Increasing Physical Activity in Middle Age May Protect Against Alzheimer's Disease

- **Meeting WHO physical activity recommendations is associated with lower accumulation of beta-amyloid, a protein linked to Alzheimer's disease**
- **It is estimated that 13% of Alzheimer's disease cases worldwide can be attributed to physical inactivity.**
- **The study, published in the journal Alzheimer's & Dementia, involved 337 people from the ALFA longitudinal cohort of the BarcelonaBeta Brain Research Center (BBRC), with the support of the "la Caixa" Foundation.**

Barcelona, 30 April 2025- An increase in physical activity between the ages of 45 and 65 could **help prevent Alzheimer's disease**, while inactivity may be detrimental to brain health. This is the main conclusion of a scientific paper published in *Alzheimer's & Dementia*, which highlights the need to promote physical activity among middle-aged adults. The study is the result of a collaboration between the Barcelona Institute for Global Health (ISGlobal), a center promoted by the "la Caixa" Foundation, and the BarcelonaBeta Brain Research Center (BBRC), a research centre of the Pasqual Maragall Foundation.

It is estimated that **13% of Alzheimer's disease cases worldwide can be attributed to physical inactivity**. In fact, the **World Health Organization (WHO)** recommends **150 to 300 minutes of moderate activity** per week or **75 to 150 minutes of vigorous activity** per week. While extensive research has shown that exercise reduces the risk of Alzheimer's disease by improving cardiovascular and mental health, recent studies suggest that physical activity may have a **direct impact on the development of brain pathology associated with the disease**.

The study, led by Eider Arenaza-Urquijo, researcher at ISGlobal, included **337 participants** from the ALFA+ longitudinal cohort, part of the ALFA study (*ALzheimer's and FAmilies*) at the BBRC, supported by the "la Caixa" Foundation. "We conducted a **four-year follow-up** of middle-aged residents of Catalonia with a family history of Alzheimer's disease," explains **Müge Akıncı**, doctoral researcher at ISGlobal and the BBRC at the time of the study and first author of the paper. "We used physical activity questionnaires to assess changes in activity over a four-year period and neuroimaging tests to analyse the effects of exercise on brain structure and function," she adds. Participants were classified as **adherent** (meeting WHO recommendations), **non-adherent** (doing less than the recommended amount of physical activity), and **sedentary** (doing zero minutes of physical activity per week).

Benefits of physical activity on brain mechanisms

Beta-amyloid (Aβ) is a protein that can impair neural communication when it accumulates in the brain and is considered the first pathological event in Alzheimer's disease. Participants who increased their physical activity to meet WHO-recommended levels showed **less beta-**

amyloid accumulation than those who remained sedentary or reduced their physical activity. Moreover, this effect appeared to be **dose-dependent**; the greater the increase in activity, the greater the reduction in amyloid burden.

Non-sedentary participants also showed a **greater cortical thickness in brain regions associated with Alzheimer's disease**. Cortical thickness in the medial temporal area is crucial for memory, so its thinning or atrophy (loss of volume) is an early sign of neurodegeneration.

"Even those who did less physical activity than recommended had greater cortical thickness than sedentary people, suggesting that any amount of exercise, no matter how minimal, has health benefits," explains **Müge Akıncı**.

More exercise as a prevention strategy

The research team looked at both the increase in physical activity and the adherence to WHO recommendations. They observed that **the benefits of physical activity appear to be related to increasing activity over time**, rather than reaching a specific activity threshold.

"These findings reinforce the importance of promoting physical activity in middle age as a public health strategy for Alzheimer's prevention," emphasises **Eider Arenaza-Urquijo**, ISGlobal researcher and lead investigator of the study. "Interventions aimed at promoting increased physical activity could be key to reducing the incidence of the disease in the future," she concludes.

Reference

Akinci, M., Aguilar-Dominguez, P., Palpatzis, E., Shekari, M., Garcia-Prat, M., Deulofeu, C., Fauria, K., Garcia-Aymerich, J., Domingo Gispert, J., Suarez-Calvet, M., Grau-Rivera, O., Sánchez-Benavides, G., & Arenaza-Urquijo, E. M. (2025). Physical activity changes during midlife link to brain integrity and amyloid burden. *Alzheimer's & Dementia: The Journal of the Alzheimer's Association*, 2025.

About ISGlobal

The Barcelona Institute for Global Health, ISGlobal, is the fruit of an innovative alliance between the "la Caixa" Foundation and academic and government institutions to contribute to the efforts undertaken by the international community to address the challenges in global health. ISGlobal is a consolidated hub of excellence in research that has grown out of work first started in the world of health care by the Hospital Clínic and the Hospital del Mar and in the academic sphere by the University of Barcelona and Pompeu Fabra University. Its working model is based on the generation of scientific knowledge through Research Programmes and Groups, and its translation through the areas of Training and Analysis and Global Development. ISGlobal has been named a Severo Ochoa Centre of Excellence and is a member of the CERCA system of the Generalitat de Catalunya.

Alzheimer's disease in numbers

It is currently estimated that Alzheimer's disease and neurodegenerative diseases affect 900,000 people, a figure that translates to one in ten of those over 65 years of age and a third of those over 85. These diseases are one of the main causes of mortality, disability, and dependency. If an effective cure is not found and life expectancy continues to increase, the number of cases worldwide could triple by 2050, exceeding one and a half million people in Spain alone, a situation that could lead to the collapse of healthcare and care systems.

About the Barcelonaβeta Brain Research Center and the Pasqual Maragall Foundation

The Barcelonaβeta Brain Research Center (BBRC) is the research centre of the Pasqual Maragall Foundation, supported by the "la Caixa" Foundation since its creation, dedicated to the prevention of Alzheimer's disease and the study of cognitive functions affected in healthy and pathological aging. BBRC research focuses on the preclinical phase of Alzheimer's disease, the period before the first symptoms appear, when changes in the brain associated with the disease already occur. The BBRC has more than 100 professionals dedicated to contributing to the forefront of research into Alzheimer's disease and other neurodegenerative diseases.

The Pasqual Maragall Foundation is a non-profit organization founded in April 2008 in response to the commitment made by Pasqual Maragall, former mayor of Barcelona and former president of the Generalitat de Catalunya, when he publicly announced that he had been diagnosed with Alzheimer's disease. The Foundation's mission is to promote research to prevent Alzheimer's disease and offer solutions that improve the quality of life of those affected and their families.

The Pasqual Maragall Foundation has the support of more than 93,000 members and of:

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