



# Calcitonin and Calcitonin-Like Compounds for Multiple Sclerosis

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## Technology description

Multiple sclerosis (MS) is a complex and unpredictable disease of the central nervous system. MS is thought to be an autoimmune disease in which the immune system attacks and destroys the myelin that insulates the nerves in the brain and spinal cord. When myelin is damaged, the transmission of messages between the brain, spinal cord and body is slowed or blocked, leading to diminished or lost function.

No cure for MS has been developed. Several therapies, including anti-inflammatory steroids, naturally occurring antiviral proteins known as interferons and immunosuppressive agents, have shown some promise for the treatment of MS symptoms. However, these treatments are associated with adverse side effects and are not effective for all patients.

The hormonally active form of vitamin D, 1,25 dihydroxyvitamin D<sub>3</sub>, known as calcitriol, has shown some ability to prevent experimental autoimmune encephalomyelitis (EAE) in mice, a chronic relapsing brain and spinal cord disease that resembles MS. While promising, the concentrations of calcitriol required to achieve this therapeutic effect are likely to cause dose-limiting hypercalcemia and are not suitable for long-term use. Promising research is underway with several analogs of calcitriol that show efficacy in the EAE mouse model and the ability to minimize dose-limiting hypercalcemia, but more work needs to be conducted to determine the potential utility of these analogs in humans.

Another promising alternative is calcitonin and related calcitonin-like compounds. Calcitonin has been shown to have anti-inflammatory properties in several animal models and may be useful in the treatment of the autoimmune disease rheumatoid arthritis. In addition, calcitonin can be used to treat hypercalcemia and, as such, may play a role as an adjuvant treatment with vitamin D analogs or other MS treatments. UW-Madison researchers have developed methods of preventing and treating MS by administering synthetic calcitonin, calcitonin-like peptides or calcitonin mimetics to a patient to diminish MS symptoms. Vitamin D analogs can be administered in combination with the calcitonin to further reduce symptoms.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a new method of preventing or treating multiple sclerosis.

## Application area

Prevention and treatment of MS

## Advantages

The combination of calcitonin and vitamin D provides improved effectiveness without the danger of hypercalcemia.

The use of synthetic calcitonin, calcitonin-like peptides or calcitonin mimetics reduces the likelihood that a patient will develop resistance to treatment during long-term use.

Calcitonin and vitamin D should be synergistic because they function by different mechanisms and at different sites.

## Institution

[Wisconsin Alumni Research Foundation](#)

## Inventors

[Bryan Becklund](#)

[Terrence Meehan](#)

[Margaret Clagett-Dame](#)

[Hector DeLuca](#)

联系我们



叶先生

电话 : 021-65679356

手机 : 13414935137

邮箱 : [yeplingsheng@zf-ym.com](mailto:yeplingsheng@zf-ym.com)