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**20th Annual  
Consortium of  
Multiple Sclerosis  
Centers Meeting  
31 May – 3 June  
2006, Scottsdale,  
Arizona, USA**



Photograph courtesy of the Westin Kierland Resort & Spa, Scottsdale, AZ

The Westin Kierland Resort, Scottsdale, AZ, USA, was the venue of this year's CMSC meeting.

## Final data from Betaferon® 16-Year Long-Term Follow-Up Study presented

The results of the longest follow-up study of a disease-modifying therapy for MS were reported by Beverly Layton (Birmingham, AL, USA) and colleagues at this year's CMSC meeting. The findings show that benefit continues – and the safety of Betaferon® treatment appears to be excellent – after 16 years.

This study was a follow-up of patients from the pivotal North American study of Betaferon® in relapsing-remitting multiple sclerosis, in which patients had been treated for 16 years. Overall, the results of this long-term study suggest that early treatment and long-term treatment with Betaferon® may be beneficial to MS patients. Findings were positive for those patients taking 250 µg Betaferon® with reduced rates of wheelchair use and relapses, as well as delayed time to disability over 16 years.

The median treatment exposure to Betaferon® was almost 10 years, indicating high therapeutic adherence. Approximately one third of participating patients who were alive were still taking 250 µg Betaferon®. The incidence of adverse events with long-term Betaferon® treatment was reported to be very low.

Further reports on the 16-Year Long-Term Follow-Up Study are given on pages 2, 3 and 4 of this publication. ■

The theme of this year's Consortium of Multiple Sclerosis Centers (CMSC) meeting was 'Celebrating 20 Years of Excellence in MS Care and Research'. This was the largest ever CMSC meeting, assembling multidisciplinary healthcare professionals who specialize in multiple sclerosis (MS) to examine recent advances in MS treatment.

At least 1200 healthcare professionals who specialize in caring for MS patients attended the CMSC meeting. Across 5 days, 14 educational courses, 14 scientific symposia, 17 workshops, five industry-sponsored symposia, and over 125 abstracts were presented on scientific and clinical topics pertaining to MS. Ample time was available for lively discussions. An exhibition hall, in which major companies provided information on important products for treating MS, was also a key feature of the meeting. The meeting successfully fulfilled the mission of the CMSC, which is to stimulate and facilitate research in MS and share information and knowledge among CMSC members.

This issue of *Medical Express Reports* discusses highlights from the CMSC, including studies on long-term therapy for MS patients, the importance of early MS treatment, cognitive changes that occur with MS, and the relevance of neutralizing antibodies against Betaferon®. ■

# Betaferon® appears effective over 16 years

Sixteen years of data on almost 90% of the patients from the original Betaferon® pivotal trial are now available. The data presented by Beverly Layton, Birmingham, AL, USA, showed improvements in relapse rates and disability status in patients treated with 250 µg Betaferon®.

Most clinical trials of disease-modifying therapies in MS have been relatively short, usually only 2 or 3 years in duration. As MS evolves over several decades and requires long-term and even life-long treatment, there is a need for relevant long-term data on the efficacy, safety and tolerability of immunomodulatory therapies.

This exceptional trial – which is the longest follow-up of an MS trial cohort so far conducted – evaluated the impact of long-term Betaferon® treatment in participants from the pivotal trial of Betaferon® in relapsing-remitting MS (Poster S44).

Originally, 372 patients at 11 centres in the USA and Canada were randomized for a 5-year trial. After Betaferon® was approved in 1993, participants were offered treatment with the 250 µg dose and remained under regular medical care. During 2005, almost 90% of the original patients were successfully identified. Those who agreed to undergo evaluation were split into three groups according to their Betaferon® use ('Never': treated for ≤10% of the time since the start of the pivotal trial; 'Ever': for >10–80%; and 'Always': for >80%) for the follow-up analyses.

Patients who agreed to participate in the follow-up trial were questioned about issues including specific adverse reactions to Betaferon® since the pivotal trial. Patient-reported quality of life measures, neuropsychological and functional tests and scales, a magnetic resonance imaging (MRI) scan and laboratory/haematology parameters were also assessed.

