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In The NEWS

Fruits, Vegetables May Guard Against Alzheimer's



Certain fruits and vegetables—including broccoli, potatoes, oranges, apples, and radishes—contain phytochemicals that work in ways similar to certain medications used to treat Alzheimer's disease, according to a recent report.* This research supports previous studies suggesting that abundant dietary intake of fruits and vegetables may lower the risk of developing Alzheimer's.

Scientists at King's College in London who investigated various fruits and vegetables found that certain plant foods contain compounds that inhibit acetylcholinesterase, the enzyme responsible for breaking down the neurotransmitter acetylcholine. Acetylcholine is crucial for relaying messages between cells of the nervous system and for signaling muscles and glands. Alzheimer's disease is associated with diminished acetylcholine levels, and some drugs used to treat Alzheimer's work by inhibiting the acetylcholinesterase enzyme.

Of the fruits and vegetables tested, the research team found broccoli to have the most potent activity against acetylcholinesterase. Further study revealed that glucosinolates, a group of compounds found in the cabbage family, were likely responsible for this action. Glucosinolates previously have been studied for their anti-cancer activity.

Potatoes may also help prevent mental decline, the researchers noted. In particular, green potatoes contain glycoalkaloids such as solanine that have activity similar to glucosinolates. Earlier research established the ability of these phytochemicals to inhibit acetylcholinesterase.

Professor Peter Houghton noted that long-term consumption of fruits and vegetables, including broccoli, potatoes, and others, "might certainly be beneficial in reducing a decline in acetylcholine levels in the nervous system."

By supporting healthy levels of acetylcholine, these fruits and vegetables may help protect aging adults from dementia and Alzheimer's disease.

—Elizabeth Wagner, ND

Reference

* Available at: <http://www.nutraingredients.com/news/ng.asp?id=62822>. Accessed October 4, 2005.

Obesity Linked to Inflammation and Heart Disease



Human fat cells produce C-reactive protein (CRP), which is linked with both increased inflammation and elevated cardiovascular disease risk, according to researchers at the University of Texas M.D. Anderson Cancer Center and the University of Texas Health Science Center in Houston.¹

This finding helps to explain why overweight adults tend to have elevated CRP levels, and demonstrates that body fat may participate in the inflammatory process that can lead to cardiovascular disease. Researchers had previously found that CRP is produced mainly in liver tissue, and more recent findings indicate that blood vessel walls also produce this protein. However, these findings did not explain why individuals with metabolic disorders or obesity exhibit high CRP levels, which are associated with a greater risk of heart disease or stroke.

To study the relationship between fat cells and CRP, the investigators used human adipose tissue donated by plastic surgery patients. Fat cells were isolated, cultured, and stimulated under different conditions. The cultured fat cells produced cytokines that resulted in inflammation and triggered production of high levels of CRP. When exposed to resistin, a hormone associated with diabetes and insulin resistance, the fat cells also produced CRP. This is particularly interesting, as fat cells themselves produce resistin.¹

The investigators then sought to explore why certain drugs, including aspirin and cholesterol-lowering statins, can lower CRP. When fat cells producing high levels of CRP were exposed to these medications, CRP production declined.¹

“This study is the first to show how body fat participates in the inflammatory process that leads to cardiovascular disease, but also demonstrates that this process can be blocked by drugs now on the market,” said study leader Edward T.H. Yeh, MD. “Inflammation is a very complicated process, but at least now we have a few more clues as to what it does and how the damage it produces can be prevented.”²

—Elizabeth Wagner, ND

Reference

1. Calabro P, Chang DW, Willerson JT, Yeh ET. Release of C-reactive protein in response to inflammatory cytokines by human adipocytes: linking obesity to vascular inflammation. *J Am Coll Cardiol*. 2005 Sep 20;46(6):1112-3.
2. Available at: http://www.eurekalert.org/pub_releases/2005-09/uoth-ff091605.php. Accessed December 7, 2005.

Apigenin Inhibits Prostate Cancer Growth



Apigenin, a dietary flavonoid commonly found in celery, parsley, garlic, bell peppers, and guava, inhibits prostate cancer cell growth, according to a recent report.* This new finding supports epidemiological evidence linking a diet rich in fruits and vegetables to a reduced risk of prostate cancer.

