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

Research and News as Reported by the Nutrition/Medical Journals

Non-soy legume consumption lowers cholesterol levels: A meta-analysis of randomized controlled trials

Bazzano, LA, Thompson AM, Tees MT, Nguyen CH, Winham DM
Nutrition, Metabolism & Cardiovascular Diseases 2009; Nov 27 [Epub ahead of print].

Researchers selected 10 randomized clinical trials that looked at the effect of eating legumes on lipids and lasted at least three weeks each. After analyzing the combined data in a meta-analysis, they found that of the 268 total participants (mostly middle-aged men), those eating a high-legume (non-soy) diet had total cholesterol levels that averaged nearly 12 points lower and LDL-cholesterol levels 8 points lower than those eating the fewest non-soy beans and peas. HDL-cholesterol levels did not change significantly.

The researchers note that this is one of the first meta-analyses to document that a diet rich in non-soy legumes can reduce total and LDL-cholesterol blood levels as well as a high-soy diet. The researchers cite soluble fiber and plant nutrients like phytosterols in beans as contributors to the cholesterol-lowering effects.



TAKE-HOME BEAN MESSAGE:

This study demonstrates that beans other than soybeans benefit lipid levels in a way that helps prevent cardiovascular disease, one of the leading causes of death in the U.S. As a meta-analysis, it has the weight of many studies behind it. Because it focuses on a food, beans, that many Americans already eat, it offers a practical way to improve health. Current dietary guidelines recommend eating three cups of beans a week (about ½ cup per day).



Adherence to the Mediterranean Diet Is Associated with Lower Abdominal Adiposity in European Men and Women

Romaguera D, Norat T, Mouw T, et al
Journal of Nutrition
2009;139:1728-1737

This 10-country study of nearly 500,000 men and women (aged 25 to 70 years old) was conducted to determine the relationship between body fat and a Mediterranean way of eating. The researchers scored participants' diets based on nine nutritional components characteristic of a traditional Mediterranean diet, one of which was legumes, such as beans. They found that a modified Mediterranean diet that included these traditional components, but was higher in meat and dairy intake than is typical, was not associated with body mass index (BMI). However, it was linked to a lower waist circumference, especially in people from northern European countries, even those with diverse eating patterns. The researchers conclude that even a modified Mediterranean way of eating may benefit body fat distribution.



TAKE-HOME BEAN MESSAGE:

This study suggests that there is less abdominal fat in people eating a Mediterranean diet, even though there was no correlation with body mass, as measured by BMI. Less abdominal fat is important as an indication of cardiovascular health. People with excess abdominal fat are at greater risk for heart disease.

The New 2010 Dietary Guidelines Highlight Beans and Peas

In June 2010, the Dietary Guidelines Advisory Committee (DGAC), comprised of 13 U.S. food and nutrition experts, presented its report with recommendations for the next update of the Dietary Guidelines for Americans to the U.S. Department of Agriculture and the Department of Health and Human Services. The report summarizes the DGAC findings on approximately 200 different dietary issues and distills those findings down into suggested guidelines. The final version of the new Dietary Guidelines will be released later this year, as part of a Congressional mandate that the guidelines be updated every five years.

The 2010 Dietary Guidelines are expected to address an important and critical health issue in this country—most Americans are overfed yet undernourished. A majority of Americans are overweight or obese; at the same time, their diet lacks adequate amounts of several important nutrients. Americans do not eat enough nutrient-rich foods, but get too much sodium, too many solid fats and added sugars (SoFAS), and too many refined grains. More than one-quarter of an American's average daily calories come from just five high-calorie foods: desserts, bread, chicken dishes, sodas/sports drinks, and pizza. The DGAC recommends Americans cut back on these and other high SoFAS foods and make more room on the plate for nutrient-dense, plant-based foods, such as vegetables, beans and peas, fruits, whole grains, nuts, and seeds.

Most Americans miss the mark on legumes like beans and peas. The 2005 Dietary Guidelines for Americans recommend up to 3 cups per week, or 1/2 cup per day. But Americans actually eat only a tablespoon or so of beans and peas a day.

A question was posed in the DGAC report: "What is the relationship between the intake of cooked dry beans and peas and selected health outcomes?" After evaluating the scientific evidence, the committee concluded that these legumes supply fiber, protein, vitamins, and minerals; they offer a complete protein when combined with grains; and, they provide

"What is the relationship between the intake of cooked dry beans and peas and selected health outcomes?"

essential protein in a vegan diet. However, the group of experts decided that evidence is limited regarding whether beans can improve body weight, blood lipid levels, or manifestations of type 2 diabetes.

The DGAC suggests:

- Including families, educators, health professionals, advocates, policy makers, scientists, and businesses in the overall discussion.
- Improving nutrition literacy and cooking skills.
- Increasing and expanding health, nutrition, and physical education programs in schools.
- Replacing high-calorie, low-nutrient foods, solid fats and added sugar with nutrient-dense foods.

Consumption of beans could improve diet quality in the US population

Mitchell DC, Lawrence FR, Hartman TJ, Curran JM
Journal of the American Dietetic Association 2009; 109(5):909-13.

