

Newly Diagnosed

The Disease- Modifying Drugs

The National Multiple Sclerosis Society is dedicated to ending the devastating effects of multiple sclerosis.



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For some people, a diagnosis of MS is a relief, giving a name and a reason for a parade of strange symptoms. For others, a diagnosis of MS brings images of the worst possible future. Both reactions will likely change somewhat over time, but for everyone with MS, diagnosis is the day when life changed.

Even before the news can be fully absorbed, people with MS face a decision about taking a “disease-modifying” drug. The Society’s Medical Advisory Board agrees that disease-modifying drugs are most effective when started early, before the disease has the opportunity to cause significant damage.

Disease-modifying medications:

- Reduce the frequency and severity of clinical attacks (also called relapses or exacerbations), which are defined as the sudden worsening of an MS symptom or symptoms, or the appearance of new symptoms, which lasts at least 24 hours and is separated from a previous exacerbation by at least one month.
- Reduce the accumulation of lesions (damaged or active disease areas) within the brain

and spinal cord as seen on MRI (magnetic resonance imaging).

- Appear to slow down the accumulation of disabilities.

Most of these drugs are taken on a long-term basis, and they are the best defense currently available to slow down the natural course of MS. Even though the disease-modifying medications don’t make a person feel better, they can be looked upon as an investment in the future.

Options

There are currently six disease-modifying medications approved by the U.S. Food and Drug Administration (FDA) for use in relapsing forms of MS (including secondary-progressive MS for those people who are still experiencing relapses). None of them is a cure for MS. None will prevent recurring symptoms, such as fatigue or numbness, which typically come and go in an hour or a day. All of them have proven records of partial to substantial success. Unfortunately, none of the currently available disease-modifying drugs are approved for treating primary progressive MS—the type of MS that shows steady progression at onset.

Decisions about taking a disease-modifying drug are best made by carefully considering and weighing factors including individual lifestyles, known side effects, and the potential risks and benefits of the different therapies. A full discussion with a knowledgeable physician is the best guide for your decision. Each person's body or disease can respond to these medications in different ways.

The following charts sort out and present some of the relevant facts. Rebif®, Copaxone®, Betaseron®, and Avonex® are self-injectable drugs for long-term use; they modulate the immune system (meaning, they adjust or modify how the immune system functions). Tysabri®, which is also an immune-modulating drug, is delivered by IV infusion (into the vein) at a registered infusion facility. Novantrone® is a powerful immune system suppressor, delivered by IV infusion in a medical setting.

Brand and Generic Name

Immunomodulating drugs

Avonex®	interferon beta-1a
Betaseron®	interferon beta-1b
Copaxone®	glatiramer acetate
Rebif®	interferon beta-1a
Tysabri®	natalizumab

Immunosuppressant drug

Novantrone®	Mitoxantrone; as of 2006, available as a generic drug
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Manufacturer/Distributor and Year of FDA Approval

Immunomodulating drugs

Avonex®	Biogen Idec—1996
Betaseron®	Berlex Laboratories, Inc.—1993
Copaxone®	TEVA Neuroscience, Inc.—1996
Rebif®	Serono, Inc.—2002
Tysabri®	Biogen Idec and Elan Pharmaceuticals, Inc. — 2006

Immunosuppressant drug

Novantrone®	Serono, Inc.—2000
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Indication (FDA-approved use)

Immunomodulating drugs

Avonex[®]	For the treatment of relapsing forms of MS, and for a single clinical episode if MRI features consistent with MS are also present.
Betaseron[®]	For the treatment of relapsing forms of MS and secondary-progressive MS with relapses.
Copaxone[®]	For the treatment of relapsing-remitting MS.
Rebif[®]	For the treatment of relapsing forms of MS.
Tysabri[®]	For the treatment of relapsing forms of MS as a monotherapy (meaning, not used in combination with any other immunomodulating therapy). Generally recommended for patients who have had inadequate response to, or are unable to tolerate, other MS therapies.

Immunosuppressant drug

Novantrone[®]	For treatment of worsening relapsing-remitting MS and for progressive-relapsing or secondary-progressive MS.
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Frequency/Route of Delivery/ Usual Dose

Immunomodulating drugs

Avonex[®]	Once a week; intramuscular (into the muscle) injection; 30 mcg.
Betaseron[®]	Every other day; subcutaneous (under the skin) injection; 250 mcg.
Copaxone[®]	Every day; subcutaneous (under the skin) injection; 20 mg (20,000 mcg).
Rebif[®]	Three times a week; subcutaneous (under the skin) injection; 44 mcg.
Tysabri[®]	Every four weeks by IV infusion in a registered infusion facility; 300 mg.

