

# Melatonin could reduce corticosteroid dosage in the treatment of multiple sclerosis

- **Research from the Institute of Biomedicine of Seville (IBiS) demonstrates that the combination of melatonin and methylprednisolone effectively protects against multiple sclerosis in animal models, allowing the corticosteroid dose to be reduced by up to four times.**

Seville, October 17, 2024

A recent study conducted by the **Molecular NeuroImmunoEndocrinology** research group at the **Institute of Biomedicine of Seville (IBiS)** and the University of Seville has revealed the potential of melatonin as an adjunct treatment for relapsing-remitting multiple sclerosis (RRMS). The article, published in the scientific journal *Journal of Autoimmunity*, shows how the combined use of melatonin and corticosteroids (methylprednisolone) “protects 90% of the animals studied, significantly reducing neuroinflammation and the required dose of corticosteroids,” as indicated by the study’s first author, Dr. **Ana Isabel Álvarez López**.

Multiple sclerosis is an autoimmune disease characterized by the destruction of myelin, the substance that covers nerve fibers and enables the proper transmission of nerve impulses. This neurodegenerative disease is the leading cause of non-traumatic disability in young adults and affects approximately 50,000 people in Spain. The most common form of multiple sclerosis, RRMS, presents with acute inflammatory episodes that cause varying degrees of disability, followed by partial or complete recovery.

Currently, the first-line treatment for RRMS relapses involves administering high doses of glucocorticoids, particularly methylprednisolone, over several days. However, this treatment can cause significant side effects, and some patients develop hypersensitivity to corticosteroids.

## **Melatonin: an ally in reducing neuroinflammation**

The study from the **Molecular NeuroImmunoEndocrinology** group, led by Professor **Antonio Carrillo Vico**, demonstrated that the combined administration of melatonin and methylprednisolone protects 90% of the animals studied from developing disease symptoms. Additionally, co-treatment with melatonin

allowed for a reduction of up to four times the dose of methylprednisolone, significantly decreasing the side effects associated with corticosteroid use.

According to Dr. Carrillo Vico, “This finding is highly significant, as we not only confirmed the efficacy of melatonin in enhancing the effect of corticosteroids, but also observed that melatonin alone can improve the resolution of a disease flare and potentiate corticosteroids in a subsequent relapse.”

