

**Clinical trial results:****A Randomized, Double-Blind, Double-Dummy, Parallel-Group Study To Evaluate The Efficacy And Safety Of Ocrelizumab In Comparison To Interferon Beta-1a (Rebif®) In Patients With Relapsing Multiple Sclerosis  
Summary**

EudraCT number	2010-020315-36
Trial protocol	SK BE SE DE ES GB BG FR IE IT CZ
Global end of trial date	

**Results information**

Result version number	v1
This version publication date	03 June 2016
First version publication date	03 June 2016

**Trial information****Trial identification**

Sponsor protocol code	WA21093
-----------------------	---------

**Additional study identifiers**

ISRCTN number	-
ClinicalTrials.gov id (NCT number)	NCT01412333
WHO universal trial number (UTN)	-

Notes:

**Sponsors**

Sponsor organisation name	F. Hoffmann-La Roche AG
Sponsor organisation address	Grenzacherstrasse 124, Basel, Switzerland, CH-4070
Public contact	F. Hoffmann-La Roche AG, F. Hoffmann-La Roche AG, +41 616878333, global.trial_information@roche.com
Scientific contact	F. Hoffmann-La Roche AG, F. Hoffmann-La Roche AG, +41 616878333, global.trial_information@roche.com

Notes:

**Paediatric regulatory details**

Is trial part of an agreed paediatric investigation plan (PIP)	No
Does article 45 of REGULATION (EC) No 1901/2006 apply to this trial?	No
Does article 46 of REGULATION (EC) No 1901/2006 apply to this trial?	No

Notes:

## Results analysis stage

Analysis stage	Interim
Date of interim/final analysis	12 May 2015
Is this the analysis of the primary completion data?	Yes
Primary completion date	12 May 2015
Global end of trial reached?	No

Notes:

## General information about the trial

Main objective of the trial:

To evaluate the efficacy and safety of ocrelizumab compared with interferon beta-1a 44 mcg subcutaneous (SC) in patients with relapsing multiple sclerosis (RMS).

Protection of trial subjects:

All study subjects were required to read and sign an Informed Consent Form.

Background therapy: -

Evidence for comparator: -

Actual start date of recruitment	20 September 2011
Long term follow-up planned	Yes
Long term follow-up rationale	Safety
Long term follow-up duration	11 Months
Independent data monitoring committee (IDMC) involvement?	Yes

Notes:

## Population of trial subjects

### Subjects enrolled per country

Country: Number of subjects enrolled	Argentina: 4
Country: Number of subjects enrolled	Bosnia and Herzegovina: 9
Country: Number of subjects enrolled	Belarus: 15
Country: Number of subjects enrolled	Brazil: 10
Country: Number of subjects enrolled	Canada: 84
Country: Number of subjects enrolled	Croatia: 16
Country: Number of subjects enrolled	Mexico: 31
Country: Number of subjects enrolled	Russian Federation: 48
Country: Number of subjects enrolled	Turkey: 13
Country: Number of subjects enrolled	Ukraine: 26
Country: Number of subjects enrolled	United States: 226
Country: Number of subjects enrolled	Norway: 1
Country: Number of subjects enrolled	Poland: 139
Country: Number of subjects enrolled	Slovakia: 18
Country: Number of subjects enrolled	Spain: 52
Country: Number of subjects enrolled	Sweden: 18
Country: Number of subjects enrolled	United Kingdom: 14
Country: Number of subjects enrolled	Belgium: 4
Country: Number of subjects enrolled	Bulgaria: 18
Country: Number of subjects enrolled	Czech Republic: 16
Country: Number of subjects enrolled	France: 9

Country: Number of subjects enrolled	Germany: 28
Country: Number of subjects enrolled	Ireland: 2
Country: Number of subjects enrolled	Italy: 34
Worldwide total number of subjects	835
EEA total number of subjects	369

Notes:

<b>Subjects enrolled per age group</b>	
In utero	0
Preterm newborn - gestational age < 37 wk	0
Newborns (0-27 days)	0
Infants and toddlers (28 days-23 months)	0
Children (2-11 years)	0
Adolescents (12-17 years)	0
Adults (18-64 years)	835
From 65 to 84 years	0
85 years and over	0

## Subject disposition

### Recruitment

Recruitment details: -

### Pre-assignment

Screening details:

A total of 1045 subjects were screened for entry into the study. Of these, 210 subjects failed screening; the main reasons were failure to meet the inclusion/exclusion criteria or unacceptable laboratory values. A total of 835 subjects were enrolled into the study.

### Period 1

Period 1 title	Double Blind Treatment Period (overall period)
Is this the baseline period?	Yes
Allocation method	Randomised - controlled
Blinding used	Double blind
Roles blinded	Subject, Investigator, Monitor, Assessor

Blinding implementation details:

Treatment was administered in a double-blind, double-dummy fashion in order to maintain blinding.