Immunosuppressant drug

Novantrone[®]	Four times a year by IV infusion in a medical facility. Lifetime cumulative dose limit of approximately 8–12 doses over 2–3 years (140 mg/m ²).
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Common Side Effects
(Always inform your health care professional of side effects.)

Immunomodulating drugs

Avonex[®]

Flu-like symptoms following injection, which lessen over time for many. (See “Managing side effects” below for more information.) Less common: depression, mild anemia, elevated liver enzymes, allergic reactions, heart problems.

Betaseron[®]

Flu-like symptoms following injection, which lessen over time for many. (See “Managing side effects” below for more information.) Injection site reactions, about 5% of which need medical attention. Less common: allergic reactions, depression, elevated liver enzymes, low white blood cell counts.

Copaxone[®]

Injection site reactions. Less common: vasodilation (dilation of blood vessels); chest pain; a reaction immediately after injection, which includes anxiety, chest pain, palpitations, shortness of breath, and flushing. This lasts 15-30 minutes, passes without treatment, and has no known long-term effects.

Rebif[®]

Flu-like symptoms following injection, which lessen over time for many. (See “Managing side effects” below for more information.) Injection site reactions. Less common: Liver abnormalities, depression, allergic reactions, and low red or white blood cell counts.

Tysabri[®]

Headache, fatigue, urinary tract infections, depression, lower respiratory tract infections, joint pain, and chest discomfort. Less common: allergic or hypersensitivity reactions within two hours of infusion (dizziness, fever, rash, itching, nausea, flushing, low blood pressure, difficulty breathing, chest pain). See “Tysabri warnings” below.

Immunosuppressant drug

Novantrone[®]

Blue-green urine 24 hours after administration; infections, bone marrow suppression (fatigue, bruising, low blood cell counts), nausea, hair thinning, bladder infections, mouth sores. Patients must be monitored for serious liver and heart damage. See “Novantrone warnings” below.

Managing side effects of the self-injectable drugs

The flu-like side effects of the interferon products—Avonex, Betaseron, and Rebif—can usually be minimized. Discuss this with your physician and the patient support program of the drug company (available through a toll-free number—see chart entitled “Industry-Sponsored Sites” on page 13). Should unacceptable side effects occur, discuss possible change to another drug with your health care professional.

The drugs that are injected subcutaneously, including Copaxone, Rebif, and Betaseron, may cause injection site reactions, including bumps, bruises, pain, and infections. Good injection techniques can minimize problems. Auto-injecting devices may be helpful. The drug company patient support programs offer injection training and helpful tips for avoiding or limiting site reactions (see chart entitled “Industry-Sponsored Sites” on page 13).

Novantrone warnings

Novantrone (mitoxantrone) is a chemotherapeutic drug originally developed to treat certain forms of

cancer. The total lifetime dose is limited in order to avoid possible heart damage. People taking Novantrone should have tests of their heart function before each dose. It cannot be used in people with pre-existing heart problems, liver disease, and certain blood disorders. In addition to cardiac toxicity, acute myelogenous leukemia (AML), a type of cancer, has been reported in MS patients and cancer patients treated with Novantrone. AML can be fatal.

Tysabri warnings

Tysabri (natalizumab) is a laboratory-produced monoclonal antibody that attaches to a specific surface structure of immune T cells. Tysabri slows or stops T cells from moving out of the bloodstream and into the brain and spinal cord where they may stimulate the inflammation that is believed to result in MS attacks.

It is important to consider the following information in discussions with your health care professional about starting on treatment with Tysabri. Three people who had been in clinical trials involving Tysabri developed a rare brain disease called PML (progressive multifocal leukoencephalopathy), caused by a common virus

called the JC virus. Two of these three people died. There is not enough known about the true risk of getting PML in people who may use Tysabri. For this reason, Tysabri is only available under a restricted distribution program referred to as the TOUCH program. Prescribing physicians and patients must enroll in this mandatory registry program. Infusion centers must also be enrolled in the TOUCH program. Tysabri cannot be infused at home. Patients using Tysabri should promptly report any continuously worsening symptoms to their prescriber.

Tysabri **should not** be used by persons whose immune systems are weakened by disease or by the use of drugs that alter the immune system, including other disease-modifying MS therapies.

Currently, nothing is known about the safety of long-term use of Tysabri—or whether additional side effects will emerge in time.

All drugs delivered by IV infusion pose risks of bruising, vein damage, blood clots and more. Infusions must be managed by a well-trained medical professional who is registered to prescribe.

