Cancer Biology Newsletter

Issue No. 2 | June 2025

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Advancing Childhood Cancer Experience, Science & Survivorship

Agir Contre le Cancer des Enfants avec Succès

The aim of the Cancer Biology research theme is to better understand the biology of pediatric cancers and accelerate research efforts by removing barriers to collaboration, increasing research pathways, and building infrastructure to enable knowledge, expertise, and data sharing across Canada.

Learn more here: Cancer Biology

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Cancer Biology Theme

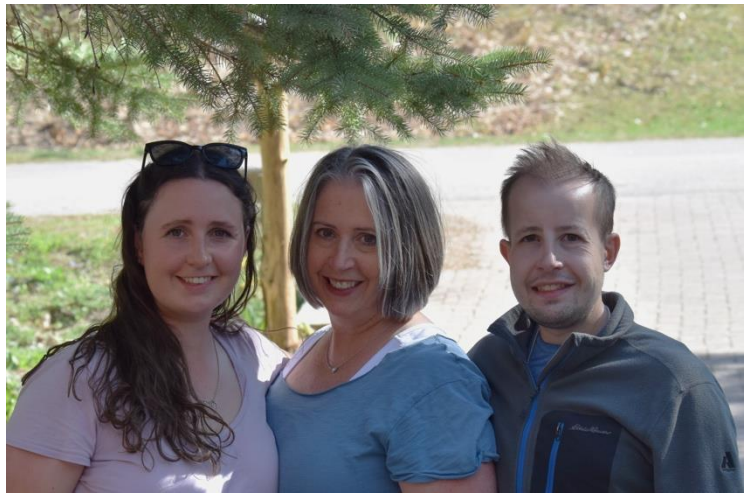
IN THIS ISSUE: Cancer Biology Theme stakeholder Karen Haas shares insights from her journey as a Person With Lived Experience and how it shapes her work in knowledge mobilization and cancer research. Plus, project updates and and an overview of our newly approved project: The Pediatric Preclinical Modelling Core.

CONTENT OVERVIEW

FOR MORE INFORMATION, please visit the Cancer Biology section of the ACCESS website or contact the Cancer Biology Theme's Project Manager at emily.nakada@mail.mcgill.ca or the ACCESS Project Manager at tricia.schneider@sickkids.ca

Featured Contributor

Photo provided by Karen Haas



From left: Katriel (daughter), Karen, & Tobin (son)

Karen Haas

***Karen** is a co-lead of the ACCESS Knowledge Mobilization Group and a stakeholder in several Cancer Biology Theme initiatives, including the Molecular Pathology Board, Proteomics Project, Biobanking Network, and the National Research Project on Brain Tumours. She is also a Person With Lived Experience (PWLE), a wife, and mother of two.*

Are You Experimenting on My Son?

It was an innocent question. I heard 'clinical trial' and my brain translated that into 'experiment'. How could I, a mom of a two-year-old who had been recently diagnosed with a malignant brain tumour, know all the phases that research must go through before a child could be a participant? Although this happened 23 years ago, I try to keep that perspective in mind in any project with which I am involved. When I served on the Ontario Cancer Research Ethics Board for six years, I thought of the patients and family members who would be reading the patient consent forms, possibly overwhelmed with information, their emotions, and questions.

I joined ACCESS in February 2024 as a Co-lead for the Knowledge Mobilization Group. A few months later, I learned that the Cancer Biology Theme was looking for PWLE interested in various projects and I was intrigued. I have a respectable level of understanding about pediatric brain tumours because of my son's diagnosis and two recurrences, and over the years I learned about different types of pediatric brain tumours through conferences and friends. On top of that, I have been part of a clinical research trial team since 2019.

Although I have an academic and career background far removed from science, I am very interested in molecular pathology and cancer research. Since 2022, I have been a part of a small team writing micro-learning modules about molecular pathology for patients and families. I understand that it might be a daunting topic for many, in part because it is not commonly discussed in appointments

Featured Contributor

with healthcare team members. I believe that it is possible to engage and inform patients and families by providing appropriate details, using analogies/metaphors, plain language, and visuals.

When I expressed interest in the various cancer biology projects, I felt confident that I could represent a range of PWLE perspectives and contribute to the knowledge mobilization outputs that will eventually be produced.

