

Probing Question: Can Alzheimer's disease be prevented?

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Most of us have had the experience of forgetting where we've parked our car or have struggled to recall an acquaintance's name. But once we hit our 50s, said James R. Connor, these incidents might cause us to worry that we're showing early signs of Alzheimer's disease.

Fortunately, that's not usually the case, says Connor, professor of neurosurgery in Penn State's College of Medicine, Penn State Milton S. Hershey Medical Center. "If forgetting something now and then was a good indicator of dementia, we'd all be in trouble," he added with a laugh.

This dreaded condition was first classified as a disease 100 years ago by German psychiatrist Alois Alzheimer and is the "leading cause of dementia in the elderly," explained Connor. In fact, four million Americans now suffer from this progressive disease, including up to 50 percent of seniors over age 85 and up to 15 percent of those over 65.

The aging of baby boomers will swell those numbers in the coming years. "At the present time, Alzheimer's disease (AD) costs the nation \$100 billion a year, with an average \$174,000 lifetime cost per patient," Connor said. "By the year 2050, there will be an estimated 14 million Americans with the disease. The human and economic toll is devastating, so it's imperative that we learn more about prevention, early diagnosis and treatment."

Is it possible to prevent Alzheimer's? For those who already have signs

of persistent memory decline, there are some neurosurgical procedures and therapeutic drugs available that may help slow the disease's ravages, Connor noted. But for the millions of "worried well," science has not yet found any definitive ways to prevent the disease.

Although recent research suggests that genes may play a role in contracting the disease, "the No. 1 risk factor for Alzheimer's is aging," said Connor. "You have to live long enough to develop this disease," which researchers believe to be caused, in part, by a sticky protein called "amyloid plaque" that accumulates on brain cells, disrupting the transmission of their signals. "Neurofibrillary tangles" -- protein threads that strangle and eventually kill nerve cells -- are also present in the brains of AD patients. "If we have a computer with cables that are broken and tangled, it won't work right, and it's the same with our brains," added Connor.

Scientists speculate that the protein coatings and tangles within the brain could be the body's inflammatory response to long-term toxin exposure, as well as damage from "free radicals," unstable molecules that attack and harm the body's cells by stealing their electrons through a process called oxidation.

Although some studies suggest that anti-inflammatory drugs (including common painkillers such as ibuprofen and naproxen) may help to dissolve amyloid plaques, "we need to proceed with caution in this area," Connor believes. One paradox of the disease, he says, is that "there may be a positive function to the plaques. They may be the body's way of sealing off leaky blood vessels in the brain."

Many researchers believe that metals (chiefly iron, copper and zinc) may play a role in Alzheimer's, since these substances are abundant within the folds of plaque in diseased brains. When free radicals bump into metal atoms in the body, they unleash a chain reaction that can wreak havoc on

healthy cells, prematurely aging them and potentially leading to a variety of serious health conditions. MRIs and autopsies of patients with advanced Alzheimer's often reveal massive iron accumulation, Connor noted.

Although excess metals may damage the brain, he adds, another paradox is that small amounts of these micronutrients are absolutely essential to healthy brain function.

Research on the exact link between metals and memory processing is inconclusive at this point. "Is there too much copper or too little in the brains of AD patients? Studies are unclear," Connor remarked. So, too, is the role of zinc, he added. Though there's high zinc content in the healthy hippocampus -- the part of the brain responsible for short-term memory -- the jury is still out on the connection, so there's no reason to recommend zinc supplements at this point. Too much might cause a problem as well. It's all about the right balance.

Nor should one completely avoid dietary iron or copper, suggested Connor, although some physicians recommend "decreasing your iron burden" through occasional blood donation, particularly for men and post-menopausal women, who are at higher risk for accumulating iron and for developing neurodegenerative diseases.

Other recommendations made by some physicians (particularly for patients noticing subtle cognitive decline) include taking antioxidants such as vitamins E and C, going for chelation therapy and making dietary changes.

"Remember," said Connor, "that if you flip the statistics, at least half of those over 85 don't have Alzheimer's. In addition to studying those with the disease, we're also studying seniors with good short-term memories, looking for predictors of healthy neurocognitive aging."

Source: By Melissa Beattie-Moss, Research Penn State

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