Alzheimer's disease and other forms of dementia continue to be among the most feared and scientifically mysterious conditions associated with aging. But researchers are making progress understanding and preventing dementia, as evidenced at the recent Alzheimer’s Association International Conference on Alzheimer's Disease 2010. Scientists at the conference presented proposals for updated clinical and research diagnostic criteria—the first such changes since 1984—plus new findings on possibilities for early detection and suggested lifestyle changes that might reduce the risk of dementia.

Commenting on the need for updated diagnostic criteria, Creighton H. Phelps, PhD, director of the National Institute on Aging’s Alzheimer’s program, said, “Important scientific discoveries have been made in Alzheimer’s, and there have been significant changes in our knowledge and conception of the disease.”

Estimated to affect as many as 5.3 million Americans, Alzheimer's disease is the most common form of dementia and the seventh-leading cause of death in the US. Other types of dementia include vascular dementia, mixed and fronto-temporal dementias, and dementia with Lewy bodies.

The brain contains some 100 billion nerve cells, called neurons, that network together to perform tasks such as reasoning, learning and remembering, as well as hearing, smelling, seeing and moving muscles. Alzheimer’s and other types of dementia occur when increasing numbers of the brain cells deteriorate and die. Two abnormal structures that form in the brain—known as plaques and tangles—are prime suspects in the damaging and killing of nerve cells seen in Alzheimer’s. Plaques contain deposits of a protein fragment, beta-amyloid, you’ll frequently read about in research on Alzheimer’s; tangles are twisted fibers of another protein, called tau. Most scientists believe these proteins somehow block communication among nerve cells or in some other way disrupt processes that cells need to survive. But experts still aren’t absolutely sure about the role plaques and tangles play in Alzheimer’s.

The primary risk factor for Alzheimer's disease is simply age. Most people who have the disease are age 65 or older, and the risk of developing Alzheimer’s doubles about every five years after 65. After age 85, the risk reaches nearly 50%. Other Alzheimer's risk factors you can’t do anything about include family history and genetics.

New research, however, suggests that some of the lifestyle factors known to help keep your body healthy—exercising, eating right—could also play a role in protecting your brain.

### 10 Warning Signs of Alzheimer's Disease

If you notice any of these warning signs, the Alzheimer’s Association recommends discussing your concerns with a physician. For more information, go to [www.alz.org/10signs](http://www.alz.org/10signs) or call 877-IS IT ALZ (877-474-8259).

1. Memory changes that disrupt daily life.
2. Challenges in planning or solving problems.
3. Difficulty completing familiar tasks at home, at work or at leisure.
4. Confusion with time or place.
5. Trouble understanding visual images and spatial relationships.
6. New problems with words in speaking or writing.
7. Misplacing things and losing the ability to retrace steps.
8. Decreased or poor judgment.
9. Withdrawal from work or social activities.
10. Changes in mood and personality.
engaging in moderate to heavy physical activity were 45% less likely to develop any kind of dementia than those reporting only light exercise. Similar figures were seen when looking only at risk of Alzheimer's disease.

In the study, activities that fell into each category were: Slight—standing, walking; Moderate—housework, yard chores, climbing stairs, light sports (e.g. bowling, golf); Heavy—major housework, intensive sports (e.g. jogging).

"It's not necessarily only heavy physical activity that can reduce risk of dementia," Dr. Tan said, "but we can fairly say that at least moderate exercise can be protective." He cautioned, however, "It's premature to say that we need to exercise in order to prevent dementia, because we don't have that data."

One difference in this new study, he added, was that it assessed people who were fairly advanced in age. Other studies of exercise and dementia have focused on younger participants.

The take-away, Dr. Tan said, was that "physical activity can be maintained even late in life, and we have to remain active even in old age. Engaging even in moderate activity at least an hour a day appears to be protective of dementia."

Another new study, however, suggests that the earlier in life you get off the couch and get moving, the better for your brain in later years. Researchers analyzed data on 9,344 women, average age 71.6, participating in an osteoporosis study who were also assessed using a standard test for cognitive ability. Women who reported that they were physically active in their teens—even if they slacked off later in life—were the least likely to have developed cognitive impairment. Overall, being physically active was associated with lower rates of cognitive impairment in late life.

Laura Middleton, PhD, of Sunnybrook Health Sciences Center in Toronto, and colleagues published their findings in the Journal of the American Geriatrics Society. They commented, "Our study suggests that we should start thinking about preventing disease, particularly dementia, very early in life. What we do when we are young could have lasting consequences."

And if you started your workout routine late, don't despair: Women who were inactive as teens but began exercising at age 30 or age 50 also had lower odds of cognitive impairment compared to lifelong couch potatoes, although not to the degree seen among those active as teens.

