

September 2019 Newsletter



How is MS Treated?

While there's no cure for MS, there are many treatments available. These treatments, called disease-modifying therapies (DMTs) reduce but do not eliminate disease activity. MS treatment typically focuses on speeding recovery from attacks, slowing the progression of the disease and managing MS symptoms that may result from any remaining disease activity. Different people may have different types of MS. In addition, disease progression and symptoms vary greatly from person to person. As a result, each person's treatment plan may be different. It's important for people with MS on DMTs to notify their healthcare team of new or worsening symptoms as they may be indicative of MS progression, or other health conditions that may need to be addressed.

Several DMTs are available for the treatment of relapsing-remitting MS (RRMS). They can be taken by injection, infusion, or orally. These medications work by curbing the immune system so it doesn't attack the protective coating (myelin) that surrounds the nerves in the brain and spinal cord. They help lessen the frequency and severity of MS relapses, control disease progression and reduce MS symptoms. [Research](#) shows much of the immune response associated with MS occurs in the early stages of the disease, making early intervention important to



ensure the most effective treatment. Many of the DMTs used to treat MS carry significant health risks. Selecting the right therapy depends on careful consideration of many factors, including duration and severity of disease, effectiveness of previous MS treatments, other health issues, cost, as well as whether or not one is pregnant, or intends to have children. Below is a list of the injectable treatment options for MS.

Injectable DMTs

[Beta interferons](#) are some of the most common drugs used to treat MS. These include [Avonex](#), [Betaseron](#), [Extavia](#), [Plegridy](#), and [Rebif](#). They are injected under the skin (SC) or into the muscle (IM). Side effects of beta interferons may include flu-like symptoms and injection-site reactions, but these typically fade within a few months. These medications lower the number of white blood cells in the body, which help the immune system fight illnesses. As a result, those taking beta interferons may be more likely to get an infection. As liver damage is another possible side effect of these medications, those on interferons must have routine blood tests to monitor liver enzymes. In addition, people taking these medications may develop [neutralizing antibodies](#) that can reduce their effectiveness over time.

[Copaxone](#) or [Glatopa](#) (its generic equivalent) must be injected SC. This medication has a chemical composition similar to the myelin sheath that surrounds nerve cells. Copaxone seems to block the immune system from damaging the myelin, but the exact mechanism is not well known. Copaxone is usually well tolerated and has fewer side effects than other DMTs. Such side effects may include skin irritation at the injection site.

There are a number of treatments for MS that are administered via intravenous infusion.



Infused DMTs

[Tysabri](#) is administered via infusion every 28 days to treat RRMS. It is used as a first line treatment for those with severe disease or as a second line treatment where other treatments have failed. Tysabri prevents immune cells from getting to the brain and spinal cord, where they can damage nerves. [Side effects](#) include headache, feeling tired, as well as joint or

muscle pain. This medication increases the risk of a rare brain infection, called [progressive multifocal leukoencephalopathy](#) (PML), in people who are positive for [JC virus](#) (the antibodies to the agent that causes PML). Those who are negative for JC virus have almost no risk of PML.

[Ocrevus](#) is the only DMT approved by the FDA to treat both RRMS and primary-progressive MS (PPMS). This medication stops the immune system from attacking the body by targeting certain immune cells (B cells). [Side effects](#) may include respiratory tract infections, skin infections and depression. Ocrevus may also increase the risk of some types of cancer, particularly breast cancer.

[Lemtrada](#) helps reduce MS relapses by targeting a protein on the surface of immune cells and depleting white blood cells, thus limiting potential nerve damage they cause. Treatment involves five consecutive days of drug infusions followed by another three days of infusions a year later. Infusion reactions are common with Lemtrada and it has a long list of [side effects](#). Due to its safety profile, it is only recommended for individuals who haven't responded to two or more other MS treatments.

[Novantrone](#) is a chemotherapy that works by suppressing the immune system to lessen its attack on the myelin sheath that surrounds nerves. It is administered via infusion every three months. Common [side effects](#) include nausea, vomiting and hair loss. It's important to note this drug can be harmful to the heart and is associated with development of blood cancers. As a result, it is only rarely used to treat severe, advanced RRMS.

For those that prefer not to use needles, there are also a variety of oral MS medications to choose from.



Oral DMTs

[Gilenya](#) is a once-daily tablet used in the treatment of RRMS. Common [side effects](#) include headaches, diarrhea, back pain, cough, abnormal liver tests and an increased risk of PML.

Because Gilenya slows heart rate, those taking this medication may need to have their heart rate closely monitored after the first dose.

