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IN THE NEWS

Brain Food

In a recent issue of the journal *Nature Reviews Neuroscience*, UCLA professor of neurosurgery and physiological science Fernando Gómez-Pinilla summarized the latest findings concerning the effects of various foods on the brain, noting that some foods have a drug-like effect.*

In an analysis of over 160 studies, omega-3 fatty acids (EPA, DHA, and ALA) emerged as significant dietary compounds to enhance learning and memory and prevent mental disorders. Another important brain nutrient is the B vitamin folic acid. Insufficient folic acid has been linked with depression and cognitive impairment, and supplementation with the vitamin has been demonstrated to be helpful in the prevention of cognitive decline and dementia.

“Understanding the molecular basis of the effects of food on cognition will help us to determine how best to manipulate diet in order to increase the resistance of neurons to insults and promote mental fitness,” Dr. Gómez-Pinilla concluded.

—Dayna Dye



Reference

* Gómez-Pinilla F. Brain foods: the effects of nutrients on brain function. *Nat Rev Neurosci*. 2008 Jul;9(7):568-78.

Higher Plasma Vitamin C Levels Linked with Reduced Diabetes Risk

In a recent issue of the *Archives of Internal Medicine*, researchers at the University of Cambridge report an association between higher plasma vitamin C levels and a lower risk of developing type 2 diabetes.*

The study included 21,831 nondiabetic participants in the EPIC-Norfolk study. Vitamin C levels were measured, and dietary questionnaires were administered upon enrollment. Over a 12 year follow-up period, 423 men and 312 women developed diabetes.

Participants in the top 20% of plasma vitamin C had a 62% lower risk of developing diabetes compared with those in the lowest fifth. Fruit and vegetable intake also emerged as protective.

“The strong independent association observed in this prospective study, together with biological plausibility, provides persuasive evidence of a beneficial effect of vitamin C and fruit and vegetable intake on diabetes risk,” the authors conclude.

—Dayna Dye



Reference

* Harding AH, Wareham NJ, Bingham SA, et al. Plasma vitamin C level, fruit and vegetable consumption, and the risk of new-onset type 2 diabetes mellitus: the European prospective investigation of cancer—Norfolk prospective study. *Arch Intern Med*. 2008 Jul 28;168(14):1493-9.

Common Spices Help Inhibit AGE

The *Journal of Medicinal Food* published a report by researchers at the University of Georgia which revealed that common spices not only confer antioxidant benefits, but offer significant protection against the formation of advanced glycation end-products (AGEs).* AGE compounds activate the immune system, leading to inflammation and tissue damage.



James Hargrove and colleagues tested extracts of 24 herbs and spices for their phenolic content, antioxidant potential, and glycation inhibitory activity. Cloves and cinnamon emerged as the leading spices in phenolic content. The team discovered a strong correlation between phenol content and ability to block AGE formation. In addition to cloves and cinnamon, the remaining spices also demonstrated an ability to inhibit AGE formation, but greater concentrations of the extracts were needed to achieve a similar effect.

“Because herbs and spices have a very low calorie content and are relatively inexpensive, they’re a great way to get a lot of antioxidant and anti-inflammatory power into your diet,” Dr. Hargrove advised.

—Dayna Dye

Reference

* Dearlove RP, Greenspan P, Hartle DK, Swanson RB, Hargrove JL. Inhibition of protein glycation by extracts of culinary herbs and spices. *J Med Food*. 2008 Jun;11(2):275-81.

Poor Vitamin D Status Linked with Greater Eight-Year Mortality Risk

In a recent report from the *Archives of Internal Medicine*, researchers from Albert Einstein College of Medicine and Johns Hopkins report an association between reduced vitamin D levels and a greater risk of dying over an eight-year period.*

Serum 25-hydroxyvitamin D levels of 13,331 participants were measured between 1988 and 1994. Over the 8.7 year median follow-up period, 1,806 deaths occurred. Among participants whose vitamin D levels placed them among the lowest 25% of participants, there was a 26% higher risk of dying, compared with those whose levels were in the top 25%.

