

An important breakthrough in hematopoiesis and the development of B cells

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A team at the Institut de recherches cliniques de Montreal (IRCM) led by Dr. Tarik Moroy, President and Scientific Director of the institute and Director of the Hematopoiesis and Cancer research unit, will be publishing an important breakthrough in tomorrow's issue of *Immunity*, a scientific journal from the Cell Press group. The researchers identified a new regulator playing a critical role in the development B cells, which produce antibodies.

Antibodies circulate through the blood and protect against [infectious diseases](#) originating from [bacteria](#) or viruses. A lack of [antibodies](#) causes the [immune system](#) to be severely compromised against infections, and is therefore life-threatening. By producing specific antibodies, mature functional [B cells](#) are essential for the body's immune response. The regulator discovered by the researchers is a transcription factor called Miz-1, which is needed for the proper development and maturation of B cells in the [bone marrow](#). This maturation process also requires a growth factor called Interleukin-7 (IL-7) that enables the development of B cells by providing it with the necessary survival signals.

"We initially wanted to clarify the role of Miz-1 during hematopoiesis, which is the formation of all blood cellular components," explains Dr. Christian Kosan, Research Associate in Dr. Möröy's research unit and the study's first author. "Surprisingly, our study demonstrated that Miz-1 is required predominantly for the very early stages of B-cell development in the bone marrow. For instance, after deleting the Miz-1 gene in a mouse, we discovered that it had almost completely lost its

ability to generate B cells. "

Upon closer evaluation, the research team found that Miz-1 has a very particular function: it is required for IL-7 to effectively trigger the maturation of B cells in the bone marrow. For that reason, mice lacking the Miz-1 transcription factor were immunocompromised, and with this severe defect in B-cell production, a pathogen invasion would most certainly lead to rapid death.

"The important breakthrough in this study is the discovery that the IL-7 signaling pathway uses the transcription factor Miz-1 to ensure both B-cell survival and maturation," adds Dr. Möröy. "Our research project therefore confirmed the importance of this signaling pathway for the development of antibody-producing cells. Our next step will be to study the impact of Miz-1 in the development of B-cell leukemia. If this regulator is necessary for the production of B cells, it is possible that it is also required for the development of B-cell leukemia. It may thus be a target for therapeutic interventions in the treatment of this type of blood cancer."

More information: For more information, please refer to the article summary published by *Immunity*: [www.cell.com/immunity/abstract ... 1074-7613\(10\)00458-9](http://www.cell.com/immunity/abstract/S0962-5195(10)00458-9)

Provided by Institut de recherches cliniques de Montreal

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