**Annualized relapse rate was up to 40% lower with Betaferon® 250 µg than without Betaferon®**

The longest patient exposure to Betaferon® was 17 years (since the start of the pivotal trial); median exposure was 10 years. Adherence and tolerability were excellent (reported in depth on page 3).

About 10% of the 328 patients identified were deceased. Intriguingly, 20 of these were in the former placebo group of the original pivotal trial, but only six in the original Betaferon® 250 µg group. Beverly and colleagues commented that this difference 'remains unexplained' as

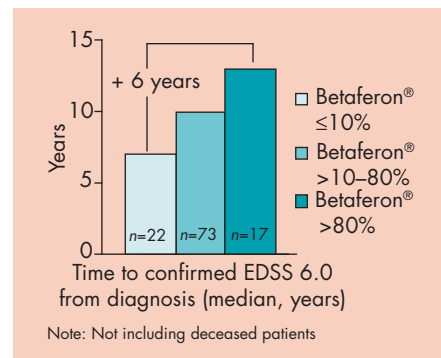


Figure 2: Time to Expanded Disability Status Scale (EDSS) ≥ 6.0 according to Betaferon® exposure was also consistently lower for people with multiple sclerosis (MS) who received the study drug.

further information was unobtainable in many cases. However, that death was due to MS has been confirmed in some cases.

Patients with MS who consistently used Betaferon® experienced fewer relapses and required less assistance to walk than patients who did not. The annualized relapse rate in the Betaferon® 250 µg Always group was up to 40% lower than in the Never group over the 16-year period (Figure 1).

Time to an Expanded Disability Status Scale (EDSS) score of 6.0 – which indicates that a patient requires some assistance (such as a cane) when walking – was also prolonged by Betaferon®. The time at which patients reached an EDSS score of ≥6.0 was 6 years earlier in the Never group (after about 7 years) than in the Betaferon® 250 µg Always group (about 13 years; Figure 2).

The authors commented that avoiding use of a wheelchair is particularly important to MS patients. They reported that ~45% of those who had not received Betaferon® required a wheelchair, compared with ~30% of patients treated with Betaferon® 250 µg from the start of the pivotal trial and ~30% who had received some Betaferon® treatment (the Ever group).

The authors stated that early and long-term treatment 'may be beneficial to MS patients'. Their data suggest that the relapse rate is lower and disease progression is slower with Betaferon® therapy. ■

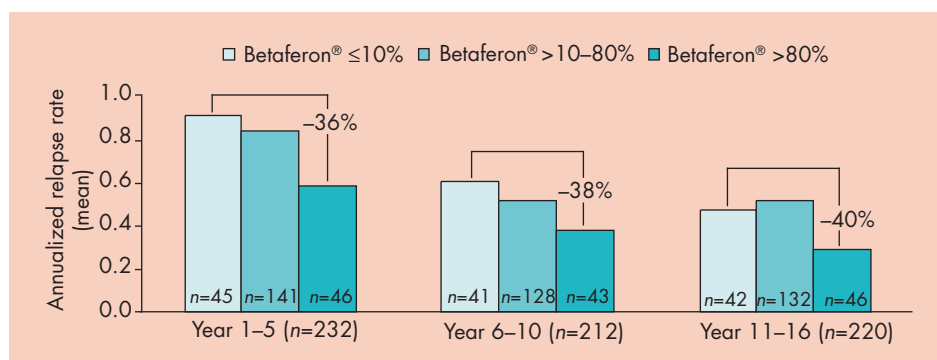


Figure 1: Annualized relapse rates according to Betaferon® exposure (consistently lower in those with greater exposure to the immunomodulator).

# Betaferon® safety over 16 years: reported excellent

The long-term safety of Betaferon® in patients with relapsing-remitting MS was reported to be excellent, with a very low incidence of adverse events.

Follow-up data were available for a far longer period from this study than has been reported for other disease-modifying therapies. Patients had received Betaferon® for up to 17 years, with a 10-year median exposure period.

Treatment adherence was high, with 30% of pivotal trial participants who were alive still receiving Betaferon®.

