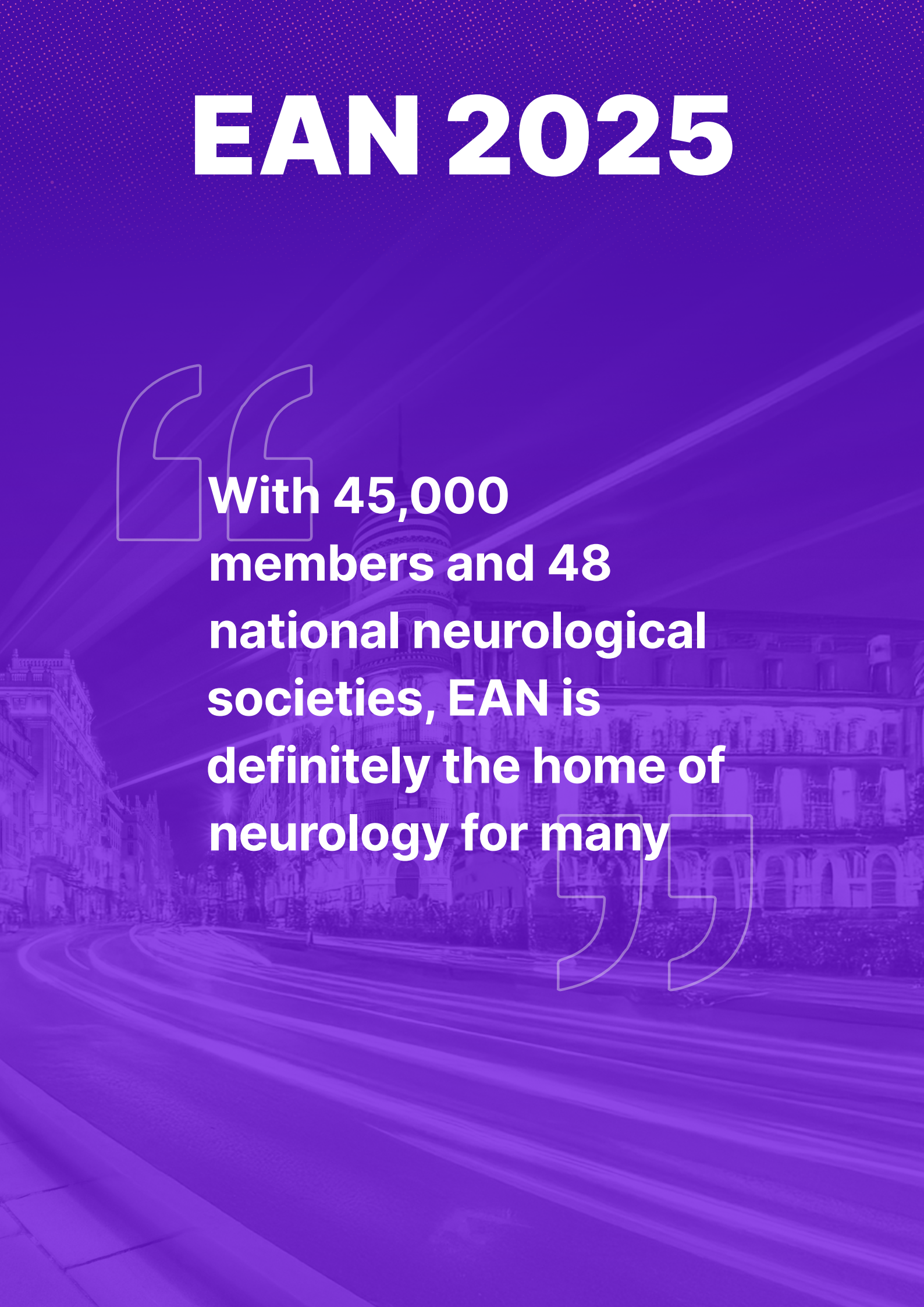
EAN 2025



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Congress Review

Review of the 11th Congress of the European Academy of Neurology (EAN)

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THE SUMMER solstice this year was celebrated by many neurologists in the charming city of Helsinki, Finland, as they came together for the 11th Congress of the European Academy of Neurology (EAN). Specifically, 6,383 onsite and 1,983 virtual participants from 113 different countries spent the weekend learning, networking, and discussing new ideas.