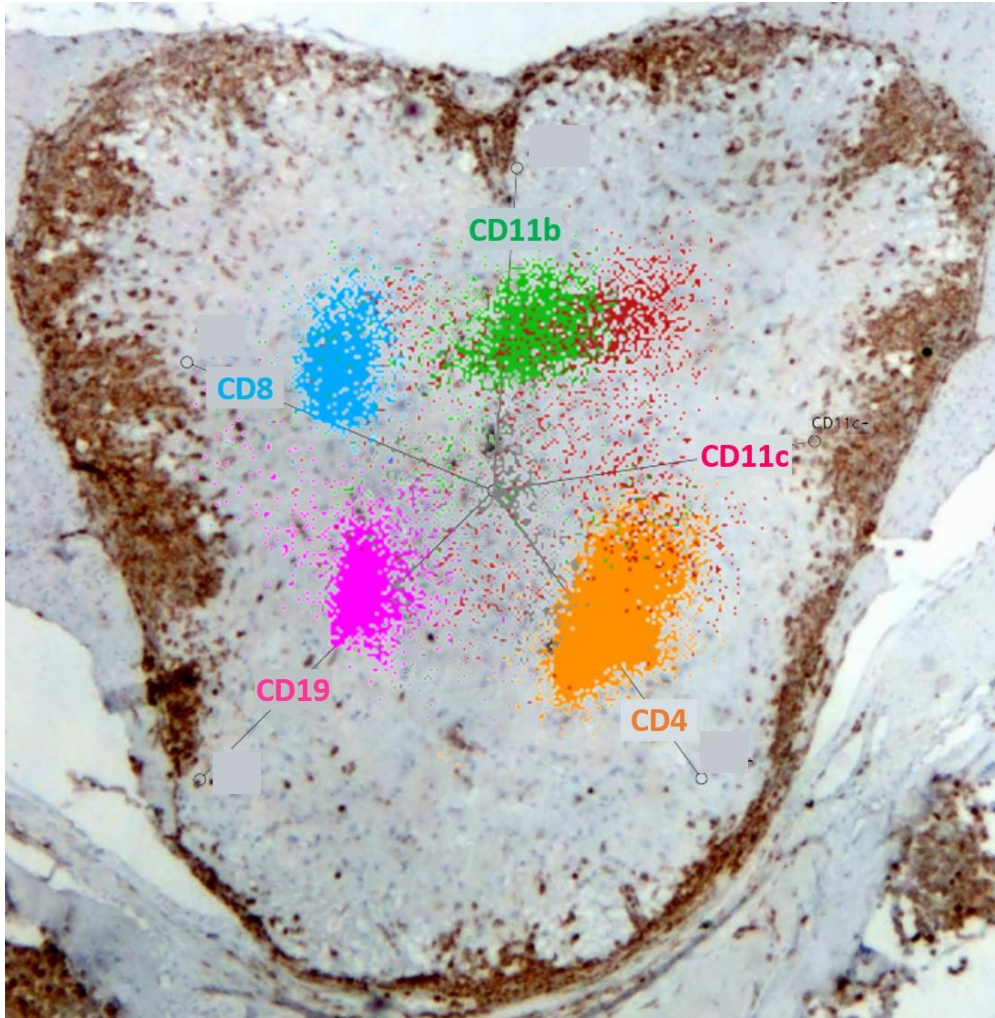
Melatonin acts by reducing the infiltration of pathogenic immune cells, such as CD4+ T lymphocytes, B lymphocytes, macrophages, and dendritic cells, into the central nervous system, thereby limiting neuroinflammation. Additionally, melatonin treatment increases the production of anti-inflammatory markers, contributing to reduced myelin destruction.

The results of this preclinical study, along with previous findings from the group, have paved the way for the development of a clinical trial in humans, named MELATOMS-1. This trial, coordinated by the IBiS team and involving the **Virgen del Rocío University Hospital (HUVR)** and the **Virgen Macarena University Hospital (HUVM)** in Seville, evaluates the use of melatonin in patients with primary progressive multiple sclerosis (PPMS), the most aggressive form of the disease, for which there is currently only one approved drug in Spain.

The MELATOMS-1 trial is a multicenter, randomized, double-blind, placebo-controlled study aimed at assessing the safety and efficacy of melatonin in PPMS patients already receiving treatment with ocrelizumab.

Dr. Carrillo Vico emphasizes that “the potential of melatonin to reduce inflammation and corticosteroid dosage in multiple sclerosis could represent a significant improvement in patients' quality of life.”

This study was funded by the Department of Health and Consumption of the Andalusian Government.



*Image 1: Histological section of spinal cord showing the main infiltrating immune cell populations*