Betaferon® was very well tolerated. Patients receiving treatment during the last 2 years reported a very low incidence of the adverse events typically

associated with Betaferon® during the previous 6 months (Figure 3).

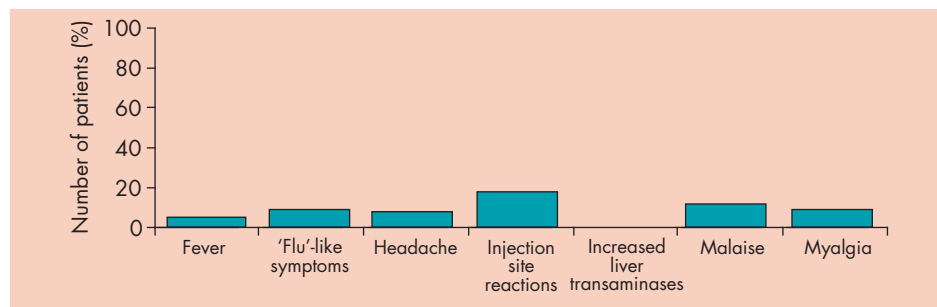


Figure 3: Adverse events reported during last 6 months by patients who had received Betaferon® within the last 2 years. A very low rate of adverse events was reported with Betaferon® treatment. Data not adjusted for drop-outs in last 2 years.

The excellent safety findings with Betaferon® contrast with the safety profiles reported for the disease-modifying therapies such as natalizumab and mitoxantrone. Increased safety risks reported even after short term treatment include progressive multifocal leucoencephalopathy with natalizumab, and cardiac toxicity and haematological malignancies with mitoxantrone. ■

## All long-term data on MS therapies assessed

A series of lively presentations and discussions took place during the educational course entitled 'Long-Term Efficacy of Disease Modifying Therapy'. Longer-term data from studies with the disease-modifying therapies Betaferon®, Avonex®, Rebif®, and Copaxone® were presented and compared in this session, chaired by Dr Norman Kachuck, Los Angeles, CA, USA.

Dr Guy Buckle, Boston, MA, USA, presented the results of the Betaferon® 16-Year Follow-Up Study evaluating the long-term safety and efficacy of this treatment in relapsing-remitting MS (RRMS). Dr Buckle commented that the results of the study suggest that 'early treatment and continuous long-term therapy may have an advantage'. Additional analyses will compare results in this patient cohort with expected outcomes based on natural history data, he added.

The studies of other disease-modifying therapies in MS so far conducted are of shorter duration than the Betaferon® study, and patient ascertainment is less complete.

Dr Frederick Munschauer, Buffalo, NY, USA, presented long-term follow-up results for Avonex®. The total study duration so far reported for this agent is only 8 years, with a follow-up completion rate of only 50.4%. As anticipated, patients on treatment continued to experience better outcome than those originally in the placebo group. Overall safety data support the favourable long-term tolerability of this treatment, added Dr Munschauer.

Long-term data for RRMS patients treated with 22 or 44 µg Rebif® or placebo were described by Dr Mark Freedman, Ottawa, ON, Canada. Of the 562 patients, 382 (68%) were available for follow-up after 8 years (Poster S26). Annualized relapse rates

were significantly lower with either dose of Rebif® than with placebo, reported Dr Freedman. Safety data were also found to be positive, with no new safety concerns emerging over the study period.

Data from a long-term follow-up study of Copaxone® therapy were presented by Dr Robert Lisak, Detroit, MI, USA. After 10 years, only 43% of patients (108 of an original 251) are reported as still participating in the follow-up study. Disability increased in both the Copaxone® and placebo groups over time, but EDSS scores were higher over 8 years in the original placebo group. This again highlights the benefits of early disease-modifying treatment in RRMS.

Safety findings in the follow-up study were also positive, with no time-dependent events reported. Fifty patients who had withdrawn from the study were also located. These patients appeared to have done less well, although it was unclear as to whether this was because they were not on therapy or because they had withdrawn due to poor treatment response. This highlights a major potential bias in long-term studies with incomplete patient ascertainment. ■

# The challenge of completing the 16-Year Long-Term Follow-Up Study

The 16-year follow-up period – currently the longest for any disease-modifying therapy in MS – presented Beverly Layton and co-workers with a unique set of challenges, both in identifying original trial participants and in gathering further data.

