Dear Dr. Patel:

Please refer to your Biologics License Application (BLA) dated and received on April 28, 2016, and your amendments, submitted under section 351(a) of the Public Health Service Act for Ocrevus (ocrelizumab) injection, 30 mg/1 mL.

We acknowledge receipt of your major amendment dated December 16, 2016, which extended the goal date by three months.

**LICENSING**

We have approved your BLA for Ocrevus (ocrelizumab) effective this date. You are hereby authorized to introduce or deliver for introduction into interstate commerce Ocrevus under your existing Department of Health and Human Services U.S. License No. 1048. Ocrevus is indicated for the treatment of adult patients with relapsing or primary progressive forms of multiple sclerosis.

**MANUFACTURING LOCATIONS**

Under this license, you are approved to manufacture ocrelizumab drug substance at Genentech, Inc., in Vacaville, CA. The final formulated product will be manufactured and filled at Roche Diagnostics GmbH in Mannheim, Germany. The drug product will be labeled and packaged at F. Hoffmann-La Roche, Ltd., in Kaiseraugst, Switzerland. You may label your product with the proprietary name, Ocrevus, and will market it as an injection in a 300 mg/10 mL (30 mg/1 mL) single-dose vial.

**DATING PERIOD**

The dating period for Ocrevus shall be 15 months from the date of manufacture when stored at 2-8°C. The date of manufacture shall be defined as the date of final sterile filtration of the
formulated drug product. The dating period for your drug substance shall be 30 months from the date of manufacture when stored at \( \leq -20^\circ C \).

**FDA LOT RELEASE**

You are not currently required to submit samples of future lots of Ocrevus to the Center for Drug Evaluation and Research (CDER) for release by the Director, CDER, under 21 CFR 610.2. We will continue to monitor compliance with 21 CFR 610.1, requiring completion of tests for conformity with standards applicable to each product prior to release of each lot.

Any changes in the manufacturing, testing, packaging, or labeling of Ocrevus, or in the manufacturing facilities, will require the submission of information to your biologics license application for our review and written approval, consistent with 21 CFR 601.12.

**APPROVAL & LABELING**

We have completed our review of this application, as amended. It is approved, effective on the date of this letter, for use as recommended in the enclosed agreed-upon labeling text.

**CONTENT OF LABELING**

As soon as possible, but no later than 14 days from the date of this letter, submit, via the FDA automated drug registration and listing system (eLIST), the content of labeling [21 601.14(b)] in structured product labeling (SPL) format, as described at [http://www.fda.gov/ForIndustry/DataStandards/StructuredProductLabeling/default.htm](http://www.fda.gov/ForIndustry/DataStandards/StructuredProductLabeling/default.htm). Content of labeling must be identical to the enclosed labeling (text for the package insert, Medication Guide). Information on submitting SPL files using eLIST may be found in the guidance for industry titled “SPL Standard for Content of Labeling Technical Qs and As” at [http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM072392.pdf](http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM072392.pdf).

The SPL will be accessible via publicly available labeling repositories.

**CARTON AND IMMEDIATE CONTAINER LABELS**

Submit final printed carton and container labels that are identical to the enclosed, agreed-upon carton and immediate container labels as soon as they are available, but no more than 30 days after they are printed. Please submit these labels electronically according to the guidance for industry titled “Providing Regulatory Submissions in Electronic Format — Certain Human Pharmaceutical Product Applications and Related Submissions Using the eCTD Specifications (May 2015)”.

Alternatively, you may submit 12 paper copies, with 6 of the copies individually mounted on heavyweight paper or similar material. For administrative purposes, designate this submission “Final Printed Carton and Container Labels for approved BLA 761053.” Approval of this submission by FDA is not required before the labeling is used.
ADVISORY COMMITTEE

Your application for ocrelizumab was not referred to an FDA advisory committee because the safety profile is acceptable for the treatment of multiple sclerosis and the clinical trial design is similar to that of trials of previously approved drugs for the treatment of relapsing forms of multiple sclerosis.

REQUIRED PEDIATRIC ASSESSMENTS

Under the Pediatric Research Equity Act (PREA) (21 U.S.C. 355c), all applications for new active ingredients, new indications, new dosage forms, new dosing regimens, or new routes of administration are required to contain an assessment of the safety and effectiveness of the product for the claimed indications in pediatric patients unless this requirement is waived, deferred, or inapplicable.

Primary Progressive Multiple Sclerosis

We are waiving the pediatric study requirement for ages birth up to 17 years because necessary studies are impossible or highly impracticable. This decision is because of the small number of patients in this age group with primary progressive multiple sclerosis.

Relapsing Forms of Multiple Sclerosis

We are waiving the pediatric study requirement for ages birth up to 10 years because necessary studies are impossible or highly impracticable. This decision is because of the small number of patients in this age group with relapsing forms of multiple sclerosis.

In addition, we are deferring submission of your pediatric study for ages 10 up to 17 years because this product is ready for approval for use in adults and the pediatric study has not been completed.

Your deferred pediatric study required by section 505B(a) of the Federal Food, Drug, and Cosmetic Act (FDCA) is a required postmarketing study. The status of this postmarketing study must be reported annually according to 21 CFR 601.28 and section 505B(a)(3)(B) of the FDCA. This required study is listed below.

3194-1 Conduct a two-part study of ocrelizumab in pediatric patients with relapsing multiple sclerosis (RMS) at least 10 years and less than 17 years of age. Part A is an open-label study of the safety, tolerability, pharmacokinetics (PK), and pharmacodynamics (PD) of ocrelizumab in pediatric patients. Part A will include two cohorts, one with body weights less than 40 kg and the other with body weights 40 kg or more. The objective of Part A is to determine a dose of ocrelizumab that will result in PK and PD effects that are comparable to those of a 600 mg dose (300 mg given twice 14 days apart) in adult patients with RMS. Safety assessments will continue for at least 2 years after the last dose of
ocrelizumab. Part B is a randomized, double-blind, parallel-group study to evaluate the efficacy and safety of ocrelizumab compared to an appropriate comparator.

Draft Protocol Submission: 02/2019
Final Protocol Submission: 09/2019
Study Completion: 07/2023
Final Report Submission: 01/2024

Submit the protocol(s) associated with this required postmarketing study to your IND 100593, with a cross-reference letter to this BLA.

Reports of this required pediatric postmarketing study must be submitted as a BLA or as a supplement to your approved BLA with the proposed labeling changes you believe are warranted based on the data derived from these studies. When submitting the reports, please clearly mark your submission "SUBMISSION OF REQUIRED PEDIATRIC ASSESSMENTS" in large font, bolded type at the beginning of the cover letter of the submission.

POSTMARKETING REQUIREMENTS (PMRs) UNDER 505(o)

Section 505(o)(3) of the FDCA authorizes FDA to require holders of approved drug and biological product applications to conduct postmarketing studies and clinical trials for certain purposes, if FDA makes certain findings required by the statute.

We have determined that an analysis of spontaneous postmarketing adverse events reported under subsection 505(k)(1) of the FDCA will not be sufficient to assess a signal of a serious risk of breast cancer and malignancies overall related to the use of Ocrevus (ocrelizumab) or to identify an unexpected serious risk of adverse maternal, fetal, and infant outcomes resulting from the use of Ocrevus (ocrelizumab) during pregnancy.

Furthermore, the new pharmacovigilance system that FDA is required to establish under section 505(k)(3) of the FDCA will not be sufficient to assess these serious risks.

Therefore, based on appropriate scientific data, FDA has determined that you are required to conduct the following:

3194-2 Conduct a prospective longitudinal observational study in adult patients with relapsing multiple sclerosis and primary progressive multiple sclerosis exposed to Ocrevus (ocrelizumab) to determine the incidence and mortality rates of breast cancer and all malignancies. All patients enrolled in the study should be followed for a minimum of 5 years or until death following their first exposure to Ocrevus. The protocol must specify two appropriate populations to which the observed incidence and mortality rates will be compared.
The timetable you submitted on March 10, 2017, states that you will conduct this study according to the following schedule:

Draft Protocol Submission: 08/2017  
Final Protocol Submission: 11/2017  
Study Completion: 11/2029  
Final Report Submission: 11/2030

3194-3 Conduct prospective pregnancy exposure registry cohort analyses in the United States that compare the maternal, fetal, and infant outcomes of women with multiple sclerosis exposed to ocrelizumab during pregnancy with two unexposed control populations: one consisting of women with multiple sclerosis who have not been exposed to ocrelizumab before or during pregnancy and the other consisting of women without multiple sclerosis. The registry will identify and record pregnancy complications, major and minor congenital malformations, spontaneous abortions, stillbirths, elective terminations, preterm births, small-for-gestational-age births, and any other adverse outcomes, including postnatal growth and development. Outcomes will be assessed throughout pregnancy. Infant outcomes, including effects on postnatal growth and development, will be assessed through at least the first year of life.

