What is Ocrevus™?
Antibodies are proteins made by the body to attack particular targets, like bacteria or viruses. Antibodies are shaped like the letter “Y” with the two tips of the “Y” both capable of binding to a target. Ocrevus™ is an antibody directed against a protein called CD20. This antibody was originally created in mice, but mouse antibodies cannot be given to humans for very long because the human body recognizes the mouse antibody as foreign. Ocrevus™ was made by genetically replacing most of the mouse antibody with a human framework, leaving the molecule with only a small mouse portion. The remaining mouse portion is located on the tip of the antibody where it binds to its target. This engineered gene is placed into a standard cell culture line (Chinese hamster ovary cells) for manufacture.

In this drawing of an antibody, the gray area is human and the black area is mouse. The black area binds to the CD20 protein. CD20 is found on B cells.

White blood cells (leukocytes) help defend our bodies against foreign invaders like bacteria and viruses. One type of white blood cell is the lymphocyte. There are several types of lymphocytes, but two of the most important types are T and B cells. Many medications for MS change the behavior of T cells, which help direct the immune system in attacking the nervous system in multiple sclerosis (MS). B cells also play two important roles. One role is to produce antibodies which help the body defend against bacteria and viruses. The other role of B cells is to present targets to the T cells, causing the T cells to become activated and more likely to attack that target.

B cells are formed in the bone marrow. They then enter the blood and go through several steps before becoming mature B cells. Partially mature B cells are the ones that present targets to the T cells. Fully mature B cells make antibodies. CD20 is not found on the surface of B cell precursors in the bone marrow, and it is not on the fully mature cells that make antibodies. It is only found on the partially mature cells. Ocrevus™ binds to the CD20 on B cells and kills them. Because CD20 is not found on precursor cells, the bone marrow is able to grow new B cells over several months, which is why Ocrevus™ needs to be given every 6 months. Because CD20 is not found on fully mature B cells, antibody levels are not affected very much. The main effect of Ocrevus™ is eliminating B cells that present targets to the T cells, causing them to be activated. Thus, Ocrevus™ decreases the immune attack on the brain, spinal cord and eyes in MS.

Ocrevus™ slows the course of multiple sclerosis when used regularly over long periods of time. It does not improve existing symptoms and is not used to treat acute MS attacks.
Starting on Ocrevus™
To obtain Ocrevus™, insurance approval must first be obtained. It takes about 10-14 days to get insurance approval. Insurance may not cover the full cost of the medication, but Genentech Access Solutions or Genentech Access to Care Foundation may be able to assist. Getting this financial assistance takes additional time following insurance approval.

After insurance approval, you will be contacted to come to the Center for your Ocrevus™ infusion.

How should Ocrevus™ be taken?
Prior to the first dose, a blood test is needed to make sure that active hepatitis B is not present. Also, any immunizations that are due should be given 6 weeks prior to the first dose.

Ocrevus™ is given by intravenous infusion in our Ambulatory Care Unit on the First Hill Campus.

First two doses: A dose of 300mg is given initially. This dose is repeated in 2 weeks. Doses of steroids (methylprednisolone) and antihistamine (diphenhydramine) are given 30 minutes before the Ocrevus™. The Ocrevus™ infusion takes about 2 ½ hours. Patients must be observed for an additional hour after the infusion. The total time for the procedure is about 4 ½ to 5 hours.

Additional doses: These are given once every 6 months, using a 600mg dose. Doses of steroids and antihistamine are given before the Ocrevus™. The infusion takes about 3 ½ hours. Patients must be observed for an additional hour after the infusion. The total time for the procedure is about 5 ½ to 6 hours.

Laboratory blood tests are not required to monitor Ocrevus™. MRI scans are done periodically while patients are on Ocrevus™.

What if a dose is missed?
Contact the Ambulatory Care Unit to arrange the next dose as soon as you can.

What are the common side effects?
- Infusion reactions: This is an allergic reaction to the drug. It usually happens during the infusion, but can rarely occur up to 24 hours after the infusion. Typical reactions might include itching, rash, hives, flushing, low blood pressure, wheezing, mouth/throat swelling, fever, headache or nausea. These reactions were seen in 34-40% of patients, but most reactions were mild. Serious reactions were seen in 0.3% of patients.
- **Infections:** There is a slight increase in infections. In one study, 58% of those treated with Ocrevus™ had any type of infection compared to 52% treated with Rebif®. In another study, 70% of those treated with Ocrevus™ had any type of infection compared to 68% of those treated with placebo.
  - **Respiratory infections:**
    - Upper respiratory (colds, sinus infection): In one study 40% of those treated with Ocrevus™ compared to 33% treated with Rebif®. In another study, 49% of those treated with Ocrevus™ compared to 43% treated with placebo.
    - Lower respiratory (pneumonia, bronchitis): In one study 8% of those treated with Ocrevus™ compared to 5% treated with Rebif®. In another study, 10% of those treated with Ocrevus™ compared to 9% treated with placebo.
  - **Herpes:** There are several viruses in the herpes family
    - Zoster (shingles): 2.1% of those treated with Ocrevus™ compared to 1% treated with Rebif®.
    - Oral herpes (fever blisters): 3.0% of those treated with Ocrevus™ compared to 2.2% treated with Rebif®.
    - Genital herpes: 0.1% of those treated with Ocrevus™ compared to none treated with Rebif®.
  - **Progressive Multifocal Leukoencephalopathy (PML):** Is a viral infection of the brain that is potentially fatal. It has not been seen with Ocrevus™. However, PML has occurred with other drugs directed against CD20, though usually in a setting where additional drugs or diseases contributed to the risk of PML. For more information on the risk of PML is available on a separate page on our website.
  - **Hepatitis B virus (HBV):** HBV can reactivate with some medications, causing severe hepatitis. This has not been seen with Ocrevus™. However, this has been seen with other drugs directed against CD20.

- **Malignancies (cancer):** It is uncertain whether there is any change in the rate of malignancies with Ocrevus™. It is mentioned as a potential side effect out of caution. In studies of MS, there were 20 cancers seen in 1531 patients (0.013%). This compares with 2 out of 826 patients treated with Rebif (0.0024%) and 2 out of 239 patients treated with placebo (0.008%).
  - Breast cancer: it is uncertain whether there is any change in the rate of breast cancer with Ocrevus™. There were 6 breast cancers in the group treated with Ocrevus™ compared to none in the control groups. However, having no cases in the control group is unexpected because several cases would normally be seen of this common cancer. Also, the 6 cases seen in the Ocrevus™ group are within the expected number for this population.

**Company Support:**  
www.Ocrevus.com  
Genentech Access Solutions: (866) 422-2377  
www.Genentech-Access.com

Insurance billing codes: J2350, C9494