National Molecular Pathology Strategy

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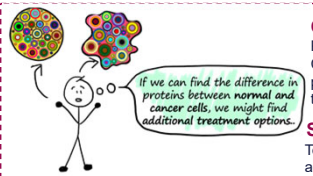
CANCER BIOLOGY

UNIFIED GOAL guiding the molecular pathology strategy [illegible] to identify and advance the next [illegible] and platforms with [illegible] use and accelerate their move from research into everyday [illegible] clinical practice to make them accessible for [illegible] CAYA with cancer.

BACKGROUND

Access to [illegible] third-party next generation sequencing platforms has improved how [illegible] adolescents, and young adults (CAYA) with cancer. The [illegible] sequencing [illegible] programs like PROFYLE, KiCS, SIGNATURE, and POG [illegible] better identify specific genetic alterations in solid tumours and [illegible] while many patients respond remarkably well to targeted therapies we don't always find actionable alterations and the response does not often last long term. There is significant untapped potential in advanced molecular diagnostics to refine disease classification, treatment, and monitoring using complementary and less invasive strategies. Some of those technologies with significant unexplored potential include circulating tumour DNA (ctDNA), biofluid and tissue proteomics, and DNA and protein modifications. Moreover, clear pathways to access these and other promising assays do not always exist, resulting in inequitable access.

PROTEOMICS PROJECT



Objective

Provide preclinical proteome analysis to all Canadian CAYA cancer patients with the potential for new and personalized lines of therapy.

Study Method

To make pre-clinical proteome analysis accessible, the proteomics project team is (**1**) [redacted] and (**2**) in a pilot study analyzing tumour proteomes from cases across Canada to establish access for all children and report possible treatment options to molecular tumour boards alongside genome sequencing.

Results

[redacted]

2) Tumours from five PROFYLE patients treated in three provinces lacking actionable genomic targets were analyzed by the ACCESS Proteomics Project Team at the BCCHR or SickKids ACCESS Proteome Centres and treatment options reported to the Molecular Tumour Board. Based on proteome guidance one patient initiated a 3-month innovative therapy trial.

[redacted]

Impact/Outcomes

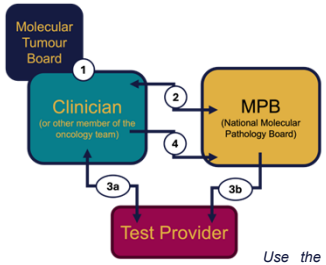
- Because most drugs target proteins, proteomic analysis will offer complementary insights for identifying new treatment options
- Pilot study of proteome guided precision therapy published in EMBO Mol Medicine.
- Publication of a [redacted] in preparation

MOLECULAR PATHOLOGY BOARD

Objective

Improve patient access to emerging molecular pathology assays for CAYA patient cases it reviews where there is significant potential for benefit and the assay is not currently available at the treating centre. Where cost is a barrier to access, the MPB may support coverage for some or all testing.

Method



1. **Patient Case Identified**
   - By clinician
   - By molecular tumour board (MTB)
2. **Case Submitted → MPB Review**
   - Patient case presented and discussed
   - Assay(s) matched
3. **Testing Arranged**
   - **(a)** Between the clinician and test provider
   - **(b)** MPB payment to test provider (if applicable)
4. **Follow-up**
   - Clinician reports on impact and patient outcomes

Use the QR code below to visit the MPB webpage to learn more and submit a case.

Patient Case Eligibility Criteria:

- Child, adolescent, or young adult aged 39 years or younger
- Confirmed or suspected current or prior cancer diagnosis
- Patient is currently treated or followed at a Canadian health institution

Minimum Criteria for an Assay to be Considered for Matching:

- Highly developed research or clinical molecular assay
- Potential to benefit the patient (e.g., clarify diagnosis, guide treatment, monitor relapse, recurrence, or metastasis)
- Available at a Canadian institution(s)
- Applicable to CAYA cancer patients
- Substantial gaps in assay accessibility exist among healthcare professionals

Results

- 4 Pilot & 4 Full-Study Patient Cases at various stages of review, testing, and follow-up

Impact/Outcomes

- Establish a pathway to access advanced molecular assays by establishing a multidisciplinary panel of experts to review referred cases and identify the most appropriate testing for each patient
- Advance assays with broad clinical potential into standard clinical practice

LIQUID BIOPSY PROJECT

Objectives

Accelerate and harmonize the implementation of liquid biopsy testing for children where diagnostic benefit can be demonstrated, while promoting the systematic collection of liquid biopsies at the time of clinically indicated procedures.

Study Method

- Establish a network of liquid biopsy experts to promote sample collection and banking, demonstrate utility, and advance testing for CAYA patients.
- [redacted]
- [redacted]
- Support immediate and equitable access to liquid biopsy testing through the MPB
- Survey the CAYA cancer community to define challenges it is well-positioned to address and identify assays to support

Results

[redacted]

[redacted]

Impact/Outcomes

- Develop and share standard operating procedures for the collection, processing, and storage of various liquid biopsy specimens (i.e. blood, cerebrospinal fluid), as well as create and share guidelines on their collection
- Establish immediate (via MPB) and long-term, equitable pathways to access liquid biopsy testing for all children with cancer where there is the potential for benefit

Timeline

Current Phase (Now – August 31, 2026): **PROTEOMICS** [redacted] perform proteomics analyses for additional pilot cases from all provinces. **MPB** Launch of full MPB study, its webpage, and match and support access to assays for patient cases across Canada. **LIQUID BIOPSY** Finalize research agreements between participating institutes with available liquid biopsy assays; conduct validation experiments; contribute to establishing an immediate pathway to access assays through the MPB

September 1, 2026 to March 31, 2027: PROTEOMICS Expand proteomic analyses to additional patient cases to refine and streamline access pipelines within and beyond the cancer centres connected to the four mass spectrometry facilities. **MPB** Review and match molecular assays to a broader range of patient cases, with particular focus on centres not previously engaged; and identify and facilitate access to additional advanced research and clinical assays through the Board. **LIQUID BIOPSY** Develop standardized liquid biopsy guidelines; and implement a clear, coordinated pathway for equitable access to liquid biopsy assays.

RECOMMEND AN ASSAY — MPB

WEBPAGE — MPB

SURVEY — LIQUID BIOPSY