“Randomized clinical trials will be needed to determine whether vitamin D supplementation at higher doses could have any potential benefit in reducing future mortality risk in those with 25-hydroxyvitamin D deficiency,” the authors conclude.

—Dayna Dye

Reference

* Melamed ML, Michos ED, Post W, Astor B. 25-hydroxyvitamin D levels and the risk of mortality in the general population. *Arch Intern Med*. 2008 Aug 11/25;168(15):1629-37.

High Omega-3 Diet Linked with Lower Heart Disease Risk

In the *Journal of the American College of Cardiology*, Akira Sekikawa, MD, and colleagues concluded that, rather than genetic factors, the omega-3 content of Japanese diets may be responsible for the lower risk of heart disease observed in this population.*

Their study involved 281 men living in Japan, 306 Caucasian American men; and 281 Japanese-American men living in Hawaii. Blood tests measured total fatty acids and omega-3 fatty acids EPA, DHA, and DPA, obtained by consuming fish.

Although total fatty acid levels were similar among all subjects, the percentage of fish-based fatty acids was twice as high among Japanese men compared with both American groups. Men living in Japan had significantly less atherosclerosis, as indicated by decreased intima-media thickness.



“Increasing intake of omega-3 fatty acids in the US could have a very substantial impact on heart disease,” Dr. Sekikawa stated.

Reference

* Sekikawa A, Curb JD, Ueshima H, et al. Marine-derived n-3 fatty acids and atherosclerosis in Japanese, Japanese-American, and white men: a cross-sectional study. *J Am Coll Cardiol*. 2008 Aug 5;52(6):417-24.

Wonder Drugs May Treat Many Conditions

At the 2008 Congress of European Pharmacological Societies, Professor Marc Feldmann of the Imperial College London predicted that drugs he helped develop to treat rheumatoid arthritis may prove to be effective for many more medical conditions, including atherosclerosis.*

The drugs, which block a cytokine known as tumor necrosis factor-alpha (TNF-alpha), include infliximab, etanercept, and adalimumab, and have shown a dramatic protective effect in patients afflicted with rheumatoid arthritis, an autoimmune disease. These agents have also shown to be of benefit for other autoimmune and inflammatory conditions, including Crohn's disease, psoriasis, ankylosing spondylitis, and ulcerative colitis.

Dr. Feldmann believes that similar drugs may have the potential to treat many other conditions, and is currently researching their effect on atherosclerosis.

He notes the possibility that "cytokines play a critical role in all diseases involving multiple biological processes, thus providing therapeutic targets for all unmet medical needs."

—Dayna Dye

Reference

* Available at: <http://www.e Phar2008.org/downloads/EPHAR08CouldArthritisWonderDrugsProvideCluesForAllDisease.pdf>. Accessed August 13, 200

Nutrient Combination Improves Memory and Learning

A combination of the omega-3 fatty acid docosahexaenoic acid (DHA) with uridine and choline improved memory and learning in animals, and could offer benefits for Alzheimer's patients, according to a new study.* These nutrients, found in a range of foods including fish, eggs, and beets, have previously been shown to support cognitive function when given separately.

Scientists at MIT supplemented gerbils with either two or three of the nutrients for four weeks and measured cognitive performance with various maze tests. They also measured brain phospholipid levels and compared them to control animals.

The combination of DHA, uridine, and choline produced the greatest improvement in memory. The gerbils that received all three supplements also had up to 70% more phospholipids in brain cell membranes than those that received none.

The researchers concluded that cognitive ability improved due to increased formation of brain synapses, where information is passed between neurons. The scientists are now exploring the possibility of a nutrient cocktail for prevention of Alzheimer's disease and dementia.

—Michael J. Hall, ND

Reference

* Holguin S, Martinez J, Chow C, Wurtman R. Dietary uridine enhances the improvement in learning and memory produced by administering DHA to gerbils. *FASEB J*. 2008 July 7.