In this investigation, scientists transplanted an androgen-dependent human prostate cancer cell line into mice bred to serve as a model for tumor growth conditions. A liquid suspension containing either apigenin or placebo was administered to the mice via a gastric tube daily for eight weeks. Prostate cancer cells were inoculated into the mice either two weeks before or two weeks after apigenin administration commenced. Tumor growth was measured twice weekly following transplantation; tumors were then excised and weighed at the study's end. In parallel experiments, prostate cancer cells were cultured in the presence of apigenin, and cell viability was determined.

Administering apigenin to mice, either before or after inoculation, inhibited the volume of prostate cancer cells in a dose-dependent manner by as much as 59% and 53%, respectively. Together, these results suggest that apigenin partially interferes with the establishment of tumors and slows the growth of established tumors. Similarly, exposure of prostate cancer cells in culture to apigenin for as little as 48 hours resulted in growth inhibition of up to 67%. No adverse effects were associated with apigenin administration.

Nutritional strategies to help avert cancer may be especially important in late-onset, slow-growing tumors such as prostate cancer. Since Americans consume an average of only 13 mg per day of apigenin, or approximately three to four and one-half times less than the lowest comparable dose used in this study, increasing daily apigenin intake may be a prudent dietary strategy for protecting against prostate cancer.

—Linda M. Smith, RN

Reference

- * Shukla S, Mishra A, Fu P, MacLennan GT, Resnick MI, Gupta S. Up-regulation of insulin-like growth factor binding protein-3 by apigenin leads to growth inhibition and apoptosis of 22Rv1 xenograft in athymic nude mice. *FASEB J*. 2005 Dec;19(14):2042-44.

Psyllium Supports Healthy Blood Sugar, Lipids



Psyllium-derived fiber lowers fasting blood sugar and improves long-term blood sugar control in patients with type II diabetes, according to a recent study conducted by scientists in Iran.* A rich source of soluble fiber, psyllium is best known as a bulk-forming laxative.

This double-blind, placebo-controlled study enrolled 36 patients with type II diabetes mellitus. Before enrollment, all patients were managing their diabetes with diet or oral medications, which were continued without change throughout the study. The participants were randomly assigned to either an experimental group that received 5.1 grams of psyllium twice daily or a control group that received cellulose.

The investigators measured fasting blood sugar at the beginning of treatment and every two weeks thereafter for the duration of the eight-week study. Total cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL), insulin, and triglycerides were measured at the beginning of the study and after four and eight weeks of treatment. Glycosylated hemoglobin (HbA1c), a marker of long-term blood sugar control, was measured at the beginning and end of the study.

After eight weeks of treatment, fasting blood sugar dropped by an average of 52.77 mg/dL in the psyllium group and rose by an average of 31.36 mg/dL in the cellulose group compared to baseline values. Similarly, HbA1c fell 1.6% in the psyllium group and increased 1.4% in the cellulose group. The psyllium group also recorded a small but significant increase in beneficial HDL. The study authors speculated that psyllium supplementation of longer duration may produce an even more favorable impact on lipid profile, as has been shown in other investigations. Psyllium was well tolerated in this study.

Psyllium fiber thus appears to be a safe, effective agent in improving short- and long-term measures of blood sugar control in individuals with type II diabetes. Maintaining optimal blood sugar is an important strategy in preventing complications associated with type II diabetes.

—Linda M. Smith, RN

Reference

* Ziai SA, Larijani B, Akhoondzadeh S, et al. Psyllium decreased serum glucose and glycosylated hemoglobin significantly in diabetic outpatients. *J Ethnopharmacol.* 2005 Nov 14;102(2):202-7.

Lipoic Acid Protects Central Nervous System



Lipoic acid inhibits inflammatory mediators associated with multiple sclerosis in adults, according to a recent report.* A potent antioxidant, lipoic acid has been found to both suppress and treat an experimental animal model of multiple sclerosis.

Researchers investigated the effects of varying oral doses of lipoic acid on two markers of inflammation and tissue damage: soluble intercellular adhesion molecule-1 and matrix metalloproteinase-9. Thirty-seven adults diagnosed with multiple sclerosis were randomly assigned to one of four groups that received: 1) placebo twice daily; 2) 600 mg of lipoic acid twice daily; 3) 1200 mg of lipoic acid in the morning and placebo in the evening; and 4) 1200 mg of lipoic acid twice daily. Blood samples were taken at the study's onset and then 24 hours, one week, and two weeks after the first dose of placebo or lipoic acid was administered.