In total, 372 patients at 11 centres in the USA and Canada were originally randomized for the pivotal Betaferon® study. Beverly's presentation described how between January and November 2005 these patients were traced via their original study centres. Considerable time and effort was involved in tracing specific patients or next of kin, which Beverly described as being more complex and difficult than recruiting patients for a new clinical trial.

The challenge was increased where study coordinators or investigators had changed or patients had moved, in some cases several times during the follow-up period. Their efforts enabled the investigators to identify 328 patients – 88.2% of the original randomized group – across the 11 centres (Figure 4).

Patients identified were spread evenly across all three of the original pivotal study treatment groups (placebo, 88.6%;

Betaferon® 50 µg, 86.4%; Betaferon® 250 µg, 89.5%). Of the 293 patients still alive, 243 agreed to participate in final analyses.

A further challenge was presented by the need to carefully consider and organize travel to the study centres for the more disabled patients. Those who declined to travel to study sites were offered home visits. Additionally, those who did not wish to be seen were offered a standardized interview for a telephone-based EDSS assessment.

The authors commented from their experience in the long-term follow-up study that 'It was clear that an established connection between the patient and the centre greatly facilitates patient management and scientific investigations.' They found that availability of a healthcare worker, usually a nurse, at the study centre enhanced patient interest and active involvement in clinical trials. ■

# Confirming the benefits of long-term therapy for MS

A large population-based study provides insight into the long-term benefits of disease-modifying treatment in 'real-world' patients.

A presentation by Dr Robert Zivadinov, Buffalo, NY, USA (as part of the educational course series), described the work of the New York State Multiple Sclerosis Consortium (NYSMSC). He also reviewed findings of a historical cohort, 5-year follow-up study of the NYSMSC registry that included an analysis of the influence of disease-modifying therapy on MS progression.

The NYSMSC is a group of MS centres in New York State, established in 1996, which has developed 'a centralized registry of patients with clinically-definite MS,' explained Dr Zivadinov. The registry uses a standardized data collection form for demographic and clinical information, with follow-up forms completed annually.

Over 6200 patients were enrolled in the registry between 1996 and 2002, providing an array of patient demographic and clinical data for a 5-year follow-up study (range 1–8 years). Patients within this cohort were categorized by disease duration and EDSS score.

Of particular interest in the study cohort are a relatively stable group of patients with disease duration of ≥10 years but an EDSS of ≤2. Dr Zivadinov reported that cumulative past and/or present use of disease-modifying therapies significantly ( $P = 0.041$ ) increased the likelihood of patients remaining in this less disabled group over the 5-year follow-up period. ■

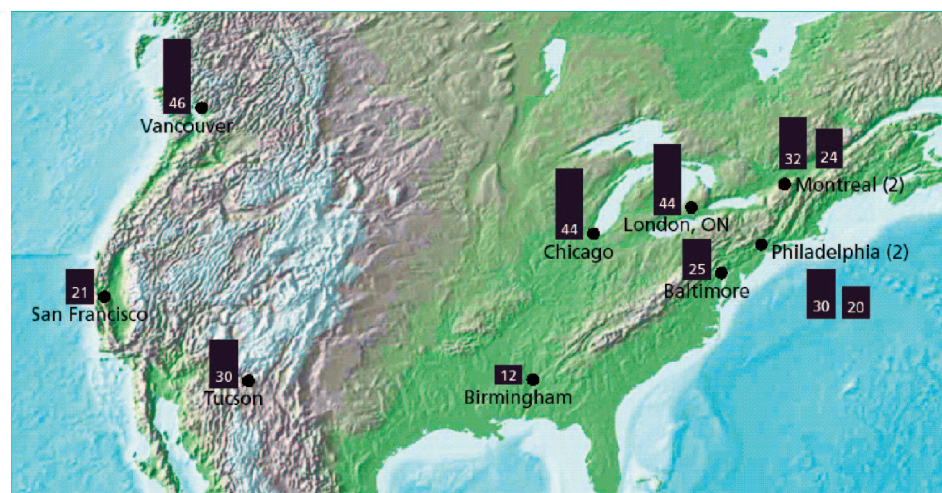


Figure 4: The 11 trial centres in North America showing the number of patients identified at each. Note: There were two centres in Philadelphia and Montreal.

