



Yanni Papanikolaou, PhD, Nutritional Strategies, Inc.

Laurel Branen, PhD, RD, LD, College of Agricultural and Life Sciences, University of Idaho

In addition to summarizing articles from scientific peer-reviewed journals, Bean Briefs highlights news and emerging research about beans and health.

Emerging Research News as Reported by the Nutrition/Medical Journals

Pinto bean consumption changes SCFA profiles in fecal fermentations, bacterial populations of the lower bowel, and lipid profiles in blood of humans.

Finley JW, Burrell JB, and Reeves PG. –2007. *Journal of Nutrition* 137: 2391-2398

Accumulating data suggest that beans lower serum lipids in human subjects and lower the risk of colon cancer via greater short-chain fatty acid (SCFA) production. This USDA study examined the hypothesis that pinto bean consumption affects SCFA production, colonic bacterial populations, and serum lipids. The study used 40 adults with premetabolic syndrome (pre-MetSyn; metabolic syndrome is a cluster of metabolic conditions that signal risks for coronary heart disease and type 2 diabetes) and 40 controls. Subjects were randomly assigned to consume either a bean entrée [1/2 cup (130 g) of dried, cooked pinto beans] or a chicken soup entrée



(equal calories to bean meal) daily for 12 weeks. Relative to baseline, propionate SCFA production from fecal material fermented in vitro with bean flour was greater in adults consuming beans relative to the soup group. The most robust effects were seen with bean consumption and lipid profiles. Specifically, beans lowered serum total cholesterol by approximately 8% in the controls and 4% in the pre-MetSyn group. Bean consumption lowered serum HDL-cholesterol and LDL-cholesterol in both groups without affecting serum triglycerides, VLDL cholesterol, or glucose. This study indicates that bean consumption can favorably affect lipid profiles associated with cardiovascular disease, however, the data do not indicate clear health benefits associated with colon cancer risk.



TAKE HOME MESSAGE: The researchers demonstrated that daily consumption of pinto beans can have several cholesterol-lowering benefits (i.e., total and LDL-cholesterol) in both healthy subjects and in those preconditioned for metabolic syndrome. In fact, the authors stated that, "the treatment differences were of such magnitude that significance was found to be both statistical and physiological. *This study adds to a growing and convincing body of evidence that adding dry beans to the diet in quantities of at least 100 g/d changes lipid profiles in a manner associated with decreased risk of cardiovascular disease.*" Nonetheless, the investigators were not able to provide a rationale as to why bean consumption lowered HDL cholesterol (i.e., higher HDL-cholesterol levels lower the risk of heart disease) while no changes were observed for triglycerides. As such, future research is necessary to unravel such unexpected results.



Diet and survival after prostate cancer diagnosis.

Berkow S, Barnard ND, Saxe GA, et al.– 2008. *Nutrition Reviews* 65: 391-403

This review considered eight observational and 17 intervention studies that examined the relationship of plant-based diets to prostate cancer. Overall, vegetable components that reduced the risk of prostate cancer included fiber, specific nutrients and antioxidants. One potential mechanism suggested that plant components function by way of altering levels of hormones that favor tumor growth. The researchers concluded that *“these studies suggest that plant-based diets that are high in fiber and phytonutrients and low in fat and saturated fat, favorably influence health outcomes for prostate cancer patients.”* In addition, individuals who adopt a plant-based diet following cancer onset may experience a slower rate of progression relative to those not consuming plants.



TAKE HOME MESSAGE: Beans and other legumes fit the profile of being a plant food rich in fiber and phytonutrients and low in total and saturated fat. Since several scientific studies are now available linking plant food consumption and reduced cancer risks, it is imperative to conduct trials looking at individual plant foods and consumption levels necessary to observe health benefits. Imagine the day when you can say, “Eating one can of baked beans per day, as part of a diet low in total and saturated fat, can reduce your chances of prostate cancer by 50%”... everything starts with a dream!

