Arnie Charbonneau Cancer Institute
The Riddell Centre for Cancer Immunotherapy

University of Calgary | Alberta Health Services

Unlocking the Power of Dendritic Cells to Strengthen Cancer Immunity

PROJECT TEAM

Dr. Johnathan Canton (PI)

TARGETED CANCERS

Cancer agnostic

RESEARCH PRIORITIES

Discovery & Innovation

RESEARCH ENABLERS

Synthetic immunology

Preclinical modeling

FUNDERS

CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

NSERC CRSNG

PARTNERS

PROVIDENCE therapeutics

PROJECT SUMMARY

Our immune system plays a critical role in identifying and eliminating cancer cells. Among the many immune cells involved, a specialized group known as dendritic cells — particularly a type called cDC1s — are essential for jump-starting the body's cancer-fighting T cell responses. Despite their importance, very few cancer therapies are designed to specifically target these powerful immune cells. A new project led by Dr. Johnathan Canton is working to change that.

The team is developing a new kind of cancer therapy that helps cDC1s perform their role more effectively. These cells act like messengers: they collect fragments of cancer cells (called antigens) and present them to T cells, which are the immune system's main cancer-fighting force. This process, known as antigen cross-presentation, is a crucial first step in helping the immune system recognize and attack cancer.

To enhance this process, Dr. Canton's team is designing specialized CARs that can be delivered to cDC1s. Their approach, CAR XP, builds on the team's recent discoveries, published in Nature Immunology and Science Immunology, that identified key proteins that help cDC1s perform this function. These advances not only open new therapeutic possibilities, but have also drawn broader attention, including coverage in UToday (November 2024).

By targeting the very cells responsible for initiating anti-cancer immunity, this project could lay the foundation for a new class of cell therapies — ones that not only attack cancer directly but also train the immune system to sustain the fight. The work will also generate critical early data to support future research and funding opportunities in this emerging area.

OVERALL IMPACT

This project represents a promising step toward rethinking how we activate the immune system to fight cancer. By targeting dendritic cells — specifically cDC1s, which play a central role in initiating anti-cancer T cell responses — Dr. Canton's team is working to develop a new class of cell therapies designed to enhance the body's natural immune response. It also opens new avenues for research into other immune cell types and provides a strong foundation for future clinical translation and funding.

Last updated October 2025