With the early sunrises and the late sunsets, the atmosphere at this year's congress was particularly warm, and felt appropriate for the overarching theme of 'Neurology in Society', as many locals spent the weekend enjoying Midsummer festivities. On the longest day of the year, Saturday 21st June 2025, EAN President Elena Moro welcomed attendees, and highlighted her 10-year journey with EAN. Moro then delved into the 4-year strategic plan that EAN began in 2024. This strategy, aimed at enhancing EAN's mission to be the home of neurology, focuses on six areas: communication, advocacy, education, membership, research, and congress, which is the glue between all domains. With 45,000 members and 48 national neurological societies, EAN is definitely the home of neurology for many.

Moro then highlighted some of the incoming challenges for neurology in Europe. The shortage of neurology residents, the introduction of new expensive therapies, and the impact of climate change are among some of the key needs to be addressed. However, some challenges offer opportunities for innovation, with the 'challenge' of AI and the role of interventional neurology. Based on these challenges, the EAN strategic plan addresses the top seven priorities for neurology within the next 10 years.

For this year's congress, the theme of 'Neurology within society' explored how society impacts the progress, priorities, and relevance of neurology, and, conversely, how neurology influences decisions and developments in society. Sessions related to this theme were woven throughout the programme, including tailored workshops and symposia.

One ongoing EAN initiative that investigates the neurological impact on society is the Cost of Illness in Neurology in Europe (COIN-EU) project. Moro explained that this project assesses the burden of neurological diseases in Europe. She revealed that in Europe, the total annual cost of neurological disorders is 1,668,000,000,000 EUR, largely due to the cost of dementia (13.07%), sleep disorders (24.97%), and headache disorders (48.09%).[1]

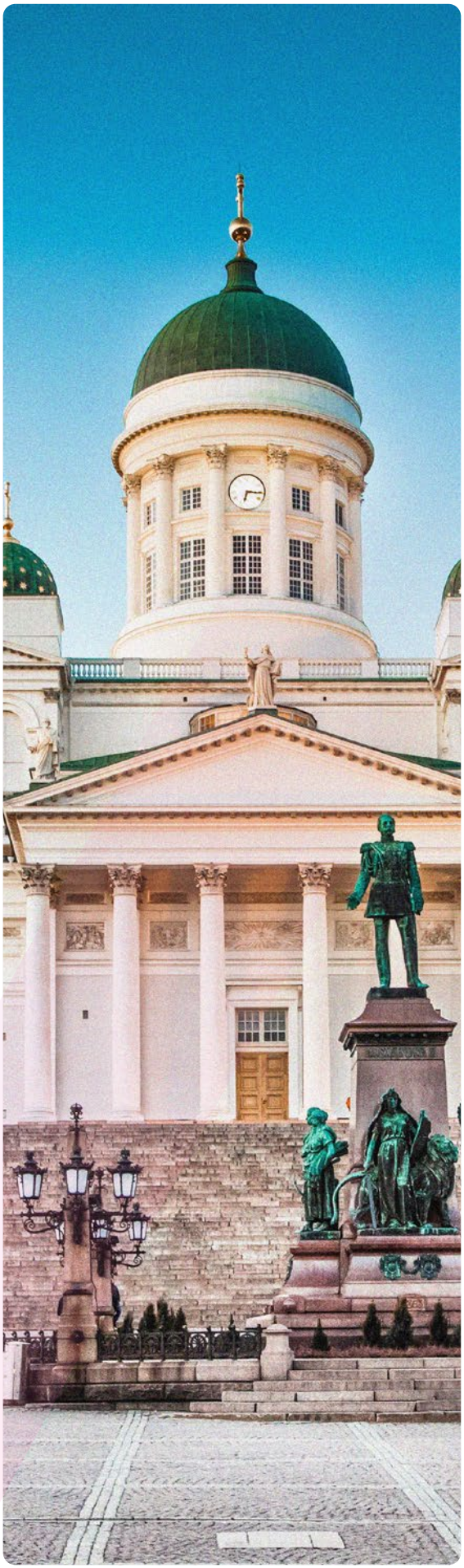
Another initiative spotlighted during the Opening Session was the EAN Scientific and Coordinating Panel project, which Moro described as the 'scientific backbone' of

EAN. This project led to the development of the EAN Panel Yearbook, which highlights the most important advances in neurology, according to members of 23 scientific panels across various subspecialities of neurology.