Despite the fact that beans offer a diverse array of nutrients, including fiber, protein, and several vitamins and minerals, few Americans eat beans as part of their daily diets. American adults eat, on average, only 0.1 to 0.3 servings of legumes daily ($\frac{3}{4}$ to 2 servings per week), with beans being most popular among Mexican-American, Hispanic-American, and other ethnic populations. This low intake is in sharp contrast to current recommendations.

The study's authors compared the nutrient and food group intake of people who eat beans to those who do not eat them, using data from the 1999-2000 and 2001-2002 NHANES surveys. Only about 8 percent of Americans ate beans on any given day; pinto beans, refried beans, baked beans, chili, and Mexican and Hispanic dishes made with beans were the most popular. When they were eaten, beans appeared to have taken the place of other vegetables and often were eaten with grain foods, such as rice. The diets of bean eaters were more healthful, with more fiber, protein, carbohydrate, folate, magnesium, iron, and zinc. Moreover, the percentages of calories from fat and saturated fat were lower in bean eaters.



TAKE-HOME BEAN MESSAGE:

This study highlights that eating one-half cup of beans or peas can improve intake of key nutrients, particularly protein, fiber, folate, and important minerals like magnesium and zinc. The study suggests it's best to eat beans in addition to other vegetables, not instead of them.

Metabolic Syndrome: A Growing Concern

"Central obesity—being 'apple-shaped'—is a key feature of metabolic syndrome."

Metabolic syndrome (AKA syndrome X and insulin resistance syndrome) is now widely accepted as a distinct condition with agreed-upon criteria. While excess calories do not cause metabolic syndrome, inactivity and obesity are major contributors. This collection of symptoms puts people at much higher risk for heart disease, stroke, and diabetes. One theory is the syndrome may be caused by resistance to insulin or overall inflammation of body tissues.

What are the odds?

One in four American adults—47 million—now are considered to have metabolic syndrome (MetSyn). Mexican-Americans, especially women, appear to be most at risk, followed by African-American women, African-American men and Caucasians. Having a parent or a sibling with diabetes raises risk dramatically. Individuals with MetSyn are twice as likely to develop heart disease and five times more likely to develop diabetes. This is why it is crucial to treat the disparate symptoms (see box), which together signal more trouble than they might individually.

What Constitutes Metabolic Syndrome?

People who have at least three of the following five risk factors, meet the basic criteria for metabolic syndrome as generally accepted by most health and government organizations:

Abdominal fat, described as an "apple shape" (waist circumference greater than 35 inches for women, 40 for men)

Elevated triglyceride blood level (150 mg/dl or higher)*

Low HDL-cholesterol blood level (below 50 for women, below 40 for men)*

High blood pressure (130/85 mmHg or higher)*

Elevated fasting blood sugar level (100 mg/dl or higher)*

* or on medication to treat it

"Inactivity and obesity are major contributors to metabolic syndrome."

What increases a person's risk of metabolic syndrome?

- Being overweight, especially if body fat is concentrated around your waistline.
- Being inactive, which can contribute to overweight.
- Resistance to insulin (something that happens if you are overweight, which then causes blood sugar to rise).
- Inheriting a tendency to MetSyn (check family history for individual risk factors, as older relatives would likely not have been diagnosed with MetSyn, given its newness).
- Growing older (the body naturally becomes more resistant to insulin with age).

What can people do about it?

- Lose weight. Aim for a BMI under 25. (BMI charts are available online.)
- Follow a heart-healthy diet that's low in saturated and trans fats, but emphasizes fruits and vegetables, legumes (like beans), nuts, whole grains, lean meats, poultry, fish, and skim or low-fat milk. Keep salt intake moderate.
- Be active – 30-60 minutes a day most days of the week. Physical activity should be part of the daily schedule. Vary the types of exercise including aerobic, muscle-building, bone-building, and stretching.
- Quit smoking.
- Consult with a doctor to determine if medications—such as statins, diuretics, ACE inhibitors or oral hypoglycemics—are needed to control any of risk factors.

A Traditional Rice and Beans Pattern Is Associated with Metabolic Syndrome in Puerto Rican Older Adults

Noel SE, Newby PK,
Ordovas JM, Tucker KL
Journal of Nutrition 2009;
139:1360-1367.

Researchers analyzed data from the Boston Puerto Rican Health Study of nearly 1,200 adults aged 45 to 75. Of three dietary patterns they identified, the traditional way of eating—which included large amounts of beans and rice—was linked to a higher risk of metabolic syndrome, as well as lower HDL cholesterol levels and higher triglycerides. However, it was not linked to obesity. A second dietary pattern—those eating a meat-and-french-fries diet—had higher blood pressure levels and greater waist circumferences than the traditional beans-and-rice eaters, who tended to be older and less acculturated to the U.S.



