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Is Exercise the Missing “Nutrient” in Keeping Your Brain and Body Young?

Nearly everyone seems to be too busy or too tired to engage in regular physical activity – even when it comes to a daily walk – and as a result, exercise often becomes the “missing link” in many health-promoting regimens.

Two recent studies clearly demonstrate the positive effects of physical activity on brain health and memory, as well as in slowing or reversing some aspects of the aging process.

Kirk I. Erickson, PhD, of the University of Pittsburgh, and his colleagues asked 120 seniors – most in their mid-60s – to participate in one of two physical activity programs for a year. Half of the participants engaged in instructor-led aerobic exercise, consisting of walking around a track three times a week. The subjects started with a 10-minute walk and increased it to a brisk 40-minute walk by the seventh week. Meanwhile, the other participants engaged in instructor-led stretching and toning exercises, including the use of weights and yoga.

All of the subjects underwent magnetic resonance imaging brain scans just before the study began, after six months, and again after one year. Erickson paid special attention to the size of the subjects’ hippocampus, a part of the brain crucial to memory. The hippocampus shrinks about 1 to 2 percent yearly in older adults, and the loss of volume increases the risk of memory loss and other types of cognitive impairment.

Erickson found that the thrice-weekly walking led to an average 2 percent increase in hippocampal volume, “effectively reversing age-related loss in volume by one to two years.” In addition, the walkers had higher blood levels of brain-derived neurotrophic factor (BDNF), a chemical known to stimulate the production of new brain cells.

In contrast, people who did the stretching and toning exercises had a 1.4 percent reduction in hippocampal volume, about an average decline for seniors. However, both groups did have improve-

ments in “spatial memory” – that is, the ability to remember the physical layout of their environment, such as being able to physically navigate around a city.

In related research, Mark A. Tarnopolsky, MD, PhD, of McMaster University, Canada, and his colleagues studied the effects of exercise on laboratory mice bred for accelerated aging. These mice experience a relatively rapid deterioration of their cells’ mitochondria, which breaks down food for energy. Typically, these mice become frail around eight months, the equivalent of 60 years in human terms.

But when Tarnopolsky exercised the mice regularly, they retained the hallmarks of young mice – even when they were the equivalent of human 60-year-olds. The mice had more mitochondria in their cells (one of the benefits of exercise) and less mitochondrial damage.

Cell biologists generally believe that the aging process is largely related to a deterioration of mitochondria.

References: Erickson KI, Voss MW, Prakash RH, et al. Exercise training increases size of hippocampus and improves memory. *Proceedings of the National Academy of Sciences of the USA*, 2011: doi 10.1073/pnas.1015950108. Safdar A, Bourgeois JM, Ogborn DI, et al. Endurance exercise rescues progeroid aging and induces systemic mitochondrial rejuvenation in mtDNA mutator mice. *Proceedings of the National Academy of Sciences of the USA*, 2011: doi 10.1073/pnas.1019581108. □

Perspectives So-Called Dangers of Vitamins

A professional colleague, Andrew Saul, PhD, makes an important point: “If nutritional supplements are allegedly so ‘dangerous,’ as the FDA and news media so often claim, then where are the bodies?”

You see, there aren’t any bodies. You can take lots of vitamins, minerals, and herbs, and the worst that

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might happen is that you'll get an upset tummy.

Of course, you're far more likely to feel better and lower your risk of health problems.

According to Saul, not a single person died from dietary supplements in 2009, based on the latest information released by the U.S. National Poison Data System.

"The new 200-page annual report of the American Association of Poison Control Centers, published in the journal *Clinical Toxicology*, shows zero deaths from multiple vitamins; zero deaths from any of the B vitamins; zero deaths from vitamins A, C, D, or E; and zero deaths from any other vitamin," says Saul. "Additionally, there were no deaths whatsoever from any amino acid, herb, or dietary mineral supplement."