Excitingly, Moro announced the launch of a new project: the EAN Neuro-DEI Digital Hub. This Hub will provide resources, insights, and collaborative efforts to advance diversity, equity, and inclusion in neurology. This includes content such as webinars and research papers on the sex and gender balance in clinical trials, the work of the Women's Brain Project, and gender differences in common neurological disorders. On a similar note, Moro revealed another new initiative to celebrate women in neurology with the Anita Harding Award Lecture, held during the Presidential Symposium. This lecture aimed to spotlight progress in gender equality within neurology and encourage continued advancement for young female neurologists and neuroscientists.

The inspiring Opening Session ended with an opening lecture given by Sir John Hardy, Chair of the Molecular Biology of Neurological Disease, Neurodegenerative Diseases, UCL Queen Square Institute of Neurology, London, UK, whose team was responsible for uncovering the first mutation directly implicated in Alzheimer's disease, leading to the highly influential 'amyloid-cascade' hypothesis. Hardy's opening lecture, 'Neurodegeneration. From genetics to pathogenesis to the beginning of mechanistic therapies', spotlighted pioneering research in Alzheimer's and certainly set the tone for the exciting congress ahead.

Read on for key insights into this year's congress, and don't miss our coverage of EAN Congress 2026, which will be held in Geneva, Switzerland, with the overarching theme 'Brains, Bytes & Beyond: Tech in Neurology'.



Nightmares Identified as Major Risk Factor for Early Death and Faster Ageing

FREQUENT nightmares are linked to accelerated biological ageing and a three-fold increase in the risk of premature death, according to new research presented at the EAN Congress 2025.[2]

Biological ageing explained **39%** of the association between nightmares and premature mortality

In this study, data were analysed from 4,196 adults aged 26–74 years, drawn from four large population-based cohort studies in the USA. Nightmare frequency was self-reported at the start of the study, and participants were followed for up to 18 years. Premature death was defined as dying before the age of 75, and biological ageing was measured at baseline using a composite of three epigenetic clocks, which estimate the rate of molecular ageing in the body. During the follow-up period, 227 premature deaths were recorded. The analysis revealed a clear linear association between nightmare frequency and risk of early death ($p<0.001$). Adults who reported weekly nightmares had nearly three times the risk of dying prematurely compared to those who never experienced nightmares (adjusted hazard ratio: 2.73; $p<0.001$). Additionally, those with more frequent nightmares demonstrated significantly faster rates of biological ageing ($p<0.001$). Mediation analysis also showed that accelerated biological ageing explained 39% of the association between nightmares and premature mortality, suggesting that the stress and sleep disruption caused by nightmares may directly impact cellular ageing.

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These findings highlight nightmares as a significant risk factor for both accelerated ageing and early death in the general population. Addressing nightmares, whether through psychological therapies, sleep hygiene education, or treatment of underlying anxiety, could promote healthy ageing and reduce mortality risk.

Glucagon-Like Peptide-1 Receptor Agonists Show Promise in Reducing Migraine Burden

A NEW study offers hope for people living with chronic migraine, revealing that glucagon-like peptide-1 receptor agonists (GLP-1 RA) may significantly reduce the frequency and impact of migraine attacks. The findings, presented at the EAN Congress 2025, explore a novel approach targeting intracranial pressure regulation rather than traditional pain pathways.[3]

Researchers at the Headache Centre of the University of Naples Federico II, Italy, administered daily subcutaneous liraglutide (1.2 mg) to 26 patients with obesity and chronic migraine over a 12-week period. Participants did not exhibit signs of idiopathic intracranial hypertension, ensuring the results reflected migraine-specific effects. Headache frequency and disability were tracked using patient diaries and Migraine Disability Assessment (MIDAS) scores, with weight change and tolerability monitored as secondary measures.

