


A microscopic image showing a network of blue, branching amyloid fibrils against a dark background. Several bright yellow, tangled clusters of fibrils are visible, particularly on the left side. White diagonal lines cross the image, creating a sense of depth and structure.

Early Detection Of **ALZHEIMER'S BIOMARKERS**

Using Shimadzu's Low-Cost,
Blood-Based Amyloid
Mass Spectrometry Service



Up until now, researchers and pharmaceutical companies have had limited options for determining Alzheimer's biomarkers. That's why Shimadzu developed an exciting new, research use only, blood-based analysis method for ***rapid, early screening of Alzheimer's amyloid deposits in the brain.***

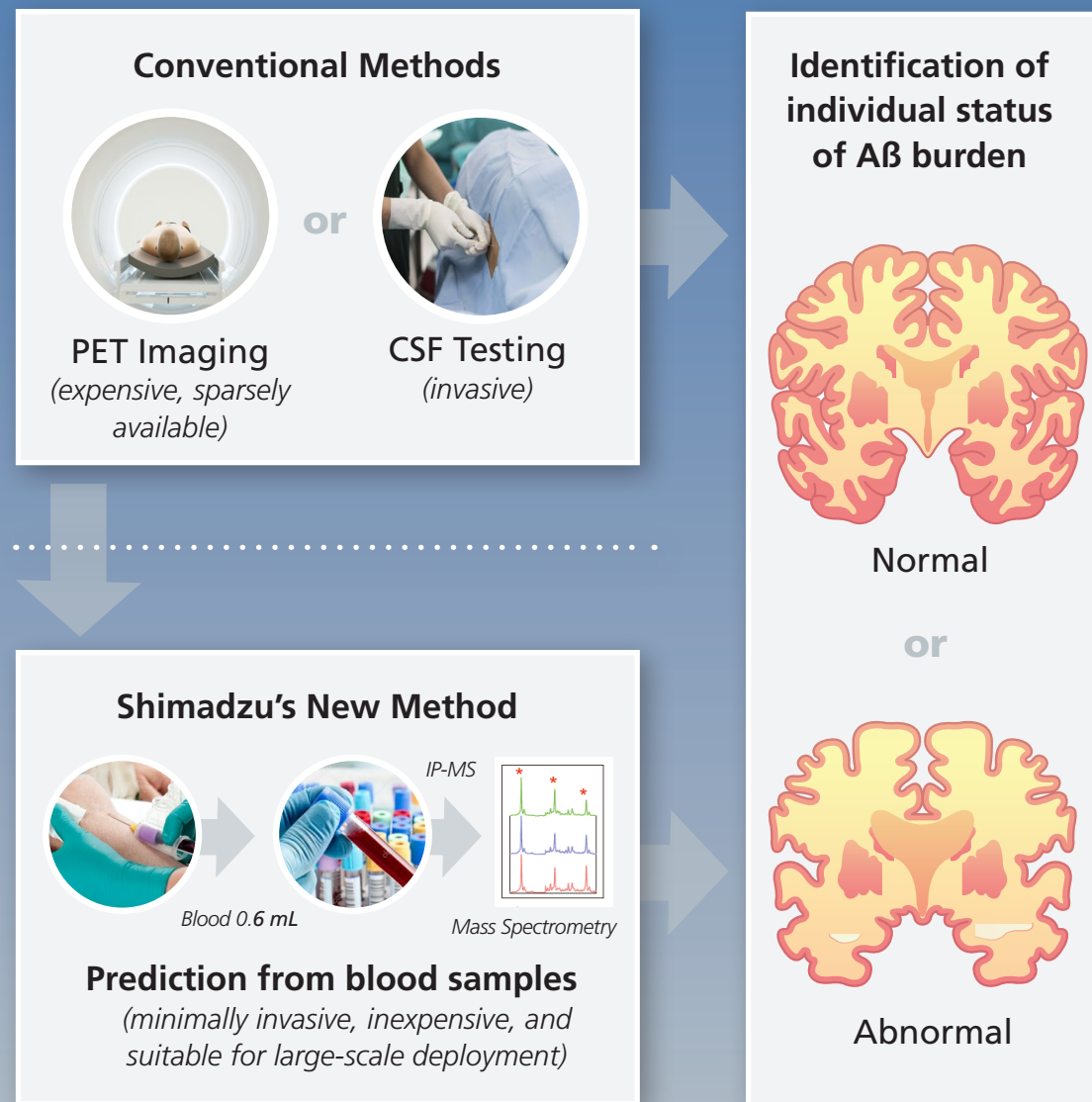


The earliest indicator of Alzheimer's is amyloid-beta deposition in the brain, which can occur more than **20 years before memory loss** or other symptoms appear. Up until recently, there was no easy way to detect the presence of amyloid deposits in a person's brain. The only reliable methods available were positron emission tomography (PET) imaging and cerebrospinal fluid (CSF) testing. However, PET brain scans are time-consuming and expensive, and CSF is collected by lumbar puncture, which is painful and invasive.

Shimadzu recently developed Amyloid Mass Spectrometry (MS) Service — a new simple, low-cost **blood analysis for early screening** of amyloid-positive subjects. This method enables early and accurate prediction of amyloid deposition in the brain with an easy-to-acquire blood sample. Unlike conventional methods, Shimadzu's new analysis is minimally invasive, cost-effective and suitable for large-scale deployment.

It's the only blood analysis capable of detecting abnormal amyloid-beta deposition in the brain with high accuracy.

Shimadzu's Amyloid MS Service offers unique benefits over conventional testing methods.





Compared to currently
available methods...

Shimadzu's Amyloid MS™ Service offers

- Reduced costs per test
- A less invasive blood-based sampling technique
- Low sample volume requirements (0.6 mL)