My interest in cancer research is strongly tied to knowledge translation or knowledge mobilization (the term to use is debated). With gratitude for the PWLE Subsidy, a project of the ACCESS Education and Training theme, I was able to take the Knowledge Translation Professional Certificate (KTPC) course in March 2025. There are well-established essential components of Knowledge Translation (KT) plans for dissemination of research, which include the who and when of project partners, expertise required, strategies, process, evaluation, resources, budget, audience(s), and most importantly, main messages. What is to be shared might differ depending on the audience.

I share with you an important resource from the KTPC course that has been helpful: Barwick, M. (2008). *Knowledge Translation Planning Template* (Version date: December 2022). The Hospital for Sick Children.

I have enormous respect and gratitude for researchers who devote their careers to finding better treatments for cancer. As a PWLE interested in research, I want to understand what is being done by researchers and ask questions that might influence the research. I strive to represent the diverse community of patients and families, and I want to contribute as much as possible to being a bridge between doctors/scientists and patients/families.

I think back to the early years when my son was either in active treatment or under close surveillance. I had a recurring dream.

Imagine that you are just going about your life when suddenly, you are no longer in the driver's seat or the passenger seat. Instead, you are in the back seat, not able to see the driver, not able to see the road, not able to provide input into the route, and not having clarity about the destination. That is what a cancer diagnosis for your child or other loved one might feel like. When I started learning about cancer research and ethics, I moved up to the front seat. I was able to ask questions and possibly influence the route.

Four years ago, as a 21-year-old with one term left in his nursing degree, my son was diagnosed with an ultra-rare metastatic sarcoma. There is no cure, nor is there a standard of care.

I realize that my interest in research might differ from the perspective of others. What is it about molecular pathology—particularly proteomics at this moment—that captures my interest so deeply? Perhaps it stems from hope. Perhaps there are answers in molecular pathology research that might help my son. If I find comfort in understanding more, perhaps others might as well.

"I strive to represent the diverse community of patients and families, and I want to contribute as much as possible to being a bridge between doctors/scientists and patients/families."

I look at the role of Knowledge Mobilization/Knowledge Translation in research to be very important. If there are discoveries, they should be shared as widely as possible. A finding of one thing might lead to others. It is fascinating to be part of the various cancer biology theme meetings, to listen to the sharing of information and findings. It all makes me hopeful that there will be better treatments and even cures in the not-so-distant future.

Our Projects

National Research Project: Brain Tumour

Project Name: Deciphering 3D chromatin states permissive to driver alterations in High-Grade Childhood Brain Tumours

Project Co-Leads: Nada Jabado & Vijay Ramaswamy

Brief Description

High-grade brain tumours have distinct genetic alterations and changes in the way DNA is organized (chromatin architecture) at the core of the processes that sustain tumour formation. This project examines how 3D and 4D chromatin changes function, how tumour cells communicate with each other and with their surrounding environment and aims to identify new therapeutic targets.

Achievements

We brought together investigators with the relevant expertise, patient advocates, and other stakeholders in the pediatric brain tumour space • We identified and collected relevant biospecimens and are well underway in conducting the proposed work, including preliminary results from high-grade glioma brain tumours with the histone 3 K27M and G34R alterations.

Current Focus

In this quarter, we made significant progress in the generation of new datasets using cutting-edge genomics methods, with 7 patient tumours profiled using Visium HD spatial transcriptomics and 4 patient tumours profiled using nano-CUT&TAG. These datasets will allow us to advance our understanding of chromatin changes in pediatric brain tumours