The timetable you submitted on March 10, 2017, states that you will conduct this study according to the following schedule:

Draft Protocol Submission: 07/2017  
Final Protocol Submission: 10/2017  
Study Completion: 10/2028  
Final Report Submission: 10/2029

3194-4 Conduct a pregnancy outcomes study using a different study design than provided for in PMR 3194-3 (for example, a retrospective cohort study using claims or electronic medical record data or a case control study) to assess major congenital malformations, spontaneous abortions, stillbirths, and small-for-gestational-age births in women exposed to ocrelizumab during pregnancy compared to an unexposed control population.

The timetable you submitted on March 10, 2017, states that you will conduct this study according to the following schedule:

Draft Protocol Submission: 07/2017  
Final Protocol Submission: 10/2017  
Study Completion: 03/2023  
Final Report Submission: 03/2024
An expanded pre-and postnatal development study (including T-cell dependent antibody response [TDAR]) of Ocrevus (ocrelizumab) in nonhuman primate.

The timetable you submitted on March 24, 2017, states that you will conduct this study according to the following schedule:

- Draft Protocol Submission: 05/2017
- Final Protocol Submission: 11/2017
- Study Completion: 05/2019
- Final Report Submission: 12/2019

Submit the protocols associated with these PMRs to your IND 100593, with a cross-reference letter to this BLA. Submit all postmarketing final reports to your BLA. Prominently identify the submission with the following wording in bold capital letters at the top of the first page of the submission, as appropriate: “Required Postmarketing Protocol Under 505(o),” “Required Postmarketing Final Report Under 505(o),” “Required Postmarketing Correspondence Under 505(o).”

Submission of the protocols for required postmarketing observational studies to your IND is for purposes of administrative tracking only. These studies do not constitute clinical investigations pursuant to 21 CFR 312.3(b) and therefore are not subject to the IND requirements under 21 CFR part 312 or FDA’s regulations under 21 CFR parts 50 (Protection of Human Subjects) and 56 (Institutional Review Boards).

Section 505(o)(3)(E)(ii) of the FDCA requires you to report periodically on the status of any study or clinical trial required under this section. This section also requires you to periodically report to FDA on the status of any study or clinical trial otherwise undertaken to investigate a safety issue. Section 506B of the FDCA, as well as 21 CFR 601.70, requires you to report annually on the status of any postmarketing commitments or required studies or clinical trials.

FDA will consider the submission of your annual report under section 506B and 21 CFR 601.70 to satisfy the periodic reporting requirement under section 505(o)(3)(E)(ii) provided that you include the elements listed in 505(o) and 21 CFR 601.70. We remind you that to comply with 505(o), your annual report must also include a report on the status of any study or clinical trial otherwise undertaken to investigate a safety issue. Failure to submit an annual report for studies or clinical trials required under 505(o) on the date required will be considered a violation of FDCA section 505(o)(3)(E)(ii) and could result in enforcement action.

**REQUESTED PHARMACOVIGILANCE**

We request that you perform postmarketing surveillance and enhanced pharmacovigilance for pancreatitis, cholecystitis and cholelithiasis, and serious and opportunistic infections, including progressive multifocal leukoencephalopathy (PML) and hepatitis B reactivation after exposure to ocrelizumab. Report all confirmed or possible cases to the BLA in an expedited fashion and include comprehensive summaries for these events as part of your required postmarketing safety reports [e.g., periodic safety update reports (PSURs)].

Reference ID: 4076448
POSTMARKETING COMMITMENTS NOT SUBJECT TO THE REPORTING REQUIREMENTS UNDER SECTION 506B

We remind you of your postmarketing commitments:

3194-6 Perform a shipping study to confirm validation of the commercial ocrelizumab drug product shipping conditions. The study will be performed using representative shipping routes and drug product that has been stored for an extended period. The study will include testing of pre- and post-shipping samples for product quality (purity by SE-HPLC, reduced and non-reduced CE-SDS, IE-HPLC, sub-visible particles, visible particles, clarity/opalescence, and potency) and confirmation that the commercial shipping configuration minimizes physical damage to drug product containers.

The timetable you submitted on March 8, 2017, states that you will conduct this study according to the following schedule:

Final Report Submission: 08/2017

3194-7 Confirm validation of the Antibody-Dependent Cellular Cytotoxicity assay (Method Q12764). The validation study will be performed to demonstrate suitability of the method to be used as a potency assay for drug substance release testing.

The timetable you submitted on March 8, 2017, states that you will conduct this study according to the following schedule:

Final Report Submission: 06/2017

3194-8 Confirm validation of the Capillary Electrophoresis Glycan Analysis assay (Method Q12756). The validation study will be performed to demonstrate suitability of the method to be used to assess levels of high-mannose 5 glycan (Man-5) for drug substance release testing.

The timetable you submitted on March 8, 2017, states that you will conduct this study according to the following schedule:

Final Report Submission: 06/2017

3194-9 Confirm validation of the Reversed-Phase Ultra-High-Performance Liquid Chromatography assay (Method Q13406). The validation study will be performed to demonstrate suitability of the method to be used to assess levels of Fc oxidation for drug substance release testing.
The timetable you submitted on March 8, 2017, states that you will conduct this study according to the following schedule:

**Final Report Submission:** 06/2017

3194-10 Confirm validation of the Polysorbate 20 assay (Method SAM-0106429) or develop, validate, and implement an alternative assay to evaluate Polysorbate 20. The validation study will be performed to demonstrate suitability of the method for use in detecting degradation of Polysorbate 20 during drug product storage and to be included in the drug product release specifications. The final validation report and updated specifications, if applicable, will be submitted to the BLA.

The timetable you submitted on March 8, 2017, states that you will conduct this study according to the following schedule:

**Final Report Submission:** 05/2017

3194-11 Manufacture, qualify, and implement new primary and secondary reference standards that are representative of the pivotal clinical study materials. The qualification protocol will be submitted as a PAS, and the final qualification report will be submitted to the BLA.

The timetable you submitted on March 14, 2018, states that you will conduct this study according to the following schedule:

**Final Protocol Submission:** 05/2017
**Final Report Submission:** 03/2018

3194-12 Perform a leachable study to evaluate the drug product container closure system through the end of shelf-life when stored under the recommended conditions. Testing will be performed at regular intervals and will include appropriate methods to detect, identify, and quantify organic non-volatile (e.g., HPLC-UV-MS), volatile (e.g., headspace GC-MS) and semi-volatile (e.g., GC-MS) species and metals (e.g., ICP-MS). Study results will be updated annually in the BLA Annual Report. The complete data and risk evaluation for potential impact of leachables on product safety and quality will be submitted to the BLA.

The timetable you submitted on March 8, 2017, states that you will conduct this study according to the following schedule:

**Final Report Submission:** 05/2019

Reference ID: 4076448
Confirm that the updates to the ocrelizumab drug substance manufacturing process and controls lead to the manufacturing of drug substance with critical product quality attributes consistent with those of the drug substance used to manufacture pivotal clinical study drug product.

The timetable you submitted on March 8, 2017, states that you will conduct this study according to the following schedule:

- **Final Protocol Submission:** 04/2017
- **Final Report Submission:** 03/2018

Submit chemistry, manufacturing, and controls protocols associated with these PMCs and all postmarketing final reports to this BLA. In addition, under 21 CFR 601.70 you should include a status summary of each commitment in your annual progress report of postmarketing studies to this BLA. The status summary should include expected summary completion and final report submission dates, any changes in plans since the last annual report, and, for clinical studies/trials, number of patients entered into each study/trial. All submissions, including supplements, relating to these postmarketing commitments should be prominently labeled “Postmarketing Commitment Protocol,” “Postmarketing Commitment Final Report,” or “Postmarketing Commitment Correspondence.”

