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Bringing clarity to Alzheimer's disease assessment

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The prevalence of Alzheimer's disease, the most common form of dementia, is expected to grow significantly in the coming years – from 57 million cases today to more than 150 million cases worldwide by 2050.[1] The advent of new disease modifying therapies marks a milestone in the management of Alzheimer's disease while also heightening the importance of early diagnosis and quantification methods to monitor suitability for treatment, drug efficacy, and potential side effects.

By using objective measures such as Centiloid scoring and tau PET quantification, clinicians can offer effective, personalized treatment plans. This approach can improve patient outcomes and advance Alzheimer's research by providing reliable data for evaluating new treatments.

This whitepaper highlights how the amyloid and tau PET quantification tools in *syngo*.MI Neurology Cortical Analysis can bring new levels of precision and reliability to the assessment and treatment of Alzheimer's disease.

[1] *https://www.alzheimersresearchuk.org/news/worldwide-dementia-cases-to-triple-by-2050-to-over-150-million*

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The benefits of Centiloid scoring and tau PET quantification

Alzheimer's disease is characterized by the accumulation of beta-amyloid plaques and tau protein tangles in the brain, which contribute to neurodegeneration and cognitive decline. Centiloid scoring standardizes the quantification of beta-amyloid plaques across three commercially available PET radiopharmaceuticals (18F-florbetapir, 18F-florbetaben, and 18F-flutemetamol). This standardization supports clinical decision-making by enabling direct comparison of amyloid burden across studies and clinical settings, regardless of which PET tracer is used.

"Due to the recent Siemens Healthineers *syngo*.via upgrade, we are now able to include the highly desired Centiloid score for all PET/CT amyloid exams," says Steven Wozniak, Associate Director of Molecular Imaging and Theranostics at 210 PET Imaging, a joint venture between Raleigh Radiology and WakeMed Health and Hospitals in North Carolina, USA.
"We are pleased to offer this valuable piece of information to our referring physicians to help improve patient outcomes."

tau PET is an advanced imaging technique that measures the distribution and density of tau protein tangles in the brain using different PET radiotracers, of which 18F-flortaucipir, also known as T807 and 18F-AV1451, is currently

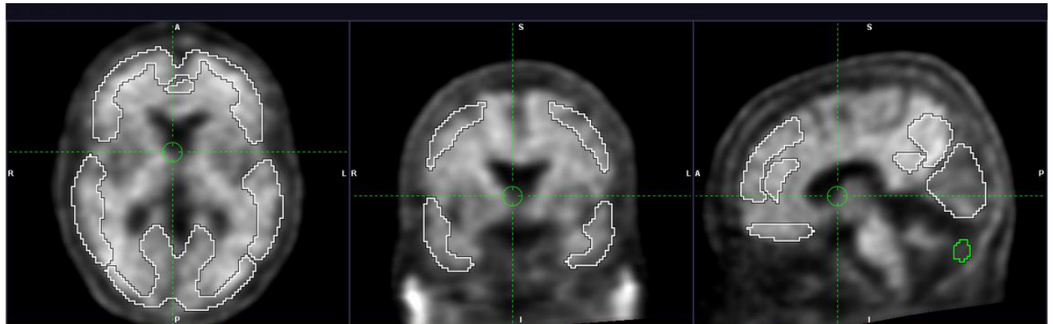


Figure 1: Example of a positive florbetaben scan of an elderly patient diagnosed with AD, processed with *syngo*.MI Neurology Cortical Analysis. Increased uptake in the parietal lobe and in the anterior and posterior cingulate gyri with a composite cortex-to-cerebellar gray SUVR of 2.10 and a corresponding Centiloid value of 127.3. Image courtesy of GAAIN.[2]

[2] *Data courtesy of Avid Radiopharmaceuticals, Philadelphia, Pennsylvania, USA.*

