# Woman with Down syndrome shows resilience to Alzheimer’s despite typical biomarkers



A recent case study published in the journal Alzheimer’s & Dementia has brought new insights into the complexities of Alzheimer’s disease, documenting a woman with Down syndrome who exhibited all the typical biomarkers associated with the condition yet showed no outward symptoms during her life. The case has sparked interest among researchers in understanding the mechanisms behind cognitive resilience despite the presence of Alzheimer's pathology.

The woman, who was in her 60s, participated in the Alzheimer Biomarker Consortium – Down Syndrome Research Study for a decade before her death. People with Down syndrome are known to have a significantly higher risk of developing dementia, with estimates suggesting up to 90 percent may experience the condition in their lifetime. After her passing, her brain was donated for research and underwent detailed analysis. MRI scans revealed the presence of amyloid plaques and other indicators typically linked to Alzheimer's disease. However, contrary to expectations, she had maintained cognitive stability with no noticeable signs of dementia symptoms throughout her life.

Lead study author Jr-Jiun Jean Liou, PhD, a post-doctoral associate at the University of Pittsburgh, remarked on the unusual nature of the case, stating, “The woman had reached an age when most individuals with Down syndrome develop dementia symptoms, yet she remained cognitively stable.” Despite comprehensive cognitive and neuroimaging assessments as well as fluid biomarker tests, the precise reasons for her cognitive resilience remain unclear.

Several potential explanations were proposed by the research team. One possibility is the presence of the protective e2 allele of the APOE gene, a genetic variant known to be linked with a reduced risk of developing dementia. Additionally, the woman’s brain was larger than average, which may have provided a greater “brain reserve”, allowing her to accumulate more Alzheimer’s-related changes before any symptoms could manifest. Dr Liou also noted that her above-average education and associated lifestyle factors could have contributed to her resistance to cognitive decline.

Neurologist Clifford Segil, DO, from Providence Saint John’s Health Center in Santa Monica, California, who was consulted for expert commentary, highlighted the difference between disease markers and clinical symptoms. “Disease progression in the real world is very different than in a laboratory,” he said. He added, “I have seen patients with high amyloid burdens sharp as a tack and patients without any amyloid burden unable to tie their own shoes,” underscoring the complexity of Alzheimer’s pathology and challenging the amyloid hypothesis as a standalone explanation for memory loss and dementia.

The case underlines the variability in Alzheimer’s disease progression and suggests that the presence of amyloid proteins alone does not necessarily predict clinical dementia. Dr Liou emphasised that cases like this provide “valuable insights” into why individuals develop dementia symptoms at different ages and rates.

Additional observations have been made on gender differences in Alzheimer’s disease. Women are almost twice as likely to develop Alzheimer’s and dementia than men but also tend to show greater resilience to disease progression. “Alzheimer’s dementia often afflicts ladies [at an older age] than it does men and the reasons for this gender difference remains unclear,” explained Dr Segil. Women’s brains are also reported to be denser and to have a larger store of verbal material, factors that may delay the manifestation of symptoms by providing a greater cognitive reserve.

This case exemplifies the intricacies of Alzheimer’s disease and highlights the need for further research into genetic, physiological, and lifestyle factors that influence its progression. The findings encourage a broader perspective on how biomarkers relate to clinical symptoms and raise important considerations for future studies on the condition’s onset and development.

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## References

* <https://alz-journals.onlinelibrary.wiley.com/doi/10.1002/alz.14479> - This URL supports the case study of a woman with Down syndrome who showed no cognitive decline despite having Alzheimer's disease pathology, highlighting the discrepancy between neuropathological findings and cognitive function.
* <https://www.ucihealth.org/about-us/news/2025/03/down-syndrome-alzheimers-and-dementia> - This page details a case study co-led by UC Irvine neuroscientists about a woman with Down syndrome who remained cognitively stable despite physiological signs of Alzheimer’s disease, shedding light on why some individuals with Down syndrome do not experience dementia symptoms.
* <https://news.engineering.pitt.edu/an-unexpected-insight-into-alzheimers-disease/> - This article reports on a case study involving a woman with Down syndrome who maintained cognitive stability despite Alzheimer's disease pathology, suggesting genetic or lifestyle factors may contribute to resilience against dementia.
* <https://alz-journals.onlinelibrary.wiley.com/hub/journal/15525279/homepage/call-for-papers/alzheimers-and-down-syndrome> - This special issue of Alzheimer's & Dementia focuses on the relationship between Down syndrome and Alzheimer's disease, encouraging research that could benefit both conditions.
* <https://pmc.ncbi.nlm.nih.gov/articles/PMC6368451/> - This article discusses the link between Down syndrome and Alzheimer's disease, noting that people with Down syndrome have a high lifetime risk of developing dementia, typically in their fifth to sixth decade.