Association between dietary glycemic index and age-related macular degeneration in nondiabetic participants in the Age-Related Eye Disease Study

Chiu C-J, Milton RC, Gensler G et al.– 2007. *American Journal of Clinical Nutrition* 8: 180-188

Researchers at the USDA assessed whether the dietary glycemic index is associated with the risk and severity of age-related macular degeneration (AMD), a condition leading to blindness, in an elderly population. Dietary data was obtained from nearly 4,100 subjects (aged 55- to 80-years-old). Individuals in the fourth and fifth quintiles had greater risk of large drusen, atrophy and neovascularization (i.e., attributes of AMD). Researchers also observed that AMD severity increased with a greater dietary glycemic index.



The researchers also stated, *“that 20 percent of the cases of advanced AMD might have been prevented if those individuals had consumed a diet with a glycemic index below the average for their age and gender.”* Thus, a reduction in dietary glycemic index may provide a non-invasive method of decreasing the risk of AMD.



TAKE HOME MESSAGE: There continues to be a growing body of evidence in support for consuming a low-glycemic index diet. This study provides data to show that a high-glycemic index diet can be detrimental to eye health. Once again, a great opportunity exists for the bean manufacturers and growers to scream out the benefits of bean consumption...not just colon health anymore! In order to get there though, we need controlled clinical studies that look at the specific effects of chronic bean consumption and age-related macular degeneration.

Association of dietary patterns with cancer recurrence and survival in patients with stage III colon cancer.

Meyerhardt JA, Niedzwieki D, Hollis D et al.–2007. *Journal of the American Medical Association* 298: 754-764

This observational research in approximately 1,000 adults from the Dana-Farber Cancer Institute in Boston, MA examined the relationship of dietary patterns with cancer recurrences and mortality of colon cancer survivors. For the purpose of this work, two major dietary patterns were identified: a prudent and a Western diet. The prudent dietary pattern was characterized by high intakes of fruits and vegetables, poultry, and fish, while the Western pattern was characterized by greater intakes of meat, fat, refined grains, and desserts. Results showed that greater intake of a Western dietary pattern after cancer diagnosis was associated with a significantly worse health outcome (i.e., colon cancer recurrences or death). The investigators concluded that *"higher intake of a Western dietary pattern may be associated with a higher risk of recurrence and mortality among patients with stage III colon cancer."*



TAKE HOME MESSAGE: While a cause and effect cannot be established from this work due to the study design, an important association remains evident—following a typical Western-style dietary pattern can be harmful in individuals who have previously been diagnosed with colon cancer, not to mention the associations that may be present in presently healthy adults. What still is not evident from this work however, is which component of the diet is harmful? Is it one particular food and/or nutrient or a combination of foods/nutrients? A guess would be that we need studies to focus on the latter, since as individuals, we do not only eat one food, but rather a variety of foods.



Low-glycemic index or low-glycemic load diets for overweight and obesity.

Thomas DE, Elliott E, and Baur L.– 2007. *Cochrane Database Systematic Reviews* 18(3): CD005105

While obesity prevalence is continually increasing, the scientific evidence remains uncertain as to the exact causality. It has been hypothesized that consuming low-glycemic index or low-glycemic load diets may produce greater weight loss in comparison to diets with a higher glycemic index or glycemic load. This systematic review examined the effects of low-glycemic index or low-glycemic load diet on weight loss in overweight or obese people. Studies that were considered in the systematic review included only randomized controlled trials comparing a low-glycemic index or low-glycemic load diet (LGI) with a higher glycemic index or high-glycemic load diet or any other diet (Cdiet) in overweight or obese people. Six studies were eligible for the analysis with a total of 202 participants. Subjects who consumed LGI diets had significantly lower body masses (-1.1 kg), decreased total fat mass and reduced body mass indexes relative to the Cdiet group. In addition, those on the LGI diet had a significantly greater reduction in total cholesterol in comparison to the Cdiets



TAKE HOME MESSAGE: These findings demonstrate that overweight or obese people following a low-glycemic index or low-glycemic load diet lost more weight and had more improvement in lipid profiles than those receiving other diets. Legumes, as a whole, have some of the lowest glycemic index values. Future marketing and communication strategies need to tap into this attribute as signs are apparent that consumers have an increased understanding of the glycemic index (Refer to "Whats New with the Glycemic Index?" on page 7).