[Aubagio](#) is another once-daily oral medication for RRMS that inhibits the function of specific immune cells. It is related to [Arava](#), a drug used to treat rheumatoid arthritis. The most common [side effects](#) include diarrhea, nausea, and hair loss. This drug can also cause abnormal liver tests/liver damage and birth defects. Women who are pregnant should not take this medication, and those who may become pregnant should not take it without using appropriate contraception.

[Tecfidera](#) (formerly known as BG-12) is a twice-daily oral medication for RRMS that stops the immune system from attacking itself and destroying myelin. It may also have a protective effect on the body, similar to the effect that [antioxidants](#) have. [Side effects](#) may include flushing, diarrhea, nausea and vomiting.

[Mayzent](#) is a once-daily oral medication that is approved for the treatment of RRMS and secondary-progressive MS (SPMS). It is thought to act by retaining certain white blood cells in the body's lymph nodes, keeping them out of circulation and out of the central nervous system. It also enters the brain and spinal cord, where it may have direct anti-inflammatory and other effects. Possible [side effects](#) include headaches, high blood pressure and liver problems. Mayzent is also harmful to a developing fetus, so women who are pregnant should not take this medication. Those who may become pregnant should use contraception when taking this medication and for ten days after stopping the medication.

[Mavenclad](#) is an anti-cancer therapy that is used to treat RRMS and SPMS. This medication is typically used by those not responding to, or intolerant of other DMTs. Mavenclad works by reducing the number of immune cells circulating in the body. It is an oral treatment given in two courses over two years, each consisting of two treatment weeks (spaced one month apart) at the beginning of each year. [Side effects](#) of Mavenclad treatment include, but are not limited to, headaches, upper respiratory tract infections, and insomnia.



Some healthcare providers may use medications that have been approved for other diseases to treat MS, also called "off-label" use.

Off-label MS treatments

[Cellcept](#) is FDA-approved for preventing rejection in patients receiving organ transplants. It works by blocking an enzyme that is needed for certain white blood cells to carry out an immune system attack. It is taken by mouth twice daily. There is [evidence](#) that Cellcept may reduce the number of MS relapses, new lesions and may slow disease progression. [Side effects](#) include increased risk of infection (including PML), nausea, difficulty sleeping, and swelling in the hands and feet. Of note, Cellcept is a teratogen, potentially causing fetal deformities or death.

[Cytosan](#) is a chemotherapy used to treat various types of cancers. It is used off-label to treat a number of autoimmune conditions, including MS. It can be given intravenously or orally. It works by binding to cell DNA and interfering with cell division and replication. [Research](#) shows Cytosan to be of benefit in progressive or worsening MS. [Side effects](#) include nausea, hair loss, changes in the skin or nails, and fetal abnormalities.

[Imuran](#) is an oral immunosuppressant that targets activation, proliferation, and differentiation of immune cells. It is used in combination with other medications to prevent organ rejection after kidney transplant and also for the treatment of rheumatoid arthritis. It has been used to treat MS outside of FDA approval for over 30 years. Several [clinical trials](#) have shown Imuran reduces relapse rate and disease worsening. [Side effects](#) include nausea, diarrhea, skin rash and hair loss. Imuran is not recommended for use during pregnancy as it may harm the fetus. Men and women should use two forms of birth control while taking this medication.

[Minocycline](#) is an oral tetracycline antibiotic that is approved for the treatment of a number of different types of bacterial infection. [Research](#) shows minocycline treatment in conjunction with Copaxone reduces the number of brain lesions, and this combination therapy is safe and well tolerated. [Side effects](#) include gastrointestinal problems, dizziness, increased skin sensitivity to the sun and a potential for fetal abnormalities.

[Rituxan](#) is a [monoclonal antibody](#) that targets a specific protein on the surface of white blood cells known to cause inflammation and damage in MS. It is FDA-approved for the treatment of some cancers, rheumatoid arthritis and certain types of vasculitis (inflammation of the blood vessels). In addition, it has been used off-label to treat both relapsing and progressive

forms of MS. Rituxan is administered via two infusions separated by two weeks. This dosing regimen is then repeated every six months. Several [clinical trials](#) have demonstrated that Rituxan has significant benefit in reducing MS disease activity, and is safe for up to 2 years of therapy. [Side effects](#) include heartburn, night sweats, weakness and an increased risk of infections (including PML). Rituxan should be used with caution in pregnancy.

[Statins](#) are oral medications used to lower cholesterol. They are being studied in MS because they are known to modulate the immune system and to help support the growth, health and protection of nerve cells. There is [evidence](#) that simvastatin significantly reduces the rate of brain atrophy in SPMS, and is safe and well tolerated. [Side effects](#) include heartburn, gas, headache and fetal abnormalities. Taking statins while pregnant or breast-feeding is not recommended.