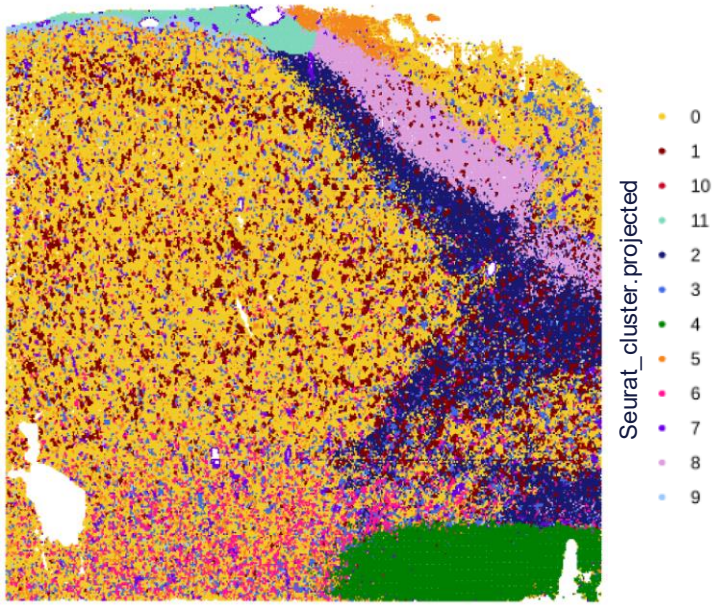


Figure from the National Research Project on Brain Tumours: Image of an H3 G34R-mutant diffuse hemispheric glioma tumour produced using Visium HD spatial transcriptomics technology. The image illustrates the existence of several spatial domains within the tumour. These domains are defined by gene signatures and markers representative of different tumour compartments, including regions containing true tumour cells and those containing other types of cells and tissues, such as brain cells, immune cells and blood vessels.

and of communication between tumours and their microenvironment. Our results could lead to designing new, targeted treatment approaches.

Requests & Opportunities

We are requesting additional high-grade tumor samples to validate findings • Any PWLE and investigators interested are always welcome to join our monthly meetings.

For more details, please refer to page 10 of the first issue of our quarterly newsletter.

National Research Project: Sarcoma

Project Name: Sarcoma MetAstasis Research Taskforce, SMART Project

Project Co-Leads: Livia Garzia, Rebecca Gladdy, and Poul Sorensen

Brief Description

In high-risk pediatric sarcomas, we have made progress in understanding the biology of the primary (original) tumours. However, we still do not fully understand what causes these cancers to relapse or spread to other parts of the body. This project aims to explore gaps in knowledge and identify therapeutic targets that might be relevant to prevent or treat metastasis and relapse in pediatric high-risk sarcomas.

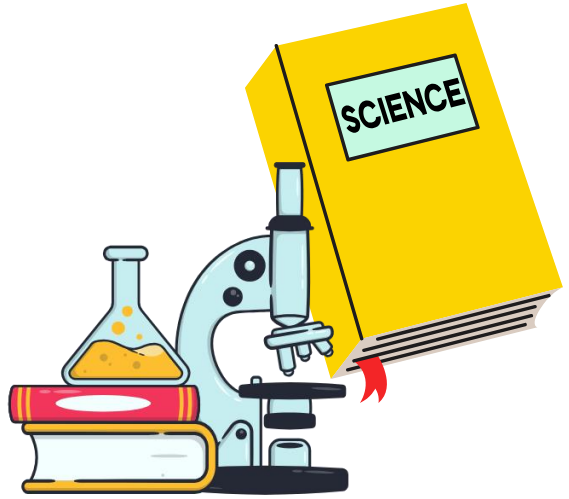
Recent Achievements

The team has completed the library preparation step for single-cell sequencing of all relevant samples for osteosarcoma (OS), rhabdomyosarcoma (RMS) with Dr. Gladdy as lead and Ewing sarcoma (EwS) are in progress • Extracellular vesicles (EVs) have been extracted and purified from all OS plasma samples, while EwS and RMS plasmas are being processed • A novel approach called single cell Taylor sequencing (scTaylorSeq, a combination of nanopore and single cell) will be used with Dr. Lavallée for EwS – the pull-down panel has been designed and pilots are in progress • Initial data on the OS single-cell study were presented by Dr. Garzia at the Canadian International Sarcoma Symposium, May 8-9th, 2025, in Toronto.

Current Focus

Analysis of OS single cell data is in progress, while sequencing of other types of sarcoma is underway • Proteomic and transcriptomic strategies for plasma EVs have been finalized and samples are being sent to different labs for analysis.

For more details, please refer to page 6 of the first issue of our quarterly newsletter where this project was featured.