Bean consumption is associated with greater nutrient intake, reduced systolic blood pressure, lower body weight, and a smaller waist circumference in adults: Results from the National Health and Nutrition Examination Survey 1999-2002

Papanikolaou Y and Fulgoni VL.—2007. *Journal of the American College of Nutrition*, in press

Epidemiological studies have shown relationships between legume consumption and measures of cardiovascular disease and obesity. However, few observational trials have examined beans as a separate food variable when determining associations with health parameters. The researchers examined associations between consuming beans, and nutrient intakes and physiological parameters. Using data from NHANES 1999-2002, a secondary analysis was completed of a reliable 24-hour dietary recall where three groups of bean consumers were identified (N=1,475). The researchers determined mean nutrient intakes and physiological values between bean consumers and non-consumers. Relative to non-consumers, bean consumers had higher intakes of dietary fiber, potassium, magnesium, iron, and copper. Those consuming beans had a lower body weight and a smaller waist size relative to non-consumers. Additionally, consumers of beans had a 23 percent reduced risk of increased waist size and a 22 percent reduced risk of being obese. Baked bean consumption was associated with a lower systolic blood pressure.



TAKE HOME MESSAGE: Data from this observational study clearly show that bean consumers have better overall intake of several key nutrients, lower body weights and smaller waist circumferences, in addition to lower systolic blood pressure in comparison to non-consumers of beans. This evidence supports the benefits of bean consumption on nutrient intake, obesity prevention and on blood pressure. Since this is observational research, it needs to be followed up with a well-designed controlled clinical trial that examines the impact of long-term bean consumption on various health variables.

Pinto bean consumption reduces biomarkers for heart disease risk.

Winham DM, Hutchins AM and Johnston CS – 2007. *Journal of the American College of Nutrition* 26: 243-249



Researchers at Arizona State University examined the effects of daily pinto bean, black-eyed peas or carrot (placebo) consumption (1/2 cup) on coronary heart disease risk factors using a randomized, crossover study design (7 men and 9 women). Pinto bean consumption was the only treatment that significantly lowered serum total cholesterol (-19 mg/dL vs 1 mg/dL) and LDL cholesterol (-14 mg/dL vs 1 mg/dL). Based on these results, the authors recommend that "pinto bean intake should be encouraged to lower serum total cholesterol and LDL-cholesterol, thereby reducing risk for coronary heart disease."



TAKE HOME MESSAGE: Pinto beans offer an easy and non-invasive approach to lowering cholesterol levels. Physicians should advise patients to regularly consume legumes and other fiber-rich foods in combination with other treatments to reduce cholesterol levels.

Baked bean consumption reduces serum cholesterol in hypercholesterolemic adults

Winham DM and Hutchins AM – 2007. *Nutrition Reviews*, Vol 27, pp. 380-386

Baked bean intake has been previously associated with reduced cholesterol levels in adults with elevated cholesterol. The present work by researchers at Arizona State University and the University of Colorado investigated whether consumption of a half-cup of vegetarian baked beans daily for eight weeks would reduce risk factors for coronary heart disease and type 2 diabetes in men and women with elevated cholesterol levels. A significant reduction in total cholesterol was seen at the end of the study in the bean group when compared to the control (-5.6% vs 0.5%, respectively), while no significant effects were seen with other parameters investigated. The mean percentage change of serum LDL-cholesterol showed a trend toward significance for the baked beans relative to the control (-5.4% vs 1.0%, respectively).



TAKE HOME MESSAGE: While these findings show that vegetarian baked bean consumption can lead to significant reductions in total cholesterol in hypercholesterolemic men and women, it is surprising that no significant effects were seen with other parameters. For example, baked bean consumption for eight weeks did not affect blood glucose levels. This is unusual since beans are considered a low-glycemic index food. The authors suggested that it is possible that the dose provided was not sufficient to produce significant changes in glucose and insulin, considering the study group was non-diabetic. It would be valuable to repeat this study with a dose of one cup of baked beans per day in adults with and without diabetes.