Successful Blinded Validation of Blood-Based Biomarkers

These new blood-based biomarkers were discovered in 2014 by Shimadzu Corporation and the Japanese National Center for Geriatrics and Gerontology (NCGG).

To assess the accuracy of these biomarkers, a study was conducted in collaboration with the Australian Imaging Biomarkers and Lifestyle Study of Ageing (AIBL) and other groups. The study used blood samples from 121 patients in Japan and 252 in Australia with varying degrees of health, ranging from healthy to mild cognitive impairments to Alzheimer's disease.

New Technique Offers High Sensitivity and Accuracy

The blood analysis works using a combination of immunoprecipitation and MALDI-TOF mass spectrometry (IP-MS). This technique was first established by a team of scientists including Shimadzu's Koichi Tanaka, who was awarded the Nobel Prize in Chemistry in 2002 for developing a method for mass spectrometric analysis of biological macromolecules.

Receiver operating characteristic (ROC) analysis showed a high area under the curve (AUC) for the composite biomarkers in both datasets, as shown in Figure 1. Results showed a significant correlation between the biomarkers and the amyloid deposits determined by PET imaging (see Figure 2 for more details). The biomarkers predicted individual brain amyloid-positive or -negative with 90.9% accuracy in the NCGG dataset and 88.3% in the AIBL dataset. For individuals in the preclinical stage of Alzheimer's, the test was able to detect amyloid deposits with high accuracy.

This study was the **first successful blinded validation of blood-based biomarkers** that used two independent large datasets from two different countries. It not only demonstrated the high accuracy of the blood analysis, but also the reliability and reproducibility. The findings show that Shimadzu's Amyloid MS Service can be used to predict early signs of Alzheimer's disease in people with no obvious symptoms such as memory loss.

The results showed a significant correlation between the biomarkers and conventional testing methods.