Over the course of treatment, patients experienced a marked reduction in headache days, falling from an average of 20 days per month to just under 9 days. This was accompanied by a significant drop in MIDAS scores, indicating improved daily functioning and reduced disruption from migraine. While patients showed a slight reduction in BMI, this was not statistically significant, and further analysis confirmed that headache improvements were unrelated to weight loss. Mild gastrointestinal side effects were reported in a minority of cases but did not necessitate discontinuing treatment.

These results suggest that GLP-1 RAs may ease migraines by modulating cerebrospinal fluid dynamics and reducing intracranial pressure, offering an entirely new treatment angle. As the effect appears independent of weight reduction, this supports the hypothesis that intracranial pressure, even within the upper normal range, may contribute to migraine pathophysiology.

Although this was a small pilot study, the clinical benefits were clear and the treatment was well-tolerated, pointing to the potential for GLP-1 RAs to play a future role in migraine management. Larger, controlled trials will be essential to validate these findings and determine long-term outcomes.

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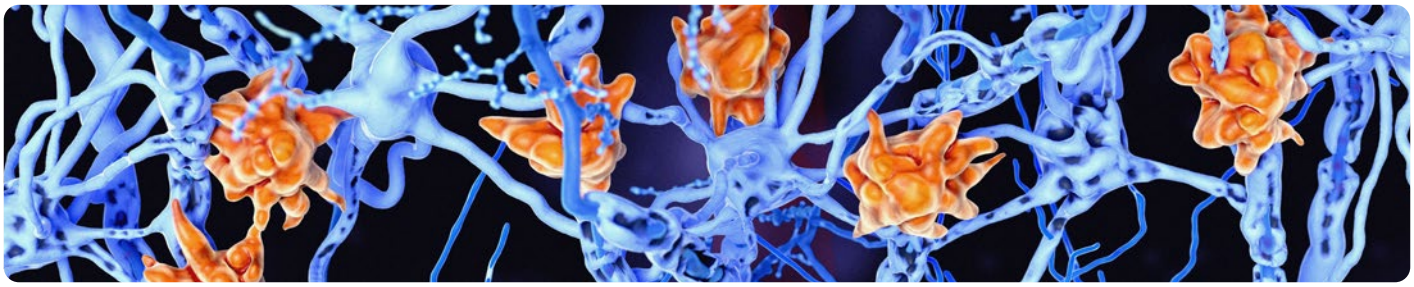


Temporal Dynamics of Serum Neurofilament Light Chain Offer Insight for Multiple Sclerosis Monitoring

SERUM neurofilament light chain (sNfL), a blood biomarker reflecting neuroaxonal injury, has emerged as a promising tool for monitoring multiple sclerosis (MS) disease activity. While previous research has linked elevated sNfL levels with evidence of disease activity, its timing in relation to relapses and how it might best inform clinical decisions remains unclear. A new retrospective study presented at the EAN Congress 2025 provided detailed insights into the temporal behaviour of sNfL around relapses, with key findings highlighting that sNfL levels can remain elevated for up to 9 months following a relapse.[4]

The study analysed data from 162 people with MS, with an average age of 32.5 years and a median disease duration of just over 2 years. Participants had a median of seven serum samples collected across a median follow-up period of 10.4 years. sNfL concentrations were measured using Simoa HD-X technology (Quanterix, Billerica, Massachusetts, USA) and normalised using Z-scores to adjust for age and BMI. Gadolinium-enhanced MRI scans were used to detect radiological activity. Evidence of disease activity was defined as the occurrence of clinical relapses, confirmed disability progression (via Expanded Disability Status Scale [EDSS]), or radiological findings within 6 months of sample collection.

