



Critical Discovery Brings Toronto-based Researchers Closer To Creating Tailored T Cell Therapy For AIDS Patients

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Researchers at Sunnybrook Health Sciences Centre have made a critical discovery in T cell development bringing immunologists one step closer to enabling the creation of tailored T cell therapy that could one day be used to treat patients with AIDS or other immune system deficiencies.

"For the first time we understand which sets of molecules are required to induce different types of T cells," says Canada Research Chair and principal investigator Dr. Juan Carlos Z--iga-Pfl-ckerr, a senior scientist at Sunnybrook Research Institute who is also a professor in the Department of Immunology at the University of Toronto.

The immune system uses two main types of T cells, alpha-beta and gamma-delta, each with unique roles in protecting us from disease. The findings show that T cell progenitors will develop into mature gamma-delta T cells despite the absence of the Notch molecule, a molecule that Z--iga-Pfl-cker's lab recently showed was essential for the early-stage development of both types of T cells.

Published today in the journal *Immunity*, the research is also the first to show at what developmental stage the two types of T cells become distinct lineages. The lead researcher, Maria Ciofani, a PhD student in Z--iga-Pfl-cker's lab, used precise cell isolation techniques to show which molecular cues are needed, and when for each lineage development. Collectively, the work clarifies how both T cell types can be generated in the laboratory, thereby enabling further study directed at tailoring their unique functions to specific clinical needs.

Gamma-delta T cells in particular hold exciting clinical promise for their ability to orchestrate immunity to a broad range of foreign molecules; experiments in mice have shown that gamma-delta T cell injections can eliminate cancerous tumours, although much work remains to translate this research into viable clinical therapy.

Z--iga-Pfl-cker was recently identified by the prestigious Thomson Scientific Essential Science Indicators as one of the most cited researchers in the field of immunology for his landmark December 2002 paper in *Immunity*, which showed how to generate T cells from stem cells in a Petri dish. In addition to enabling Z--iga-Pfl-cker's current work, this breakthrough discovery established a simple and effective way for other researchers to study T cell development, and has advanced this study in hundreds of labs around the world.

Article adapted by Medical News Today from original press release.

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