**PROMOTIONAL MATERIALS**

You may request advisory comments on proposed introductory advertising and promotional labeling. To do so, submit, in triplicate, a cover letter requesting advisory comments, the proposed materials in draft or mock-up form with annotated references, and the package insert to:

- Food and Drug Administration
- Center for Drug Evaluation and Research
- Office of Prescription Drug Promotion
- 5901-B Ammendale Road
- Beltsville, MD 20705-1266

REPORTING REQUIREMENTS

You must submit adverse experience reports under the adverse experience reporting requirements for licensed biological products (21 CFR 600.80). You should submit postmarketing adverse experience reports to:

Food and Drug Administration
Center for Drug Evaluation and Research
Central Document Room
5901-B Ammendale Road
Beltsville, MD 20705-1266

Prominently identify all adverse experience reports as described in 21 CFR 600.80.

You must submit distribution reports under the distribution reporting requirements for licensed biological products (21 CFR 600.81).

You must submit reports of biological product deviations under 21 CFR 600.14. You should promptly identify and investigate all manufacturing deviations, including those associated with processing, testing, packing, labeling, storage, holding, and distribution. If the deviation involves a distributed product, may affect the safety, purity, or potency of the product, and meets the other criteria in the regulation, you must submit a report on Form FDA-3486 to:

Food and Drug Administration
Center for Drug Evaluation and Research
Division of Compliance Risk Management and Surveillance
5901-B Ammendale Road
Beltsville, MD 20705-1266

Biological product deviations, sent by courier or overnight mail, should be addressed to:

Food and Drug Administration
Center for Drug Evaluation and Research
Division of Compliance Risk Management and Surveillance
10903 New Hampshire Avenue, Bldg. 51, Room 4206
Silver Spring, MD 20903

Reference ID: 4076448
**MEDWATCH-TO-MANUFACTURER PROGRAM**

The MedWatch-to-Manufacturer Program provides manufacturers with copies of serious adverse event reports that are received directly by the FDA. New molecular entities and important new biologics qualify for inclusion for three years after approval. Your firm is eligible to receive copies of reports for this product. To participate in the program, please see the enrollment instructions and program description details at [http://www.fda.gov/Safety/MedWatch/HowToReport/ucm166910.htm](http://www.fda.gov/Safety/MedWatch/HowToReport/ucm166910.htm).

**POST-APPROVAL FEEDBACK MEETING**

New molecular entities and new biologics qualify for a post-approval feedback meeting. Such meetings are used to discuss the quality of the application and to evaluate the communication process during drug development and marketing application review. The purpose is to learn from successful aspects of the review process and to identify areas that could benefit from improvement. If you would like to have such a meeting with us, call the Regulatory Project Manager for this application.

If you have any questions, call LCDR Nahleen Lopez, Regulatory Project Manager, at (240) 402-2659.

Sincerely,

{See appended electronic signature page}

Robert Temple  
Deputy Director (Acting)  
Office of Drug Evaluation I  
Center for Drug Evaluation and Research

ENCLOSURES:  
Content of Labeling  
Carton and Container Labels
OCREVUS™ (ocrelizumab) injection, for intravenous use
Initial U.S. Approval: 2017

INDICATIONS AND USAGE
OCREVUS is a CD20-directed cytolytic antibody indicated for the treatment of patients with relapsing or primary progressive forms of multiple sclerosis (1)

DOSE AND ADMINISTRATION
- Hepatitis B virus screening is required before the first dose (2.1)
- Pre-medicate with methylprednisolone (or an equivalent corticosteroid) and an antihistamine (e.g., diphenhydramine) prior to each infusion (2.2)
- Administer OCREVUS by intravenous infusion
  - Start dose: 300 mg intravenous infusion, followed two weeks later by a second 300 mg intravenous infusion (2.3)
  - Subsequent doses: 600 mg intravenous infusion every 6 months (2.3)
- Must be diluted prior to administration (2.3, 2.6)
- Monitor patients closely during and for at least one hour after infusion (2.3, 2.5)

DOSE FORMS AND STRENGTHS
- Injection: 300 mg/10 mL (30 mg/mL) in a single-dose vial. (3)

CONTRAINDICATIONS
- Active hepatitis B virus infection (4)
- History of life-threatening infusion reaction to OCREVUS (4)

ADVERSE REACTIONS
The most common adverse reactions were:
- RMS (incidence ≥10% and > REBIF): upper respiratory tract infections and infusion reactions (6.1)
- PPMS (incidence ≥10% and > placebo): upper respiratory tract infections, infusion reactions, skin infections, and lower respiratory tract infections (6.1)

To report SUSPECTED ADVERSE REACTIONS, contact Genentech at 1-888-835-2555 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

USE IN SPECIFIC POPULATIONS
- Pregnancy: Based on animal data, may cause fetal harm. (8.1)

See 17 for PATIENT COUNSELING INFORMATION and Medication Guide.

Revised: 3/2017
FULL PRESCRIBING INFORMATION

1 INDICATIONS AND USAGE

OCREVUS is indicated for the treatment of adult patients with relapsing or primary progressive forms of multiple sclerosis.

2 DOSAGE AND ADMINISTRATION

2.1 Assessments Prior to First Dose of OCREVUS

Hepatitis B Virus Screening

Prior to initiating OCREVUS, perform Hepatitis B virus (HBV) screening. OCREVUS is contraindicated in patients with active HBV confirmed by positive results for HBsAg and anti-HBV tests. For patients who are negative for surface antigen [HBsAg] and positive for HB core antibody [HBcAb+] or are carriers of HBV [HBsAg+], consult liver disease experts before starting and during treatment [see Warnings and Precautions (5.2)].

Vaccinations

Because vaccination with live-attenuated or live vaccines is not recommended during treatment and after discontinuation until B-cell repletion, administer all necessary immunizations according to immunization guidelines at least 6 weeks prior to initiation of OCREVUS [see Warnings and Precautions (5.2) and Clinical Pharmacology (12.2)].

2.2 Preparation Before Every Infusion

Infection Assessment

Prior to every infusion of OCREVUS, determine whether there is an active infection. In case of active infection, delay infusion of OCREVUS until the infection resolves [see Warnings and Precautions (5.2)].

Recommended Premedication

Pre-medicate with 100 mg of methylprednisolone (or an equivalent corticosteroid) administered intravenously approximately 30 minutes prior to each OCREVUS infusion to reduce the frequency and severity of infusion reactions [see Warnings and Precautions (5.1)]. Pre-medicate with an antihistamine (e.g., diphenhydramine) approximately 30-60 minutes prior to each OCREVUS infusion to further reduce the frequency and severity of infusion reactions.

The addition of an antipyretic (e.g., acetaminophen) may also be considered.

2.3 Recommended Dosage and Dose Administration

Administer OCREVUS under the close supervision of an experienced healthcare professional with access to appropriate medical support to manage severe reactions such as serious infusion reactions.

- Initial dose: 300 mg intravenous infusion, followed two weeks later by a second 300 mg intravenous infusion.
- Subsequent doses: single 600 mg intravenous infusion every 6 months.
- Observe the patient for at least one hour after the completion of the infusion [see Warnings and Precautions (5.1)].
## Table 1  Recommended Dose, Infusion Rate, and Infusion Duration for RMS and PPMS

<table>
<thead>
<tr>
<th>Amount and Volume¹</th>
<th>Infusion Rate and Duration³</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Dose</strong></td>
<td></td>
</tr>
<tr>
<td>(two infusions)</td>
<td></td>
</tr>
<tr>
<td>Infusion 1</td>
<td>300 mg in 250 mL</td>
</tr>
</tbody>
</table>
| • Start at 30 mL per hour
| • Increase by 30 mL per hour every 30 minutes
| • Maximum: 180 mL per hour
| • Duration: 2.5 hours or longer |
| Infusion 2         | 300 mg in 250 mL            |
| (2 weeks later)    |                             |
| **Subsequent Doses** |                           |
| (one infusion)     |                             |
| One infusion       | 600 mg in 500 mL           |
| every 6 months²    | • Start at 40 mL per hour
|                   | • Increase by 40 mL per hour every 30 minutes
|                   | • Maximum: 200 mL per hour
|                   | • Duration: 3.5 hours or longer |

¹ Solutions of OCREVUS for intravenous infusion are prepared by dilution of the drug product into an infusion bag containing 0.9% Sodium Chloride Injection, to a final drug concentration of approximately 1.2 mg/mL.

² Administer the first Subsequent Dose 6 months after Infusion 1 of the Initial Dose.

³ Infusion time may take longer if the infusion is interrupted or slowed [see Dosage and Administration (2.5)].

