

# What Can We Do to Prevent Alzheimer Disease?

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A pilot study at the VA Puget Sound Health Care System investigates ways to prevent or slow dementia progression.

**A**lzheimer disease (AD) and other forms of dementia are pressing public health issues. They diminish quality of life for older adults and their families and impose significant financial costs on individuals and society. Dementia prevention and the development of treatments for dementia are important goals, and as a consequence, the VA Geriatric Research Education and Clinical Centers (GRECCs) have been conducting innovative research for the treatment and prevention of AD and related dementias.

Research conducted at the VISN 20 GRECC at the VA Puget Sound Health Care System (PSHCS) has helped increase clinicians' understanding of the role of insulin in the development of AD and has evaluated the potential of treatment approaches based on the insulin-related research. More recently, this research has provided the basis for a pilot study aimed at dementia prevention for high-risk patients and for educational outreach about prevention within the VA.

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## DEMENTIA STUDIES

The hormone insulin is required for efficient use of glucose throughout the body, including the brain. Insulin may also play a role in regulating cerebral amyloid, which is directly involved in the development of AD neuropathology and in maintaining healthy vascular function and lipid metabolism, both of which are required for brain health.<sup>1</sup> Research over the past decade has shown that patients with AD have reduced levels of brain insulin, and individuals with insulin resistance have an increased risk of developing AD. Insulin resistance also has been shown to be related to reduced cerebral glucose metabolism, even in individuals who did not have a memory disorder.<sup>2</sup>

One recent study, led by Suzanne

Craft, PhD, and colleagues at PSHCS, tested the potential of intranasal insulin to treat cognitive impairment.<sup>3</sup> Participants with either AD or milder memory deficits used a specially designed device to deliver insulin or a placebo to the nose twice a day. Insulin provided in this way reaches the brain quickly without entering the lungs or affecting glucose metabolism elsewhere in the body. Participants who received the insulin experienced improvements in delayed memory and functional abilities compared with those who received the placebo.

Studies at the same laboratory investigated the role of diet and exercise in insulin metabolism and cognitive function. In a diet-related study, older adults with normal memory and those

The VHA's Geriatric Research Education and Clinical Centers (GRECCs) are designed for the advancement and integration of research, education, and clinical achievements in geriatrics and gerontology throughout the VA health care system. Each GRECC focuses on particular aspects of the care of aging veterans and is at the forefront of geriatric research and clinical care. For more information on the GRECC program, visit the website (<http://www1.va.gov/grecc/>). This column, which is contributed to by GRECC staff members, is coordinated and edited by Kenneth Shay, DDS, MS, director of geriatric programs for the VA Office of Geriatrics and Extended Care, VA Central Office, Washington, DC. Please send suggestions for future columns to [Kenneth.Shay@va.gov](mailto:Kenneth.Shay@va.gov).



with mild memory impairment received either a high saturated fat, high glycemic index (GI) diet or a low saturated fat, low GI diet for 4 weeks.<sup>4</sup> Plasma insulin levels decreased and delayed visual memory improved for participants who received the low-fat, low-GI diet. AD-related markers in cerebrospinal fluid, however, improved only among participants with mild memory impairment, not among healthy individuals.

In an exercise-related study, older adults with glucose intolerance participated in a 6-month aerobic exercise program.<sup>5</sup> Although memory did not improve, cardiorespiratory fitness, executive function, and insulin sensitivity improved for participants in the aerobic exercise program compared with those in a stretching program. The relationship of diet and exercise and cognitive function is complex and likely involves insulin regulation, vascular function, and lipid metabolism, among other factors. More research is needed to fully understand the relationships among diet, exercise, and dementia, but these results suggest that lifestyle modifications may play a role in prevention of dementia.

When patients have problems with memory, attention, or executive function, they may have difficulty managing their medications, making good nutritional choices, and monitoring blood pressure and blood glucose.<sup>6</sup> Given the importance of controlling vascular risk factors, helping patients manage their medical conditions may help them prevent or delay the onset of AD.

## PILOT STUDY

A VA-funded pilot study with the goal of dementia prevention among high-risk patients was recently conducted at the PSHCS. This study focused on veterans at significantly elevated risk of dementia: those with both diabetes and hypertension, with poor con-

trol of either or both conditions, and who had some degree of memory or attentional impairment. Participants were randomly assigned to continue their usual care or to add a 6-month care management intervention to their usual care.

A registered nurse who helped the veterans overcome the barriers to controlling their medical conditions led the intervention. Barriers ranged from relatively simple problems, such as appropriate use of insulin, to more complex issues, such as learning about healthy nutrition and exercise for people with diabetes. The intervention was adapted to meet each participant's cognitive level, and family involvement was encouraged, with the veteran's permission. Preliminary results of this study were presented at the annual meeting of the Gerontological Society of America in 2011 and the Alzheimer's Association International conference in July 2013.<sup>7,8</sup>

The VISN 20 GRECC also developed a "Dementia Roadshow" in which GRECC clinicians present educational, research-based lectures on dementia-related topics at VAMCs in VISN 20. One lecture in this series incorporates this recent research about prevention of dementia through control of diabetes and hypertension, as well as depression, posttraumatic stress disorder, and other risk factors; the lecture is presented to frontline clinicians who can then use this information to guide their work with high-risk patients.

The GRECCs are at the forefront of understanding the causes of dementia and how to prevent it. This work will help the VA to develop more effective ways of reducing the public health burden of this disease. ●

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