In the Media

Compounds that color fruits and veggies may protect against colon cancer

Press release: http://www.eurekalert.org/pub_releases/2007-08/osu-ctc081507.php

Understanding the molecular structures of compounds that give certain fruits and vegetables their rich colors may help researchers find even more powerful cancer fighters, a new study suggests.

Evidence from laboratory experiments on rats and on human colon cancer cells also suggests that anthocyanins, the compounds that give color to most red, purple and blue fruits and vegetables appreciably slow the growth of colon cancer cells.

The findings also bring scientists a step closer to figuring out what exactly gives fruits and vegetables their cancer-fighting properties.

"These foods contain many compounds, and we're just starting to figure out what they are and which ones provide the best health benefits," said Monica Giusti, the lead author of the study and an assistant professor of food science at Ohio State University.

Giusti presented the findings, which represent the collaborative efforts of Giusti and her colleagues, on August 19 at the national meeting of the American Chemical Society in Boston.



Giusti and her colleagues found that in some cases, slight alterations to the structure of anthocyanin molecules made these compounds more potent anti-cancer agents.

In their studies on human colon cancer cells grown in laboratory dishes, the researchers tested the anti-cancer effects of anthocyanin-rich extracts from a variety of fruits and vegetables. They retrieved these anthocyanins from some relatively exotic fruits and other plants, including grapes, radishes, purple corn, chokeberries, bilberries, purple carrots and elderberries...

...The researchers found that the amount of anthocyanin extract needed to reduce cancer cell growth by 50 percent varied among the plants. Extract derived from purple corn was the most potent, in that it took the least amount of this extract (14 micrograms per milliliter of cell growth solution) to cut cell numbers in half. Chokeberry and bilberry extracts were nearly as potent as purple corn. Radish extract proved the least potent, as it took nine times as much (131 µg/ml) of this compound to cut cell growth by 50 percent.

"All fruits and vegetables that are rich in anthocyanins have compounds that can slow down the growth of colon cancer cells, whether in experiments in laboratory dishes or inside the body," Giusti said.



TAKE HOME MESSAGE: We know from previously published medical literature that beans are rich in anthocyanins. However, processing of beans and other legumes may lead to degradation of anthocyanins. We need to conduct studies to assess the effects of canning, freezing, and other processing techniques on anthocyanin composition and antioxidant activity prior to communicating health benefits associated with anthocyanins in legume products.

What's New with the Glycemic Index?

Source: Taken from the
Glycemic Index Spring/
Summer 2007 Labs
Newsletter

Continued Growth Predicted for the GI in the Food Industry

Flavors and Ingredients Outlook 2007, an annual publication of Packaged Facts, predicts that health and wellness will continue to be one of the most powerful drivers in the food industry. The report predicts that the glycemic index will enjoy continued growth as a key market in the food industry.

Sales of \$1.8 billion in 2011 for Low-GI Products

A new report, titled Low Glycemic Index Products in the US, published by Packaged Facts, a division of MarketResearch.com predicts that sales of low-GI products will grow at an annual rate of 45.7% through 2011, when they will be worth \$1.8 billion.

Canadians Are Familiar with the GI

As published in August 2006 Tracking Nutrition Trends VI (CCFN), 62% of Canadians have knowledge of the GI and understand its purpose. Adults aged 45-64 are most likely to know the role of the GI, as are people with higher levels of education and those who are confident about their nutrition knowledge.



Awareness of the GI is Increasing in the U.S. and Worldwide

As reported by the 2007 IFIC Foundation Food and Health Survey, awareness of the glycemic index has increased by 12% from 2006 to 2007. Global media coverage of the GI and glycemic load has more than tripled since 2002.