### 2.4 Delayed or Missed Doses

If a planned infusion of OCREVUS is missed, administer OCREVUS as soon as possible; do not wait until the next scheduled dose. Reset the dose schedule to administer the next sequential dose 6 months after the missed dose is administered. Doses of OCREVUS must be separated by at least 5 months [see Dosage and Administration (2.3)].

### 2.5 Dose Modifications Because of Infusion Reactions

Dose modifications in response to infusion reactions depends on the severity.

**Life-threatening Infusion Reactions**

Immediately stop and permanently discontinue OCREVUS if there are signs of a life-threatening or disabling infusion reaction [see Warnings and Precautions (5.1)]. Provide appropriate supportive treatment.

**Severe Infusion Reactions**

Immediately interrupt the infusion and administer appropriate supportive treatment, as necessary [see Warnings and Precautions (5.1)]. Restart the infusion only after all symptoms have resolved. When restarting, begin at half of the infusion rate at the time of onset of the infusion reaction [see Dosage and Administration (2.2)]. If this rate is tolerated, increase the rate as described in Table 1. This change in rate will increase the total duration of the infusion but not the total dose.

**Mild to Moderate Infusion Reactions**

Reduce the infusion rate to half the rate at the onset of the infusion reaction and maintain the reduced rate for at least 30 minutes [see Warnings and Precautions (5.1)]. If this rate is tolerated, increase the rate as described in Table 1. This change in rate will increase the total duration of the infusion but not the total dose.

### 2.6 Preparation and Storage of the Dilute Solution for Infusion

**Preparation**

OCREVUS must be prepared by a healthcare professional using aseptic technique.

Visually inspect for particulate matter and discoloration prior to administration. Do not use the solution if discolored or if the solution contains discrete foreign particulate matter. Do not shake.

Withdraw intended dose and further dilute into an infusion bag containing 0.9% Sodium Chloride Injection, to a final drug concentration of approximately 1.2 mg/mL.
Withdraw 10 mL (300 mg) of OCREVUS and inject into 250 mL
Withdraw 20 mL (600 mg) of OCREVUS and inject into 500 mL

Do not use other diluents to dilute OCREVUS since their use has not been tested. The product contains no preservative and is intended for single use only.

Storage of Infusion Solution

Prior to the start of the intravenous infusion, the content of the infusion bag should be at room temperature.

Use the prepared infusion solution immediately. If not used immediately, store up to 24 hours in the refrigerator at 2°C–8°C (36°F–46°F) and 8 hours at room temperature up to 25°C (77°F), which includes infusion time. In the event an intravenous infusion cannot be completed the same day, discard the remaining solution.

No incompatibilities between OCREVUS and polyvinyl chloride (PVC) or polyolefin (PO) bags and intravenous (IV) administration sets have been observed.

Administration

Administer the diluted infusion solution through a dedicated line using an infusion set with a 0.2 or 0.22 micron in-line filter.

3 DOSAGE FORMS AND STRENGTHS

Injection: 300 mg/10 mL (30 mg/mL) clear or slightly opalescent, and colorless to pale brown solution in a single-dose vial.

4 CONTRAINDICATIONS

OCREVUS is contraindicated in patients with:

- Active HBV infection [see Dosage and Administration (2.6) and Warnings and Precautions (5.2)]
- A history of life-threatening infusion reaction to OCREVUS [see Warnings and Precautions (5.1)]

5 WARNINGS AND PRECAUTIONS

5.1 Infusion Reactions

OCREVUS can cause infusion reactions, which can include pruritus, rash, urticaria, erythema, bronchospasm, throat irritation, oropharyngeal pain, dyspnea, pharyngeal or laryngeal edema, flushing, hypotension, pyrexia, fatigue, headache, dizziness, nausea, and tachycardia. In multiple sclerosis (MS) clinical trials, the incidence of infusion reactions in OCREVUS-treated patients [who received methylprednisolone (or an equivalent steroid) and possibly other pre-medication to reduce the risk of infusion reactions prior to each infusion] was 34 to 40%, with the highest incidence with the first infusion. There were no fatal infusion reactions, but 0.3% of OCREVUS-treated MS patients experienced infusion reactions that were serious, some requiring hospitalization.

Observe patients treated with OCREVUS for infusion reactions during the infusion and for at least one hour after completion of the infusion. Inform patients that infusion reactions can occur up to 24 hours after the infusion.

Reducing the Risk of Infusion Reactions and Managing Infusion Reactions

Administer pre-medication (e.g., methylprednisolone or an equivalent corticosteroid, and an antihistamine) to reduce the frequency and severity of infusion reactions. The addition of an antipyretic (e.g., acetaminophen) may also be considered [see Dosage and Administration (2.3)].
Management recommendations for infusion reactions depend on the type and severity of the reaction [see Dosage and Administration (2.5)]. For life-threatening infusion reactions, immediately and permanently stop OCREVUS and administer appropriate supportive treatment. For less severe infusion reactions, management may involve temporarily stopping the infusion, reducing the infusion rate, and/or administering symptomatic treatment.

5.2 Infections

A higher proportion of OCREVUS-treated patients experienced infections compared to patients taking REBIF or placebo. In RMS trials, 58% of OCREVUS-treated patients experienced one or more infections compared to 52% of REBIF-treated patients. In the PPMS trial, 70% of OCREVUS-treated patients experienced one or more infections compared to 68% of patients on placebo. OCREVUS increased the risk for upper respiratory tract infections, lower respiratory tract infections, skin infections, and herpes-related infections [see Adverse Reactions (6.1)]. OCREVUS was not associated with an increased risk of serious infections in MS patients. Delay OCREVUS administration in patients with an active infection until the infection is resolved.

Respiratory Tract Infections

A higher proportion of OCREVUS-treated patients experienced respiratory tract infections compared to patients taking REBIF or placebo. In RMS trials, 40% of OCREVUS-treated patients experienced upper respiratory tract infections compared to 33% of REBIF-treated patients, and 8% of OCREVUS-treated patients experienced lower respiratory tract infections compared to 5% of REBIF-treated patients. In the PPMS trial, 49% of OCREVUS-treated patients experienced upper respiratory tract infections compared to 43% of patients on placebo and 10% of OCREVUS-treated patients experienced lower respiratory tract infections compared to 9% of patients on placebo. The infections were predominantly mild to moderate and consisted mostly of upper respiratory tract infections and bronchitis.

Herpes

In active-controlled (RMS) clinical trials, herpes infections were reported more frequently in OCREVUS-treated patients than in REBIF-treated patients, including herpes zoster (2.1% vs. 1.0%), herpes simplex (0.7% vs. 0.1%), oral herpes (3.0% vs. 2.2%), genital herpes (0.1% vs. 0%), and herpes virus infection (0.1% vs. 0%). Infections were predominantly mild to moderate in severity. There were no reports of disseminated herpes.

In the placebo-controlled (PPMS) clinical trial, oral herpes was reported more frequently in the OCREVUS-treated patients than in the patients on placebo (2.7% vs 0.8%).

Progressive Multifocal Leukoencephalopathy (PML)

PML is an opportunistic viral infection of the brain caused by the John Cunningham (JC) virus that typically only occurs in patients who are immunocompromised, and that usually leads to death or severe disability. Although no cases of PML were identified in OCREVUS clinical trials, JC virus infection resulting in PML has been observed in patients treated with other anti-CD20 antibodies and other MS therapies and has been associated with some risk factors (e.g., immunocompromised patients, polytherapy with immunosuppressants). At the first sign or symptom suggestive of PML, withhold OCREVUS and perform an appropriate diagnostic evaluation. MRI findings may be apparent before clinical signs or symptoms. Typical symptoms associated with PML are diverse, progress over days to weeks, and include progressive weakness on one side of the body or clumsiness of limbs, disturbance of vision, and changes in thinking, memory, and orientation leading to confusion and personality changes.

Hepatitis B Virus (HBV) Reactivation

There were no reports of hepatitis B reactivation in MS patients treated with OCREVUS. Fulminant hepatitis, hepatic failure, and death caused by HBV reactivation have occurred in patients treated with other anti-CD20 antibodies. Perform HBV screening in all patients before initiation of treatment with OCREVUS. Do not administer OCREVUS to patients with active HBV confirmed by positive results for HBsAg and anti-HB tests.
For patients who are negative for surface antigen [HBsAg] and positive for HB core antibody [HBcAb+] or are carriers of HBV [HBsAg+], consult liver disease experts before starting and during treatment.