Statistical analysis revealed that sNfL Z-scores were significantly higher in patients who experienced disease activity within 1 year of sampling, but only when the samples were taken during clinical remission ($p<0.001$). Importantly, sNfL levels did not predict activity beyond this 1-year time frame. Further analysis around the timing of clinical relapses showed that sNfL rose sharply at relapse onset ($p<0.001$), with levels remaining elevated for up to 9 months thereafter.

These findings underscore the relevance of sNfL as a short-term indicator of MS disease activity, particularly in identifying patients at risk during periods of apparent remission. However, the study also highlights limitations, including its retrospective nature, which may not fully reflect real-time clinical settings. For clinical practice, careful timing of sNfL measurement is essential. Elevated levels post-relapse may reflect recent activity rather than future risk, so interpretation must consider recent clinical history. Incorporating sNfL testing into routine MS management could support earlier interventions, but clinicians must remain aware of its temporal constraints.

> **“sNfL Z-scores were significantly higher in patients who experienced disease activity within 1 year of sampling”**

Sleep Patterns Linked to Risk of Brain and Mental Health Conditions

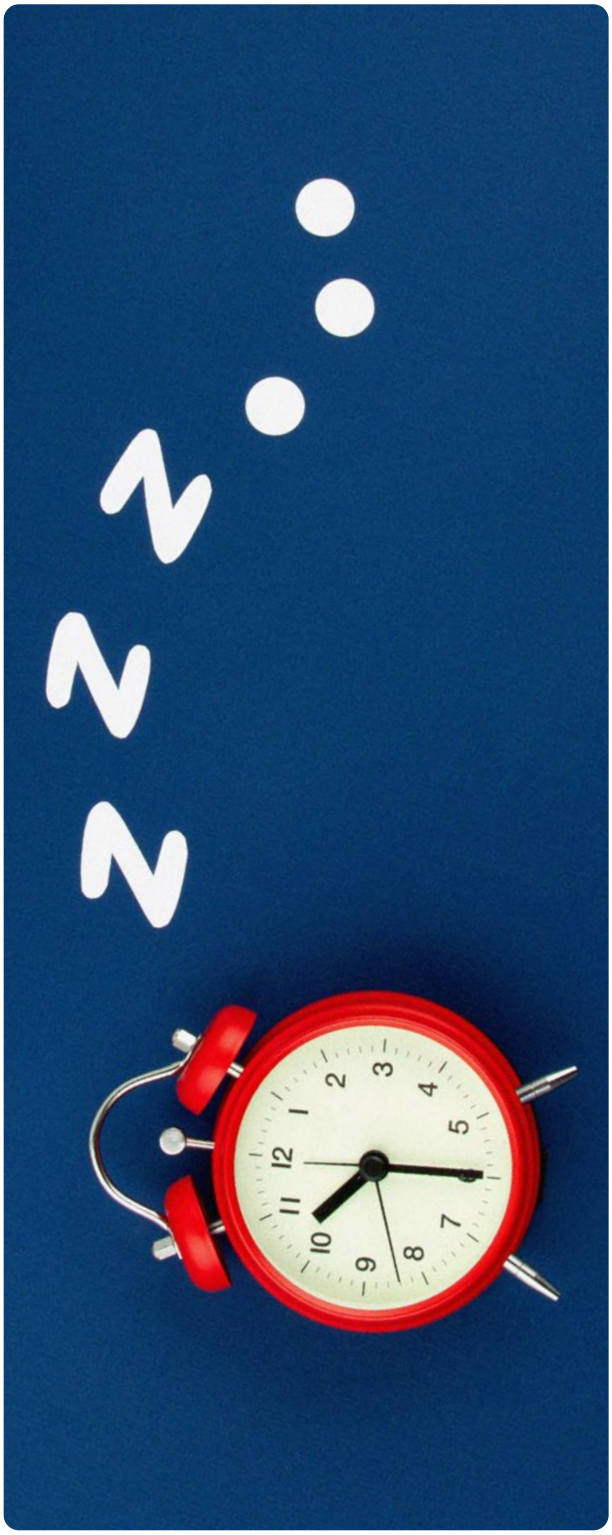
A MAJOR study from the Bernese Sleep-Wake Registry has identified significant links between sleep traits and the development of chronic health conditions, suggesting that sleep monitoring could become an important tool in preventive healthcare.[5]

Researchers analysed data from 4,170 participants (63% male), using overnight polysomnography and measures of heart rate variability (HRV) to examine associations between sleep characteristics and 36 incident comorbidities. Participants were followed for a total of 13,217 person-years.