Our Projects

National Research Project: Leukemia

Project Name: Diagnostic and precision intervention for leukemia arising in infancy

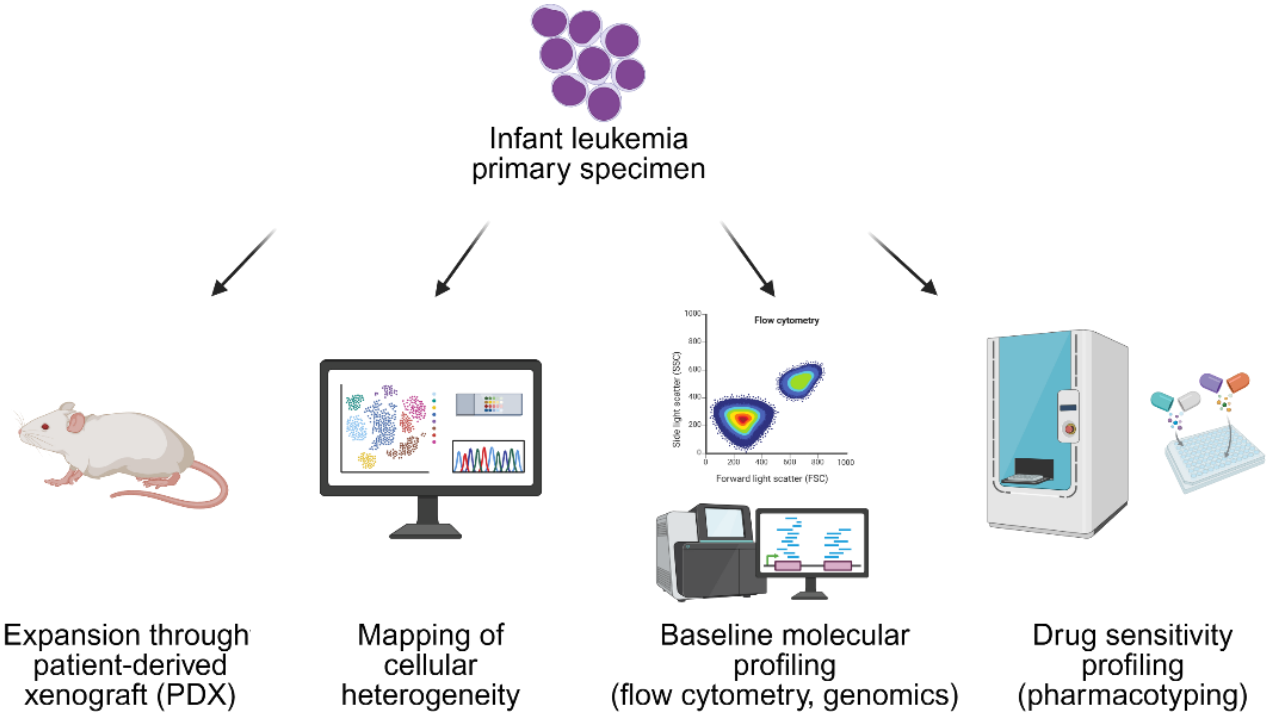
Project Lead: Sonia Cellot

Brief Description

Recent advancements in genetics have revealed that pediatric leukemia is much more diverse than we previously thought, but this diversity is just starting to be considered in how we diagnose, treat, and monitor the disease. Our goal is to create a national team of experts to study infant leukemia and accelerate research to improve treatments and outcomes. Our goal is to eventually apply this as a model to other high-risk leukemia subtypes.

Recent Achievements

Ethics agreements have been created and submitted to the respective centres (CHU Sainte-Justine, SickKids, BC Children's Hospital, The Children's Hospital of Winnipeg) and are expected to be approved shortly • The granularity and quantity of available samples across different centres have been assessed and documented. We have identified approximately 20 samples of interest across the various centres • Priority samples have been identified along with their key characteristics • A clinical fellow has been recruited to support the clinical annotation of samples • The initial set of priority experiments has been defined (single-cell RNA sequencing, drug-screening, PDX – Patient Derived Xenograft), based on the number of cells available per sample.



Current Focus

We have begun harmonising our standard operating procedures (SOPs), with a particular focus on those related to single-cell RNA sequencing, to ensure consistency across all participating centres • We are curating the list of drug compounds to be screened.

Requests and Opportunities

We are continuously seeking new samples that meet our inclusion criteria. If you have potential candidates or would like more information, please do not hesitate to contact us.

