Researchers identify factors behind blood-making stem cells

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A team of researchers from the Institute for Research in Immunology and Cancer (IRIC) of the University of Montreal have made significant progress in the understanding of blood-producing (hematopoietic) stem cells.

The study led by IRIC Chief Executive Officer and Scientific Director, Dr. Guy Sauvageau, identifies factors that control the production of hematopoietic stem cells. Published in the journal *Cell Stem Cell*, the research offers interesting insight critical to the development of novel regenerative therapies and treatments for leukemia.

Hematopoietic stem cells (HSCs) are located within the bone marrow and serve as a reservoir for the production of all blood cells. A disruption in this process can have dire consequences leading either to a depleted blood cell population which can cause severe immune deficiencies, or excessive proliferation of blood cells which can trigger the development of leukemia. At the moment, relatively little is known about what controls this production.

The current study aims to understand the roles of various proteins that are present in HSCs and their impact on blood production. Researchers found that three proteins (Msi2, Pard6a and Prkcz) help blood cells to regenerate. That is, when HSCs lack these proteins, blood cells have a reduced capacity to regenerate themselves. Results from a fourth protein, Prox1, showed the reverse effect: their presence hinders the reproduction of blood cells.

"Understanding which proteins control the production of blood-making stem cells is crucial knowledge for designing therapies for diseases caused by unruly HSCs" explains Dr. Sauvageau, "Now that we recognize the key roles that these proteins play, we can evaluate their potential as therapeutic targets to treat a variety of diseases such as leukemia."

More information: Kristin J. Hope, Sonia Cellot, Stephen B. Ting, Tara MacRae, Nadine Mayotte, Norman N. Iscove, and Guy Sauvageau. An RNAi Screen Identifies Msi2 and Prox1 as Having Opposite Roles in the Regulation of Hematopoietic Stem Cell Activity. Cell Stem Cell, Volume: 7; Issue: 1; Manuscript: 682 www.cell.com/cell-stem-cell/

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