Industry-Sponsored Sites for Patient Information and/or Financial Assistance

Immunomodulating drugs

Avonex® MS Active Source 800-456-2255	www.avonex.com www.msactivesource.com www.healthtalk.com
Betaseron® MSPathways 800-788-1467	www.betaseron.com www.mspathways.com www.championsofcourage.org www.betanurses.com
Copaxone® Shared Solutions 800-887-8100	www.copaxone.com www.sharedsolutions.com www.mswatch.com
Rebif® MS LifeLines 877-447-3243	www.mslifelines.com www.rebif.com
Tysabri® 800-456-2255	www.biogenidec.com www.tysabri.com

Immunosuppressant drug

Novantrone® 877-447-3243	www.novantrone.com
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BENEFITS OF THE DISEASE-MODIFYING DRUGS

Reducing the frequency and severity of attacks

Most people using a disease-modifying drug have fewer and less severe MS attacks (relapses or exacerbations). In individual clinical trials comparing a drug versus an inactive placebo treatment, MS attacks were reduced by 28–68 percent by different agents. In addition, most people were found to have fewer, smaller, or no new lesions developing within their central nervous system as visible in MRI scans.

Preventing permanent damage

Permanent damage to nerve fibers (called axons) occurs early in MS in association with the destruction of myelin. Overall brain shrinkage (or atrophy), can occur early in the disease, and damage can be ongoing even when the person has no symptoms of an attack and feels well. Therefore, MS specialists advise the early use of a drug that effectively limits lesion formation and brain atrophy, or shrinkage. In the opinion

of the National MS Society Medical Advisory Board, limiting lesions may be a key to reducing future permanent disability for many people with MS.

None of these drugs is recommended for women who are pregnant or plan to become pregnant. Physicians should be consulted. Most women will be advised to avoid using these medications during pregnancy.

The bottom line

Many factors will influence the decision that you and your physician make about your choice of medication. One of them will be lifestyle issues that could affect your ability to stay with a treatment over time. Another factor is your response to the therapy, which should be carefully tracked. If your MS is not responding, you and your physician should discuss your options.

PAYING FOR A DISEASE-MODIFYING DRUG: SOME HELP IS AVAILABLE

Some private insurance plans do not cover prescription drugs, although they may cover procedures such as IV infusions in a medical facility. Plans that do cover prescription drugs often have a list of specific drugs covered by the plan (known as a formulary). It is possible that some disease-modifying drugs are covered by a plan and some are not. Insurance information about Tysabri is not yet fully available.

Disease-modifying drugs are costly. The actual cost to an individual or an insurance company will vary depending on the source. Because cost information is subject to frequent change, we recommend that you contact your health care plan and/or your pharmacy for cost information.

Because Novantrone and Tysabri must be infused in a medical facility, they are covered under Medicare Part B. If Avonex is administered in a physician's office or clinic, it will be covered by Medicare Part B.

Medicare Part D covers prescription drugs through private plans approved by Medicare. For more information on Medicare prescription drug coverage, go to: www.nationalmssociety.org/medicare, or call 1-800-FIGHT-MS (1-800-344-4867).

Medicaid includes prescription drug coverage. However, the list of specific drugs covered may vary from state to state. Call your state Medicaid office for more information.

Each of the drug companies offers a program designed to help people apply for and use all the state and federal programs for which they are eligible. They also help some people who are uninsured or under-insured through patient assistance programs. The companies invite physicians and people with MS who might be deterred by the cost from considering a disease-modifier to call the toll-free numbers listed in the chart entitled "Industry-Sponsored Sites" on page 13. Ask for information on available assistance.

HELP WITH THE COST OF DRUGS FOR SYMPTOM MANAGEMENT

In addition to the disease-modifying drugs discussed above, there are many other drugs, treatments, and strategies to help manage specific MS symptoms such as bowel and bladder function, spasticity and pain. Symptom management drugs make important contributions to keeping people with MS well and active.

“Finding Lower-Priced Prescription Drugs” is a useful resource focused on making medications more affordable. It is available at: www.nationalmssociety.org/healthinsurance_resources.asp.

“Free and Low Cost Prescription Drugs” lists the patient-assistance programs from drug manufacturers. The booklet is available free online. To download or view, log on to <http://www.institutedc.org/>.

See also the free report, “Top 17 Ways to Cut Your Prescription Drug Costs” available online and as a PDF (www.institutedc.org/top17.htm).

NOTES

Avonex® is a registered trademark of Biogen Idec.

Betaseron® is a registered trademark of Berlex Laboratories, Inc.

Copaxone® is a registered trademark of TEVA Neuroscience, Inc.

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