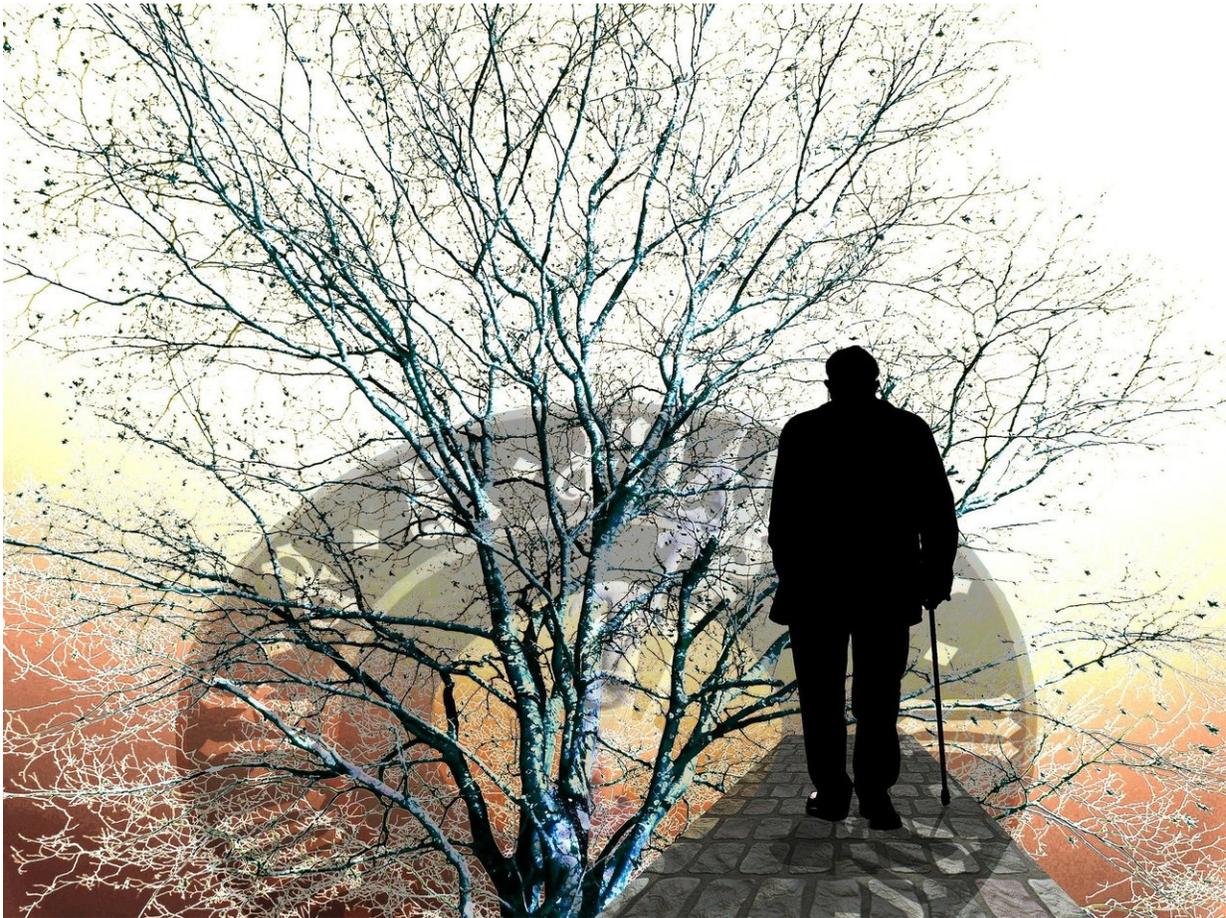


Advancing precision hormone therapies to reduce Alzheimer's risk

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A new University of Arizona Health Sciences study found women on

hormone therapy were up to 58% less likely to develop neurodegenerative diseases including Alzheimer's disease, and reduction of risk varied by type and route of hormone therapy and duration of use. The findings could lead to the development of a precision medicine approach to preventing neurodegenerative diseases.

The study, published in *Alzheimer's & Dementia: Translational Research & Clinical Interventions*, found that women who underwent [menopausal hormone therapy](#) for six years or greater were 79% less likely to develop Alzheimer's and 77% less likely to develop any neurodegenerative disease.

"This is not the first study on the impact of [hormone](#) therapies on neurodegenerative disease reduction," said Roberta Diaz Brinton, Ph.D., director of the UArizona Center for Innovation in Brain Science and senior author on the paper. "But what is important about this study is that it advances the use of precision hormone therapies in the prevention of neurodegenerative disease, including Alzheimer's."

Hormone therapy is the most effective treatment for the symptoms of menopause, which can include hot flashes, night sweats, insomnia, weight gain and depression. During the study, Dr. Brinton and the research team examined the insurance claims of nearly 400,000 women aged 45 and older who were in menopause.

They focused on the effects of individual U.S. Food and Drug Administration-approved hormone therapy medications, including estrogens and progestins, and combination therapies on [neurodegenerative diseases](#). Additionally, they evaluated the impacts of the type of hormone therapy, the route of administration—oral vs. through the skin—and the duration of therapy on the risk of developing disease.

They found that using the natural steroids estradiol or progesterone resulted in greater risk reduction than the use of synthetic hormones. Oral hormone therapies resulted in a reduced risk for combined neurodegenerative diseases, while hormone therapies administered through the skin reduced the risk of developing dementia. Overall risk was reduced the most in patients 65 years or older.

Additionally, the protective effect of long-term therapy lasting longer than one year on Alzheimer's, Parkinson's disease and dementia was greater than with short-term [therapy](#) of less than one year.

"With this study, we are gaining mechanistic knowledge. This reduction in risk for Alzheimer's disease, Parkinson's and dementia means these diseases share a common driver regulated by estrogen, and if there are common drivers, there can be common therapies," said Dr. Brinton, who has researched neurodegenerative diseases and the aging female brain for more than 25 years. "The key is that [hormone therapy](#) is not a treatment, but it's keeping the brain and this whole system functioning, leading to prevention. It's not reversing disease; it's preventing disease by keeping the brain healthy."

Dr. Brinton's co-authors include first author Gregory L. Branigan, Ph.D., an MD-Ph.D. student in the UArizona College of Medicine—Tucson; Kathleen Rodgers, Ph.D., associate director of translational neuroscience at the Center for Innovation in Brain Science and professor of pharmacology in the UArizona College of Medicine—Tucson; postdoctoral research associate Yu Jin Kim, Ph.D., in the Center for Innovation in Brain Sciences; and former postdoctoral research associate Maira Soto, Ph.D.

Dr. Brinton recently co-authored another paper led by researchers at Weill Cornell Medicine and published in *Scientific Reports*. Those findings demonstrated that the menopausal transition stage has

pronounced effects on the brain's structure, connectivity and energy metabolism, and provides a neurological framework for both vulnerability and resilience.

Neurodegenerative diseases associated with aging are a major public health concern as the proportion of populations aged 65 and older increase. There is no known cure for Alzheimer's [disease](#), which affects more than 5.5 million people in the United States.

More information: Yu Jin Kim et al, Association between menopausal hormone therapy and risk of neurodegenerative diseases: Implications for precision hormone therapy, *Alzheimer's & Dementia: Translational Research & Clinical Interventions* (2021). [DOI: 10.1002/trc2.12174](https://doi.org/10.1002/trc2.12174)

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