You can download the 200-page Poison Control report at <http://www.aapcc.org/dnn/Portals/0/2009%20AR.pdf>. The data discussed are found in Table 22B, pages 1138-1148.

I encourage you to read more of what Saul writes at <http://www.orthomolecular.org/> -JC

Latest Vitamin D Suggestions Shift Toward Larger Amounts

How much vitamin D should you take? The latest word is substantially higher than December's paltry recommendation of 600 IU daily from the U.S. Institute of Medicine.

Cedric F. Garland, DrPH, of the University of California, San Diego, and his colleagues analyzed the supplemental vitamin D intake of 3,667 men and women and their blood levels of the vitamin. Garland and one of his coresearchers, Robert P. Heaney, MD, are regarded as among the top vitamin D experts in the world.

Study participants reported taking vitamin D in amounts ranging from 1,000 IU to 10,000 IU daily.

According to Garland, daily intake of 4,000 to 8,000 IU daily are needed to reduce the risk of several major diseases – breast and colon cancer, multiple sclerosis, and type 1 diabetes – by about half. Optimal blood levels of vitamin D – 25(OH) D – are in the range of 40 to 60 ng/ml.

"The supplemental dose ensuring that 97.5 percent of this population achieved a serum [vitamin D] of at least 40 ng/ml was 9,600 IU daily," wrote Garland.

This and larger amounts "are of the same magnitude as produced by a single ... dose of UV-B radiation, such as would be obtained during a few minutes of solar UV-B exposure near noon in midsummer, assuming nearly complete skin exposure."

Garland wrote that taking "up to 40,000 IU vitamin D per day is unlikely to result in vitamin D toxicity." He added that toxicity would result from two factors, namely a high dose of supplementation combined with unusually high individual absorption of vitamin D.

Reference: Garland CF, French CB, Baggerly LL, et al. Vitamin D supplement doses and serum 25-hydroxyvitamin D in the range associated with cancer prevention. *Anticancer Research*, 2011;31:607-612. □

MS Risk Influenced by Both Sun Exposure and Vitamin D Levels

A history of sun exposure is associated with a lower risk of "first demyelinating events (FDEs)" – typically a prelude to developing multiple sclerosis (MS), according to a study by Australian researchers. Vitamin D was also protective, but not to the same extent as sun exposure.

Robyn M. Lucas, PhD, of the Australian National University, Canberra, and her colleagues studied 216 people, ages 18 to 59 years, who had been diagnosed with an FDE, and compared them with 395 people without an FDE.

"Higher levels of past, recent, and accumulated leisure-time sun exposure were each associated with a reduced risk of FDE," wrote Lucas. That sun exposure, from age six to the present, lowered the odds of FDE by 30 percent.

Interestingly, higher actinic skin damage, a marker of excessive sun exposure, was associated with a 61 percent lower risk of FDE. Actinic skin damage is considered precancerous and increases the risk of squamous cell skin cancer.

People with high blood levels of vitamin D had only a 7 percent lower risk of FDE.

Reference: Lucas RM, Ponsonby AL, Dear K, et al. Sun exposure and vitamin D are independent risk factors for CNS demyelination. *Neurology*, 2011;76:540-548. □

Magnesium Levels Very Low in People with Type 2 Diabetes

Magnesium levels run low in people with type 2 diabetes, according to a study by researchers in Brazil.

Celia Colli, PhD, of the University of Sao Paulo, and her colleagues studied 51 patients with type 2 diabetes. Seventy-seven percent of them were deficient in magnesium, based on low levels of the mineral determined by intake, plasma levels, red blood cells, or urinary excretion.

Poor kidney function was strongly associated with low magnesium levels.

Lower magnesium levels were associated with poorer glucose tolerance.

“It is important to emphasize that there were no significant differences between non-medicated patients and those receiving insulin, metformin and diuretic drugs,” Colli wrote.

The researchers also wrote that “low body concentrations of this mineral may influence the evolution of the disease [type 2 diabetes] and generate further complications.”