### Arms

Are arms mutually exclusive?	Yes
------------------------------	-----

<b>Arm title</b>	Interferon beta-1a 44 mcg SC
------------------	------------------------------

Arm description:

Subjects with relapsing multiple sclerosis (RMS) who experienced at least either two documented clinical relapses within 2 years or one clinical relapse within 1 year prior to screening received interferon beta-1a three times per week (with placebo infusions matching ocrelizumab every 24 weeks).

Arm type	Active comparator
Investigational medicinal product name	Interferon beta-1a
Investigational medicinal product code	
Other name	Rebif
Pharmaceutical forms	Solution for injection
Routes of administration	Subcutaneous use

Dosage and administration details:

Subjects received interferon beta-1a 44 mcg SC injections three times per week (with placebo infusions matching ocrelizumab infusions every 24 weeks).

Investigational medicinal product name	Placebo
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Concentrate for solution for infusion
Routes of administration	Intravenous use

Dosage and administration details:

Subjects received placebo infusions matching ocrelizumab infusions of 300 mg on Days 1 and 15 for the first dose and as a single infusion of 600 mg for all subsequent doses every 24 weeks.

<b>Arm title</b>	Ocrelizumab
------------------	-------------

Arm description:

Subjects with RMS who experienced at least either two documented clinical relapses within 2 years or one clinical relapse within 1 year prior to screening received ocrelizumab every 24 weeks (with placebo injections matching interferon beta-1a SC three times per week).

Arm type	Experimental
----------	--------------

Investigational medicinal product name	Ocrelizumab
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Concentrate for solution for infusion
Routes of administration	Intravenous use

Dosage and administration details:

Subjects received ocrelizumab 600 mg intravenous (IV) as 300 mg infusions on Days 1 and 15 for the first dose and as a single infusion of 600 mg for all subsequent infusions every 24 weeks.

Investigational medicinal product name	Placebo
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Solution for injection
Routes of administration	Subcutaneous use

Dosage and administration details:

Subjects received placebo injections matching interferon beta-1a SC three times per week.

<b>Number of subjects in period 1</b>	Interferon beta-1a 44 mcg SC	Ocrelizumab
Started	418	417
Completed	320	360
Not completed	98	57
Consent withdrawn by subject	25	12
Physician decision	-	1
Adverse Event	25	16
Protocol violation	1	1
Death	1	1
Other	16	10
Pregnancy	3	-
Non-compliance	1	3
Non-compliance with study drug	1	1
Lost to follow-up	10	6
Lack of efficacy	15	6

## Baseline characteristics

### Reporting groups

Reporting group title	Interferon beta-1a 44 mcg SC
-----------------------	------------------------------

Reporting group description:

Subjects with relapsing multiple sclerosis (RMS) who experienced at least either two documented clinical relapses within 2 years or one clinical relapse within 1 year prior to screening received interferon beta-1a three times per week (with placebo infusions matching ocrelizumab every 24 weeks).

Reporting group title	Ocrelizumab
-----------------------	-------------

Reporting group description:

Subjects with RMS who experienced at least either two documented clinical relapses within 2 years or one clinical relapse within 1 year prior to screening received ocrelizumab every 24 weeks (with placebo injections matching interferon beta-1a SC three times per week).

Reporting group values	Interferon beta-1a 44 mcg SC	Ocrelizumab	Total
Number of subjects	418	417	835
Age categorical Units: Subjects			

Age continuous Units: years arithmetic mean standard deviation	37.4 ± 9	37.2 ± 9.1	-
Gender categorical Units: Subjects			
Female	280	271	551
Male	138	146	284

## End points

### End points reporting groups

Reporting group title	Interferon beta-1a 44 mcg SC
Reporting group description: Subjects with relapsing multiple sclerosis (RMS) who experienced at least either two documented clinical relapses within 2 years or one clinical relapse within 1 year prior to screening received interferon beta-1a three times per week (with placebo infusions matching ocrelizumab every 24 weeks).	
Reporting group title	Ocrelizumab
Reporting group description: Subjects with RMS who experienced at least either two documented clinical relapses within 2 years or one clinical relapse within 1 year prior to screening received ocrelizumab every 24 weeks (with placebo injections matching interferon beta-1a SC three times per week).	

