

# Microenvironment of hematopoietic stem cells can be a target for myeloproliferative disorders

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This image depicts the authors of the study, including Dr. Mendez and others.  
Credit: CNIC

The protective microenvironment of the hematopoietic stem cell niche, which produces cells of the blood and the immune system, also protects against myeloproliferative neoplasia.

The discovery of a new therapeutic target for certain kinds of myeloproliferative disease is, without doubt, good news. This is precisely the discovery made by the Stem Cell Physiopathology group at the CNIC (the Spanish National Cardiovascular Research Center), led by Dr. Simón Méndez–Ferrer. The team has shown that the [microenvironment](#) that controls [hematopoietic stem cells](#) can be targeted for the [treatment](#) of a set of disorders called myeloproliferative neoplasias, the most prominent of which are chronic myelomonocytic leukemia (CMML), juvenile myelomonocytic leukemia (JMML), and atypical [chronic myelogenous leukemia](#) (CML).

The findings, published today in *Nature*, demonstrate that these myeloproliferative neoplasias only appear after damage to the microenvironment that sustains and controls the hematopoietic [stem cells](#)—the cells that produce the cells of the blood and the immune system. Protecting this microenvironment, or niche, has thus emerged as a new route for the treatment of these diseases, for which there is currently no fully effective treatment.

"In normal conditions, the microenvironment is able to control the proliferation, differentiation and migration of the hematopoietic stem cell. A specific genetic mutation in these [cells](#) results in inflammatory injury to the microenvironment and this control breaks down. What our work shows is that this damage can be prevented or reversed by treatments that target the niche," explained Dr. Méndez-Ferrer.

Indeed, the same team of researchers has demonstrated the efficacy of a possible new treatment, which has been patented through the CNIC. The treatment involves an innovative use of clinically approved treatments for other diseases, so that, according to the authors, "it shouldn't be associated with adverse side effects". The new treatment route has been tested in animals and has received financial backing for a multicenter phase II clinical trial. "This study has a very strong translational and

clinical potential", emphasized study first author Dr. Lorena Arranz, who added that "current treatment for myeloproliferative neoplasias is largely symptomatic and directed at preventing thrombosis and fatal cardiovascular events".

The only real cure available today is a bone marrow transplant, which is not advisable in patients over 50 years old. "This makes it important to identify new therapeutic targets for the development of effective treatments," the investigators conclude.

**More information:** Paper: Neuropathy of haematopoietic stem cell niche is essential for myeloproliferative neoplasms, [DOI: 10.1038/nature13383](https://doi.org/10.1038/nature13383)

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