For more details, please refer to page 11 of the first issue of our quarterly newsletter.

Figure (left) from the National Research Project on Leukemia: Prioritised experimental milestones of the Infant Leukemia Network. Created with BioRender.com. Flow cytometry, Genomics, PDX, pharmacotyping are terms defined in the glossary.

Our Projects

National Research Platform: PCMM Network

Project Name: Pediatric Cancer Models & Mechanisms (PCMM) Network

Project Lead: Chris Maxwell

Brief Description

The Pediatric Cancer Models and Mechanisms (PCMM) network is a national platform that has created an Experts registry and a matching program for preclinical and clinical researchers. The PCMM network promotes preclinical investigations and enables all researchers across Canada to access leading experts and technologies.

Achievements

Created the Experts' registry, registered 60+ investigators across the country and connected to 1000+ domestic and international investigators • Launched the first round of competition and funded 3 new projects, including in developmental therapeutics, gene functionalisation and biomarker discovery • Launched the second round of competition with a goal of funding 4 partnership projects.

Current Focus

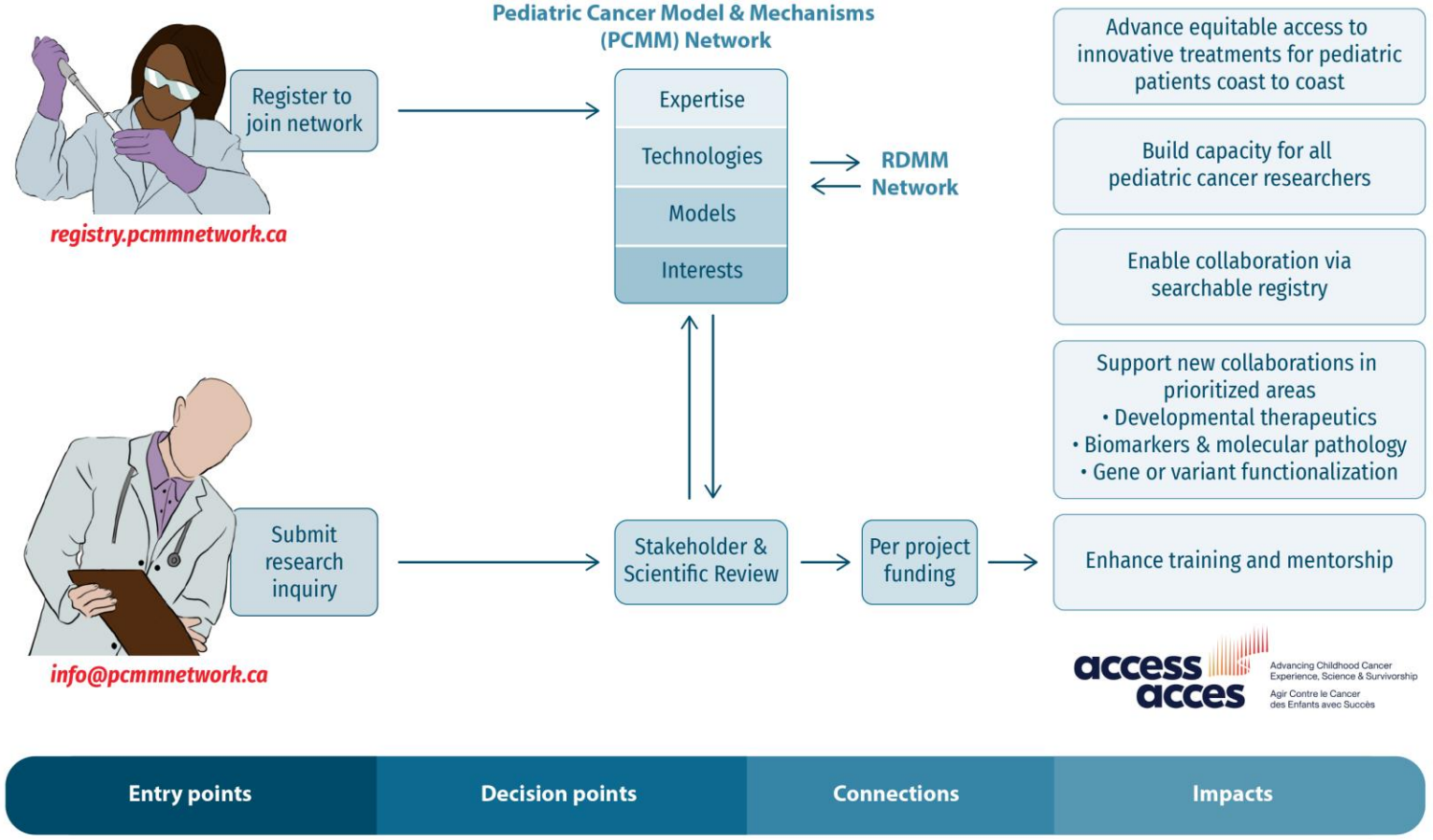
The Network's Governance and Scientific Oversight Committee are currently evaluating partner applications from the second round.

