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Montreal researchers shed light on common juvenile cancer

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A team of researchers from the Institute for Research in Immunology and Cancer (IRIC) of the University of Montreal have defined for the first time the mechanism behind three cancer-causing genes in acute lymphoblastic leukemia. Published in the journal *Genes and Development*, the findings offer insight on the complex interaction between the genes and their contributions to leukemia, thereby providing the foundation for the design of targeted therapies.

The study was conducted by primary authors Mathieu Tremblay, Ph.D. student and Cédric Tremblay, post-doctoral fellow in the Hematopoiesis and Leukemia Laboratory at the Université de Montréal and led by corresponding author and IRIC Principal Investigator, Trang Hoang.

Acute lymphoblastic leukemia (ALL) is the most frequent childhood cancers and affects lymphocytes, the cells in the body that normally fight infections. ALL starts when a single, immature white blood cell called a "blast" develops a series of mistakes or mutations that allow it to multiply uncontrollably. Eventually, these leukemic blasts take over the lymphoid organs, the bone marrow and crowd out normal blood cells.

While extensive research has been conducted over the years to understand this type of cancer, deciphering the complex process responsible for transforming normal cells into cancerous cells remains a challenge. In this study, researchers started from the well-known basis that the interaction between two genes, SCL and LMO, is involved at the onset of a specific type of ALL, called T-cell leukemia.

"We wanted to uncover the precise mechanism behind the process that causes a normal cell to become cancerous. Our study reveals that SCL and LMO expand the pool of immature lymphocytes, which proliferate intensively under the influence of a specific signal. These SCL-LMO-primed cells then acquire mutations in a third gene, Notch1, which is known to play a role in the majority of T-ALL patients," explains Trang Hoang. "In short, the synergy between these three genes in a permissive cell is sufficient to induce leukemia."

Although chemotherapy can cure up to 80 percent of ALL in children, researchers hope to minimize the side effects by designing new therapies that specifically target cancer causing genes. "The knowledge from our study could be instrumental in the development of less invasive cancer therapies," adds Dr. Hoang.

More information: Genes and Development : genesdev.cshlp.org/content/24/11/1093.abstract

Provided by University of Montreal

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