MS relapses are caused by inflammation in the brain and spinal cord that damages the myelin coating around nerve fibers. This damage slows or disrupts the transmission of nerve impulses and causes the symptoms of MS. An individual suffering an MS relapse may experience a flare of their usual MS symptoms, or entirely new ones, depending on what nerves are affected. Most relapses will gradually resolve without treatment. For more severe relapses, neurologists may recommend a number of treatments.

MS Relapse treatments

[Corticosteroids](#), such as [Solu-Medrol](#) (methylprednisolone) or [Deltasone](#) (prednisone), are the most common treatment for MS flares. Typically, the treatment regimen is a three to five day course of high-dose, intravenous corticosteroids to reduce nerve inflammation and end the relapse more quickly. This regimen may or may not be followed with a slow taper of oral prednisone. These drugs will calm the flare, but they won't slow the course of the disease. The [side effects](#) of corticosteroid treatment are numerous and may include increased appetite/weight gain, sudden mood swings, restlessness, osteoporosis, high blood pressure or difficulty sleeping.

[Plasmapheresis](#) may be the appropriate course of treatment if MS symptoms are new, severe and haven't responded to steroids (or steroids can't be used). This procedure involves removing whole blood from the body and filtering it to remove antibodies that may be

attacking the nervous system. The “clean” blood is then given back as a transfusion. Plasmapheresis does carry some [side effects](#), but, for the most part, they are mild and transient.

[H.P. Acthar Gel](#) injection is sometimes used to calm MS flares. Acthar is an [adrenocorticotrophic hormone](#) (ACTH) analogue, believed to work by helping the body produce its own natural steroid hormones (which reduce the level of inflammation in the body). Acthar can be injected SC or IM. The side effects of H.P. Acthar Gel injections can be found [here](#).

[Intravenous immunoglobulin](#) (IVIG) treatment is sometimes used to treat MS flares. This is a sterile solution of concentrated antibodies extracted from healthy people that can be given intravenously (through a vein). Antibodies are proteins the body makes to help fight infections. It isn't completely known how IVIG works. Experts believe it prevents abnormal antibodies directed against one's own cells from working and also prevents immune cells from being active. There are a number of [side effects](#) associated with IVIG treatment, the majority are mild and resolve once the infusion is finished.

A wide variety of medications are used to help manage the symptoms of MS. The National MS Society [website](#) contains a list of common MS symptoms and the medications frequently used to treat them. However, medications aren't the only answer.

Some people with MS rely on physical therapy to learn stretching and strengthening exercises, which often help in many regards. A physical therapist can also provide instruction on how to use mobility devices to help manage leg weakness and other gait problems. A number of lifestyle changes can also make a big difference. It's important for people with MS to keep a regular sleep schedule and get plenty of rest, eat a healthy diet and get regular exercise. Physical activity not only helps improve muscle strength, it also increases cardiovascular health, improves one's mood and cognitive function. It's important to note, however, exercise should be tailored to the individual and people with MS should not embark on a new regimen without first consulting with their physician. It's essential for individuals with MS to manage the stress and emotional changes that accompany living with the disease, as they also have the potential to make MS symptoms worse. This can be done with medications, or therapy (or a combination of the two). The majority of people with MS have problems with aspects of thinking, such as memory, concentration or problem solving, at



some point in the course of their disease. Our [June 2019 newsletter](#) discusses some helpful strategies and devices to help exercise one's brain and maintain mental sharpness. Staying cool is vital when living with MS. Many find a rise in body temperature can make MS symptoms worse. Staying in the air conditioning is a good strategy, as well as wearing loose, breathable clothing in hot weather.

As discussed in our [August 2017 newsletter](#), a number of alternative therapies are helpful in managing MS symptoms, most often in combination with prescribed MS treatments. For example, it is well known that vitamin D promotes calcium absorption for strong bones.



However, recent research also suggests Vitamin D may play a role in [myelin repair](#) and [protecting the brain](#) in people at risk for developing MS. Acupuncture is an age-old healing practice of traditional Chinese medicine in which thin needles are placed at specific points on the body. It is primarily used to relieve pain but also has been used to treat other MS symptoms. [Studies](#) show it can help MS symptoms like numbness, pain, muscle spasms, weakness and improving balance. Myelin becomes damaged in people with MS. [Researchers](#) in Poland found treatment with a myelin peptide skin patch significantly reduced disease activity in subjects with RRMS. Results suggest this treatment was safe and well tolerated.

Coping with MS isn't easy at times, however successful treatment of MS and its symptoms can make a big difference in living with the disease. Effective MS treatments vary from person to person, what works well for one person won't necessarily work for another. It's important for people with MS to work with their healthcare providers to develop a treatment plan that addresses their physical symptoms and emotional outlook. This should be an ongoing dialogue throughout the disease course, as symptoms evolve.