Requests & Opportunities

Have you visited the PCMM Network website and/or the Experts Registry? We ask that you complete a quick (< 2-minute) survey to share your experience with us. Link to the Survey.

For more details, please visit the following websites:

- PCMM Network Website
- PCMM Network Registry



Our Projects

National Research Platform: Molecular Pathology

Project Name: Molecular Pathology Strategy

Project Co-Leads: Philipp Lange and Liana Nobre

Brief Description

This project focuses on a comprehensive, research-driven strategy to identify and accelerate the integration of next-generation molecular pathology assays and platforms into routine clinical care, ensuring equitable access for all children with cancer across Canada. Our objectives include (i) establishing the necessary infrastructure to expand access to proteomic profiling; (ii) advancing the clinical implementation of liquid biopsy technologies; and (iii) democratising access to advanced molecular diagnostics and specialised expertise by creating a National Molecular Pathology Board (MPB) dedicated to pediatric oncology.

Achievements to Date

The proteomics project team has generated promising, early results comparing protocols and results from 4 labs across Canada, as part of its congruence study • The MPB has reviewed 3 patient test cases.

Current Focus

Liquid biopsy meetings are restarting and are scheduled to occur monthly on the 4th Thursday at 1 pm ET. The first meeting is on June 26th • The proteomics project team is establishing 3 National Pediatric Proteomic Centres in BC, ON, and QC with the goal of performing real-time proteomic profiling of patient samples across Canada. The team is working on test cases towards this goal • The proteomics team continues its work on a congruence study • The MPB is working towards putting out an open call for patient cases for review and matching with advanced molecular assays.

Requests & Opportunities

Interested individuals, especially in advancing circulating tumour (ct)DNA testing and access, are invited to join our meetings • We are looking for a Person With Lived Experience to join the Liquid Biopsy working group.

For more details, please refer to page 13 of the first issue of our quarterly newsletter.

