

# The existence of neutrophils in the spleen discovered

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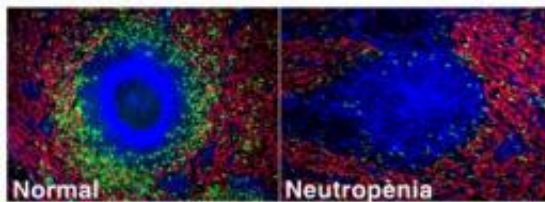


Image of B lymphocytes (in blue) surrounded by neutrophils (in green) and endothelial cells (in red) of a human spleen. The image on the left side corresponds to a normal spleen and on the right side to a spleen of a patient with neutropenia, where the presence of neutrophils is much lower. Credit: IMIM (Hospital del Mar Research Institute)

For the first time, it has been discovered that neutrophils exist in the spleen without there being an infection. This important finding made by the research group on the Biology of B Cells of IMIM (Hospital del Mar Research Institute) in collaboration with researchers from Mount Sinai in New York, has also made it possible to determine that these neutrophils have an immunoregulating role.

Neutrophils are the so-called cleaning cells, since they are the first cells to migrate to a place with an infection and inflammation to destroy the pathogens. Until now, scientific literature had considered [neutrophils](#) essentially as lowly qualified soldiers that simply limited the expansion of an infection, as a first action to pave the way for other cells of the

immune system in charge of eradicating the infection permanently.

"This study has revealed that neutrophils are found in the [spleen](#) without there being an infection, contributing totally new knowledge in the field of biology" explains Andrea Cerutti, the coordinator of the research group on the Biology of B Cells of IMIM, a professor at ICREA and the last signatory of the article.

Researchers noticed that the existence of neutrophils in the spleen started when the [fetus](#) is developing, even when there is no infectious process involved; this was not known in scientific literature. The study was expanded to people of different ages and other mammals. Detecting the presence of neutrophils in the spleen suggested that these played a different role in the spleen to the one usually given to them.

The neutrophils in the spleen are located around B lymphocytes to help their activation and offer a first rapid response when there are pathogens. "through several different experimental approaches we have proven that neutrophils in the spleen acquire the ability to interact with [B cells](#) or B lymphocytes, inducing the production of [antibodies](#), a role that lymphocytes circulating in blood are not able to do" states Irene Puga, researcher of the IMIM and a signatory of this article.

This finding improves the understanding of the mechanisms with which our immune system protects us against an infection, an essential requirement to better control all pathologies linked to it. Also, when faced with certain diseases, such as neutropenia (or a numeric deficiency of neutrophils), it will become necessary to study not only the deficiency of neutrophils, but also how this affects the production of antibodies.

This work opens the door to therapies which are geared at, and more affective against, different [pathogens](#), for example, to develop vaccines to increase the capacity of neutrophils in the spleen so as to have an

incidence on the production of antibodies by type B lymphocytes.

**More information:** "B–helper neutrophils stimulate immunoglobulin diversification and production in the marginal zone of the spleen" Irene Puga, et al., *Nature Immunology* 2011.

Provided by IMIM (Hospital del Mar Research Institute)

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