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**Treatment of Multiple Sclerosis**

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✓ **Abstract:**

Multiple sclerosis (MS) is a condition that affects your brain and spinal cord. In MS, the coating that protects your nerves (myelin) is damaged, and this causes a range of symptoms. There's no cure for multiple sclerosis So there are studies to find treatment by use stem cells, vitamin D and antihistamine (Clemastine)

✓ **Introduction:**

Multiple sclerosis (MS) is a potentially disabling disease of the brain and spinal cord. In MS, the immune system attacks the protective sheath (myelin) that covers nerve fibers and causes communication problems between your brain and the rest of your body. Eventually, the disease can cause the nerves themselves to deteriorate or become permanently damaged. Signs and symptoms of MS vary widely and depend on the amount of nerve damage and which nerves are affected. Some people with severe MS may lose the ability to walk independently or at all, while others may experience long periods of remission without any new symptoms. It's estimated that there are more than 2.3 million people worldwide diagnosed with MS. It's most commonly diagnosed in people in their 20s and 30s, although it can develop at any age. It's about two to three times more common in women than men. There's no cure for multiple sclerosis. However, treatments can help speed recovery from attacks, modify the course of the disease and manage symptoms. In this report we'll discuss studies on MS cure.

✓ **Discussion:**

Researchers are exploring whether it's possible for stem cells to become cell types which could slow MS disease activity, repair existing damage or replace faulty parts of the immune system or nervous system. The most studied type of stem cell therapy for MS is autologous haematopoietic stem cell transplantation (often shortened to AHSCT, ASCT or HSCT). This uses your own stem cells, which are collected and then injected back into your body. Early results have been encouraging and understanding how best to treat people with stem cells is improving. The aim of AHSCT is to replace or reboot your body's immune system so that it no longer attacks your myelin or causes inflammation in your brain and spinal cord. AHSCT uses high doses of chemotherapy to wipe out your existing immune system, which is then rebuilt using stem cells collected from your blood before you have the chemotherapy. The hope is that your rebooted immune system will stop attacking you and there will be no further damage.<sup>1</sup> stem cells called Oligodendrocyte progenitor cells (OPCs) can create specialized brain cells called oligodendrocytes, which send octopus-like arms to wrap new myelin around damaged axons. OPCs are already scattered throughout the brains of MS sufferers, but only in some people do they produce enough of the specialized brain cells that regenerate myelin, and therefore reduce symptoms. Recent years have seen great advances in our understanding of how to influence OPC stem cells to respond properly to myelin damage. We can now grow them in hundreds of tiny artificial wells, each containing a different drug and several microscopic axon-mimicking cables, and examine which drugs best kick-start the OPCs into re-myelinating action. This innovative lab technique is helping researchers to fast identify the most promising concoctions to take to clinical trials.<sup>2</sup> In 2015, scientists at our Cambridge Centre for Myelin Repair revealed a role for vitamin D in promoting myelin repair. They found that adding vitamin D boosted the number of myelin-making cells present in the brain by 80% in rats. The vitamin D receptor protein pairs with an existing protein already known to be involved in myelin repair, called RXR gamma. In 2016 scientists found that children born with very low levels of vitamin D were more likely to develop MS in later life.

This suggests that vitamin D levels during pregnancy might affect a child's future risk of MS.<sup>3</sup> High doses of Vitamin D can help the immune system of multiple-sclerosis sufferers. Researchers found the vitamin D can help regulate the hyperactive immune system of people with multiple sclerosis, potentially finding a cheap treatment for the future. The study tested different doses of vitamin D against the response of the immune system's T-cells – a type of white blood cell which plays a key role in immunity against disease, and is also linked to MS. The results showed that higher doses of the vitamin D showed a reduction in the amount of these T-cells. (The study used 40 participants with MS to test the doses of vitamin D. Each subject received either a high dose of 10,400 international units, or a lower dose of 800 international units. Both of these amounts are still higher than the recommended daily amount of 600 international units).<sup>4</sup>

Clemastine fumarate is an antihistamine commonly used to block central and peripheral H1 histamine sites and thereby minimize the symptoms of allergies. It is helped to partly reverse damage to the eyes in people with multiple sclerosis. In the clinical trial, 50 people who had MS for 5 to 15 years were treated in a 'cross-over' trial design. 25 people received clemastine tablets for 90 days and then received a placebo or dummy tablet for 60 days. The second group received the placebo for 90 days and then clemastine for 60 days. Participants and the assessing doctors did not know which medication they were receiving when, to avoid biasing the results. 92% of the patients continued on their usual immune modulating MS treatments during the trial but were not permitted to take other drugs that might affect nerve signalling or repair such as fampridine or biotin. The researchers used a test of nerve conduction speed known as visual evoked potentials, or VEP, to assess if the drug was working. This test uses visual patterns to stimulate the nerves in the retina of the eye. In the first group, the speed of nerve transmission was significantly faster after clemastine treatment than that seen at the beginning of the trial and compared to those receiving the placebo. This result also lasted throughout the period when they were receiving the placebo. Similar results were seen in the second group, with an increase in nerve transmission speed after taking clemastine. These results indicate that myelin repair had occurred as myelin helps the nerves to transmit signals faster. clinical test to measure visual acuity, the ability to read numbers or letters in low-contrast conditions, also seemed to show improvement.<sup>5</sup>

✓ **Conclusion:**

Multiple sclerosis (MS) is a condition that affects your brain and spinal cord. In MS, the coating that protects your nerves (myelin) is damaged, and this causes a range of symptoms. and there isn't any cure for it, But there are studies that researches for find a cure by:

1. Stem cells : (**AHSCT, OPCs**) The aim of AHSCT is to replace or reboot your body's immune system so that it no longer attacks your myelin or causes inflammation in your brain and spinal cord. (**OPCs**) can create specialized brain cells called oligodendrocytes, which send octopus-like arms to wrap new myelin around damaged axons.
2. Vitamin D: The vitamin D receptor protein pairs with an existing protein already known to be involved in myelin repair, called RXR gamma, boosted the number of myelin-making cells present in the brain.
3. Antihistamine (**Clemastine fumarate**): It is helped to partly reverse damage to the eyes in people with multiple sclerosis.

✓ **References:**

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