### Primary: Annualised Relapse Rate (ARR) in Subjects With Relapsing Multiple Sclerosis (MS) at 96 Weeks

End point title	Annualised Relapse Rate (ARR) in Subjects With Relapsing Multiple Sclerosis (MS) at 96 Weeks
End point description: ARR was calculated as the total number of relapses for all subjects in the treatment group divided by the total subject-years of exposure to that treatment. Intent-to-treat (ITT) population included all randomised subjects in the study.	
End point type	Primary
End point timeframe: Week 96	

End point values	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	418	417		
Units: relapses				
number (confidence interval 95%)	0.29 (0.234 to 0.361)	0.155 (0.121 to 0.198)		

### Statistical analyses

Statistical analysis title	ARR by Week 96
Statistical analysis description: Adjusted by Geographical Region (US vs. Rest of World) and baseline EDSS (<4.0 vs. ≥4.0).	
Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab

Number of subjects included in analysis	835
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.0001
Method	Negative Binomial Model
Parameter estimate	Ratio
Point estimate	0.532
Confidence interval	
level	95 %
sides	2-sided
lower limit	0.397
upper limit	0.714

## Secondary: Time to Onset of Confirmed Disability Progression (CDP) for at Least 12 and 24 Weeks During the Double Blind Treatment Period

End point title	Time to Onset of Confirmed Disability Progression (CDP) for at Least 12 and 24 Weeks During the Double Blind Treatment Period
-----------------	---

End point description:

Disability progression was defined as an increase in the EDSS score of:

A)  $\geq 1.0$  point from the baseline EDSS score when the baseline score was less than or equal to ( $\leq$ ) 5.5

B)  $\geq 0.5$  point from the baseline EDSS score when the baseline score was  $> 5.5$

This endpoint was considered confirmatory only when results of both studies WA21092 and WA21093 were combined. Disability progression was considered confirmed when the increase in the EDSS was confirmed at a regularly scheduled visit at least 12 weeks or 24 weeks after the initial documentation of neurological worsening. ITT population included all randomised subjects in the study. Here, 99999 indicates median and -99999 and 99999 minimum and maximum of full range as less than 50% of subjects experience onset of CDP.

End point type	Secondary
----------------	-----------

End point timeframe:

Week 96

End point values	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	418	417		
Units: weeks				
median (full range (min-max))	99999 (-99999 to 99999)	99999 (-99999 to 99999)		

## Statistical analyses

Statistical analysis title	Time to onset of CDP at week 12
----------------------------	---------------------------------

Statistical analysis description:

Hazard ratios (HR) were estimated by stratified Cox regression. Stratification factors were Geographical Region (US vs. Rest of World) and baseline EDSS ( $< 4.0$  vs.  $\geq 4.0$ ).



Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	835
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.0169
Method	Logrank
Parameter estimate	Hazard ratio (HR)
Point estimate	0.63
Confidence interval	
level	95 %
sides	2-sided
lower limit	0.42
upper limit	0.92

<b>Statistical analysis title</b>	Time to onset of CDP at week 24
-----------------------------------	---------------------------------

Statistical analysis description:

Hazard ratios (HR) were estimated by stratified Cox regression. Stratification factors were Geographical Region (US vs. Rest of World) and baseline EDSS (<4.0 vs. ≥4.0).

Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	835
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.037
Method	Logrank
Parameter estimate	Hazard ratio (HR)
Point estimate	0.63
Confidence interval	
level	95 %
sides	2-sided
lower limit	0.4
upper limit	0.98

### **Secondary: Number of T1 Gadolinium (Gd)-Enhancing Lesions as Detected by Brain Magnetic Resonance Imaging (MRI) During the Double Blind Treatment**

End point title	Number of T1 Gadolinium (Gd)-Enhancing Lesions as Detected by Brain Magnetic Resonance Imaging (MRI) During the Double Blind Treatment
-----------------	--

End point description:

The total number of T1 gadolinium-enhancing lesions for all subjects in the treatment group divided by the total number of brain MRI scans. The total number of lesions is calculated as the sum of the individual number of lesions at Weeks 24, 48, and 96. ITT population included all randomised subjects in the study.

End point type	Secondary
----------------	-----------

End point timeframe:

Baseline up to week 96

<b>End point values</b>	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	418	417		
Units: lesions				
number (not applicable)	465	21		

## Statistical analyses

<b>Statistical analysis title</b>	T1-Gd lesions
Statistical analysis description:	
Adjusted by baseline T1 Gd lesion (present or not), baseline EDSS (<4.0 vs. >=4.0) and geographical region (US vs. ROW).	
Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	835
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.0001
Method	Negative Binomial Model
Parameter estimate	Adjusted rate ratio
Point estimate	0.051
Confidence interval	
level	95 %
sides	2-sided
lower limit	0.029
upper limit	0.089

## Secondary: Number of New, and/or Enlarging T2 Hyperintense Lesions as Detected by Brain Magnetic Resonance Imaging (MRI) During the Double Blind Treatment

End point title	Number of New, and/or Enlarging T2 Hyperintense Lesions as Detected by Brain Magnetic Resonance Imaging (MRI) During the Double Blind Treatment
End point description:	
The total number of new and/or enlarging T2 lesions for all subjects in the treatment group divided by the total number of brain MRI scans. The total number of lesions is calculated as the sum of the individual number of lesions at Weeks 24, 48, and 96. ITT population included all randomised subjects in the study.	
End point type	Secondary
End point timeframe:	
Baseline up to week 96	