Soy Isoflavones, Curcumin Synergize to Thwart Pancreatic Cancer

Soy isoflavones and curcumin work together to decrease activation of genes that help cancer cells survive, and could help avert pancreatic cancer, a new study reveals.* Pancreatic cancer remains the fourth leading cause of cancer deaths, and effective prevention and treatment strategies are greatly needed.

Noting that pancreatic cancer incidence is relatively low among Asians, American researchers wondered if traditional Asian dietary elements, such as soy isoflavones and curcumin might offer anti-cancer activity.

The scientists added isoflavones and curcumin, individually and in combination, to pancreatic cancer cell cultures. Their results revealed that “inhibition of cell growth and induction of apoptosis [cellular suicide] was significantly greater in the combination group than could be achieved by either agent alone.”

Soy isoflavones and curcumin may work by suppressing the activity of nuclear factor-kappa B (NF- κ B), a key regulator of inflammatory and immune responses that is believed to play an important role in the progression of cancer.

—Dale Kiefer

Reference

* Wang Z, Desmoulin S, Banerjee S, et al. Synergistic effects of multiple natural products in pancreatic cancer cells. *Life Sci.* 2008 Aug 15;83(7-8):293-300.

Lycopene Lowers Lipids, Slows Accumulation of Atherosclerotic Plaque

Lycopene slowed the development of atherosclerosis in rabbits fed a high-fat diet, similar to the effects of fluvastatin, a new study reports.* Lycopene is a carotenoid found at high levels in tomatoes that has an antioxidant effect. Statin drugs like fluvastatin prevent atherosclerosis by suppressing the accumulation and oxidation of low-density lipoprotein (LDL).

Forty rabbits were treated in one of five groups: a standard diet (control), a high-fat diet alone, a high-fat diet with 4 mg/kg or 12 mg/kg lycopene, or a high-fat diet with 10 mg/kg fluvastatin.

After eight weeks, all treated groups had significantly lower levels of total cholesterol, triglycerides, and LDL compared with the high-fat diet alone. Both lycopene and fluvastatin reduced atherosclerotic plaque formation, but lycopene was superior to fluvastatin for decreasing lipid levels, oxidized LDL, and inflammation.

Overall, the authors conclude, “these findings provide a theoretical rationale for the use of lycopene as a preventive and therapeutic drug in atherosclerosis.”

—Laura J. Ninger, ELS

Reference

* Hu MY, Li YL, Jiang CH, Liu ZQ, Qu SL, Huang YM. Comparison of lycopene and fluvastatin effects on atherosclerosis induced by a high-fat diet in rabbits. *Nutrition.* 2008 Jun 26.

Resveratrol Slows Aging in Mice

Resveratrol, a compound found in red grapes and other foods, attenuates the effects of aging in mice,* similar to benefits previously found with calorie-restricted diets. Research has shown that resveratrol extends the life span of certain yeast, worms, flies, and fish.

Experimental mice were treated with dietary restriction (every-other-day feeding), a high-calorie diet, or a standard (control) diet, each group either with or without resveratrol. Regardless of the diet, resveratrol supplementation for about one year suppressed age-related cardiovascular disease, osteoporosis, cataracts, and decline in motor coordination, similar to dietary restriction. In treated mice, liver and muscle tissues resembled those in younger animals.

The benefits of resveratrol may be due to antioxidant and anti-inflammatory effects. Resveratrol may become useful in humans to mimic some of the beneficial effects of dietary restriction without actually decreasing caloric intake.

—Laura J. Ninger, ELS



Reference

* Pearson KJ, Baur JA, Lewis KN, et al. Resveratrol delays age-related deterioration and mimics transcriptional aspects of dietary restriction without extending life span. *Cell Metab.* 2008 Jul 2.