Reference: Sales CH, Pedrosa LF, Lima JG, et al. Influence of magnesium status and magnesium intake on the blood glucose control in patients with type 2 diabetes. *Clinical Nutrition*, 2011: epub ahead of print. □

Foods Rich in B Vitamins Appear to Lower Risk of Developing PMS

B-complex supplements, particularly vitamin B6, have often been recommended to reduce symptoms of premenstrual syndrome (PMS). A new study has found that eating a diet rich in B vitamins seems to have a similar benefit – suggesting that poor eating habits may increase the risk of PMS.

Elizabeth R. Bertone-Johnson, ScD, of the University of Massachusetts, Amherst, and her colleagues analyzed data from the Nurses’ Health Study II. None of the women had PMS symptoms when the study began. However, 1,057 women were diagnosed with PMS in the following 10 years, and they were compared with 1,968 women who did not have PMS.

Women who had the highest dietary intake of vitamin B1 (thiamine) were 25 percent less likely to develop PMS, and those with the highest dietary intake of vitamin B2 (riboflavin) were 35 percent less likely to develop PMS.

In this study, the other B vitamins were not associated with a lower risk of PMS, and neither were supplements.

Vitamin B2 is needed to make pyridoxyl phosphate, the active form of vitamin B6. Bertone-Johnson also cited a 2007 study in which 60 women were given 100 mg of vitamin B6, a drug treatment, or a placebo for three months. Only the vitamin B6 supplements led to a reduction in PMS symptoms.

An estimated 15 percent of women of reproductive age have PMS. Researchers believe that the cause may be related to an interaction of ovarian hormones and brain neurotransmitters, including serotonin and gamma-amino butyric acid.

Reference: Chocano-Bedoya PO, Manson JE, Hankinson SE, et al. Dietary B vitamin intake and incident premenstrual syndrome. *American Journal of Clinical Nutrition*, 2011: doi 10.3945/ajcn.110.009530. □

Omega-3 Fish Oils Reduce Odds of Macular Degeneration

The “regular consumption” of omega-3 fish oils can greatly reduce the risk of developing age-related macular degeneration (AMD), the most common cause of blindness among seniors.

William G. Christen, ScD, of the Harvard Medical School, and his colleagues analyzed the dietary habits of 38,022 women health professionals. No one had AMD when the study began, but 235 cases were diagnosed during 10 years of follow up.

Christen reported that diets high in the omega-3 eicosapentaenoic acid (EPA) were associated with a 34 percent lower risk of AMD, and that high intake of docosahexaenoic acid (DHA) was related to a 38 percent lower risk. In addition, eating at least one serving of fish each week was associated with a 42 percent lower risk of AMD.

He wrote that omega-3 fish oils “may be of benefit in primary prevention of AMD.”

Reference: Christen WG, Schaumberg DA, Glynn RJ, et al. Dietary omega-3 fatty acid and fish intake and incident age-related macular degeneration in women. *Archives of Ophthalmology*, 2011: doi 10.1001/archophthalmol.2011.34. □

Supplemental Curcumin May Reduce Colon Cancer Risk

Curcumin, an extract of the spice turmeric, appears to reduce a significant risk factor for colon and rectal cancer.

Robert E. Carroll, MD, of the University of Illinois, Chicago, and his colleagues, used curcumin to treat 41 patients with “aberrant crypt foci (ACF),” a precancerous change in the colon. All of the patients were smokers who were diagnosed with at least eight ACF during a colonoscopy. The patients were also assessed for their levels of two pro-inflammatory compounds, prostaglandin E2 (PGE2) and 5-hydroxyeicosatetraenoic acid (5-HETE).

The patients were then given supplements containing either 2 or 4 grams of curcumin daily for 30 days.

People taking 4 grams of curcumin had a significant 40 percent reduction in their numbers of ACF. The 2-gram dose of curcumin did not have any apparent effect. Nor did either dose of curcumin lower PGE2 or 5-HETE levels.