Our Projects

National Research Platform: Modelling

Project Name: Pediatric Preclinical Modelling Core

Project Co-Leads: Jason Berman, James Lim, and Donna Senger

Brief Description

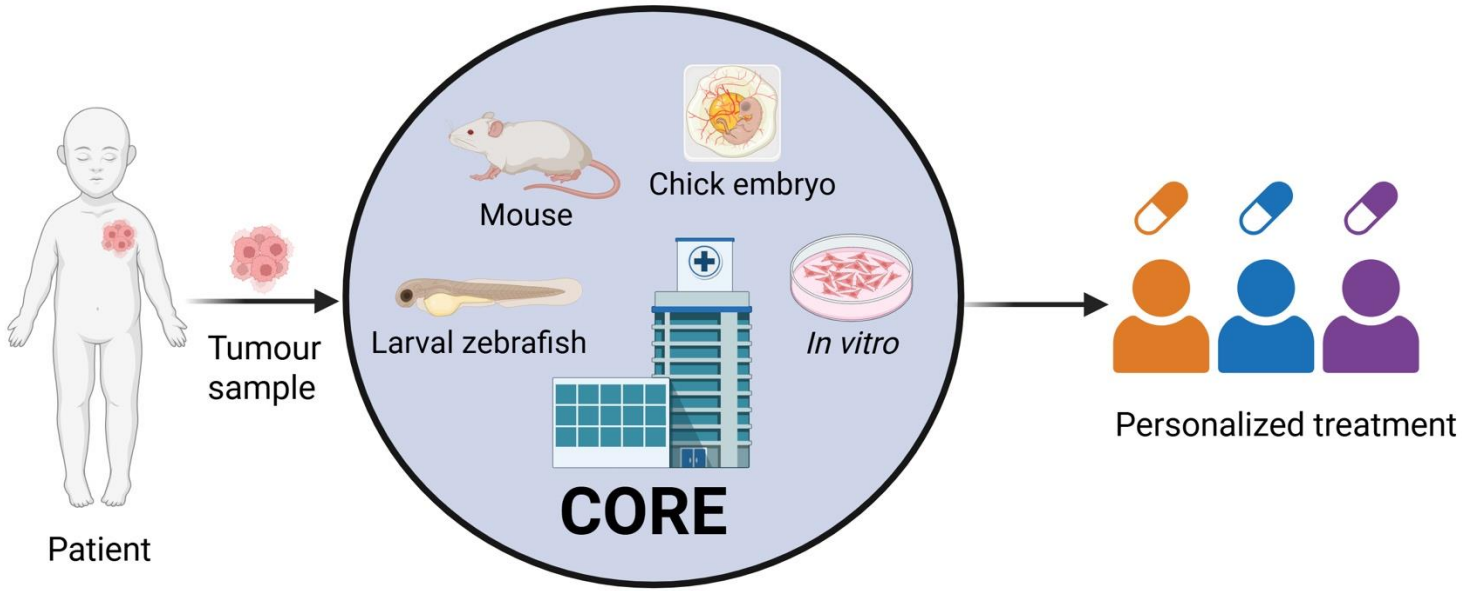
Oncologists have relied on cytotoxic chemotherapies that do not target cancer cells specifically and carry a significant burden on short- and long-term toxicity. In general, these therapies are selected based on histologic cancer type, without consideration of the underlying characteristics of each patient's specific tumour. Next-generation sequencing approaches have enabled therapy to be better tailored to the underlying genomic lesions present in each patient's cancer, but response rates to targeted drugs remain disappointing, in part due to a lack of functional validation. We propose to establish a national core that will promote and expand preclinical investigations of each individual Children, Adolescent and Young Adults (CAYA) tumour through the generation of patient derived xenograft (PDX) models. PDXs facilitate a deeper characterisation of the tumour and functional assessment of drug response or the tumourigenic contributions of variants of uncertain significance (VUS). Based on identification of actionable drug targets, we will assess matched Health Canada / Food and Drug Administration approved drugs or compounds accessible through a clinical trial with the opportunity for timely clinical implementation.

Aims

We propose creating a National Pediatric Preclinical Modelling Core to improve survival and quality of life for childhood cancer patients in Canada by identifying treatments tailored to the unique genetic and protein makeup of each tumour. Using zebrafish, chick embryos, and mice, we will collect samples and generate individualized patient models to rapidly assess drug responses and guide personalised treatment options for CAYA patients with cancer • In addition to preclinical drug testing, we will collaborate with other ACCESS cancer theme projects to develop and integrate complementary models.

Key Deliverables

We will establish a core of experts with pediatric modelling expertise, PWLE, and collaborators



Pediatric Preclinical Modeling Core Pipeline and Overview: Preclinical models will be developed on a case-by-case basis to assess drug efficacy. Drug response data from these models will be shared with the oncology team to support informed treatment decision-making.

Our Projects

• Establish and integrate the pipeline, including procedures and forms, of the core • Establish a virtual biobank of annotated models.

Achievements

The proposal based on the work described was approved by ACCESS in March of 2025 • We have recruited two Persons With Lived Experience (PWLE) to the core • As the ACCESS modelling core builds and extends on the earlier work of the PROFYLE Model System Node, the project team is well-informed and -coordinated to get the work underway • We have connected with other Cancer Biology Theme project teams.

Current Focus

We are currently expanding on the number of preclinical PDX models of the core • We are establishing protocols, creating forms, and addressing other logistical matters • We are beginning the work of surveying the landscape of laboratories and centres with modelling capabilities in the pediatric cancer space

Requests & Opportunities

We are surveying the Canadian pediatric cancer research community to identify investigators that have or are establishing PDX models and have the capacity or interest in evaluating drug responses to inform clinical implementation and improve patient outcomes • We are recruiting two additional PWLE.

