

# Multiple Sclerosis (MS) and the new drug: Dalfampridine SR (Ampyra)

## What is MS?

MS is a chronic autoimmune inflammatory demyelinating disease of the central nervous system (CNS) which is made up of the brain, spinal cord, and optic nerves. MS is major cause of disabilities.

## Epidemiology

In the US today, there are approximately 400,000 people with MS.

There are more than 2.5 million people with MS in the world.

The factors that contribute to MS include age, gender, geography, and ethnic background.

- Most people with MS are diagnosed between the ages of 20 and 50
- More female than male with ratio of around 3:1, and the disparity appears to be increasing
- Disease varies by geographic region and ancestry.

There is higher incidence at latitudes closer to the poles than the equator. White populations, especially those from Northern Europe, appear to be most susceptible.

## Etiology

Autoimmune disease: an abnormal response of the body's immune system that is directed against the myelin (the white matter) in the central nervous system (the brain, spinal cord and optic nerves).

- **Environment:** Environmental triggers may be involved in the development of MS such as smoking, toxins, lacking of sunlight exposures (low vitamin D levels)
- **Genetics:** MS is not directly inherited, but genetics play an important role. The risk is approximately 20 times greater compared to the general population in anyone who has a close relative (parent, and sibling) with the disease (first-degree relatives risk is 2.5 percent, the sibling risk is 3 to 5 percent with identical twins is 20 to 39 percent).

## Symptoms

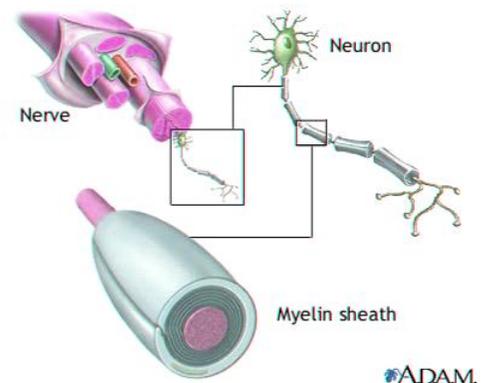
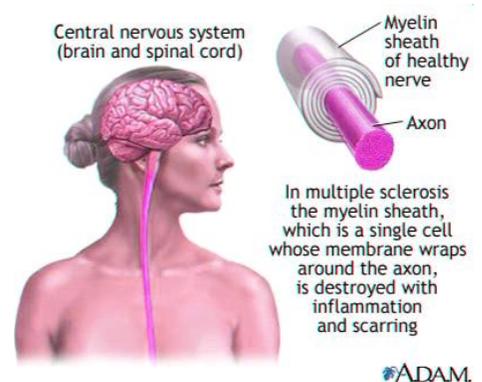
Symptoms may be mild, such as numbness in the limbs, or severe, such as paralysis or loss of vision. The clinical symptoms may include:

- Fatigue
- sensory problems such as numbness, itching and pain, impairment of facial sensation
- motor problems such as spasm, tremor, and walking problems
- bladder and bowel dysfunction
- optic neuritis may lead to visual loss or impairment
- dizziness and vertigo
- sexual dysfunction
- cognitive impairment
- emotional changes, depression
- speech disorders
- swallowing problems
- headache
- hearing loss
- seizures
- respiratory problems

## Disease courses of MS

Relapsing-remitting MS: approximately 85 - 90 % of MS cases at onset with partial or complete recovery periods (remissions), and there is no disease progression occurring during the periods between the flare up symptoms.

- Secondary progressive MS: the disease worsens more steadily, with or without occasional flare-ups, minor recoveries
- Primary progressive MS: 10% of MS cases with slowly worsening neurological function from the beginning, with no distinct relapses or remissions and with occasional plateaus and temporary minor improvements
- Progressive relapsing MS: steadily worsening disease from the beginning, but with clear attacks of worsening neurological function, with or without full recovery.



## Diagnosis

Your physician will make a diagnosis based on:

- Medical history, symptoms, and neurological exams
- Magnetic Resonance Imaging (MRI)
- Visual Evoked Potential (VEP)
- Cerebral Spinal Fluid Analysis
- Blood test to rule out the conditions that cause similar symptoms of MS

## Treatments

There is presently no cure for this disease. The treatment is to enhance the quality of life by reducing the symptoms, disease progression, and improving functions. Since the symptoms and disease progressions are different in each patient, the treatment regimen is based on patient needs to optimize their expected outcomes. Your physician will prescribe medications based on your symptoms such as pain relief medications, anti-inflammation drugs, corticosteroids, etc.

There are many FDA approved drugs for MS such as Betaseron, Avonex, Copoaxone, Extavia, Rebif, Novantrone, and Tysabri. However, there are many side effects of these drugs in many patients which set many limitations of their use.

Many previous studies were shown that a low dose naltrexone has shown to slow MS progression, progesterone was found to increase the thickness and the length of myelin formation, and estriol was involved in decreasing the demyelination effect.

Rehabilitation programs are designed to help patient's improve or maintain their ability to perform daily activities effectively and safely at home and at work. Rehabilitation is an important therapy for people with MS at all stages of the disease to improve and maintain mobility, speech and swallowing, memory, and cognitive functions.

**Ampyra (Dalfampridine SR)**, a new FDA approved drug to improve walking in all types of MS, has given patients with MS a new hope.

- Ampyra is a potassium channel blocker which may improve the conduction of nerve signals in nerve fibers which have been damaged by MS.
- Possible common side effects included seizures back pain, dizziness, insomnia, fatigue, nausea, balance disorder, urinary tract infection, falls, and headache.
- Ampyra is contraindicated in patients with seizure history or with moderate to severe renal impairment.
- Dosage recommended- starting at 10mg every 12 hours with a maximum of 20mg every 12 hours has given optimal effect and minimal side effects.
- This drug is currently not available commercially. However, it can be readily provided by a compounding pharmacy.
- Compounded Dalfampridine 10mg SR capsule
- 4-Aminopyridine

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