Broccoli Reduces Prostate Cancer Risk

Epidemiological studies suggest that men who consume at least one serving of cruciferous vegetables per week (e.g. broccoli, cauliflower, cabbage, etc.) are less likely to develop prostate cancer.* It's believed that chemical compounds called isothiocyanates are responsible for this protective effect, but efforts to understand the mechanisms at work have previously involved tissue culture or animal models. Now, a year-long study with human volunteers has further illuminated this phenomenon under real-life conditions.*

British researchers randomly assigned subjects to consume either a broccoli-rich or a pea-rich control diet for 12 months. Subjects' prostates were biopsied before, during, and after the study period, and differences in gene expression were scrutinized. Analyses revealed that more changes in gene expression occurred among men on the broccoli-rich diet, reaching significance within six months.

"Consuming broccoli...result[s] in complex changes to signaling pathways associated with inflammation and carcinogenesis in the prostate," concluded researchers. These changes in gene expression may account for the observation that "diets rich in cruciferous vegetables may reduce the risk of prostate cancer and other chronic disease."

—Dale Kiefer

Reference

* Traka M, Gasper AV, Melchini A, et al. Broccoli consumption interacts with GSTM1 to perturb oncogenic signalling pathways in the prostate. *PLoS ONE.* 2008 Jul 2;3(7):e2568.

Pomegranate Extract Inhibits Inflammation

Pomegranate extract inhibited inflammatory activity in blood isolated from treated rabbits.* Pomegranate is known to have beneficial antioxidant and anti-inflammatory properties.

In this study, four rabbits were given 10 mL of pomegranate fruit extract (equivalent to 175 mL of pomegranate juice), and two control animals received water. Blood was collected two hours later and incubated with either cyclooxygenase enzymes (COX-1 and COX-2, involved in inflammation) or with rabbit cartilage cells (chondrocytes) to test the effect of pomegranate-treated blood on inflammatory processes.

Plasma samples from treated rabbits significantly inhibited COX-1 and especially COX-2 activity as compared with untreated plasma. Treated plasma samples also inhibited the production of inflammatory mediators nitric oxide and prostaglandin E2 in chondrocytes.

The authors believe these actions suggest a future role in the treatment of arthritis: “.consumption of pomegranate fruit extract may be of value in inhibiting inflammatory stimuli-induced cartilage breakdown and production of inflammatory mediators in arthritis.”

—Laura J. Ninger, ELS



Reference

* Shukla M, Gupta K, Rasheed Z, Khan KA, Haqqi TM. Bioavailable constituents/metabolites of pomegranate (*Punica granatum* L) preferentially inhibit COX2 activity ex vivo and IL-1beta-induced PGE2 production in human chondrocytes in vitro. *J Inflamm (Lond)*. 2008 Jun 13;5:9.

Calorie Restriction Decreases Oxidative Stress, Increases Life Span

The healthful benefits of calorie restriction may be related to decreased oxidative stress associated with consuming fewer calories, rather than decreased energy intake alone, according to a new report.* Calorie restriction extends life span in experimental animals, and has been associated with numerous health benefits in humans.

Researchers studied aged mice, which received either a calorie-restricted diet, or a calorie-restricted diet rich in advanced glycation end products (AGEs). AGEs induce oxidative stress, which is correlated with organ dysfunction and decreased life span.

Old mice fed the reduced-calorie diet laced with AGEs developed blood markers of oxidative stress, followed by insulin resistance, heart and kidney damage, and decreased longevity. Virtually identical mice, which consumed the simple calorie-restricted diet, experienced no such signs of oxidative stress, and lived longer than their counterparts.

“Therefore,” concluded researchers, “the beneficial effects of a [calorie restricted] diet may be partly related to reduced oxidant intake, a principal determinant of oxidant status in aging mice, rather than decreased energy intake.”

—Dale Kiefer

Reference

* Cai W, He JC, Zhu L, et al. Oral glycotoxins determine the effects of calorie restriction on oxidant stress, age-related diseases, and life span. *Am J Pathol*. 2008 Aug;173(2):327-36.

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