Possible Increased Risk of Immunosuppressant Effects with Other Immunosuppressants

When initiating OCREVUS after an immunosuppressive therapy or initiating an immunosuppressive therapy after OCREVUS, consider the potential for increased immunosuppressive effects [see Drug Interactions (7.1) and Clinical Pharmacology (12.1, 12.2)]. OCREVUS has not been studied in combination with other MS therapies.

Vaccinations

Administer all immunizations according to immunization guidelines at least 6 weeks prior to initiation of OCREVUS.

The safety of immunization with live or live-attenuated vaccines following OCREVUS therapy has not been studied, and vaccination with live-attenuated or live vaccines is not recommended during treatment and until B-cell repletion [see Clinical Pharmacology (12.2)].

No data are available on the effects of live or non-live vaccination in patients receiving OCREVUS.

5.3 Malignancies

An increased risk of malignancy with OCREVUS may exist. In controlled trials, malignancies, including breast cancer, occurred more frequently in OCREVUS-treated patients. Breast cancer occurred in 6 of 781 females treated with OCREVUS and none of 668 females treated with REBIF or placebo. Patients should follow standard breast cancer screening guidelines.

6 ADVERSE REACTIONS

The following serious adverse reactions are discussed in greater detail in other sections of the labeling:

- Infusion Reactions [see Warnings and Precautions (5.1)]
- Infections [see Warnings and Precautions (5.2)]
- Malignancies [see Warnings and Precautions (5.3)]

6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reactions rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in clinical practice.

The safety of OCREVUS has been evaluated in 1311 patients across MS clinical studies, which included 825 patients in active-controlled clinical trials in patients with relapsing forms of MS (RMS) and 486 patients in a placebo-controlled study in patients with primary progressive MS (PPMS).

Adverse Reactions in Patients with Relapsing Forms of MS

In active-controlled clinical trials (Study 1 and Study 2), 825 patients with RMS received OCREVUS 600 mg intravenously every 24 weeks (initial treatment was given as two separate 300 mg infusions at Weeks 0 and 2) [see Clinical Studies (14.1)]. The overall exposure in the 96-week controlled treatment periods was 1448 patient-years.

The most common adverse reactions in RMS trials (incidence ≥ 10%) were upper respiratory tract infections and infusion reactions. Table 2 summarizes the adverse reactions that occurred in RMS trials (Study 1 and Study 2).

Table 2: Adverse Reactions in Adult Patients with RMS with an Incidence of at least 5% for OCREVUS and Higher than REBIF
Adverse Reactions

### Studies 1 and 2

<table>
<thead>
<tr>
<th>Adverse Reactions</th>
<th>OCREVUS 600 mg IV Every 24 Weeks(^1) (n=825)</th>
<th>REBIF 44 mcg SQ 3 Times per Week (n=826)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Upper respiratory tract infections</td>
<td>40</td>
<td>33</td>
</tr>
<tr>
<td>Infusion reactions</td>
<td>34</td>
<td>10</td>
</tr>
<tr>
<td>Depression</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Lower respiratory tract infections</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Back pain</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Herpes virus-associated infections</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Pain in extremity</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

\(^1\) The first dose was given as two separate 300 mg infusions at Weeks 0 and 2.

### Adverse Reactions in Patients with Primary Progressive MS

In a placebo-controlled clinical trial (Study 3), a total of 486 patients with PPMS received one course of OCREVUS (600 mg of OCREVUS administered as two 300 mg infusions two weeks apart) given intravenously every 24 weeks and 239 patients received placebo intravenously [see Clinical Studies (14.2)]. The overall exposure in the controlled treatment period was 1416 patient-years, with median treatment duration of 3 years.

The most common adverse reactions in the PPMS trial (incidence ≥ 10%) were upper respiratory tract infections, infusion reactions, skin infections, and lower respiratory tract infections. Table 3 summarizes the adverse reactions that occurred in the PPMS trial (Study 3).

**Table 3  Adverse Reactions in Adult Patients with PPMS with an Incidence of at least 5% for OCREVUS and Higher than Placebo**

<table>
<thead>
<tr>
<th>Adverse Reactions</th>
<th>Study 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OCREVUS 600 mg IV Every 24 Weeks(^1) (n=486)</td>
</tr>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Upper respiratory tract infections</td>
<td>49</td>
</tr>
<tr>
<td>Infusion reactions</td>
<td>40</td>
</tr>
<tr>
<td>Skin infections</td>
<td>14</td>
</tr>
<tr>
<td>Lower respiratory tract infections</td>
<td>10</td>
</tr>
<tr>
<td>Cough</td>
<td>7</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>6</td>
</tr>
<tr>
<td>Edema peripheral</td>
<td>6</td>
</tr>
<tr>
<td>Herpes virus associated infections</td>
<td>5</td>
</tr>
</tbody>
</table>

\(^1\) One dose of OCREVUS (600 mg administered as two 300 mg infusions two weeks apart)

### Laboratory Abnormalities

**Decreased Immunoglobulins**

OCREVUS decreased total immunoglobulins with the greatest decline seen in IgM levels. In MS clinical trials, there was no apparent association between immunoglobulin decrease and risk for serious infections.
In the active-controlled (RMS) trials (Study 1 and Study 2), the proportion of patients at baseline reporting IgG, IgA, and IgM below the lower limit of normal (LLN) in OCREVUS-treated patients was 0.5%, 1.5%, and 0.1%, respectively. Following treatment, the proportion of OCREVUS-treated patients reporting IgG, IgA, and IgM below the LLN at 96 weeks was 1.5%, 2.4%, and 16.5%, respectively.

In the placebo-controlled (PPMS) trial (Study 3), the proportion of patients at baseline reporting IgG, IgA, and IgM below the LLN in OCREVUS-treated patients was 0.0%, 0.2%, and 0.2%, respectively. Following treatment, the proportion of OCREVUS-treated patients reporting IgG, IgA, and IgM below the LLN at 120 weeks was 1.1%, 0.5%, and 15.5%, respectively.

**Decreased Neutrophil Levels**

In the PPMS clinical trial (Study 3), decreased neutrophil counts occurred in 13% of OCREVUS-treated patients compared to 10% in placebo patients. The majority of the decreased neutrophil counts were only observed once for a given patient treated with OCREVUS and were between LLN - 1.5 x 10^9/L and 1.0 x 10^9/L. Overall, 1% of the patients in the OCREVUS group had neutrophil counts less than 1.0 x 10^9/L and these were not associated with an infection.

**6.2 Immunogenicity**

As with all therapeutic proteins, there is potential for immunogenicity. Immunogenicity data are highly dependent on the sensitivity and specificity of the test methods used. Additionally, the observed incidence of a positive result in a test method may be influenced by several factors, including sample handling, timing of sample collection, drug interference, concomitant medication, and the underlying disease. Therefore, comparison of the incidence of antibodies to OCREVUS with the incidence of antibodies to other products may be misleading.

Patients in MS trials (Study 1, Study 2, and Study 3) were tested at multiple time points (baseline and every 6 months post-treatment for the duration of the trial) for anti-drug antibodies (ADAs). Out of 1311 patients treated with OCREVUS, 12 (~1%) tested positive for ADAs, of which 2 patients tested positive for neutralizing antibodies. These data are not adequate to assess the impact of ADAs on the safety and efficacy of OCREVUS.

**7 DRUG INTERACTIONS**

**7.1 Immunosuppressive or Immune-Modulating Therapies**

The concomitant use of OCREVUS and other immune-modulating or immunosuppressive therapies, including immunosuppressant doses of corticosteroids, is expected to increase the risk of immunosuppression. Consider the risk of additive immune system effects when coadministering immunosuppressive therapies with OCREVUS. When switching from drugs with prolonged immune effects, such as daclizumab, fingolimod, natalizumab, teriflunomide, or mitoxantrone, consider the duration and mode of action of these drugs because of additive immunosuppressive effects when initiating OCREVUS [see Warnings and Precautions (5.2)].

**8 USE IN SPECIFIC POPULATIONS**

**8.1 Pregnancy**

**Risk Summary**

There are no adequate data on the developmental risk associated with use of OCREVUS in pregnant women. There are no data on B-cell levels in human neonates following maternal exposure to OCREVUS. However, transient peripheral B-cell depletion and lymphocytopenia have been reported in infants born to mothers exposed to other anti-CD20 antibodies during pregnancy. OCREVUS is a humanized monoclonal antibody of an immunoglobulin G1 subtype and immunoglobulins are known to cross the placental barrier. Following administration of ocrelizumab to pregnant monkeys at doses similar to or greater than those used clinically, increased perinatal mortality, depletion of B-cell populations, renal, bone marrow, and testicular toxicity were observed in the offspring in the absence of maternal toxicity [see Data].
In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2% to 4% and 15% to 20%, respectively. The background risk of major birth defects and miscarriage for the indicated population is unknown.