<b>End point values</b>	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	418	417		
Units: lesions				
number (not applicable)	2103	380		

## Statistical analyses

<b>Statistical analysis title</b>	Enlarging T2 hyperintense lesions
Statistical analysis description: Adjusted by baseline T2 lesion count, baseline EDSS (<4.0 vs. ≥4.0) and geographical region (US vs. ROW).	
Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	835
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.0001
Method	Negative Binomial Model
Parameter estimate	Adjusted rate ratio
Point estimate	0.171
Confidence interval	
level	95 %
sides	2-sided
lower limit	0.13
upper limit	0.225

## Secondary: Percentage of Subjects With Confirmed Disability Improvement (CDI) for at Least 12 Weeks

End point title	Percentage of Subjects With Confirmed Disability Improvement (CDI) for at Least 12 Weeks
End point description: Disability improvement was assessed only for the subgroup of subjects with a baseline EDSS score of ≥ 2.0. It was defined as a reduction in EDSS score of: A) ≥1.0 from the baseline EDSS score when the baseline score was ≥2 and ≤5.5 B) ≥ 0.5 when the baseline EDSS score > 5.5. This endpoint was considered confirmatory only when results of both studies WA21092 and WA21093 were combined. ITT population included all randomised subjects in the study. Here, number of subjects analysed signifies number of subjects who were evaluable for the endpoint.	
End point type	Secondary
End point timeframe: Week 96	

<b>End point values</b>	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	308	318		
Units: percentage of subjects				
number (confidence interval 95%)	18.83 (14.62 to 23.65)	21.38 (17.01 to 26.3)		

## Statistical analyses

<b>Statistical analysis title</b>	Confirmed Disability Improvement for 12 weeks
Statistical analysis description:	
Cochran-Mantel-Haenszel (CMH) Chi-Squared test was used. Stratified by Geographical Region (US vs. Rest of World) and baseline EDSS (<4.0 vs. >=4.0) 95 percent (%) confidence interval (CI) of proportion were constructed using Pearson-Clopper method.	
Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	626
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.4019
Method	CMH Chi-Squared test (stratified)
Parameter estimate	Relative risk (stratified)
Point estimate	1.14
Confidence interval	
level	95 %
sides	2-sided
lower limit	0.84
upper limit	1.56

## Secondary: Number of T1 Hypointense Lesions During the Double Blind Treatment

End point title	Number of T1 Hypointense Lesions During the Double Blind Treatment
End point description:	
The total number of new T1-Hypo-Intense Lesions (Chronic Black Holes) for all subjects in the treatment group divided by the total number of brain MRI scans. The total number of lesions is calculated as the sum of the individual number of new lesions at Weeks 24, 48, and 96. ITT population included all randomised subjects in the study.	
End point type	Secondary
End point timeframe:	
Baseline up to week 96	

<b>End point values</b>	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	418	417		
Units: lesions				
number (not applicable)	1484	567		

## Statistical analyses

<b>Statistical analysis title</b>	T1 Hypointense Lesions
Statistical analysis description: Adjusted by baseline T1-hypointense lesion count, baseline EDSS (<4.0 vs. ≥4.0) and geographical region (US vs. ROW).	
Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	835
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.0001
Method	Negative Binomial Model
Parameter estimate	Adjusted rate ratio
Point estimate	0.357
Confidence interval	
level	95 %
sides	2-sided
lower limit	0.272
upper limit	0.47

## Secondary: Change From Baseline in Multiple Sclerosis Functional Composite (MSFC) Score to Week 96

End point title	Change From Baseline in Multiple Sclerosis Functional Composite (MSFC) Score to Week 96
End point description: MSFC score consists of: A) Timed 25-Foot walk; B) 9-Hole Peg Test (9-HPT); and C) Paced Auditory Serial Addition Test (PASAT-3 version). The MSFCS is based on the concept that scores for these three dimensions (arm, leg, and cognitive function) are combined to create a single score (the MSFC) that can be used to detect change over time in a group of subjects with MS. Since the three primary measures differ in what they actually measure, a common composite score for the three different measures i.e., Z-score was selected for the purpose. MSFC Score = {Z arm, average + Z leg, average + Z cognitive} / 3.0. The results from each of these three tests are transformed into Z-scores and averaged to yield a composite score for each subject at each time point. ITT population included all randomised subjects in the study. Here, n signifies the number of subjects evaluable at specified time points.	
End point type	Secondary
End point timeframe: Baseline, Week 96	

<b>End point values</b>	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	418	417		
Units: units on a scale				
arithmetic mean (standard error)				
Unadjusted Baseline mean (n= 342, 358)	-0.001 (± 0.033)	0.026 (± 0.034)		
Adjusted Week 96 mean (n= 269, 308)	0.169 (± 0.029)	0.276 (± 0.028)		