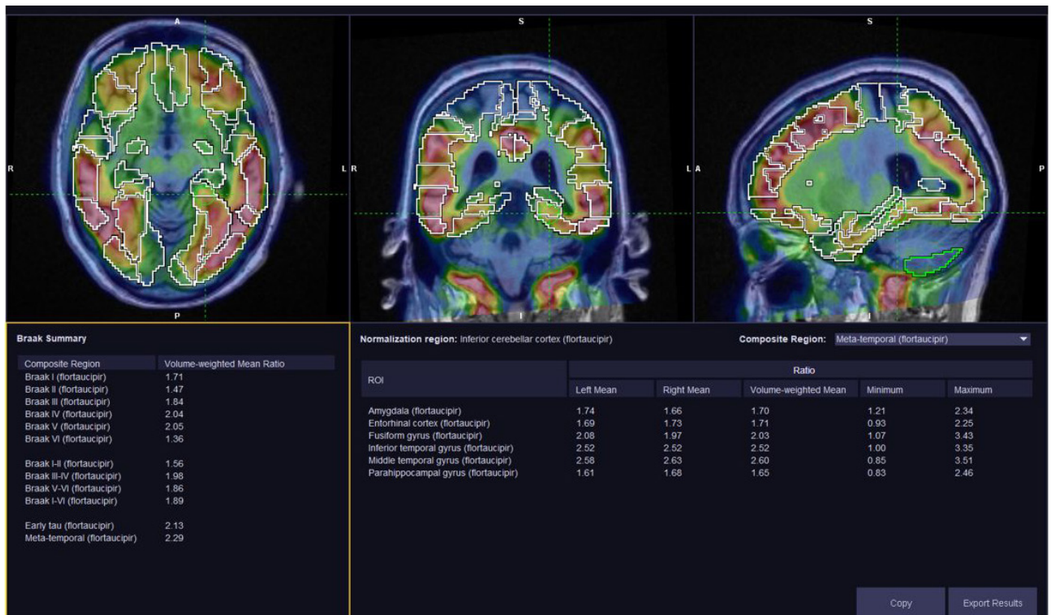


Figure 2: A 54-year-old A+ / T+ (per visual reads) female with Alzheimer's disease. Increased flortaucipir uptake in all major lobes including the frontal and occipital lobes where tau accumulates at later stages of the disease. High SUVR at all Braak regions with Braak I-VI SUVR = 1.83 and the SUVR for the temporal meta region equal to 2.21. Data from the A05 trial courtesy of Eli Lilly.[3]

the only ligand approved for clinical use by the FDA. Quantification of flortaucipir images is integrated within the *syngo*.MI Neurology Cortical Analysis workflow based on the Braak staging system, which correlates tau pathology with cognitive impairment through a six-stage framework.

Visual interpretation of both amyloid and tau PET scans remains the standard interpretation approach, but quantification helps resolve borderline and ambiguous cases and supports the evaluation of pathology burden for therapeutic decision-making.

Improving diagnostic confidence

Alzheimer's disease is frequently misdiagnosed due to both false positives and false negatives. One widely cited study found that more than one in five cases were misdiagnosed.[4]

syngo.via's new quantitative tools provide an additional layer of diagnostic confidence by enabling standardized Centiloid measurements that support early diagnosis and the timely initiation of treatment. Early diagnosis is particularly important for determining eligibility for treatment with anti-amyloid drugs, which target the early stages of the disease and are not indicated for advanced dementia patients.

Confirmation of beta-amyloid plaques is required for patients to be eligible for treatment with the disease modifying therapies Leqembi and Kisluna. This can be accomplished through an amyloid PET scan or through laboratory analysis of cerebrospinal fluid (CSF), although PET/CT is typically preferred by both patients and neurologists because it is less invasive and generates quantitative data.

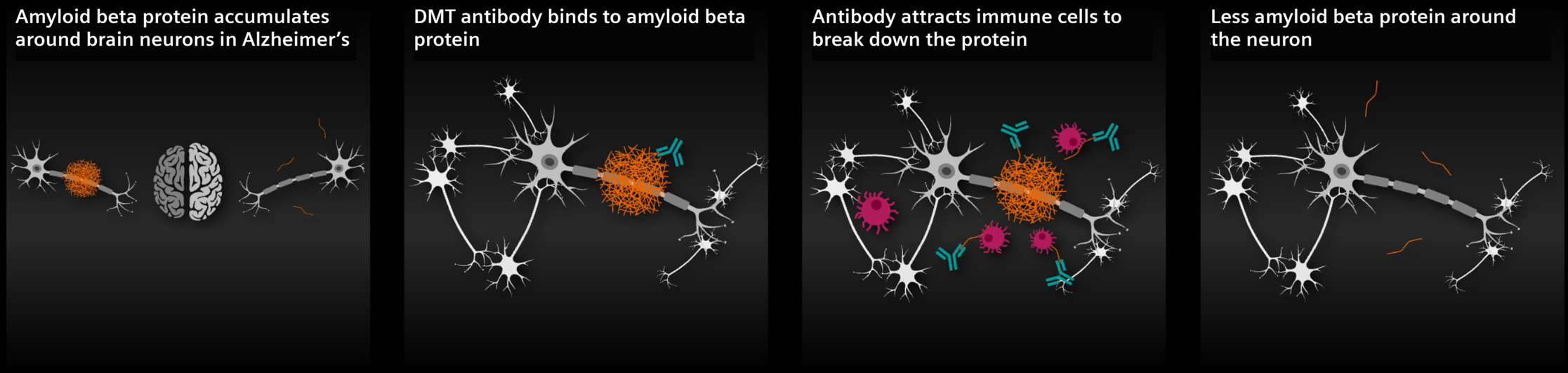
Beyond confirmation of therapy eligibility, tau PET supports the identification of individuals who are most likely to respond to disease-modifying therapies, a capability that will further strengthen as the temporal interplay between tau deposition, neurodegenerative processes, and cognitive decline is elucidated.