## Therapeutic benefits begin early

Early immunomodulatory treatment with interferon beta can delay time to a second clinical or magnetic resonance imaging (MRI) event in patients with clinically isolated syndrome (CIS) suggestive of MS.

As part of the Continuing Medical Education (CME)-accredited symposium *Treatment Strategies across the MS Lifespan*, Dr Ben Thrower, Atlanta, GA, USA, made this statement during his presentation 'Clinically Isolated Syndromes: Predicting and Delaying MS'.

He also summarized evidence that MRI data predict progression to clinically definite MS (CDMS) in patients with CIS. He reported that 83% of patients with CIS and T2-weighted brain lesions progressed to CDMS compared with only 11% of those with CIS and a normal MRI.

Data from major clinical trials have demonstrated the efficacy of immunomodulatory therapy in delaying the time to a second clinical event in patients with CIS, he commented. He also outlined the efficacy results of Betaferon® in the treatment of patients with a first clinically demyelinating event and an MRI scan indicative of MS, in the BENEFIT (Betaferon®/Betaseron®, interferon beta-1b, in Newly Emerging multiple sclerosis For Initial Treatment) study. The 2-year risk of MS was ~40% (Poser criteria) or ~85% (McDonald criteria) in these patients.

In this study, CDMS onset (according to the Poser criteria) was delayed by 1 year and the overall risk of CDMS was reduced by 50% over 2 years for patients treated with Betaferon® instead of placebo. In addition, supportive MRI outcomes data show that Betaferon® reduces the median cumulative number of newly active lesions as well as the change in T2 lesion volume. ■

## Early Betaferon® therapy well accepted by patients

The BENEFIT study showed Betaferon® to be an effective and well-tolerated therapy for patients with a first clinical event suggestive of MS according to Dr Mark Freedman, Ottawa, ON, Canada and colleagues.

Dr Freedman's poster described how a dose-titration scheme during a 3-week treatment initiation period, along with concomitant non-steroidal anti-inflammatory medication to reduce 'flu'-like symptoms, improved tolerability during the early stages of treatment with Betaferon® (Figure 5). It was noted also that injection site reactions may be reduced if an autoinjector is used (Poster S27).

Treatment adherence was good in both the Betaferon® 250 µg and placebo study groups, with more than 97% of patients completing 80% of treatment, reported Dr Freedman. Discontinuation rates were low in the Betaferon® (7.2%) and placebo groups (5.7%). Indeed, 96% of the patients who completed the double-blind study period chose to enter the follow-up study for a further 3 years.

Dr Freedman and colleagues also found that the rates of 'flu'-like symptoms were 'substantially less frequent in the

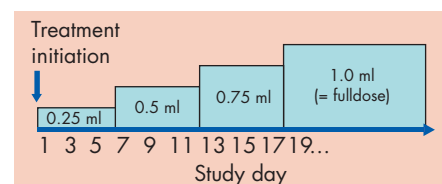


Figure 5: Dosing schedule used to initiate Betaferon® treatment helps to improve tolerability over the early days of therapy.

second year of treatment,' falling from 41.8% in the first year to 12.7%.

Two patient-reported outcomes were measured during the study – the Functional Assessment of MS and the EuroQoL 5-dimension questionnaires. Since patients with early MS have little disease-related morbidity and their quality of life is expected to be relatively high, these measures were intended to detect any adverse effects of therapy. However, compared with placebo, Betaferon® had no adverse influence on either of these measures, demonstrating that patients were not negatively impacted by therapy to slow the onset of MS. ■

## Help for cognitive impairment

Compensatory techniques or medication can help MS patients cope.