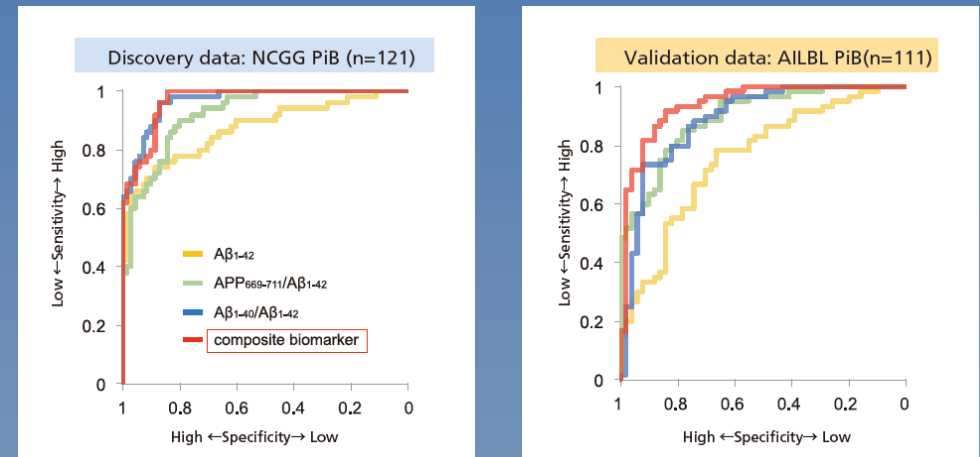


Figure 1: ROC Curves

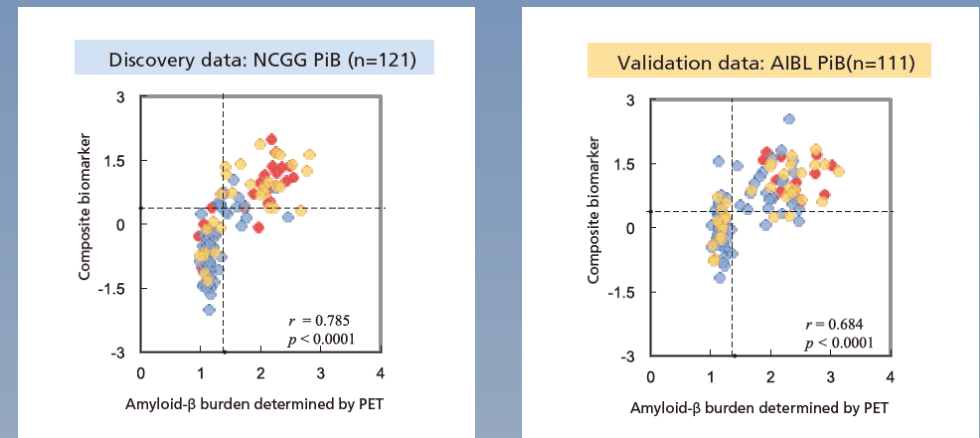
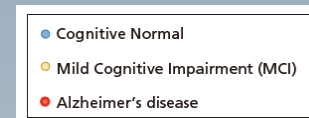


Figure 2: Correlation Between Marker Values and Amyloid Deposition Quantities



Nature article, "High Performance Plasma Amyloid-β Biomarkers for Alzheimer's Disease"