The GI is not just relevant to diabetes. The glycemic index has a broad range of health applications including:

- reducing cardiovascular disease risk
- promoting weight loss
- regulating appetite
- preventing tooth decay
- promoting eye health
- improving cognitive function and memory



TAKE HOME MESSAGE: Beans and other legumes have a low-glycemic index. A low-glycemic index diet has been reported to protect against several chronic diseases, including heart disease, diabetes, obesity and cognitive impairments. Based on evidence to date, there is substantial and convincing data to support the use of a low-glycemic index diet. In addition, more and more consumers are understanding the value of the glycemic index and will be likely seeking and demanding more choice in product selection.



Edible dry beans grown in the U.S.



ADZUKI

These are small, reddish brown beans with a nutty, sweet flavor. Adzuki beans are often used in Asian cuisines. They are particularly popular in Japanese cooking where they're used in confections.



BABY LIMA

Flat-shaped, creamy white-colored beans with a rich, buttery flavor. Baby lima beans are excellent in soups, stews and casseroles or just cooked with herbs and spices.



BLACK BEAN

Black beans are small ovals with deep black skins. They have cream colored flesh with a mild, sweet, earthy taste and a soft texture. Sometimes called turtle beans, these beans are used in classic Latin American, Caribbean and Southwestern United States soups, stews and sauces.



BLACKEYE BEAN

Blackeye beans are characterized by their kidney shaped, white skin with a small black eye and very fine wrinkles. They have a scented aroma, creamy texture and distinctive flavor. Originally from Africa, blackeye beans are also known as cowpeas and black-eyed peas and have rapid cooking potential, with no pre-soaking needed.



CRANBERRY BEAN

Cranberry beans are small rounded beans known for their creamy texture with a subtle, nut-like flavor. They are ivory in color with red markings that disappear on cooking. These beans are a favorite in northern Italian, Spanish and Portuguese cuisines.

DARK RED KIDNEY BEAN



Large, kidney-shaped bean with a deep reddish-brown color. They have a robust, full-bodied flavor and soft texture. Dark red kidney beans are most often used in chili and are also popular in salads and with rice.



GARBANZO BEAN

Garbanzo beans or chickpeas are usually beige to pale yellow in color with a nutlike taste and buttery texture. The garbanzo bean is especially popular in many Middle Eastern and Indian dishes such as hummus, falafels and curries.



GREAT NORTHERN BEAN

Great Northerns are flat, kidney-shaped, medium-sized, white beans with a delicate flavor. Great Northern beans take on the flavors of the foods with which they are cooked which is why they are popular in France for making cassoulet (a white bean casserole). In the United States they are traditionally prepared as Boston baked beans.



LARGE LIMA BEAN

Sometimes called "butter beans"; large lima beans are flat-shaped, ivory-colored beans with a smooth, creamy, sweet flavor. Used in a popular American side dish called succotash, large limas make a good substitute for potatoes or rice and are excellent in soups and casseroles.



LIGHT RED KIDNEY BEAN

Large, kidney-shaped bean with a robust, full-bodied flavor and soft texture. Popular in

the Caribbean region as well as Portugal and Spain, the light red kidney beans are most often used in chili, salads and paired with rice.



NAVY BEAN

Small white ovals with a mild flavor and powdery texture. Also known as pea beans. Most often used in pork and beans, or baked beans, also used in soups and stews, and are great pureed.



PINK BEAN

Small, pale, pink-colored beans with a rich, meaty flavor and a slightly powdery texture. Related to the kidney bean, pink beans turn reddish brown when cooked. Pink beans are often used in chili and are a favorite in Old West recipes.



PINTO BEAN

Medium-sized, oval-shaped bean with a mottled beige and brown skin, an earthy flavor and a powdery texture. Closely related to red kidney beans. When cooked, pintos lose their mottling and turn brown. They are most often used in refried beans, and are great for Tex-Mex and Mexican bean dishes.



SMALL RED BEAN

Dark red color with flavor and properties similar to red kidney, only smaller in size. Also called Mexican red bean, they hold both shape and firmness when cooked. Most often used in soups, salads, chili and Creole dishes.



US Dry Bean Council
PO Box 1026
Pierre SD 57501 USA
P: 605-494-0280
F: 605-494-0304
www.beansforhealth.com

More information, recipes
and news at:
www.beansforhealth.com