The study found that conventional sleep structure, or macroarchitecture, had limited associations with new health conditions. Sleep-disordered breathing was the exception, showing clear links to cardiovascular, endocrine, and metabolic diseases. In contrast, HRV, a measure of autonomic nervous system function, was strongly associated with multiple comorbidities.

Neurological conditions, including stroke, were linked to higher and more complex HRV patterns. On the other hand, psychiatric disorders, mainly depression, were associated with lower HRV, reduced complexity, and signs of diminished parasympathetic activity. Metabolic conditions were related to increased HRV, particularly with a dominant very low-frequency component.

The study supports growing evidence that sleep plays a key role in healthy ageing. Looking to the future, the researchers will further explore the link between health outcomes and sleep microarchitecture.



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Insulin Resistance Predicts Faster Cognitive Decline in Alzheimer's Disease

A RECENT study, presented at the EAN Congress 2025, investigated the role of insulin resistance as a marker for progression in Alzheimer's disease (AD).[6]

Researchers conducted a retrospective analysis over 10 years, examining 315 non-diabetic patients diagnosed with either AD or other neurodegenerative diseases (NDD) based on cerebrospinal fluid (CSF) biomarkers. Patients were stratified into three groups according to their triglyceride-glucose (TyG) index, a measure of insulin resistance: low, medium, and high. Baseline clinical features, CSF biomarkers, and disease progression were compared across these groups.

Among the 210 patients with AD, those with a high TyG index showed worse blood–brain barrier markers and a notable interaction with the apolipoprotein E (APOE) ε4ε4 genotype, although this was not observed in the NDD group. Despite similar baseline characteristics such as sex, education, APOE genotype, and CSF biomarkers, patients with AD and high insulin resistance also had more cardiovascular risk factors.

Importantly, in the subgroup of patients with mild cognitive impairment due to AD, a high TyG index was strongly associated with faster cognitive decline over 3 years. This association did not reach statistical significance for progression from mild cognitive impairment to dementia, though a similar trend was noted. No significant effect of insulin resistance on disease progression was found in the NDD group.

The findings suggest that insulin resistance may serve as a useful predictor of cognitive decline in early AD. Identifying patients with high insulin resistance could improve risk stratification and inform early intervention strategies aimed at slowing disease progression.

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AI Model Improves Accuracy in Polyneuropathy Diagnosis