Data

Animal Data

Following intravenous administration of OCREVUS to monkeys during organogenesis (loading doses of 15 or 75 mg/kg on gestation days 20, 21, and 22, followed by weekly doses of 20 or 100 mg/kg), depletion of B-lymphocytes in lymphoid tissue (spleen and lymph nodes) was observed in fetuses at both doses.

Intravenous administration of OCREVUS (three daily loading doses of 15 or 75 mg/kg, followed by weekly doses of 20 or 100 mg/kg) to pregnant monkeys throughout the period of organogenesis and continuing through the neonatal period resulted in perinatal deaths (some associated with bacterial infections), renal toxicity (glomerulopathy and inflammation), lymphoid follicle formation in the bone marrow, and severe decreases in circulating B-lymphocytes in neonates. The cause of the neonatal deaths is uncertain; however, both affected neonates were found to have bacterial infections. Reduced testicular weight was observed in neonates at the high dose.

A no-effect dose for adverse developmental effects was not identified; the doses tested in monkey are 2 and 10 times the recommended human dose of 600 mg, on a mg/kg basis.

8.2 Lactation

Risk Summary

There are no data on the presence of ocrelizumab in human milk, the effects on the breastfed infant, or the effects of the drug on milk production. Ocrelizumab was excreted in the milk of ocrelizumab-treated monkeys. Human IgG is excreted in human milk, and the potential for absorption of ocrelizumab to lead to B-cell depletion in the infant is unknown. The developmental and health benefits of breastfeeding should be considered along with the mother’s clinical need for OCREVUS and any potential adverse effects on the breastfed infant from OCREVUS or from the underlying maternal condition.

8.3 Females and Males of Reproductive Potential

Contraception

Women of childbearing potential should use contraception while receiving OCREVUS and for 6 months after the last infusion of OCREVUS [see Clinical Pharmacology (12.3)].

8.4 Pediatric Use

Safety and effectiveness of OCREVUS in pediatric patients have not been established.

8.5 Geriatric Use

Clinical studies of OCREVUS did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects.

11 DESCRIPTION

Ocrelizumab is a recombinant humanized monoclonal antibody directed against CD20-expressing B-cells. Ocrelizumab is a glycosylated immunoglobulin G1 (IgG1) with a molecular mass of approximately 145 kDa.

OCREVUS (ocrelizumab) Injection for intravenous infusion is a preservative-free, sterile, clear or slightly opalescent, and colorless to pale brown solution supplied in single-dose vials. Each mL of solution contains 30 mg ocrelizumab, glacial acetic acid (0.25 mg), polysorbate 20 (0.2 mg), sodium acetate trihydrate (2.14 mg), and trehalose dihydrate (40 mg) at pH 5.3.
12 CLINICAL PHARMACOLOGY

12.1 Mechanism of Action
The precise mechanism by which ocrelizumab exerts its therapeutic effects in multiple sclerosis is unknown, but is presumed to involve binding to CD20, a cell surface antigen present on pre-B and mature B lymphocytes. Following cell surface binding to B lymphocytes, ocrelizumab results in antibody-dependent cellular cytolysis and complement-mediated lysis.

12.2 Pharmacodynamics
For B-cell counts, assays for CD19+ B-cells are used because the presence of OCREVUS interferes with the CD20 assay. Treatment with OCREVUS reduces CD19+ B-cell counts in blood by 14 days after infusion. In clinical studies, B-cell counts rose to above the lower limit of normal (LLN) or above baseline counts between infusions of OCREVUS at least one time in 0.3% to 4.1% of patients. In a clinical study of 51 patients, the median time for B-cell counts to return to either baseline or LLN was 72 weeks (range 27-175 weeks) after the last OCREVUS infusion. Within 2.5 years after the last infusion, B-cell counts rose to either baseline or LLN in 90% of patients.

12.3 Pharmacokinetics
Pharmacokinetics (PK) of OCREVUS in MS clinical studies fit a two compartment model with time-dependent clearance. The overall exposure at the steady-state (AUC over the 24 week dosing intervals) of OCREVUS was 3,510 mcg/mL per day. In clinical studies in MS patients, maintenance doses of ocrelizumab were either 600 mg every 6 months (RMS patients) or two 300 mg infusions separated by 14 days every 6 months (PPMS patients). The mean maximum concentration was 212 mcg/mL in patients with RMS (600 mg infusion) and 141 mcg/mL in patients with PPMS (two 300 mg infusions administered within two weeks). The pharmacokinetics of ocrelizumab was essentially linear and dose proportional between 400 mg and 2000 mg.

Distribution
The population PK estimate of the central volume of distribution was 2.78 L. Peripheral volume and inter-compartment clearance were estimated at 2.68 L and 0.29 L/day, respectively.

Elimination
Constant clearance was estimated at 0.17 L/day, and initial time-dependent clearance at 0.05 L/day, which declined with a half-life of 33 weeks. The terminal elimination half-life was 26 days.

Metabolism
The metabolism of OCREVUS has not been directly studied because antibodies are cleared principally by catabolism.

Specific Populations

Renal impairment
Patients with mild renal impairment were included in clinical trials. No significant change in the pharmacokinetics of OCREVUS was observed in those patients.

Hepatic impairment
Patients with mild hepatic impairment were included in clinical trials. No significant change in the pharmacokinetics of OCREVUS was observed in those patients.

13 NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility
No carcinogenicity studies have been performed to assess the carcinogenic potential of OCREVUS.

No studies have been performed to assess the mutagenic potential of OCREVUS. As an antibody, OCREVUS is not expected to interact directly with DNA.
No effects on reproductive organs were observed in male monkeys administered ocrelizumab by intravenous injection (three loading doses of 15 or 75 mg/kg, followed by weekly doses of 20 or 100 mg/kg) for 8 weeks. There were also no effects on estrus cycle in female monkeys administered ocrelizumab over three menstrual cycles using the same dosing regimen. The doses tested in monkey are 2 and 10 times the recommended human dose of 600 mg, on a mg/kg basis.

14 CLINICAL STUDIES

14.1 Relapsing Forms of Multiple Sclerosis (RMS)

The efficacy of OCREVUS was demonstrated in two randomized, double-blind, double-dummy, active comparator-controlled clinical trials of identical design, in patients with RMS treated for 96 weeks (Study 1 and Study 2). The dose of OCREVUS was 600 mg every 24 weeks (initial treatment was given as two 300 mg IV infusions administered 2 weeks apart, and subsequent doses were administered as a single 600 mg IV infusion) and placebo subcutaneous injections were given 3 times per week. The dose of REBIF, the active comparator, was 44 mcg given as subcutaneous injections 3 times per week and placebo IV infusions were given every 24 weeks. Both studies included patients who had experienced at least one relapse within the prior year, or two relapses within the prior two years, and had an Expanded Disability Status Scale (EDSS) score from 0 to 5.5. Patients with primary progressive forms of multiple sclerosis (MS) were excluded. Neurological evaluations were performed every 12 weeks and at the time of a suspected relapse. Brain MRIs were performed at baseline and at Weeks 24, 48, and 96.

The primary outcome of both Study 1 and Study 2 was the annualized relapse rate (ARR). Additional outcome measures included the proportion of patients with confirmed disability progression, the mean number of MRI T1 gadolinium (Gd)-enhancing lesions at Weeks 24, 48, and 96, and new or enlarging MRI T2 hyperintense lesions. Progression of disability was defined as an increase of 1 point or more from the baseline EDSS score attributable to MS when the baseline EDSS score was 5.5 or less, or 0.5 points or more when the baseline EDSS score was above 5.5. Disability progression was considered confirmed when the increase in the EDSS was confirmed at a regularly scheduled visit 12 weeks after the initial documentation of neurological worsening. The primary population for analysis of confirmed disability progression was the pooled population from Studies 1 and 2.

In Study 1, 410 patients were randomized to OCREVUS and 411 to REBIF; 11% of OCREVUS-treated and 17% of REBIF-treated patients did not complete the 96-week double-blind treatment period. The baseline demographic and disease characteristics were balanced between the two treatment groups. At baseline, the mean age of patients was 37 years; 66% were female. The mean time from MS diagnosis to randomization was 3.8 years, the mean number of relapses in the previous year was 1.3, and the mean EDSS score was 2.8; 74% of patients had not been treated with a non-steroid therapy for MS in the 2 years prior to the study. At baseline, 40% of patients had one or more T1 Gd-enhancing lesions (mean 1.8).