## Statistical analyses

<b>Statistical analysis title</b>	MSFC score at week 96
Statistical analysis description:	
Estimates are from analysis based on mixed-effect model of repeated measures (MMRM) using unstructured covariance matrix: Change = Baseline MSFCS Score + Geographical Region + Baseline EDSS (< 4.0 vs. ≥ 4.0) + Week + Treatment + Treatment*Week (repeated values over Week) + Baseline MSFCS Score*Week.	
Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	835
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.004
Method	mixed-effect model of repeated measures
Parameter estimate	Difference in Adjusted Means
Point estimate	0.107
Confidence interval	
level	95 %
sides	2-sided
lower limit	0.034
upper limit	0.18
Variability estimate	Standard error of the mean
Dispersion value	0.037

## Secondary: Percent Change in Brain Volume as Detected by Brain Magnetic Resonance Imaging (MRI) From Week 24 to Week 96

End point title	Percent Change in Brain Volume as Detected by Brain Magnetic Resonance Imaging (MRI) From Week 24 to Week 96
End point description:	
Brain volume was recorded as an absolute "normalised" value at the baseline visit then recorded at subsequent visits as a percentage change relative to the absolute value at the baseline visit. Therefore, brain volume at Week 24 was calculated as the brain volume at the baseline visit multiplied by 1 + ([percentage change in brain volume from baseline visit to Week 24]/100). Estimates are from analysis based on mixed-effect model of repeated measures (MMRM) using unstructured covariance matrix: Percentage Change = Brain Volume at Week 24 + Geographical Region (US vs. ROW) + Baseline EDSS (< 4.0 vs. ≥ 4.0) + Week + Treatment + Treatment*Week (repeated values over Week) + Brain Volume at Week 24*Week. ITT population included all randomised subjects in the study. Here, number of subjects analysed signifies number of subjects who were evaluable for the endpoint.	
End point type	Secondary

End point timeframe:  
From week 24 up to week 96

<b>End point values</b>	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	259	287		
Units: percent change				
arithmetic mean (standard error)	-0.75 (± 0.051)	-0.638 (± 0.049)		

### Statistical analyses

<b>Statistical analysis title</b>	Percent change in brain volume
Statistical analysis description:	
Estimates are from analysis based on MMRM using unstructured covariance matrix: Percentage Change = Brain Volume at Week 24 + Geographical Region + Baseline EDSS (< 4.0 vs. ≥ 4.0) + Week + Treatment + Treatment*Week (repeated values over Week) + Brain Volume at Week 24*Week.	
Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	546
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.09
Method	MMRM
Parameter estimate	Difference in Adjusted Means
Point estimate	0.112
Confidence interval	
level	95 %
sides	2-sided
lower limit	-0.018
upper limit	0.241
Variability estimate	Standard error of the mean
Dispersion value	0.066

### Secondary: Change From Baseline in Short Form Health Survey-36 (SF-36) Physical Component Summary (PCS) Score at Week 96

End point title	Change From Baseline in Short Form Health Survey-36 (SF-36) Physical Component Summary (PCS) Score at Week 96
-----------------	---

End point description:

The SF-36 is a multi-purpose, short-form health survey with 36 questions. It yields an 8-scale profile of functional health and well-being scores (domains) as well as psychometrically based physical and mental health summary measures. The SF-36 taps 8 health concepts: physical functioning, bodily pain, physical role functioning, emotional role functioning, emotional well-being, social functioning, vitality, and general health perceptions. The 8 scales are further summarized to 2 distinct higher-ordered clusters: the PCS and mental composite t-score (MCS). The range for all 8 domains as well as for the composite t-scores is from 0 to 100 with 100 as best possible health status and 0 as worst health status. Descriptive statistics at baseline include subjects with assessment at baseline and at least one post-

baseline value. ITT population. Here, n signifies the number of subjects evaluable at specified time points.

End point type	Secondary
End point timeframe:	
Baseline, Week 96	

End point values	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	418	417		
Units: units on a scale				
arithmetic mean (standard error)				
Unadjusted Baseline mean (n= 319, 355)	44.552 ( $\pm$ 0.544)	44.307 ( $\pm$ 0.541)		
Adjusted mean change at week 96(n=276, 315)	-0.833 ( $\pm$ 0.472)	0.326 ( $\pm$ 0.444)		

## Statistical analyses

Statistical analysis title	SF-36 PCS score at week 96
Statistical analysis description:	
Estimates are from analysis based on MMRM using unstructured covariance matrix: Change = Baseline PCS Score + Geographical Region + Baseline EDSS (< 4.0 vs. $\geq$ 4.0) + Week + Treatment + Treatment*Week (repeated values over Week) + Baseline PCS Score*Week.	
Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	835
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.0404
Method	MMRM
Parameter estimate	Difference in Adjusted Means
Point estimate	1.159
Confidence interval	
level	95 %
sides	2-sided
lower limit	0.051
upper limit	2.268
Variability estimate	Standard error of the mean
Dispersion value	0.564

