protein and salt intakes among men with recurrent calcium oxalate stones found that stone recurrence decreased by 50% in the dietary intervention group. Bone health is also related to diet. In a prospective cohort study in California involving over 1000 postmenopausal women [19], those women with the highest ratio of animal to plant protein intake had more than a threefold risk of experiencing a hip fracture over a 7 year follow-up, even after controlling for several potential confounders.

## The optimal diet

These human trials and observational studies demonstrate benefits clinicians might achieve with motivated patients if successfully promoting optimal nutrition were part of the standard medical armory. In addition to interventional human trials there is a robust epidemiological and laboratory body of support for the hypothesis that an optimal diet not only prevents but can also treat a variety of diseases. And while no one study is likely to definitively prove anything, the breadth and depth of research now supporting the dietary effect is impressive. In 2005 we attempted to broadly summarize some of the depth of this research in a book for the public titled *The China Study* [20].

In this effort we observed that the diet often found to have remarkable benefits both in prevention and treatment of several

chronic diseases is a diet based on whole, unrefined plant foods, including beans, whole grains, fruits and vegetables. During the last three decades a major trend has emerged within the professional diet and health communities to advocate greater consumption of these foods and a lesser consumption of animal-based foods [21–24]. Further recommendations are usually added, such as a) to consume, as much as possible, these foods in their wholesome food form (e.g., brown rice instead of white rice, whole wheat instead of white flour); b) to minimize the consumption of processed food products often high in sugar, salt and fat (a good recipe for a donut); c) to consume, as much as possible, organic, fresh and natural foods; and d) to minimize the consumption of added fat, salt and sugar.

## Integrating this information

Translating this science into practice is a monumental task riddled with challenges. Challenges include larger societal forces such as opposing industry interests and a popular health media saturated with conflicting messages, as well as practical considerations for clinicians such as lack of time with patients, lack of resources, lack of reimbursement, lack of patient motivation, and lack of training. These are very real and formidable obstacles to integrating nutrition into clinical medicine.

But even given these challenges, the time for highlighting nutrition has never been better. There are financial incentives for a society increasingly burdened by health care costs (especially in the United States), improving technologies available for patient education and motivation, and surging interest among the public. An opinion survey in Australia regarding plant-based diets published in 2006 found that more than 40% of the respondents had some level of interest in adopting a plant-based diet [25]. In addition, improving technology such as computer-based health risk assessments, activity monitoring devices, and improved communication media allow better patient education and motivation. Given this confluence of factors, along with an increasingly broad array of research findings demonstrating the benefits of optimal nutrition, we propose that tackling the barriers between nutrition and clinical medicine is one of the most rewarding strategies for improving the state of medicine and health; rewarding for patients, professionals, and society as a whole.

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**Correspondence:** T.M. Campbell II, 519 Richmond Ave., #4, Buffalo, New York 14222, USA.

Phone: (1-716) 697-0897

email: tmc33@buffalo.edu; tccl@cornell.edu