

CIC bioGUNE researchers identify immune cell checkpoints that regulate cell responsiveness to infectious agents

The research describes the role of the mitochondrial MCJ protein in the metabolism of immune cells

The work, conducted in collaboration with the University of Vermont, has recently been published in the journal *Immunity*, one of the most prestigious journals worldwide in the field of immunology

(Bilbao, 26 May 2016). A study conducted by CIC bioGUNE, the Centre for Cooperative Research in Biosciences, in collaboration with the University of Vermont, has identified checkpoints in CD8 cells, which regulate their responsiveness to infectious agents, specifically the flu virus. CD8 cells are responsible for killing viruses and tumours.

The research describes how the mitochondrial MCJ protein regulates the metabolism of the CD8 cells during the different phases of their response to infections, both in terms of activating and generating memory once the infectious agent has disappeared. The work shows that many more memory cells appear when this protein is absent. Those CD8 cells which survive the infectious agent (in this case, flu) are able to respond rapidly if the pathogen reappears, as they “remember” the virus and are immediately available to respond to aggression.

The work also opens the door to the possibility of regulating the development of this type of cell during vaccination. By controlling the amount of MCJ in the cells, it would theoretically be possible to improve the effectiveness/ memory of the cells and, in doing so, the efficiency of vaccinations, which activate these cells.

The work, pioneered by the group led by Dr. Mercedes Rincón, professor in the Department of Medicine at the University of Vermont, and with the team of Dr. Juan Anguita at CIC bioGUNE, has been published in *Immunity*, a high impact journal and one of the most renowned publications in the field of immunology.

CIC bioGUNE and the University of Vermont have jointly had several articles published describing the role of the mitochondrial MCJ protein in the metabolism of immune cells, including macrophages – cells of the innate immune system responsible for recognising and destroying infectious agents – and CD8 T cells, which belong to the adapted immune system and are especially adept at combating virus infections.

The metabolism and its regulation are key elements in controlling cell activity. Through this research, CIC bioGUNE has set up a strategic working partnership with

Mitotherapeutix, a U.S. company, to establish therapies based on metabolic control using the MCJ protein.

Juan Anguita, researcher at Ikerbasque and study director in CIC bioGUNE, explains: “The goal is to develop tools which control activity of the MCJ protein, enabling the cell metabolism to be sped up or slowed down depending on the specific needs of the pathology in question. This may implicate immune or other cell types involved in cancers or infectious diseases”.

Dr. Rincón and Dr. Anguita have worked together for almost 20 years in issues related to the immune response, and for the last 9 years have jointly worked on describing the role of MCJ in the response of macrophages – cells of the innate immune system responsible for recognising and destroying infectious agents – and T cells.

About CIC bioGUNE

The Centre for Cooperative Research in Biosciences (CIC bioGUNE), located in the Bizkaia Technology Park, is a biomedical research organisation conducting cutting-edge research at the interface between structural, molecular and cell biology, with a particular focus on the study of the molecular bases of disease, for use in the development of new diagnostic methods and advanced therapies.