In Study 2, 417 patients were randomized to OCREVUS and 418 to REBIF; 14% of OCREVUS-treated and 23% of REBIF-treated patients did not complete the 96-week double-blind treatment period. The baseline demographic and disease characteristics were balanced between the two treatment groups. At baseline, the mean age of patients was 37 years; 66% were female. The mean time from MS diagnosis to randomization was 4.1 years, the mean number of relapses in the previous year was 1.3, and the mean EDSS score was 2.8; 74% of patients had not been treated with a non-steroid therapy for MS in the 2 years prior to the study. At baseline, 40% of OCREVUS-treated patients had one or more T1 Gd-enhancing lesions (mean 1.9).

In Study 1 and Study 2, OCREVUS significantly lowered the annualized relapse rate and the proportion of patients with disability progression confirmed at 12 weeks after onset compared to REBIF. Results for Study 1 and Study 2 are presented in Table 4 and Figure 1.

Table 4 Key Clinical and MRI Endpoints in RMS Patients from Study 1 and Study 2

Reference ID: 4076448
<table>
<thead>
<tr>
<th>Endpoints</th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OCREVUS</strong> 600 mg every 24 weeks N=410</td>
<td><strong>REBIF 44 mcg three times a week N=411</strong></td>
<td><strong>OCREVUS</strong> 600 mg every 24 weeks N=417</td>
</tr>
</tbody>
</table>

**Clinical Endpoints**

| Annualized Relapse Rate (Primary Endpoint) | 0.156 | 0.292 | 0.155 | 0.290 |
| Relative Reduction | 46% (p<0.0001) | 47% (p<0.0001) |
| Proportion Relapse-free | 83% | 71% | 82% | 72% |

| Proportion of Patients with 12-week Confirmed Disability Progression¹ | 9.8% OCREVUS vs 15.2% REBIF |
| Risk Reduction (Pooled Analysis²) | 40%; p=0.0006 |

**MRI Endpoints**

| Mean number of T1 Gd-enhancing lesions per MRI | 0.016 | 0.286 | 0.021 | 0.416 |
| Relative Reduction | 94% (p<0.0001) | 95% (p<0.0001) |
| Mean number of new and/or enlarging T2 hyperintense lesions per MRI | 0.323 | 1.413 | 0.325 | 1.904 |
| Relative Reduction | 77% (p<0.0001) | 83% (p<0.0001) |

¹ Defined as an increase of 1.0 point or more from the baseline Expanded Disability Status Scale (EDSS) score for patients with baseline score of 5.5 or less, or 0.5 or more when the baseline score is greater than 5.5. Kaplan-Meier estimates at Week 96.

² Data prospectively pooled from Study 1 and Study 2.
In exploratory subgroup analyses of Study 1 and Study 2, the effect of OCREVUS on annualized relapse rate and disability progression was similar in male and female patients.

14.2 Primary Progressive Multiple Sclerosis (PPMS)

Study 3 was a randomized, double-blind, placebo-controlled clinical trial in patients with PPMS. Patients were randomized 2:1 to receive either OCREVUS 600 mg or placebo as two 300 mg intravenous infusions 2 weeks apart every 24 weeks for at least 120 weeks. Selection criteria required a baseline EDSS of 3 to 6.5 and a score of 2 or greater for the EDSS pyramidal functional system due to lower extremity findings. Neurological assessments were conducted every 12 weeks. An MRI scan was obtained at baseline and at Weeks 24, 48, and 120.

In Study 3, the primary outcome was the time to onset of disability progression attributable to MS confirmed to be present at the next neurological assessment at least 12 weeks later. Disability progression occurred when the EDSS score increased by 1 point or more from the baseline EDSS if the baseline EDSS was 5.5 points or less, or by 0.5 points or more if the baseline EDSS was more than 5.5 points. In Study 3, confirmed disability progression also was deemed to have occurred if patients who had onset of disability progression discontinued participation in the study before the next assessment. Additional outcome measures included timed 25-foot walk, and percentage change in T2 hyperintense lesion volume.

Study 3 randomized 488 patients to OCREVUS and 244 to placebo; 21% of OCREVUS-treated patients and 34% of placebo-treated patients did not complete the trial. The baseline demographic and disease characteristics were balanced between the two treatment groups. At baseline, the mean age of patients was 45; 49% were female. The mean time since symptom onset was 6.7 years, the mean EDSS score was 4.7, and 26% had one or more T1 Gd-enhancing lesions at baseline; 88% of patients had not been treated previously with a non-steroid treatment for MS. The time to onset of disability progression confirmed at 12 weeks after onset was significantly longer for OCREVUS-treated patients than for placebo-treated patients (see Figure 2). Results for Study 3 are presented in Table 5 and Figure 2.
### Table 5  Key Clinical and MRI Endpoints in PPMS patients for Study 3

<table>
<thead>
<tr>
<th>Endpoints</th>
<th>Study 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCREVUS 600 mg (two 300 mg infusions two weeks apart every 24 weeks) N=488</td>
<td>Placebo N=244</td>
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</table>

<table>
<thead>
<tr>
<th>Clinical Outcomes</th>
<th>Study 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of patients with 12-week Confirmed Disability Progression&lt;sup&gt;1&lt;/sup&gt;</td>
<td>32.9%</td>
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<tr>
<td>Risk reduction</td>
<td>24%; p=0.0321</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>MRI Endpoints</th>
<th>Study 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean change in volume of T2 lesions, from baseline to Week 120 (cm&lt;sup&gt;3&lt;/sup&gt;)</td>
<td>-0.39</td>
</tr>
<tr>
<td>p&lt;0.0001</td>
<td></td>
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</tbody>
</table>

<sup>1</sup> Defined as an increase of 1.0 point or more from the baseline EDSS score for patients with baseline score of 5.5 or less, or an increase of 0.5 or more when the baseline score is more than 5.5
Figure 2 Kaplan-Meier Plot of Time to Onset of Confirmed Disability Progression Sustained for at Least 12 Weeks with the Initial Event of Neurological Worsening Occurring During the Double-blind Treatment Period in Study 3*

*All patients in this analysis had a minimum of 120 weeks of follow-up. The primary analysis is based on all disability progression events accrued including 21 without confirmatory EDSS at 12 weeks.

In the overall population in Study 3, the proportion of patients with 20 percent worsening of the timed 25-foot walk confirmed at 12 weeks was 49% in OCREVUS-treated patients compared to 59% in placebo-treated patients (25% risk reduction).

In exploratory subgroup analyses of Study 3, the proportion of female patients with disability progression confirmed at 12 weeks after onset was similar in OCREVUS-treated patients and placebo-treated patients (approximately 36% in each group). In male patients, the proportion of patients with disability progression confirmed at 12 weeks after onset was approximately 30% in OCREVUS-treated patients and 43% in placebo-treated patients. Clinical and MRI endpoints that generally favored OCREVUS numerically in the overall population, and that showed similar trends in both male and female patients, included annualized relapse rate, change in T2 lesion volume, and number of new or enlarging T2 lesions.

16 HOW SUPPLIED/STORAGE AND HANDLING

OCREVUS (ocrelizumab) injection is a preservative-free, sterile, clear or slightly opalescent, and colorless to pale brown solution supplied as a carton containing one 300 mg/10 mL (30 mg/mL) single-dose vial (NDC 50242-150-01).

Store OCREVUS vials at 2°C–8°C (36°F–46°F) in the outer carton to protect from light. Do not freeze or shake.

Reference ID: 4076448
PATIENT COUNSELING INFORMATION

Advise the patient to read the FDA-approved patient labeling (Medication Guide).

Infusion Reactions

Inform patients about the signs and symptoms of infusion reactions, and that infusion reactions can occur up to 24 hours after infusion. Advise patients to contact their healthcare provider immediately for signs or symptoms of infusion reactions [see Warnings and Precautions (5.1)].

Infection

Advise patients to contact their healthcare provider for any signs of infection during treatment or after the last dose [see Clinical Pharmacology (12.2)]. Signs include fever, chills, constant cough, or signs of herpes such as cold sore, shingles, or genital sores [see Warnings and Precautions (5.2)].

