Arnie Charbonneau Cancer Institute
The Riddell Centre for Cancer Immunotherapy

University of Calgary | Alberta Health Services

Exploring How Gut Bacteria Impact the Effectiveness of CAR T-Cell Cancer Therapy

PROJECT TEAM


Dr. Douglas Mahoney (Co-I)

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Dr. Robert Puckrin (Co-I)


Dr. Kathy McCoy (PI)


Dr. Mona Shafey (Co-I)

TARGETED CANCERS

- Blood cancers

RESEARCH PRIORITIES

- Discovery & Innovation

PARTNERS

- University of Calgary
- International Microbiome Centre

FUNDERS

- CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada
- Marathon of Hope Cancer Centres Network

RESEARCH ENABLERS

- Genomics
- Biobanking
- Synthetic immunology
- Preclinical modeling

Previous enablers:
- Vectorology

PROJECT SUMMARY

CAR T-cell therapy has brought new hope to patients with certain blood cancers, offering remarkable results in many cases. However, it doesn't work for everyone — about half of patients either don't respond to the treatment or experience a relapse. To date, most research has focused on improving the therapy by modifying the genetic design of the T cells themselves.

Dr. Kathy McCoy's project takes a different and innovative approach. Her team is investigating how the gut microbiome — the trillions of bacteria and other microbes that live in our digestive system — might influence the effectiveness of CAR T-cells. Previous studies have shown that the microbiome can enhance the success of other cancer treatments, and Dr. McCoy's team believes it could play a similar role in CAR T-cell therapy.

In their early research, the team identified specific bacteria that appear to help the immune system fight cancer more effectively. These findings, originally observed in another form of immunotherapy, are now showing promise in preclinical models of leukemia, where the same bacteria may also improve CAR T-cell performance.

The next phase of the project will focus on uncovering how these microbes interact with CAR T-cells and determining whether these effects can be replicated in patients. The ultimate goal is to develop microbiome-based therapies that could be used alongside CAR T-cell treatment — potentially helping more patients benefit from this life-saving technology.

This project has already achieved important early milestones. It was launched in 2021 with seed funding from the ACTION initiative and has since secured additional support to expand, including funding from the Marathon of Hope Cancer Centre Network through the Prairie Cancer Research Consortium, and a Project Grant from CIHR.

OVERALL IMPACT

Researchers are exploring the connection between the microbiome and the effectiveness of CAR T-cells in treating blood cancers, with the ultimate goal of launching a clinical trial that combines CAR T-cell therapy with microbial therapy to enhance treatment responses.

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