Events & Opportunities

REQUESTS & OPPORTUNITIES

- ✓ The **Biobanking Project** is identifying (and engaging) Canadian biobanks currently managing biospecimens from pediatric cancer patients.
- ✓ The **Modelling Core** is identifying Canadian investigators establishing cancer models and that have the capacity and interest in performing drug screens.
- ✓ The **Brain Tumour** and **Liquid Biopsy working groups**, and the **Modelling Core** are seeking People With Lived Experience to join their project teams.
- ✓ If you have visited the **PCMM Network** website or registry, please complete a quick survey.

Link to PCMM Network Survey

EVENTS

- ✓ **Plans for the 3rd Annual ACCESS Meeting** are underway in Toronto (March 9th-11th, 2026) – mark your calendars!
- ✓ **The 4th Annual Team Addy 3x3 Basketball Tournament** takes place on July 12th, 2025 at the University of Guelph
  - For more information, visit the Team Addy website

Team Addy Website

FOR EVEN MORE INFORMATION, please reach out to the Cancer Biology Theme Project Manager, Emily Nakada, or ACCESS Project Manager, Tricia Schneider.

TO ACCESS THE FIRST ISSUE, please click here.

Glossary

Key Terms

Biomarkers: biological molecules like genes and proteins that suggest the presence of cancer in a patient.

Chromatin: a complex of DNA and proteins that form the chromosomes found in the cells. Its primary function is to package DNA so they are more compact.

Circulating Tumour DNA (ctDNA): DNA that is released from cancer cells into the bloodstream.

Congruence Study: it examines the consistency or "fit" between different elements within a research design like the methodology, or analysis technique.

Cytotoxic: a substance toxic to living cells. “cyto” meaning cell and “toxic” meaning poison.

Developmental Therapeutics: a type of clinical research that focuses on developing new, safe, and effective treatments that improve the quality of life for cancer patients.

Driver Alteration: a specific change in the sequence or expression level of a gene that provides a significant growth advantage to a cell, allowing it to proliferate abnormally.

Drug Screening: the process of identifying and refining potential drug candidates for a specific disease by screening compounds for desired biological activity and optimising them for efficacy and safety.

Extracellular Vesicle (EV): sacs released by cells into the space outside a cell but still within the respective tissue or organ.

Flow cytometry: a scientific technique that analyses individual characteristics of cells or particles in suspension as they flow through a laser beam.

Functional validation: the process of experimentally confirming that a gene, mutation, or biological mechanism has a specific role or effect in a system like causing a disease or influencing a trait.

Genomics: the study of all DNA in a cell, tissue, or organ, to understand their structure, function, and interactions.

G34R Alteration: a specific genetic change in the H3F3A gene. It is commonly found in pediatric high-grade gliomas and is linked to altered gene regulation and tumour development.

K27M Alteration: referring to the H3K27M mutation; it is a significant genetic change found in certain brain tumours, indicating a poor prognosis due to its disruption of normal gene regulation.

Liquid Biopsy: a minimally invasive laboratory test that analyses bodily fluids to detect cancer cells or tumour DNA.

Nanopore: a method of analysing molecules by passing them through tiny pores (nanopores) and measuring changes in electrical current to reveal the molecular structure or sequence in real time.

Nano-CUT&Tag: a method for analysing chromatin at the single-cell level.

Patient-Derived Xenograft (PDX) Model: a model of cancer where a patient’s tissue or cells are engrafted in an animal to accurately represent the biology and heterogeneity of a cancer.

Pharmacotyping: the process of analysing an individual’s/group's response to drugs based on their genetic, molecular, or cellular characteristics. It helps identify which treatments are likely to be most effective or safe, supporting more personalized approaches.

Proteomics: The study of the structures, composition, function, interactions and activities of proteins.

Spatial (Transcriptomics and Proteomics): methods that study the expression of genes and proteins across a tissue sample to understand how cells interact with each other and their environment.

Transcriptomics: the study of all RNA molecules in a cell, tissue, or organ at a specific time.

Variant of Uncertain Significance (VUS): a change in DNA whose impact on health or disease risk is not yet known.

Thank you
Merci

accessforkidscancer.ca

accessforkidscancer.ca/project-category/cancer-biology/

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