↗ **Source**

[3] *Data courtesy of Rome Imaging Center, Rome, Georgia, USA.*

[4] *https://alz-journals.onlinelibrary.wiley.com/doi/full/10.1016/j.jalz.2016.06.529*

How Disease Modifying Therapies works



Improving treatment planning and drug efficacy monitoring

In addition to supporting diagnostic confidence, the improved longitudinal monitoring of neurodegenerative conditions through quantitative comparison of exams over time allows for more personalized and precise treatment planning using well-established imaging biomarkers combined with other non-imaging, laboratory biomarkers, such as CSF.

Quantification methods provide objective measures that allow practitioners to track changes in brain pathology and assess treatment impact while also minimizing the potential for adverse effects by informing decisions about when to discontinue treatment.

"Neurologists are very interested in Centiloid scoring," Wozniak says. "This quantitative value helps support the radiologists' findings and is also used to monitor treatment response. It's a highly valued piece of data that was not previously available to us before the recent *syngo*.via upgrade."

Standardizing best practices

In January 2025, the Society of Nuclear Medicine and Molecular Imaging (SNMMI) and the Alzheimer's Association released updated Appropriate Use Criteria (AUC) for amyloid and tau PET imaging in patients with mild cognitive impairment, Alzheimer's disease, and other dementias. The updated criteria expand PET imaging guidance to include tau PET and provide specific guidance to enhance diagnostic precision, treatment decisions, and patient care.[5] It also emphasizes that amyloid PET is more sensitive for identifying early Alzheimer's pathology, while the accumulation of tau protein more closely follows the clinical progression of dementia.

By offering a detailed view of disease pathology, tau PET significantly enhances Alzheimer's disease staging beyond conventional clinical classifications including cognitively unimpaired, MCI, and AD.

↗ **Source**

Amyloid and tau PET quantification can now be more readily provided and standardized, with the automatic quantitative output in the post-processing step included in the final physician report. Given the high burden of proof required for payor coverage of biomarker imaging for initial diagnosis and monitoring, access to automated, quantifiable, standardized measures has the potential to ease the burden of proof for payor coverage of initial diagnosis as well as the ongoing monitoring of patients.

Patient benefits

Advancements in amyloid and tau PET imaging and quantification support more timely and confident care decisions. They also enable more personalized treatment plans for patients.

The quantification tools that *syngo*.MI Neurology Cortical Analysis bring to PET data is particularly beneficial for less experienced readers and facilities that have *syngo*.via but lack subspecialized expertise in neurodegenerative imaging. Patients can receive more accurate diagnoses and more timely treatments without needing to travel extensively to major hospitals, where wait times for specialized imaging are long. Quantification also promotes patient engagement and facilitates communication by allowing patients and their families to better understand the severity of their condition.

Committed to continuous innovation

syngo.via's algorithms continuously evolve, with each release improving accuracy through optimization of image processing pipelines as well as testing and validation on new datasets. Siemens Healthineers remains committed to advancing responsible tool and algorithm training by partnering with our customers and the informatics community. We leverage one of the largest, most anatomically diverse medical imaging datasets in the world to enhance disease detection, diagnosis, and treatment.

Alzheimer's disease and neurology represent just one clinical application of these algorithms. *syngo*.via for MI extends its support for physicians across multiple specialties, from cardiology to oncology, and beyond.

Contact your Siemens Healthineers representative to get more information how you can upgrade your *syngo*.via system to the lastest software version with *syngo*.MI Neurology Cortical Analysis.

[5] *https://snmmi.org/Web/Clinical-Practice/Appropriate-Use-Criteria/Articles/Updated-Appropriate-Use-Criteria-for-Amyloid-and-Tau-PET*

Learn more about syngo.via for MI at:
↗ ***syngo*.via for MI – Siemens Healthineers USA**

Learn more about beta-amyloid PET/CT imaging for Alzheimer's disease at:
↗ **Beta-amyloid PET/CT imaging for Alzheimer's disease – Siemens Healthineers USA**

syngo.via solutions consist of a broad variety of software options, which are medical devices in their own right.

syngo.via solutions-based software options are not commercially available in all countries. Due to regulatory reasons, their future availability cannot be guaranteed. Please contact your local Siemens Healthineers organization for further details.

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customer's unique setting. Because there is no "typical" hospital or laboratory and many variables exist (e.g., hospital size, samples mix, case mix, level of IT and/or automation adoption) there can be no guarantee that other customers will achieve the same results.

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