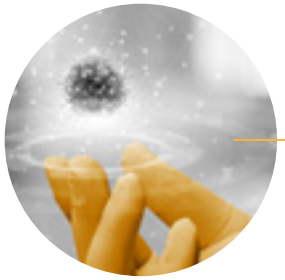

3.3.9 MicroRNA Regulation of Immune Tolerance, Autoimmunity and Cancer Group*

COMPOSITION

Alicia González Martín. Investigadora Ramón y Cajal. Universidad Autónoma de Madrid
Rocío Bartolomé Cabrero. Investigadora Predoctoral. Universidad Autónoma de Madrid
María del Pilar González Molina. Investigadora Predoctoral. Universidad Autónoma de Madrid
Laura Gámez Reche. Investigador Predoctoral. Universidad Autónoma de Madrid
Laura Mañas Cordero. Técnico de Investigación. Universidad Autónoma de Madrid
Eleftheria Papaioannou. Investigadora Juan de la Cierva. Universidad Autónoma de Madrid
Ana María Prieto Muñoz. Técnico de Investigación. Universidad Autónoma de Madrid
Javier Sanz Gallardo. Investigador Predoctoral. Universidad Autónoma de Madrid

STRATEGIC OBJECTIVE

Our laboratory is interested in understanding the cellular and molecular mechanisms of immune tolerance, autoimmunity and cancer. Specifically, we focus on studying how microRNAs (miRNAs) and their target genes regulate immune tolerance, autoinmune diseases and antitumor immunity. In addition, we are actively developing innovative genome engineering strategies for therapeutic purposes.

MicroRNAs have recently emerged as important factors in the post-transcriptional control of protein concentrations in metazoan organisms. For the past few years, we studied the functions of miRNAs in the mammalian immune system. We identified the first miRNA that regulates B cell tolerance and established its causative role in the development of lethal autoimmunity (Gonzalez-Martin et al, Nature Immunology, 2016 Apr; 17: 433-40). We also discovered critical roles for other microRNAs in different immune tolerance mechanisms and autoimmune diseases (Gonzalez-Martin and Lai et al, Nature Communications, 2016 Aug 2; 7:12207, Ichiyama et al, Immunity, 2016 Jun 21; 44:1284-98 and Liu et al, Journal of Experimental Medicine, Aug 22; 213:1901-19). In addition, we developed the first B cell receptor reprogramming strategy using the latest genome editing technologies (Elife, 2019 Jan 17; 8). Previously, work on tumor immunology established an important role for the chemokine receptor CCR5 in T cell antitumor responses (Gonzalez-Martin et al, Cancer Research, 2011 Aug 15; 71:5455-66). Overall, our studies have established miRNAs as critical regulators of immune tolerance and autoimmunity, and revealed new mechanisms controlling antitumor immunity.

Current research in the laboratory continues to identify and study the roles of miRNAs and their target genes in immune tolerance, autoimmunity and tumor immunology by combining genetic, genomic, biochemical, and functional screen approaches to understand the functions and molecular mechanisms of miRNA control at molecular, cellular, and system levels. The mechanisms identified might provide valuable biomarkers or therapeutic targets for the treatment of autoimmune diseases and for cancer immunotherapy.

RESEARCH LINES

- Correlation of drug levels with therapeutic response.
- Intestinal ultrasound.
- Dysplasia detection techniques in IBD.
- Hypercoagulability studies in IBD.
- Immunological basis of inflammatory bowel disease: changes in cellular and inflammatory mediator expression with different therapies.

*Group recently created, december 2022