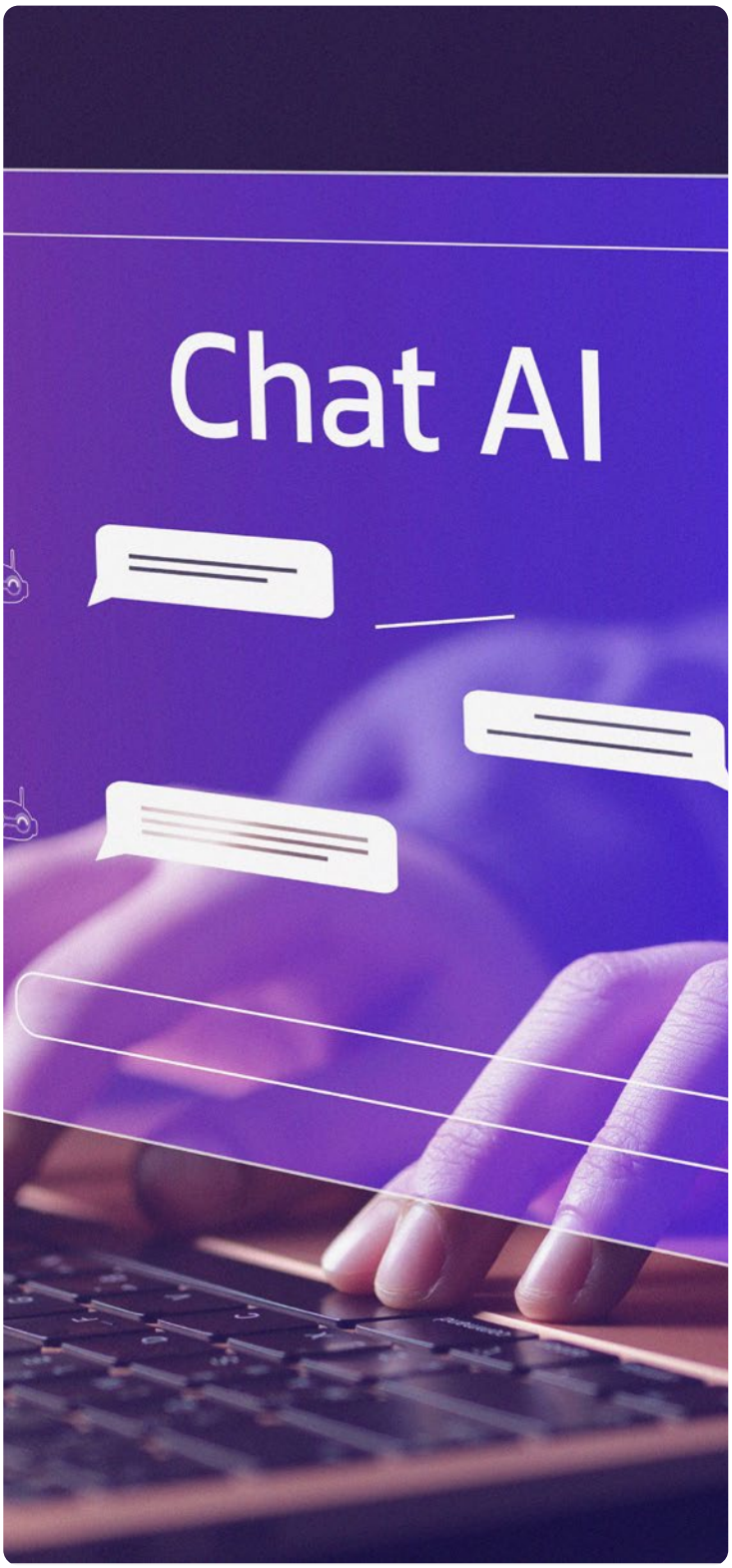
ACCURATE diagnosis and management of polyneuropathies remains a significant challenge, especially for non-specialist neurologists. A recent study, presented at the EAN Congress 2025, explored the potential of the AI model GPT-4o (OpenAI, San Francisco, California, USA) to assist in diagnosing these complex conditions and guiding confirmatory testing.[7]

The research involved 100 confirmed polyneuropathy cases collected from tertiary care centres, with input from 26 neurologists across 19 centres in 10 countries, including both specialists and non-specialists.

Using a zero-shot chain-of-thought prompting method, GPT-4o generated a primary diagnosis, two differential diagnoses, and a recommended confirmatory test for each case. These outputs were compared to the neurologists' own diagnoses and test choices, both before and after they reviewed GPT-4o's suggestions. The study found that GPT-4o displayed strong consistency in its outputs and performed significantly better than non-specialists in accuracy of the leading diagnosis (65.5% versus 54.4%), though it was slightly less accurate than specialists (73.9%). When considering differential diagnoses, GPT-4o's accuracy improved and again surpassed non-specialists but remained below the specialist level.

Interestingly, non-specialist neurologists improved their diagnostic accuracy after reviewing GPT-4o's suggestions, indicating the model's potential as a valuable decision support tool. Specialists showed a smaller, non-significant improvement. In terms of recommending appropriate diagnostic tests, GPT-4o matched the experts and notably outperformed non-specialists.

Despite promising results, GPT-4o made errors, such as over-relying on laboratory data or patient history, and sometimes overlooking important clinical details. Nevertheless, the study concludes that supervised integration of GPT-4o could help bridge the expertise gap in neurological care by supporting non-specialists and improving diagnostic accuracy in polyneuropathy.



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