## Secondary: Percentage of Subjects Who Have No Evidence of Disease Activity (NEDA) up to Week 96

End point title	Percentage of Subjects Who Have No Evidence of Disease Activity (NEDA) up to Week 96
-----------------	--



**End point description:**

NEDA was defined only for subjects with a baseline EDSS score  $\geq 2.0$ . Subjects who completed the 96-week treatment period were considered as having evidence of disease activity if at least one protocol-defined relapse (PDR), a confirmed disability progression (CDP) event or at least one MRI scan showing MRI activity (defined as Gd-enhancing T1 lesions, or new or enlarging T2 lesions) was reported during the 96-week treatment period, otherwise the subject was considered as having NEDA. ITT population included all randomised subjects in the study. Here, number of subjects analysed signifies number of subjects who were evaluable for the endpoint.

End point type	Secondary
----------------	-----------

**End point timeframe:**

Week 96

End point values	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	270	289		
Units: percentage of subjects				
number (confidence interval 95%)	24.1 (19.1 to 29.6)	43.9 (38.1 to 49.9)		

**Statistical analyses**

<b>Statistical analysis title</b>	NEDA at week 96
-----------------------------------	-----------------

**Statistical analysis description:**

Analysed using CMH test, stratified by Geographical Region (US vs. Rest of World) and baseline EDSS ( $<4.0$  vs.  $\geq 4.0$ ). 95% CI of proportion were constructed using Pearson-Clopper method.

Comparison groups	Interferon beta-1a 44 mcg SC v Ocrelizumab
Number of subjects included in analysis	559
Analysis specification	Pre-specified
Analysis type	superiority
P-value	$< 0.0001$
Method	CMH Chi-Squared test (stratified)
Parameter estimate	Relative risk (stratified)
Point estimate	1.81
Confidence interval	
level	95 %
sides	2-sided
lower limit	1.41
upper limit	2.32

**Secondary: Number of Subjects With Adverse Events (AEs)**

End point title	Number of Subjects With Adverse Events (AEs)
-----------------	--

**End point description:**

AEs included infusion related reactions (IRRs) and serious MS relapses, but excluded non-serious MS relapses. Serious Adverse Events (SAEs) included serious MS relapses and serious IRRs. The safety population included all subjects who received any study drug.

End point type	Secondary
End point timeframe:	
Baseline up to Week 96	

<b>End point values</b>	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	417	417		
Units: subjects	357	360		

### Statistical analyses

No statistical analyses for this end point

### Secondary: Exposure to Ocrelizumab (Area Under the Concentration - Time Curve)

End point title	Exposure to Ocrelizumab (Area Under the Concentration - Time Curve) <sup>[1]</sup>
-----------------	--

End point description:

The pharmacokinetics (PK) population included all subjects in the ocrelizumab group who had at least 1 measurable concentration value.

End point type	Secondary
----------------	-----------

End point timeframe:

Week 96

Notes:

[1] - The end point is not reporting statistics for all the arms in the baseline period. It is expected all the baseline period arms will be reported on when providing values for an end point on the baseline period. Justification: The data was only planned to be reported for Ocrelizumab reporting arm.

<b>End point values</b>	Ocrelizumab			
Subject group type	Reporting group			
Number of subjects analysed	389			
Units: microgram per millilitre*day				
arithmetic mean (standard deviation)	3513 (± 955)			

### Statistical analyses

No statistical analyses for this end point

### Secondary: Number of Subjects With Anti-Drug Antibodies (ADAs) to Ocrelizumab

End point title	Number of Subjects With Anti-Drug Antibodies (ADAs) to Ocrelizumab
-----------------	--

End point description:

Number of subjects positive for anti-drug antibodies (ADAs) to ocrelizumab is the number of post-baseline evaluable subjects determined to have treatment-induced ADA or treatment-enhanced ADA during the study period. Baseline evaluable subjects with an ADA assay result from a baseline sample

(s). The safety population included all subjects who received any study drug. Here, n signifies the number of subjects evaluable at the specified time points.

End point type	Secondary
----------------	-----------

End point timeframe:

Baseline up to week 96

End point values	Interferon beta-1a 44 mcg SC	Ocrelizumab		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	417	417		
Units: subjects				
Positive sample at baseline (n= 407, 402)	2	4		
Positive for ADA post-baseline (n= 403, 405)	5	2		

### Statistical analyses

No statistical analyses for this end point

## Adverse events

### Adverse events information

Timeframe for reporting adverse events:

Baseline to Week 96 (Double Blind Treatment Period)

Assessment type	Systematic
-----------------	------------

### Dictionary used

Dictionary name	MedDRA
-----------------	--------

Dictionary version	18.0
--------------------	------

### Reporting groups

Reporting group title	Interferon beta-1a
-----------------------	--------------------

Reporting group description:

Subjects with relapsing multiple sclerosis (RMS) who experienced at least either two documented clinical attacks within 2 years or one clinical attack within 1 year prior to screening received interferon beta-1a three times per week (with placebo infusions matching ocrelizumab every 24 weeks).