If, despite keeping active, you're still carrying a few extra pounds, it may also make a difference to your brain where you have any additional inches. Diana R. Kerwin, MD, of Northwestern University, and colleagues recently reported that "pear-shaped" women are at greater risk of poor cognitive performance with extra weight than their "apple-shaped" peers.

The researchers analyzed data on more than 8,700 postmenopausal women from the Women's Health Initiative (WHI). Although the WHI is a long-running study, Dr. Kerwin and colleagues didn't look at changes in cognition over time; rather, they compared body composition with cognitive performance at the inception of the study, when the women were ages 65-79.

For "pear-shaped" women with a waist-to-hip ratio of less than 0.78, as body mass index (BMI) went up with extra weight, cognitive scores went down. The relationship was almost a straight line, with cognitive scores declining as BMI went from 25 to 40. (To determine waist-to-hip ratio, divide your waist measurement by your hip measurement. If your waist is 36 inches and your hips are 48 inches, your ratio is 0.75.)

But for "apple-shaped" women with waist-to-hip ratios of 0.86 or more, the trend was reversed: Overweight women with fat concentrated at the waist actually scored higher on the cognitive tests than their thinner peers.

Writing in the Journal of the American Geriatrics Society, Dr. Kerwin and colleagues concluded that the findings suggest the relationship between body fat and brain function is more complex than previously thought. Cells that store fat around the abdomen, for example, are known to release estrogen, which has neuroprotective effects.

"The fat distribution difference seen opened up a new area of research," Dr. Kerwin commented, "looking directly at the fat cell and possibly the underlying mechanism of how body weight relates to brain function and neurodegenerative diseases such as Alzheimer's disease."

The researchers added, "These findings do not negate other research demonstrating that obesity is a major risk factor for cardiovascular disease and other chronic diseases, including those such as hypertension and diabetes mellitus, which have been found to increase dementia risk."

Focus on Antioxidants in Food

Two other new studies point to the possibility that vitamin E—especially from dietary sources—may help stave off mental decline with aging. In
results from one study tracing 5,395 people age 55 and up for nearly a decade, researchers reported that those with the highest intake of vitamin E from food were less likely to develop dementia than those consuming the least dietary vitamin E. Similar results were seen for Alzheimer’s disease specifically.

Publishing their findings in Archives of Neurology, Elizabeth E. Devore, ScD, of Erasmus Medical Center in the Netherlands, and colleagues noted that oxidative stress—damage to the cells from oxygen exposure—is thought to play a role in the development of Alzheimer’s disease. Experimental data suggest that antioxidants—nutrients that help repair this damage—may protect against the degeneration of nervous-system cells.

“Although clinical trials have shown no benefit of antioxidant supplements for Alzheimer’s disease, the wider variety of antioxidants in food sources is not well studied relative to dementia risk,” the researchers added. “A few studies, with varying lengths of follow-up, have yielded inconsistent results.”

So Devore and colleagues looked at intakes of four antioxidants: vitamin E, vitamin C, beta carotene and flavonoids. Over an average of 9.6 years of follow-up, 465 participants in their study developed dementia; 365 of those were diagnosed with Alzheimer’s disease. After adjusting for other potentially related factors, the one-third of individuals who consumed the most dietary vitamin E (an average of 18.5 milligrams per day, a little more than the US adult RDA of 15 milligrams) were 25% less likely to develop dementia than the one-third who consumed the least (an average 9 milligrams per day). The middle group, however, averaging 25% less likely to develop dementia than the lowest-intake group. Dietary intake levels of vitamin C, beta carotene and flavonoids were not associated with dementia risk.

The major food sources of vitamin E for study participants were margarine, sunflower oil, butter, cooking fat, soybean oil and mayonnaise. The polyunsaturated fats found in liquid vegetable oils and some spreads (not those containing partially hydrogenated fats) are a healthy way to get dietary vitamin E: A tablespoon of sunflower oil, for example, contains 5.5 milligrams of vitamin E. Sunflower and safflower oils are among the best sources of vitamin E, while canola, corn and soybean oils also provide some vitamin E. Nuts, such as peanuts, hazelnuts and especially almonds, and seeds like sunflower seeds are also among the best sources of vitamin E. Green vegetables, such as spinach and broccoli, provide some vitamin E.

“The brain is a site of high metabolic activity, which makes it vulnerable to oxidative damage,” Devore and colleagues explained, “and slow accumulation of such damage over a lifetime may contribute to the development of dementia. In particular, when beta-amyloid (a hallmark of pathologic Alzheimer’s disease) accumulates in the brain, an inflammatory response is likely evoked that produces nitric oxide radicals and downstream neurodegenerative effects. Vitamin E is a powerful fat-soluble antioxidant that may help to inhibit the pathogenesis of dementia.”