The curcumin supplements were 98 percent pure. However, most curcumin supplements on the market are standardized to 95 percent purity. Although absorption of curcumin is poor, the 4-gram

Quick Reviews of Recent Research

• Zinc lozenges do reduce cold symptoms

In 1984 researchers published the first study showing that zinc lozenges reduced the length and severity of the common cold. Other studies have shown conflicting results. Now, in an analysis of 13 therapeutic studies and two preventive studies, researchers working in conjunction with the Cochrane Collaboration reported that zinc lozenges do have benefits – if people start taking them within 24 hours of their first cold symptoms. The researchers analyzed the responses of 1,360 people in those 13 studies and found that zinc lozenges reduced the length of colds by an average of one day or more. Zinc also significantly reduced the symptoms. People taking zinc were also less likely to have cold symptoms after seven days, compared with people who did not take the supplements.

Singh M. *Cochrane Database Systematic Review*, 2011; 2:CD001364.

• Quercetin helps in sarcoidosis

Sarcoidosis is a chronic inflammatory disease that most commonly affects the lungs, but can also lead to inflammation and swelling in other tissues, such as lymph nodes, the liver, eyes, and skin. Researchers from The Netherlands treated 12 sarcoidosis patients with 2,000 mg of quercetin daily and compared their responses with six patients who received placebos – all within a single 24-hour period. Quercetin reduced markers of inflammation and free radical stress, whereas placebos did not. People with higher levels of inflammation and free radical stress at the beginning of the study benefited the most.

Boots AW. *Clinical Nutrition*, 2011: epub ahead of print.

• Magnesium helpful in improving sleep

Researchers at the U.S. Department of Agriculture treated 78 women and 22 men with sleep disorders, giving them either 320 mg of magnesium (in the form of magnesium citrate) or placebos for seven weeks. People taking magnesium supplements benefited from a 37 percent improvement in sleep

quality, based on their scores on a standardized test. In addition, people taking magnesium had a significant decrease in C-reactive protein, a marker of inflammation. The researchers noted that 58 percent of the subjects were not consuming recommended amounts of magnesium when the study began.

Nielsen FH. *Magnesium Research*, 2010;23:158-168.

• Omega-3 fish oils ease depression in seniors

In Italy, researchers treated 46 women, ages 66 to 95 years, with fish oil supplements. The supplements provided 2.5 grams of omega-3s, consisting of 1.67 grams of eicosapentaenoic acid (EPA) and 0.83 grams of docosahexaenoic acid (DHA). After two months of supplementation, the subjects had significantly fewer depressive symptoms and a higher overall quality of life.

Rondanelli M. *Nutrition, Health and Aging*, 2011;15:37-44.

• Trans fats increase risk of depression

The consumption of trans fats can increase the risk of depression, according to a team of researchers from Spain and The Netherlands. In studying 12,000 people, who had an average age of 37 years, those with high trans fat intake were 42 percent more likely to suffer from depression, even if they consumed a Mediterranean-style diet.

Sanchez-Villegas A. *PLoS One*, 2011: doi 10.1371/journal.pone.0016268.

• Vitamin E supplements reduce ALS risk

Researchers at Harvard University studied more than one million people, of whom 805 developed amyotrophic lateral sclerosis (ALS) at some point between 1986 and 2005. People taking vitamin E supplements for at least five years had a 36 percent lower risk of ALS, also known as Lou Gehrig's disease.

Wang H. *American Journal of Epidemiology*, 2011;73:

Curcumin and Colon Cancer...

Continues from previous page

supplements led to a five-fold increase in blood levels of curcumin.

Curcumin has antioxidant, antiinflammatory, and anticancer effects. It is the subject of numerous human studies in which it is being investigated as an adjunct to conventional cancer therapies.

Reference: Carroll RE, Benya RV, Turgeon DK, et al. Phase 2a clinical trial of curcumin for the prevention of colorectal neoplasia. *Cancer Prevention Journal*, 2011;4:354-364. □

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