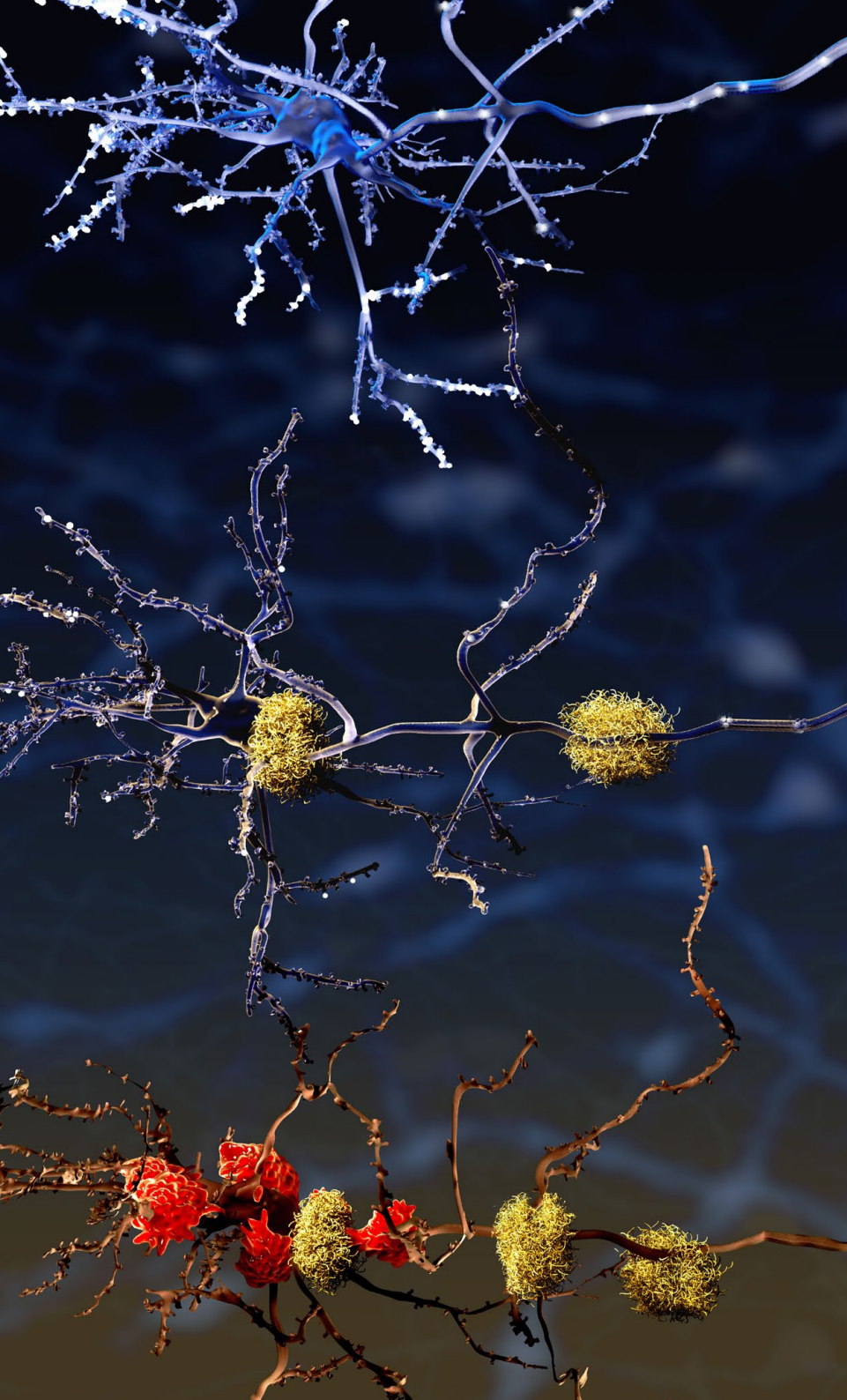
A Major Step Forward for Advancements in Drug Discovery

These findings have important implications for the early prediction of Alzheimer's disease, the development of new treatments and the recruitment of patients in clinical trials.

Shimadzu's Amyloid MS Service will contribute substantially to the development of therapeutic and preventive drugs for Alzheimer's. While the screening test can't diagnose Alzheimer's, it is useful for identifying suitable candidates for drug trials, thereby opening the door to new advancements in drug discovery.

Shimadzu is currently ***the only company in the world*** to offer this unique, critical service. Companies worldwide can ship their samples to Shimadzu for early prediction of amyloid-beta deposits. Shimadzu will analyze the blood samples and send a detailed report with all findings in a PDF file and Excel spreadsheet.





Shimadzu Corporation is equipped to handle your large-volume orders. We have the resources and expertise necessary to analyze any number of samples.

Shimadzu has built an efficient process for analyzing samples:

1. Samples are collected and shipped to Shimadzu.
2. Shimadzu analyzes the samples.
3. Shimadzu sends a detailed report via electronic format.

Final Thoughts

Shimadzu's Amyloid MS Service could help speed up and reduce the costs of developing new Alzheimer's treatments. It offers reliable, cost-effective and less invasive biomarkers for large-scale screening of Alzheimer's.



For more information, visit
www.AmyloidMS.com

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Amyloid MS Service is for drug discovery and development only.***