Antigen-specific regulatory networks to treat Myasthenia Gravis

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Dr. Santamaría, a Spanish immunologist who works at the University of Calgary (Canada), published recently in *Nature* (Clemente-Casares X et al. Expanding antigen-specific regulatory networks to treat autoimmunity. Nature 2016;530(7591):434-40) a promising novel therapy for autoimmune disorders. In this article they show that systemic delivery of nanoparticles coated with autoimmune-disease-relevant peptides triggers the generation and expansion of antigen-specific regulatory CD4+ T cells leading to resolution of established autoimmune phenomena and clinical improvement, without compromising systemic immunity. They developed the project using three different animal models (Diabetes Mellitus type 1, Rheumatoid Arthritis and Multiple Sclerosis). They hope to test this new treatment in humans in a clinical trial. They also want to test the therapy in other autoimmune diseases.

Myasthenia gravis (MG) is an autoimmune antibody-mediated disease of the neuromuscular junction. The disease is clinically characterized by fatigable muscle weakness that can involve ocular, bulbar, respiratory and limb muscles. These symptoms may produce an important quality-of-life impairment. Bulbar and respiratory symptoms may be severe and life-threatening. Nowadays, different drugs exist to treat the disease, mainly immunosuppressive therapies. These drugs may produce infectious and neoplastic side effects. For this reason, the research of new effective therapies without compromising systemic immunity is extremely interesting in scientific and clinical terms. The results of Dr. Santamaría research in autoimmune disease are encouraging.

The Neuromuscular Laboratory (Hospital de Sant Pau, Barcelona), directed by Dr. Isabel Illa, has been conducting clinical and translational research in MG for more than 20 years and has a special interest in new non-immunosuppressive therapies, because it would imply a relevant change in treatment and prognosis. For this reason, we have started collaboration with Dr. Santamaría with the aim of investigating the nanoparticle therapy in MG.

Dr. Elena Cortés works as a clinic and researcher in the Neuromuscular Diseases Unit of the Hospital de la Santa Creu i Sant Pau. She currently has a Rio Hortega grant from the Carlos III Health Institute and she is investigating new diagnostic and prognostic factors in MG. Her doctoral thesis, directed by Dr. Illa, focuses on the study of biomarkers of evolution and response to treatment. A stage focused on laboratory research of new therapies would expand her basic training in this field.

Dr. Cortés applies for a one-year stage in the laboratory of Dr. Pere Santamaría at the University of Calgary (Canada) between January and December 2019. The research activity will begin in July 2018, being financed by the Rio Hortega grant and the mobility M-AES grant of ISCIII until December 2018. Therefore, the stay will have a total duration of 1.5 years.

Her research would help us to:
1) Understand the functioning of the immune system in patients with Myasthenia Gravis.
2) Start the pre-clinical study of a new therapeutic strategy in patients with MG.
3) Participate in case the nanoparticle therapy reaches the clinical trial phase in humans.