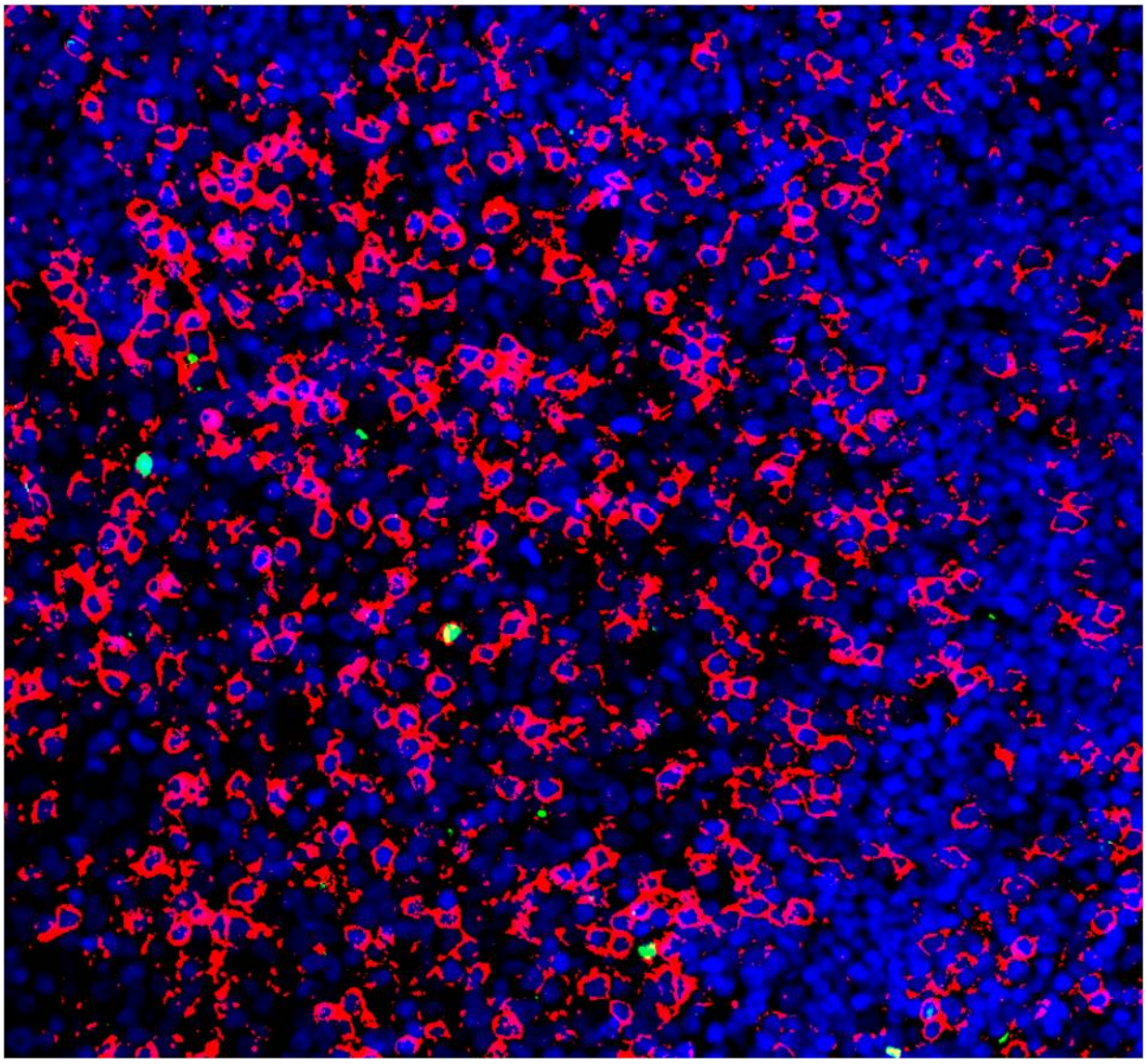
New type of blood cells work as indicators of autoimmunity

August 14 2017



T follicular regulatory cells survey antibody production within human germinal

centers. Credit: Luís Graça Lab

A team from Instituto de Medicina Molecular Lisboa, led by Luis Graça, has analyzed blood samples from patients with Sjögren syndrome, an autoimmune disease that affects the mucous membranes and moisture-secreting glands of the eyes and mouth, and found that these patients have a significant increase in a specific immune cell type called T follicular regulatory cells (Tfr).

These cells are usually found in lymphoid tissues, where they regulate antibody production. It was a surprise to find an increase of this type of cell in patients with excessive antibody production. In fact, the results now published in *Science Immunology* were the opposite of what the team was expecting.