In a symposium entitled 'Surviving Cognitive Impairments in MS' led by Dr Jeffrey Wilken, Rockville, MD, USA and Dr Elizabeth Quig, Washington DC, USA, speakers admitted that cognitive dysfunction may be the greatest unrecognized problem faced by people

with MS. Practical solutions were presented by Dr Howard Rossman and Sonda Lawson, Farmington Hills, MI, USA (Table 1). Pharmacological management may also be indicated in some patients with memory loss or depression-related deficits. ■

Memory loss	Executive dysfunction
<ul style="list-style-type: none"> <li>• Make and use written lists</li> <li>• Try using single 'memory book' or an automated personal organizer</li> <li>• Family conference to aid awareness of level and extent of dysfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Approach tasks linearly</li> <li>• Take frequent brief breaks</li> <li>• Schedule cognitively demanding tasks earlier in the day</li> <li>• Minimize noise distraction</li> </ul>

Table 1: Practical recommendations for patients.

## Evaluating cognitive impairments in MS

Accurate diagnosis of cognitive deterioration in MS patients is required to ensure appropriate treatment.

At the meeting, the challenge of cognitive deterioration in MS was discussed in an educational course entitled 'Cognitive Evaluation: How to Identify Problems and Make Use of Test Results' led by Dr Jeffrey Wilken, Rockville, MD, USA. Occurring in 40% to 65% of MS patients, the cognitive domains most regularly affected are attention, memory, information processing speed, visuospatial perception and executive function.

Sadly, problems with executive function and memory in MS patients are often misdiagnosed as depression or stress. However, they significantly impact work status, social activity, and the need for personal assistance.

If cognitive dysfunction is suspected in a given patient with MS, office testing can be performed, but a comprehensive

neuropsychological examination requires hours of time; therefore, referral to a neuropsychologist is recommended. A neuropsychological evaluation provides functional evaluation of the patient's capabilities as well as individualized recommendations for treatment and accommodation.

Magnetic resonance imaging (MRI) data can also be helpful. Dr Elizabeth Quig, Washington DC, USA, emphasized that the cognitive issues associated with MS are associated with brain pathology, and reviewed data showing the correlation between deterioration in cognitive function and brain MRI changes. A significantly increased likelihood of cognitive dysfunction has been found in patients with greater overall T2 lesion area, greater T1 and T2 lesion load and a high number of juxtacortical lesions, she commented.

Several studies have also shown that lesions located in specific areas of the brain may be associated with specific types of dysfunction, added Dr Quig. For example, frontal lobe lesions can affect abstract problem solving, memory, and word fluency. Dr Quig also described recent research showing a higher correlation of cognitive dysfunction with brain atrophy than with T2 and T1 disease burden. This suggests that brain atrophy may be an independent predictor of cognitive dysfunction, she explained.

Tests for cognitive dysfunction used in clinical studies of MS should accurately and reproducibly measure impairment of patients' sensory and motor competence and be consistent with expert consensus, enabling comparison with other data. Appropriate tests include: the Symbol Digit Modality Task (SDMT oral version), a test of selective, sustained attention; the Paced Auditory Serial Addition Task (PASAT-3), a sensitive test of working memory and attention; the California Verbal Learning Test-II for verbal memory function (CVLT-II); and the Controlled Oral Word Association Test (COWAT), which provides an indicator of executive function. ■

## Long-term progressive cognitive dysfunction occurs in MS patients

Longer-term longitudinal studies demonstrate an accumulation of deficits in the majority of study participants. This was the finding of a poster entitled 'Cognitive Dysfunction in MS: the Interferon Beta-1b 16-Year Long-Term Follow-Up Study', presented by Dr Dawn Langdon, London, UK, and co-workers.

Work by Dr Langdon's team also verifies that cognitive dysfunction in MS is progressive. She presented initial results for 179 English-speaking MS patients who participated in the 16-Year Follow-Up Study, at the CMSC meeting (Poster S40).

Patients' premorbid status was estimated using the Wechsler Test of Adult Reading Ability Full Scale Intelligence Quotient.

Participants were significantly impaired ( $P < 0.001$ ) compared with their estimated premorbid levels, across four cognitive tests (SDMT, PASAT-3, CVLT-II, COWAT). Very few patients were able to function at their estimated premorbid optimum level, she commented.