Advise patients that PML has happened with drugs that are similar to OCREVUS and may happen with OCREVUS. Inform the patient that PML is characterized by a progression of deficits and usually leads to death or severe disability over weeks or months. Instruct the patient of the importance of contacting their doctor if they develop any symptoms suggestive of PML. Inform the patient that typical symptoms associated with PML are diverse, progress over days to weeks, and include progressive weakness on one side of the body or clumsiness of limbs, disturbance of vision, and changes in thinking, memory, and orientation leading to confusion and personality changes [see Warnings and Precautions (5.2)].

Advise patients that OCREVUS may cause reactivation of hepatitis B infection and that monitoring will be required if they are at risk [see Warnings and Precautions (5.2)].

Vaccination

Advise patients to complete any required vaccinations at least 6 weeks prior to initiation of OCREVUS. Administration of live-attenuated or live vaccines is not recommended during OCREVUS treatment and until B-cell recovery [see Warnings and Precautions (5.2)].

Malignancies

Advise patients that an increased risk of malignancy, including breast cancer, may exist with OCREVUS. Advise patients that they should follow standard breast cancer screening guidelines [see Warnings and Precautions (5.3)].

Pregnancy

Instruct patients that if they are pregnant or plan to become pregnant while taking OCREVUS they should inform their healthcare provider [see Pregnancy (8.1)].

OCREVUS™ [ocrelizumab]

Manufactured by: Genentech, Inc.
A Member of the Roche Group
1 DNA Way
South San Francisco, CA 94080-4990
U.S. License No. 1048

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What is the most important information I should know about OCREVUS?

OCREVUS can cause serious side effects, including:

- **Infusion reactions**: OCREVUS can cause infusion reactions that can be serious and require you to be hospitalized. You will be monitored during your infusion and for at least 1 hour after each infusion of OCREVUS for signs and symptoms of an infusion reaction. Tell your healthcare provider or nurse if you get any of these symptoms:
  - itchy skin
  - trouble breathing
  - nausea
  - shortness of breath
  - rash
  - throat irritation or pain
  - headache
  - fatigue
  - hives
  - feeling faint
  - swelling of the throat
  - fast heart beat
  - tiredness
  - fever
  - dizziness
  - coughing or wheezing
  - redness on your face
  - flushing

  These infusion reactions can happen for up to 24 hours after your infusion. It is important that you call your healthcare provider right away if you get any of the signs or symptoms listed above after each infusion. If you get infusion reactions, your healthcare provider may need to stop or slow down the rate of your infusion.

- **Infection**:
  - OCREVUS increases your risk of getting upper respiratory tract infections, lower respiratory tract infections, skin infections, and herpes infections. Tell your healthcare provider if you have an infection or have any of the following signs of infection including fever, chills, a cough that does not go away, or signs of herpes (such as cold sores, shingles, or genital sores). These signs can happen during treatment or after you have received your last dose of OCREVUS. If you have an active infection, your healthcare provider should delay your treatment with OCREVUS until your infection is gone.
  - **Progressive Multifocal Leukoencephalopathy (PML)**: Although no cases have been seen with OCREVUS treatment, PML may happen with OCREVUS. PML is a rare brain infection that usually leads to death or severe disability. Tell your healthcare provider right away if you have any new or worsening neurologic signs or symptoms. These may include problems with thinking, balance, eyesight, weakness on 1 side of your body, strength, or using your arms or legs.
  - **Hepatitis B virus (HBV) reactivation**: Before starting treatment with OCREVUS, your healthcare provider will do blood tests to check for hepatitis B viral infection. If you have ever had hepatitis B virus infection, the hepatitis B virus may become active again during or after treatment with OCREVUS. Hepatitis B virus becoming active again (called reactivation) may cause serious liver problems including liver failure or death. Your healthcare provider will monitor you if you are at risk for hepatitis B virus reactivation during treatment and after you stop receiving OCREVUS.
  - **Weakened immune system**: OCREVUS taken before or after other medicines that weaken the immune system could increase your risk of getting infections.

What is OCREVUS?

OCREVUS is a prescription medicine used to treat adults with relapsing or primary progressive forms of multiple sclerosis. It is not known if OCREVUS is safe or effective in children.

Who should not receive OCREVUS?

- Do not receive OCREVUS if you have an active hepatitis B virus (HBV) infection.
- Do not receive OCREVUS if you have had a life threatening allergic reaction to OCREVUS. Tell your healthcare provider if you have had an allergic reaction to OCREVUS or any of its ingredients in the past. See “What are the ingredients in OCREVUS?” for a complete list of ingredients in OCREVUS.

Before receiving OCREVUS, tell your healthcare provider about all of your medical conditions, including if you:

- have or think you have an infection. See “What is the most important information I should know about OCREVUS?”
- have ever taken, take, or plan to take medicines that affect your immune system, or other treatments for MS. These medicines could increase your risk of getting an infection.
- have ever had hepatitis B or are a carrier of the hepatitis B virus.
- have had a recent vaccination or are scheduled to receive any vaccinations. You should receive any required vaccines at least 6 weeks before you start treatment with OCREVUS. You should not receive certain vaccines (called 'live' or 'live attenuated' vaccines) while you are being treated with OCREVUS and until your healthcare provider tells you that your immune system is no longer weakened.
- are pregnant, think that you might be pregnant, or plan to become pregnant. It is not known if OCREVUS will harm your unborn baby. You should use birth control (contraception) during treatment with OCREVUS and for 6 months after your last infusion of OCREVUS.
Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements.

How will I receive OCREVUS?
- OCREVUS is given through a needle placed in your vein (intravenous infusion) in your arm.
- Before treatment with OCREVUS, your healthcare provider will give you a corticosteroid medicine and an antihistamine to help reduce infusion reactions (make them less frequent and less severe). You may also receive other medicines to help reduce infusion reactions. See “What is the most important information I should know about OCREVUS?”
- Your first full dose of OCREVUS will be given as 2 separate infusions, 2 weeks apart. Each infusion will last about 2 hours and 30 minutes.
- Your next doses of OCREVUS will be given as one infusion every 6 months. These infusions will last about 3 hours and 30 minutes.

What are the possible side effects of OCREVUS?
OCREVUS may cause serious side effects, including:
- See “What is the most important information I should know about OCREVUS?”
- Risk of cancers (malignancies) including breast cancer. Follow your healthcare provider’s instructions about standard screening guidelines for breast cancer.

Most common side effects include infusion reactions and infections. See “What is the most important information I should know about OCREVUS?”

These are not all the possible side effects of OCREVUS.
Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

General information about the safe and effective use of OCREVUS.
Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. Do not use OCREVUS for a condition for which it was not prescribed. Do not give OCREVUS to other people, even if they have the same symptoms that you have. It may harm them. You can ask your pharmacist or healthcare provider for information about OCREVUS that is written for health professionals.

What are the ingredients in OCREVUS?
Active ingredient: ocrelizumab
Inactive ingredients: glacial acetic acid, polysorbate 20, sodium acetate trihydrate, trehalose dihydrate.

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For more information, go to www.OCREVUS.com or call 1-844-627-3887.

This Medication Guide has been approved by the U.S. Food and Drug Administration

Issued: 3/2017

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**Ocrevus™ (ocrelizumab)**

**Injection**

**300 mg/10 mL**

(30 mg/mL)

**For Intravenous Infusion. Must Be Diluted.**


**NDC 50342-159-91**

Refrigerate at 2°C to 8°C (36°F to 46°F). In original carton to protect from light. Do Not Freeze. Do Not Shake. No preservative.

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Reference ID: 4076448
Each mL of solution contains 30 mg ocrelizumab, glacial acetic acid (0.25 mg), polysorbate 20 (0.2 mg), sodium acetate trihydrate (0.14 mg), and trehalose dihydrate (40 mg) at pH 5.3. No preservative.

**Usual dosage:** See package insert for dosage, dilution, and administration information.

**Storage:** Refrigerate at 2°C to 8°C (36°F to 46°F) in original carton to protect from light. Do Not Freeze. Do Not Shake.

No US standard of potency.

**Ocrevus™ (ocrelizumab) Injection**

**NDC 50242-150-01**

**300 mg/10 mL**

(30 mg/mL)


**1 vial**

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**Ocrevus™ (ocrelizumab) Injection**

**NDC 50242-150-01**

**300 mg/10 mL**

(30 mg/mL)

**For Intravenous Infusion. Must Be Diluted. Single-Dose Vial. Discard Unused Portion.**

**1 vial**

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/s/

ROBERT TEMPLE
03/28/2017