To understand the reason behind such unexpected results, the researchers studied multiple biological samples. For instance, comparing Tfr cells in the blood and in the tissues where antibodies are produced (tonsils obtained from pediatric tonsillectomies), provided evidence that blood Tfr cells are immature, not able to fully suppress antibody production. Such immaturity was confirmed by studying blood samples from other patients with genetic defects. Furthermore, exposure of healthy volunteers to flu vaccine led to an increase in blood Tfr cells, in line with their generation during immune responses with antibody production.

Blood circulating Tfr cells are distinguished from other circulating lymphocytes by two molecular markers, CXCR5 and FOXP3, the first of which endows these cells with the ability to migrate into specific zones of lymph nodes, where they may complete maturation and regulate antibody production.

The team is now trying to understand what happens to these cells in other autoimmune diseases to evaluate their potential not only for diagnostics but also to identify which patients may benefit with medicines that interfere with the production of harmful antibodies.

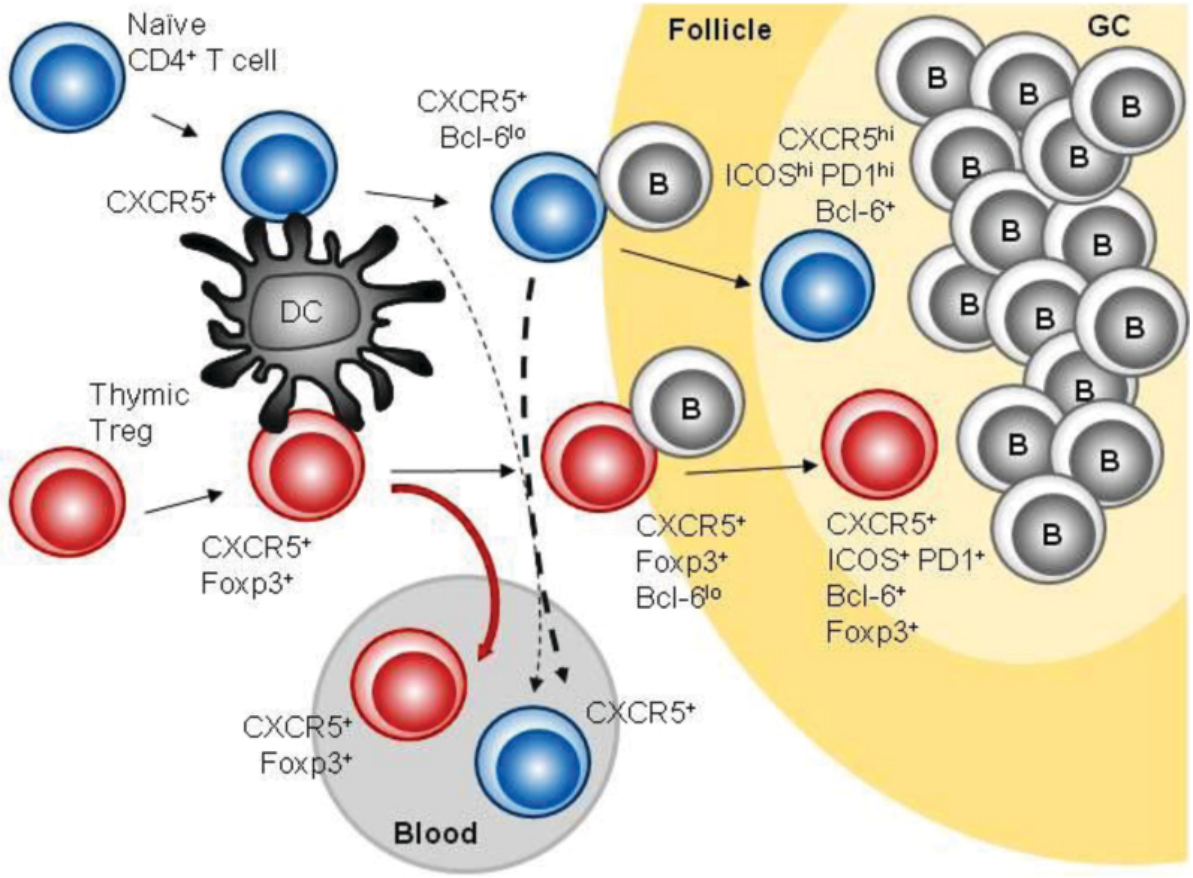


Diagram modelling Fonseca et al.'s hypothesis that blood Tfr cells are generated in secondary lymphoid tissue and enter the circulation before full differentiation into tissue Tfr cells. Tfh cells in red and Tfr cells in blue. DC = dendritic cells. B = B cells. GC = germinal center. Credit: Fonseca et al., *Sci. Immunol*. 2, eaan1487 (2017)

More information: V.R. Fonseca el al., "Human blood Tfr cells are indicators of ongoing humoral activity not fully licensed with suppressive function ," *Science Immunology* (2017). DOI: 10.1126/sciimmunol.aan1487