Reporting group title	Ocrelizumab
-----------------------	-------------

Reporting group description:

Subjects with RMS who experienced at least either two documented clinical attacks within 2 years or one clinical attack within 1 year prior to screening received ocrelizumab every 24 weeks (with placebo injections matching interferon beta-1a SC three times per week).

Serious adverse events	Interferon beta-1a	Ocrelizumab	
Total subjects affected by serious adverse events			
subjects affected / exposed	40 / 417 (9.59%)	29 / 417 (6.95%)	
number of deaths (all causes)	1	1	
number of deaths resulting from adverse events	0	0	
Neoplasms benign, malignant and unspecified (incl cysts and polyps)			
Thyroid Adenoma			
subjects affected / exposed	0 / 417 (0.00%)	2 / 417 (0.48%)	
occurrences causally related to treatment / all	0 / 0	0 / 2	
deaths causally related to treatment / all	0 / 0	0 / 0	
Malignant melanoma			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Vascular disorders			
Peripheral venous disease			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	

Varicose vein			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
General disorders and administration site conditions			
Chest pain			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	1 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Reproductive system and breast disorders			
Dysmenorrhea			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Menometrorrhagia			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Menorrhagia			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Ovarian cyst			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Uterine polyp			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Respiratory, thoracic and mediastinal disorders			
Asthma			

subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Pneumonia aspiration			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Pulmonary embolism			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Psychiatric disorders			
Depression Suicidal			
subjects affected / exposed	2 / 417 (0.48%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	1 / 2	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Anxiety			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Apathy			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Completed Suicide			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 1	
Stress			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Suicidal ideation			

subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Injury, poisoning and procedural complications			
Accidental overdose			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cartilage injury			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Infusion related reaction			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	1 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Jaw fracture			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Lower limb fracture			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Meniscus injury			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Skull fracture			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cardiac disorders			

Acute myocardial infarction			
subjects affected / exposed	1 / 417 (0.24%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 1	1 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Angina unstable			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Atrioventricular block second degree			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Nervous system disorders			
Multiple sclerosis relapse			
subjects affected / exposed	2 / 417 (0.48%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 2	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Seizure			
subjects affected / exposed	1 / 417 (0.24%)	2 / 417 (0.48%)	
occurrences causally related to treatment / all	0 / 1	1 / 2	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cerebral infarction			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Epilepsy			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Head Discomfort			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	1 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Hydrocephalus			



subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Presyncope			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Viith Nerve Paralysis			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Blood and lymphatic system disorders			
Spontaneous haematoma			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	1 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Gastrointestinal disorders			
Abdominal pain			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Gastritis			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Gastrointestinal inflammation			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Ileus paralytic			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Inguinal hernia			

subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Mechanical ileus			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 1	0 / 0	
Oesophagitis			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Hepatobiliary disorders			
Cholecystitis acute			
subjects affected / exposed	1 / 417 (0.24%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 1	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cholecystitis			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cholelithiasis			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Hepatitis acute			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	1 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Skin and subcutaneous tissue disorders			
Dermatitis bullous			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	1 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Urticaria			

subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	1 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Renal and urinary disorders			
Nephrolithiasis			
subjects affected / exposed	2 / 417 (0.48%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 2	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Musculoskeletal and connective tissue disorders			
Arthritis			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 2	
deaths causally related to treatment / all	0 / 0	0 / 0	
Osteoarthritis			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Vertebral Osteophyte			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Infections and infestations			
Appendicitis			
subjects affected / exposed	1 / 417 (0.24%)	3 / 417 (0.72%)	
occurrences causally related to treatment / all	1 / 1	0 / 3	
deaths causally related to treatment / all	0 / 0	0 / 0	
Pneumonia			
subjects affected / exposed	2 / 417 (0.48%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	1 / 2	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Pyelonephritis			
subjects affected / exposed	0 / 417 (0.00%)	2 / 417 (0.48%)	
occurrences causally related to treatment / all	0 / 0	1 / 2	
deaths causally related to treatment / all	0 / 0	0 / 0	

Anal abscess			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Upper respiratory tract infection			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cholecystitis infective			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cystitis			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Gastritis viral			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Injection site cellulitis			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Staphylococcal sepsis			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Tooth infection			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	1 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Urinary tract infection			

subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Viral infection			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	1 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Viral Pericarditis			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Metabolism and nutrition disorders			
Dehydration			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Hypertriglyceridaemia			
subjects affected / exposed	1 / 417 (0.24%)	0 / 417 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Hypoglycaemia			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Hypokalaemia			
subjects affected / exposed	0 / 417 (0.00%)	1 / 417 (0.24%)	
occurrences causally related to treatment / all	0 / 0	1 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	