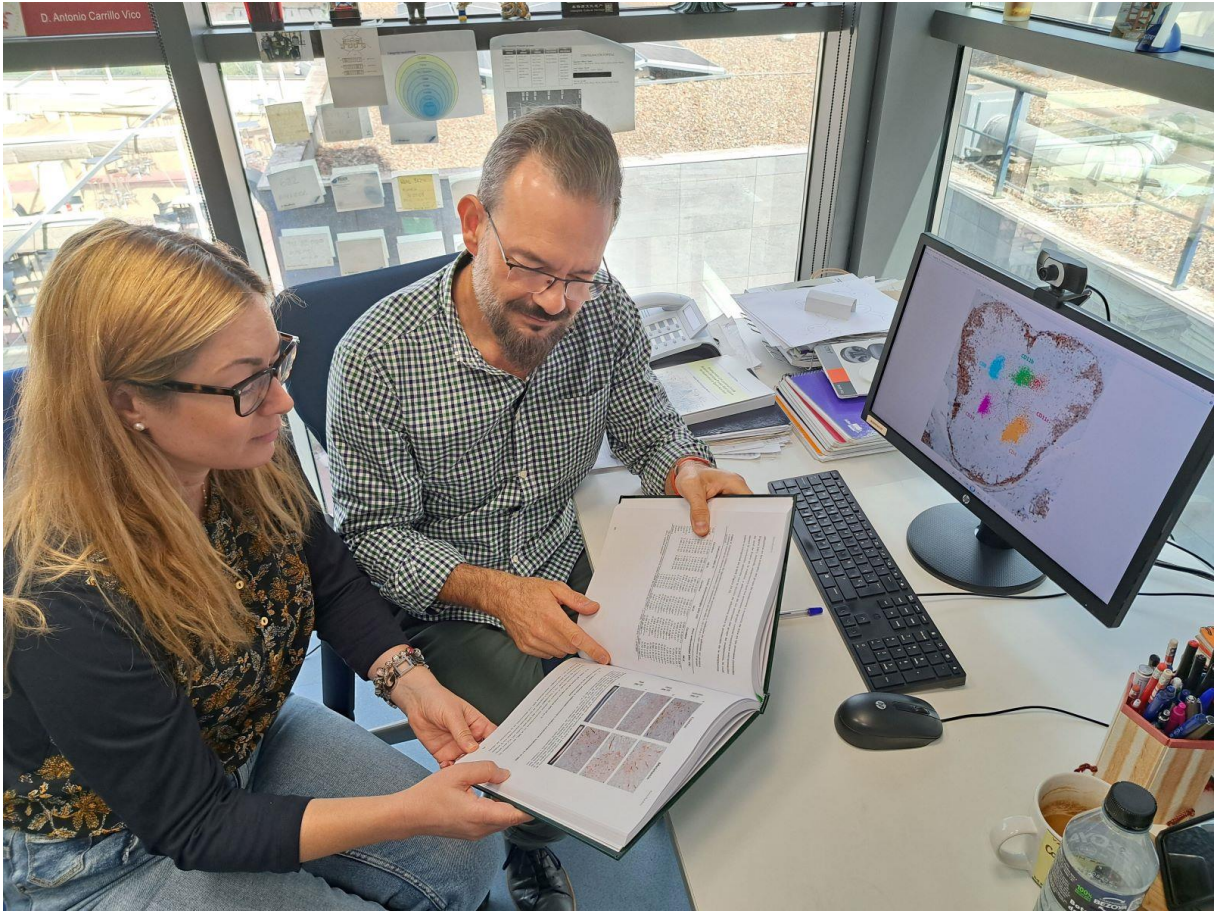


Image 2: From left to right, Dr. Ana Isabel Álvarez López and Dr. Antonio Carrillo Vico.

Reference: *Melatonin synergistically potentiates the effect of methylprednisolone on reducing neuroinflammation in the experimental autoimmune encephalomyelitis mouse model of multiple sclerosis*  
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### About IBiS

The Institute of Biomedicine of Seville (**IBiS**) is a multidisciplinary center focused on carrying out fundamental research on the causes and mechanisms of the most prevalent pathologies in the population and the development of new methods to diagnose and to treat diseases.

**IBiS** is made up of 42 consolidated groups and 42 affiliated groups led by researchers from the University of Seville, the Spanish National Research Council (CSIC) and the Virgen del Rocío and Virgen Macarena University Hospitals and Valme, organized around five thematic areas: Infectious Diseases and Immune System, Neurosciences, Onco-hematology and Genetics, Cardiovascular Pathology, Respiratory / Other Systemic Pathologies and Liver, Digestive and Inflammatory Diseases.

**IBiS** depends institutionally on the Department (Consejería) of Health and Consumption of the Junta de Andalucía; the Andalusian Health Service (SAS); the Department (Consejería) of University, Research and Innovation; the University of Seville and the Spanish National Research Council (CSIC). It is managed by the Public Foundation for the Management of Health Research in Seville (FISEVI).

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