Lipoic acid decreased the two inflammatory mediators in a dose-dependent fashion. In animal studies, such changes have been associated with decreased progression of multiple sclerosis. Investigators believe that this decrease in inflammatory compounds may help protect the central nervous system against neurodegenerative processes that contribute to multiple sclerosis. Lipoic acid was well tolerated, and the reported side effects did not differ from those noted in the placebo group.

Lipoic acid may thus protect against neurodegenerative processes through a novel mechanism. Since neurodegenerative conditions such as multiple sclerosis are associated with significant disability and mortality, effective nutritional interventions are greatly needed.

—Linda M. Smith, RN

Reference

* Yadav V, Marracci G, Lovera J, et al. Lipoic acid in multiple sclerosis: a pilot study. *Mult Scler.* 2005 Apr;11(2):159-65.

Resveratrol Found to Stop Flu Virus in Cell Culture Study



According to a report in the *Journal of Infectious Diseases*, resveratrol—a health factor found in grapes, wine, peanuts, and other plants—blocks the influenza (flu) virus.*

Italian researchers believe this natural compound has advantages over drugs because it has multiple effects against the virus. Viral infection involves many steps, each of which provides an opportunity for effective treatment. In addition to creating and assembling viral proteins from the host, viruses also send immune-suppressing signals to the host's immune system, crippling its ability to respond. The virus accomplishes its takeover through signals it sends to the host's cellular command center. Resveratrol works by intercepting those signals, thus thwarting the virus' ability to carry out its predetermined plan to manufacture, transport, and assemble viral proteins.

The Italian researchers first tested resveratrol's ability against flu virus by treating cells with the compound after infection. The antiviral effect was 90%. For resveratrol to be effective, however, it had to be added to the infected cells six hours after infection and continued for an additional 24 hours. This tipped off the scientists that resveratrol interferes with the virus not at the point where it infects the cells or where viral proteins are being manufactured, but later when the proteins are being assembled into new viruses. Further studies confirmed that the viral proteins had been created but had not been "packaged and shipped" to the viral building site. Thus, viral replication was severely hampered. Resveratrol had interfered with viral "package and ship" signals.

Having shown that resveratrol worked in cells, the researchers sought to determine whether the effect could be duplicated in animals. When they administered resveratrol to mice infected with influenza, the survival rate, normally 20%, doubled to 40%. Overall, the amount of flu virus in the animals' lungs was reduced 98% compared to that of mice that received placebo.*

Reference

* Palamara AT, Nencioni L, Aquilano K, et al. Inhibition of influenza A virus replication by resveratrol. *J Infect Dis.* 2005 May 15;191(10):1719-29.

Malnutrition Is Epidemic, Overlooked Among Elderly

Malnutrition is highly prevalent yet widely underdiagnosed in the elderly, according to the European Nutrition for Health Alliance (ENHA).^{*} As a call to action for the detection, prevention, and treatment of malnutrition, ENHA recently sponsored its inaugural conference in London, “Malnutrition within an Ageing Population.”

Malnutrition is an imbalance of energy, protein, and other nutrients that causes measurably adverse effects on tissue, body form and function, and clinical outcomes. Ironically, malnutrition among the elderly is occurring at a time when many public health officials are promoting campaigns to reduce caloric intake in an effort to avert the obesity epidemic.

According to ENHA, 14% of community-dwelling adults in the United Kingdom over 65 years of age are malnourished, while 60-100% of nursing home residents suffer from malnutrition. Further, an estimated 10% of nursing home residents lose 10% of their body weight in the first six months following admission. In patients under a physician’s care—including hospitalized patients—malnutrition goes undiagnosed in up to 70% of cases.

Numerous factors contribute to malnutrition in the elderly. In some cases, acquiring and preparing food is prohibitively difficult. Additionally, older adults may experience loss of appetite due to diminished sense of taste, side effects of medication, or depressed mood. Difficulties with chewing or swallowing can also make it challenging for the elderly to maintain optimal nutritional intake. Furthermore, metabolic and physiological changes associated with aging render older people more susceptible to mineral and nutrient deficiencies.

The elderly are not only at higher risk of malnutrition than are younger adults, but also are less likely to recover from metabolic complications accompanying malnutrition. The malnourished are at greater risk for complications of surgery, are more vulnerable to infection, and have longer hospital stays.

Conference attendees recommended addressing malnutrition in the elderly as a public health issue through measures such as promoting screening programs and increasing efforts to educate health care and social care professionals.

—Linda M. Smith, RN

Reference

* Available at: <http://www.european-nutrition.org>. Accessed December 7, 2005.

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