Frequency threshold for reporting non-serious adverse events: 5 %

<b>Non-serious adverse events</b>	Interferon beta-1a	Ocrelizumab	
Total subjects affected by non-serious adverse events			
subjects affected / exposed	289 / 417 (69.30%)	309 / 417 (74.10%)	
Injury, poisoning and procedural complications			
Infusion related reaction			
subjects affected / exposed	49 / 417 (11.75%)	157 / 417 (37.65%)	
occurrences (all)	63	270	
Nervous system disorders			
Headache			
subjects affected / exposed	70 / 417 (16.79%)	60 / 417 (14.39%)	
occurrences (all)	109	87	
Dizziness			
subjects affected / exposed	23 / 417 (5.52%)	16 / 417 (3.84%)	
occurrences (all)	27	18	
General disorders and administration site conditions			
Influenza like illness			
subjects affected / exposed	92 / 417 (22.06%)	23 / 417 (5.52%)	
occurrences (all)	106	25	
Fatigue			
subjects affected / exposed	36 / 417 (8.63%)	43 / 417 (10.31%)	
occurrences (all)	47	56	
Injection site erythema			
subjects affected / exposed	53 / 417 (12.71%)	1 / 417 (0.24%)	
occurrences (all)	56	1	
Pyrexia			
subjects affected / exposed	24 / 417 (5.76%)	15 / 417 (3.60%)	
occurrences (all)	33	18	
Injection site reaction			
subjects affected / exposed	28 / 417 (6.71%)	2 / 417 (0.48%)	
occurrences (all)	28	2	
Psychiatric disorders			
Depression			
subjects affected / exposed	30 / 417 (7.19%)	34 / 417 (8.15%)	
occurrences (all)	35	37	
Insomnia			

subjects affected / exposed occurrences (all)	23 / 417 (5.52%) 24	25 / 417 (6.00%) 30	
Musculoskeletal and connective tissue disorders			
Back pain			
subjects affected / exposed	17 / 417 (4.08%)	28 / 417 (6.71%)	
occurrences (all)	18	31	
Arthralgia			
subjects affected / exposed	23 / 417 (5.52%)	21 / 417 (5.04%)	
occurrences (all)	26	24	
Myalgia			
subjects affected / exposed	27 / 417 (6.47%)	12 / 417 (2.88%)	
occurrences (all)	29	13	
Infections and infestations			
Nasopharyngitis			
subjects affected / exposed	41 / 417 (9.83%)	79 / 417 (18.94%)	
occurrences (all)	61	127	
Upper respiratory tract infection			
subjects affected / exposed	52 / 417 (12.47%)	65 / 417 (15.59%)	
occurrences (all)	87	108	
Urinary tract infection			
subjects affected / exposed	43 / 417 (10.31%)	44 / 417 (10.55%)	
occurrences (all)	52	75	
Sinusitis			
subjects affected / exposed	20 / 417 (4.80%)	27 / 417 (6.47%)	
occurrences (all)	25	35	
Influenza			
subjects affected / exposed	20 / 417 (4.80%)	24 / 417 (5.76%)	
occurrences (all)	25	30	
Bronchitis			
subjects affected / exposed	13 / 417 (3.12%)	22 / 417 (5.28%)	
occurrences (all)	15	28	

## More information

### Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? Yes

Date	Amendment
15 June 2012	<ol style="list-style-type: none"><li>1. Dosing preparation and infusion guidance were revised to simplify the preparation of infusion bags and dosing procedures.</li><li>2. Specific eligibility cut-off values for immunoglobulin M (IgM) and immunoglobulin G (IgG) and the re-treatment criteria for IgG were modified to reflect the central lab reference ranges.</li><li>3. Sites were informed of additional, optional sub-studies conducted at select centers in which subjects could be eligible to participate</li></ol>
28 March 2013	<ol style="list-style-type: none"><li>1. Inclusion of an OLE phase under the same protocol.</li><li>2. Addition of the following exploratory objectives: proportion of disease activity free subjects, defined as absence of both relapses and sustained accumulation of disability, and absence of MRI activity by Week 96; evaluation of long term safety and efficacy of ocrelizumab in the OLE study phase.</li><li>3. Clarification on how sustained disability progression was calculated</li></ol>
04 September 2014	<ol style="list-style-type: none"><li>1. An update to the Statistical Considerations and Analytical Plan section of the protocol in line with the SAP amendment to implement European Medicines Agency (EMA) Scientific Advice and to increase statistical rigor.</li><li>2. Conversion of the optional investigator-sponsored Roche-supported exploratory substudies to Roche-sponsored studies as per current policy of the sponsor</li><li>3. Revision of the pre-specified mandatory biomarker</li></ol>

Notes:

---

### Interruptions (globally)

Were there any global interruptions to the trial? No

### Limitations and caveats

None reported