In more advanced MS, the majority of patients appear to be 'impaired on at

least one attentional task and a significant minority are impaired on verbal memory and verbal fluency,' said Dr Langdon, adding that cognition can be usefully and validly assessed even in the context of advanced MS.

More data on the effects of immunomodulatory therapy on cognition in MS patients are needed. Cognitive data from the 16-year long-term follow-up study will be analysed further to determine the effect of Betaferon® therapy on cognitive changes over time.

The study confirms previous findings from a 45-patient study that assessed the evolution of cognitive dysfunction in early MS patients over 10 years. By the end of the 10-year period, the proportion of cognitively impaired patients had risen from 18% to 56%. ■

# Neutralizing antibodies to Betaferon® are low-level and transient

Dr Joel Oger, Vancouver, Canada, and co-workers have undertaken a subgroup analysis measuring neutralizing antibodies (NAb) against Betaferon® and exploring changes in NAb over time in NAb-positive patients from the pivotal North American Betaferon® trial.

This analysis was designed ‘To understand better the relevance of NAb to interferon beta-1b therapy for MS by examining their evolution over time’ (Poster S56). NAb are induced by all current immunomodulatory treatments for MS – including Betaferon®, Avonex®, Rebif®, and Copaxone®.

Nab-positive status and titres were analysed in 52 patients treated with Betaferon® who were described as ‘eventually NAb-positive’ during the pivotal study. These patients had two consecutive positive titres at any point during the study.

Elevated NAb titres were not found with Betaferon® until after 6 months’ treatment.

But even then, Dr Oger and colleagues reported that the proportion of patients with a high titre (i.e. >400) ‘remained low’ at between 1.9% and 14.6% of ‘eventually NAb-positive’ patients.

The proportion of patients with NAb peaked at around Day 540 of the trial, as did the median NAb titre (Figure 6), which peaked at a level that was not ‘considered important’: low antibody titres are unlikely to impact the biological effects of Betaferon®.

Dr Oger and co-workers’ analyses show that NAb to Betaferon® are transient. High NAb titres were only observed after 6 months’ treatment, they added. In addition, the proportion of patients with high NAb titres remained low throughout the study. Data on NAb suggest that ‘treatment decisions should be based on the patient’s clinical course and not on their NAb status’, commented the researchers. ■

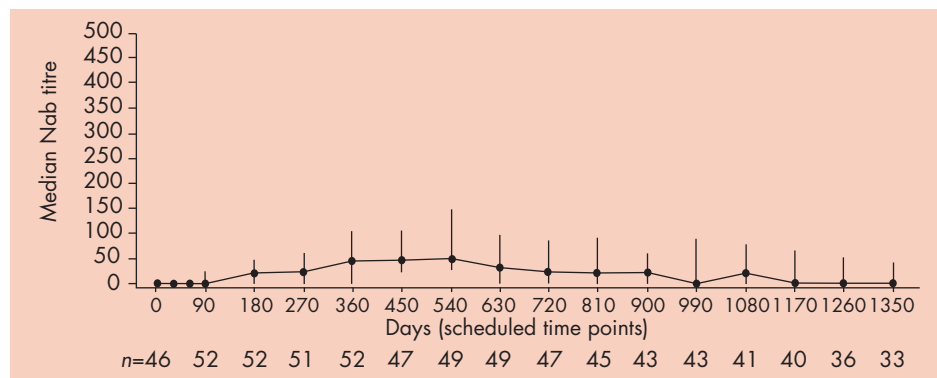


Figure 6: Median (Q1–Q3) NAb titres at each time point. n= no. of patients tested

# Few NAb to Betaferon® are observed after 16 years’ therapy

The transience of neutralizing antibodies (NAb) during Betaferon® treatment has been confirmed by findings from the 16-Year Long-Term Follow-Up Study.

At the end of the pivotal trial, 54% of patients who formed the eventual long-term follow-up cohort were reported to have Betaferon® NAb. In contrast, at the time of the long-term follow up study, the frequency of NAb had decreased to 11% – an 80% decrease (Figure 7).

