

Protein NBS1 is crucial for macrophage functional activity

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Protein NBS1, which plays a key role in DNA damage repair, is required for macrophage functional activity. This is one of the conclusions of a scientific paper published in the journal *Blood* by a team of experts from the Faculty of Biology of the University of Barcelona (UB), the Barcelona Science Park (PCB) and the Institute for Research in Biomedicine (IRB Barcelona). The protein also has implications for understanding the immune defects observed in patients with Nijmegen breakage syndrome and other related disorders.

When proteins are not able to repair DNA

Protein NBS1 (Nijmegen breakage syndrome 1) is a component of the MRE11 complex, which is a sensor of DNA double-strand breaks and plays a crucial role in the DNA damage response and cell signalling. In the new study, the scientific team has examined the role of NBS1 in macrophage function. Macrophages are [immune system cells](#) able to produce great quantities of [reactive oxygen species](#) that can damage DNA. The study has been developed with a knockout (KO) mouse model genetically modified to not express the gene that codifies protein NBS1.

According to results, when macrophages are activated by pro-inflammatory (IFN- γ and LPS) stimuli, NBS1 absence produces DNA breaks, which causes defects in proliferation, delayed differentiation and increased senescence. Moreover, these cells show an increased

expression of pro-inflammatory cytokines, molecules that favour autoimmune processes and disorders in in vivo models of inflammatory diseases.

The article published in the journal *Blood* provides new insights into the role that macrophages play in severe immunodeficiency in patients with Nijmegen breakage syndrome and similar diseases.

The Consolidated Research Group Macrophage Biology, led by Antonio Celada, professor in the Department of Physiology and Immunology, is focused on studying the role that [macrophages](#) play in inflammation, one of the keys of immune response (elimination of bacteria, virus, parasites, tumour cells, etc.).

More information: "NBS1 is required for macrophage homeostasis and functional activity in mice." [DOI: 10.1182/blood-2015-04-637371](https://doi.org/10.1182/blood-2015-04-637371)

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