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Alzheimer's

Early blood test to predict dementia is step closer as biological markers identified

Scientists have found patterns of four proteins that predict onset of dementia more than a decade before formal diagnosis



Work is under way to develop and roll out simple blood tests to diagnose Alzheimer's, but even with swift diagnosis, challenges remain. Photograph: Science Photo Library/Alamy

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Researchers have taken a major step towards a blood test that can predict the risk of dementia more than a decade before the condition is formally diagnosed in patients.

Hopes for the test were raised after scientists discovered biological markers for the condition in blood samples collected from more than 50,000 healthy volunteers enrolled in the UK Biobank project.

Analysis of the blood identified patterns of four proteins that predicted the onset of dementia in general, and Alzheimer's disease and vascular dementia specifically, in older age.

When combined with more conventional risk factors such as age, sex, education and genetic susceptibility, the protein profiles allowed researchers to predict dementia with an estimated 90% accuracy nearly 15 years before people received clinical confirmation of the disease.

More than 55 million people live with dementia worldwide, a figure that is expected to reach 78 million by 2030. About 70% of all dementia is caused by Alzheimer's disease, with vascular dementia, caused by blood vessel damage, making up 20% of cases.

“We hope to develop this as a screening kit that can be used in the NHS,” said Prof Jianfeng Feng, who holds posts at the University of Warwick and Fudan University in China.

A flurry of recent studies have [demonstrated the potential for blood tests](#) to flag patients most likely to develop dementia. Armed with such information, doctors could determine which patients to fast-track for further assessments, including full diagnostic testing for Alzheimer’s.

Confirming the disease early is crucial if patients are to benefit from two new Alzheimer’s drugs, lecanemab and donanemab, which are under review by the UK medicines regulator. If licensed, the National Institute for [Health](#) and Care Excellence will look at the costs and benefits before deciding if they should be made available on the NHS.

The US medicines regulator, the Food and Drug Administration, has approved lecanemab and is expected to rule on donanemab imminently. European regulators are still reviewing both drugs.

Ever since lecanemab, a synthetic antibody therapy created by Biogen in the US and Eisai in Japan, made headlines in 2022 for slowing Alzheimer’s, doctors and medical charities have warned that the [health service is not ready to deliver such drugs](#).

For patients to receive lecanemab or donanemab, they would need to have early stage Alzheimer’s and a lumbar puncture or a PET scan to confirm the presence of amyloid protein in the brain. Toxic clumps of amyloid are one of the hallmarks of Alzheimer’s disease. But Alzheimer’s Research UK estimates that only 2% of eligible patients receive such testing.

Work is under way to develop and roll out [simple blood tests to diagnose Alzheimer’s](#), but even with swift diagnosis, challenges remain. The new drugs must be infused into patients every two weeks, and because of the potentially fatal side effects, patients need regular MRI scans to check for brain swelling or bleeding.

For the latest study, blood samples from 52,645 UK adults without dementia were collected and frozen between 2006 and 2010 and analysed 10 to 15 years later. More than 1,400 participants went on to develop dementia.

Using artificial intelligence, the researchers looked for connections between nearly 1,500 blood proteins and developing dementia years later. Writing in [Nature Aging](#), they describe how four proteins, Gfap, Nefl, Gdf15 and Ltbp2, were present in unusual levels among those who developed all-cause dementia, Alzheimer’s disease or vascular dementia.

Higher levels of the proteins were warning signs of disease. Inflammation in the brain can trigger cells called astrocytes to over-produce Gfap, a known biomarker for Alzheimer's. People with raised Gfap were more than twice as likely to develop dementia than those with lower levels.

Another blood protein, Nefl, is linked to nerve fibre damage, while higher than normal Gdf15 can occur after damage to the brain's blood vessels. Rising levels of Gfap and Ltbp2 was highly specific for dementia rather than other brain diseases, the scientists found, with changes occurring at least 10 years before people received a dementia diagnosis.

The researchers are speaking to companies to develop the test but said the cost, currently at several hundred pounds, would need to come down to make it viable.

Dr Sheona Scales, the director of research at Alzheimer's Research UK, said: "This new study adds to the growing body of evidence that looking at levels of certain proteins in the blood of healthy people could accurately predict dementia before symptoms develop."

Further studies are needed to understand how well such tests work in more diverse populations. Scales added: "Even when tests show promise in studies like this, they still need to go through regulatory approval before they can be used in a health care setting.

"Blood tests are showing great promise, but so far, none have been validated for use in the UK. In collaboration with Alzheimer's Society, NIHR, and with generous funding from players of People's Postcode Lottery, we are in the process of funding research to provide the evidence the NHS would need to move forward with blood tests to diagnose Alzheimer's disease."

Prof Sir Stephen Powis, the NHS national medical director, said the NHS was "doing everything possible to prepare for the arrival of new treatments for Alzheimer's disease once they are deemed safe and approved for use".

He added: "The pandemic had a significant impact on the dementia diagnosis rate but thanks to NHS staff, who have worked hard to recover services, dementia diagnosis rates are the highest they have been for three years."

<https://www.theguardian.com/society/2024/feb/12/early-blood-test-to-predict-dementia-is-step-closer-as-biological-markers-identified>