A total of 221 patients from the pivotal trial were analysed for Betaferon® NAb as part of the long-term follow-up.

Among many parameters, the long-term follow-up study, reported by Beverly Layton and colleagues looked at the presence of NAb to Betaferon® in patients receiving the 250 µg dose. Beverly and her colleagues commented that the correlation of NAb to clinical status in the long-term follow-up study is yet to be analysed. ■

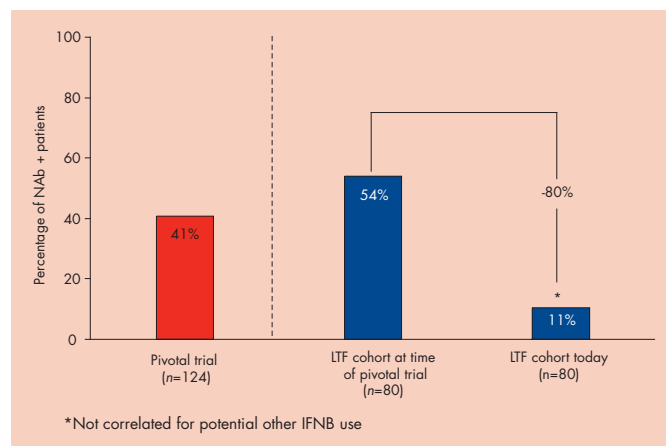


Figure 7: Reduction in the number of NAb-positive patients with Betaferon® 250 µg during the long-term follow-up. LTF, long-term follow-up.

# NAb to Betaferon® not associated with poor clinical outcome

A study on the prevalence of NAb in more than 6000 patients on Betaferon® showed that those tested because of poor clinical outcome had fewer NAb than an unselected population of all treated patients. This observation is inconsistent with the hypothesis that NAb are a primary cause of poor clinical outcome in patients treated with Betaferon®.

The study, described by its author, Dr Avertano Noronha, Chicago, IL, USA, included the results of 11 095 NAb tests from 6698 MS patients (mostly relapsing-remitting) treated with Betaferon®. The subjects came from North America (*n*=2010 patients), Europe (*n*=2417), and Australia (*n*=2271). A finding of NAb positivity was based on a single positive titre of ≥20 NU/ml.

Surprisingly, NAb prevalence was found to be significantly less in the selected North American and European cohorts than in the unselected Australian cohort (Table 2). This finding was robust, and could not be explained by potential sources of study bias, such as variations in patient demographics, testing methods, NAb titres or duration of treatment with Betaferon®.

In contrast to the North American and European groups, NAb testing was mandatory for healthcare reimbursement in Australia, so the latter dataset represents virtually all patients on Betaferon® in Australia, regardless of their clinical status.

In the North American and European groups, testing was done at the discretion of the clinicians, usually (>90%) because of disease worsening.

Dr Noronha discussed the implications of the finding that in two independent cohorts of patients selected because of poor clinical response to Betaferon®, the cross-sectional prevalence of NAb was very significantly less than in an unselected cohort. Essentially, this result is the reverse of the result expected if NAb exerted a negative effect on Betaferon® efficacy. These results are incompatible with the theory that NAb are responsible, even partially, for the poor clinical response.

Based on the results of this study, it is likely that NAb play little or no role in patients who have a poor clinical response to Betaferon therapy. Thus treatment decisions should be based on the patient's clinical course, not on NAb titre, stated Dr Noronha. Further, the clinical value of routine testing for NAb is not supported by these findings.

Dr Noronha gave a presentation entitled '*Neutralizing Antibodies to Interferon Beta-1b are Not Associated with Disease Worsening in MS*', as part of the CME-accredited symposium *Treatment Strategies across the MS Lifespan*. ■

Patient cohort	Population tested	NAb-positive patients	P-value vs Australian cohort
North America	Selected patients	21.3%	<10 <sup>-28</sup>
Europe	Selected patients	27.6%	<10 <sup>-11</sup>
Australia	All patients	37.0%	–

Table 2: Prevalence of NAb-positive status in the North American, European and Australian cohorts.



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