In the second study, researchers compared blood levels of eight different forms of vitamin E with risk of devel-
oping Alzheimer’s among 232 people over the age of 80. Most studies related to Alzheimer’s have concentrated on the most common form of vitamin E, alpha-tocopherol. During six years of follow-up, 37 cases of Alzheimer’s were diagnosed. Those with the highest vitamin E levels of all kinds were 45%-54% less likely to develop the disease.

Francesca Mangialasche, MD, of the Aging Research Center at the Karolinska Institute in Stockholm, and colleagues wrote in the Journal of Alzheimer’s Disease, “We hypothesized that all the vitamin E family members could be important in protecting against Alzheimer’s disease. If confirmed, this result has implications for both individuals and society, as 70% of all dementia cases in the general population occur in people over 75 years of age, and the study suggests a protective effect of vitamin E against Alzheimer’s disease in individuals aged 80-plus.”

Their findings might also help explain why clinical trials with vitamin E supplements have proven disappointing, compared to observational studies of dietary vitamin E intake: Vitamin E’s apparent protective power against Alzheimer’s may be due to a combination of different forms, as found in food. Supplements typically contain only one form, alpha-tocopherol. Dr. Mangialasche and colleagues pointed out.

Spotlight on the “Sunshine Vitamin”

Another new study suggests that vitamin D, which recent research has linked to everything from preventing fractures to delaying death, may also play a role in keeping your brain sharp as you age. David J. Llewellyn, PhD, of the University of Exeter in England, and colleagues assessed blood levels of vitamin D in 858 Italian adults who were age 65 or older when the study began. Participants completed interviews and medical examinations and provided blood samples. At the beginning of the study and again after three and six years, they repeated three tests of cognitive function—one assessing overall cognition, one focusing on attention and one that places greater emphasis on executive function, or the ability to plan, organize and prioritize.

Participants who were severely deficient in vitamin D (having blood levels of 25-hydroxyvitamin D of less than 25 nanomoles per liter) were 60% more likely to suffer substantial cognitive decline in general over the six-year period. Those deficient in vitamin D were also 31% more likely to experience declines on the test measuring executive function than those with sufficient vitamin D levels. No similar link was seen for the test measuring attention, however.

Reporting their findings in Archives of Internal Medicine, Llewellyn and colleagues noted that the association between vitamin D deficiency and cognitive decline “remained significant after adjustment for a wide range of potential confounders and when analyses were restricted to elderly subjects who were non-demented at baseline.

The researchers suggested that vitamin D may help prevent the degeneration of brain tissue by having a role in formation of nervous tissue, maintaining levels of calcium in the body, or clearing of beta-amyloid. They cautioned that this observational study couldn’t prove a cause-and-effect relationship, but added, “If future prospective studies and randomized controlled trials confirm that vitamin D deficiency is causally related to cognitive decline, then this would open up important new possibilities for treatment and prevention.”

Head and Heart

The most solid evidence for lifestyle steps to protect your brain, however, supports diet and exercise changes similar to what’s known to protect your heart. That only makes sense: After all, every heartbeat pumps about 20% to 25% of your blood to your head, where your brain cells use at least 20% of the total food and oxygen carried in the blood. If your heart can’t work right, neither will your brain.

According to the Alzheimer’s Association, the risk of developing Alzheimer’s or vascular dementia appears to be increased by many of the same conditions that damage the heart or blood vessels. These include high blood pressure, heart disease, stroke, diabetes and high cholesterol. (For more information, visit <www.alz.org/we_can_help_brain_health_maintain_your_brain.asp>.)

So, while some evidence suggests exercise may directly benefit brain cells by increasing blood and oxygen flow, there’s even stronger evidence that exercise may protect brain health through its proven benefits to the cardiovascular system.

Like exercise, eating a healthy diet may have its greatest impact on brain health through its effect on heart health. The so-called "Mediterranean diet," which has been shown to have cardiovascular benefits, may also be a healthy prescription for your head; such a dietary pattern includes relatively little red meat and emphasizes whole grains, fruits and vegetables, fish and shellfish, and nuts, olive oil and other healthy fats. Similarly, the DASH (Dietary Approaches to Stop Hypertension) eating plan, which has been shown to improve high blood pressure, may also help prevent Alzheimer’s and dementia. (For details on DASH, see <www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf>.)

And some studies have found that the heart-healthy omega-3 fatty acids found in fish could also have benefits for your brain.

That’s the best news, really, in the still-challenging battle against Alzheimer’s and other forms of dementia: The steps you’re already taking to protect your heart, combat hypertension and keep yourself fit are also the smartest choices to keep your brain sharp as you get older.