TAKE-HOME BEAN MESSAGE:

The researchers reached conflicting conclusions from this study. Although a traditional Puerto Rican Diet seems to encourage the onset of metabolic syndrome, the specific foods eaten as part of this dietary pattern may have quite different effects when eaten with other healthful foods. The high rice intake—refined rice, with a high glycemic index—encourages elevated blood glucose levels, which can lead to metabolic syndrome. But beans and other legumes are thought to be protective against metabolic syndrome. It could be that bean intake was not high enough to counteract the negative effects of the refined rice. On the other hand, perhaps it was the high bean intake that kept body weight lower. The researchers call for more research, but clearly signal that eating beans is still desirable as part of a more healthful diet that includes fruits, vegetables, and whole grains.



Effect of non-oil-seed pulses on glycaemic control: A systematic review and meta-analysis of randomised controlled experimental trials in people with and without diabetes

Sievenpiper JL, Kendall CW, Esfahani A, et al
Diabetologia 2009;
52(8):1479-95.

In a meta-analysis that pooled the results of 41 studies, Canadian researchers found that beans had a positive effect on blood glucose levels. By itself, a high legume intake lowered both fasting blood glucose (by 80%) and insulin levels (by 50%). When combined with a low-glycemic index diet or a high-fiber diet, a high intake of legumes appeared to impart additional benefits consistent with better long-term glycemic control.



TAKE-HOME BEAN MESSAGE:

This comprehensive review drives home the importance of diet on control of blood glucose levels for treatment of those already diagnosed with diabetes, as well as for prevention for those who might be at risk for the disease. One of the food groups that is well-documented to benefit glucose levels is legumes. Analysis of these pooled studies confirms that simply eating more legumes, such as beans, can improve both glucose and insulin levels. But eating beans and other legumes as part of a high-fiber intake and keeping glycemic index low (by eating foods with less of an impact on blood sugar levels, such as whole grains, fruits, and vegetables) is more effective.

Resistant Starch: The Latest Fiber to Make Headlines

Fiber has been traditionally defined as either insoluble or soluble. But researchers have identified a third type that's changed the traditional view of fiber. Resistant starch, like all fiber, resists digestion in the stomach and small intestine. However, resistant starch is broken down by bacteria in the large intestine.

Starch is comprised of two types of branched molecules, amylopectin and amylose. Cooking causes amylose to form a tight crystalline structure that is hard to digest, which is what creates resistant starch. Natural sources of resistant starch include beans and peas, as well as potatoes, vegetables, bananas, and grains (particularly after they've been cooked and cooled). Resistant starch also is present in a high-amylose cornstarch sold as Hi-Maize, which can be used in cooking.

Food	Resistant Starch (grams per 1/2 cup)
White beans	4.2
Lentils	3.4
Split peas	2.6
Chickpeas	2.6
Kidney beans	2.0
Pinto beans	1.9
Black beans	1.7

"Resistant starch has been shown to help boost feelings of fullness, to increase metabolism, and to protect digestive system health, all while balancing blood sugar levels," explains David Feder, RD, author of *The Skinny Carbs Diet* (Rodale 2010), a cookbook of meals high in resistant starch. Because the starch is broken down in the large intestine, it also helps maintain bacterial balance by making the intestine more acidic, creating an environment that is unfriendly toward pathogenic bacteria. Additional benefits come from short-chain fatty acids produced by the intestinal bacteria, which stimulate blood flow, cell growth, and muscle tone in the colon.

"Beans have more resistant starch than any other food," adds Feder. "Clearly we need to eat more beans. It is estimated that only about 9 percent of the resistant starch in our diet currently comes from beans and peas, while about 60 percent is from breads, cereals, pasta, and vegetables."

"Beans have more resistant starch than any other food."

The potential health benefits of legumes as a good source of dietary fiber

Trinidad TP, Mallillin AC,
Loyola AS, Sagum RS,
Encabo RR
British Journal of Nutrition
2010;103(4):569-574.

Researchers studied the potential health benefits of a variety of beans, comparing their mineral availability, glycemic index (GI), and cholesterol-lowering effects. They found that lima beans rate the highest for iron availability, while kidney beans and pigeon peas ranked best for calcium and zinc. All the legumes studied were low-GI foods. Kidney beans stood out for their ability to significantly lower both total and LDL cholesterol. The researchers conclude that legumes have potential health benefits worth promoting, specifically lowering cholesterol blood levels and boosting mineral intake.



TAKE-HOME BEAN MESSAGE:

Many people are aware that beans are high in fiber and a good source of protein, but lesser known are beans' benefits on blood sugar and blood cholesterol levels. The fact that they do not raise blood sugar levels much, despite being carbohydrates, is key to their ability to keep diabetes under better control, compared to sugary foods and refined carbohydrates that cause blood sugar to spike and then plummet. Beans are beneficial to treating and possibly preventing the onset of type 2 diabetes. Moreover, legumes like beans have shown the ability to lower cholesterol levels and thus reduce the risk of heart attack and stroke. Also, the minerals in beans can make a significant contribution to dietary intake.



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.

The US Dry Bean Council (USDBC) is a private trade association in the United States that represents growers, shippers, and end users of U.S. edible dry beans. The USDBC promotes the use, consumption and marketing of edible dry beans worldwide.



US DRY BEAN
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