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Scientific abstract

Title: Precision Oncology at CR-CHUM and the Guy-Lafleur Program

Background and rationale: Precision oncology uses genomic and clinical data to guide cancer treatment. In Quebec, adult patients currently have limited access to comprehensive molecular profiling and whole-genome sequencing (WGS). The Guy-Lafleur Precision Oncology Program at CR-CHUM was created to accelerate translation of genomic discoveries into patient care. Built on the foundation of the CR-CHUM's molecular pathology platform, leveraging CHUM's Clinical Molecular Diagnostic Service draining the greater Montreal region and linked to national efforts such as the Marathon of Hope Cancer Centres Network (MOHCCN), the program integrates large-scale sequencing, advanced bioinformatic pipelines, and harmonized biobank infrastructures.

Objectives: The overarching goal is to establish Quebec's first adult precision oncology hub. Specific objectives include: (i) streamlining recruitment and consent across CHUM biobanks; (ii) integrating large-scale sequencing into a clinical-grade pipeline; (iii) accelerating validation of actionable variants through streamlined WGS molecular pathology workflows; (iv) establishing a multidisciplinary Molecular Tumor Board to interpret genomic results and guide clinical decision making; (v) creating dedicated navigation programs for drug and trial access; and (vi) implementing a clinico-genomic digital platform that integrates panel-based and WGS data to enable real-world evidence generation across the province.

Methods and results: The program is developing unified processes for patient recruitment, consent, and access to health data. Sequencing is performed in collaboration with McGill Genome Center (C3G) with analyses supported by GenPipes and DRAGEN pipelines and integration into CR-CHUM's bioinformatics infrastructures such as CITADEL data science platform. Variant annotation and interpretation pipelines are being established to ensure actionable findings are clinically validated and can be reported back to treating teams. A Molecular Tumor Board will bring together oncologists, pathologists, geneticists, pharmacists, patient navigators, and translational scientists to review cases and align recommendations with available therapies and clinical trial opportunities.

Conclusions: The Guy-Lafleur Program represents a transformative step in embedding precision oncology within CHUM's research and clinical care ecosystem. It aims to position CR-CHUM as the first adult hub for precision oncology in Quebec, aligned with MOHCCN's national vision for data harmonization, collaborative discovery, and clinical translation.

Anticipated impact: This initiative is expected to increase equitable access to genomic testing and innovative therapies, strengthen integration of clinical and research data across Quebec, and accelerate clinical trial matching. Ultimately, it provides a scalable, sustainable model for embedding WGS into routine adult oncology care in Canada.

Plain language abstract

Title: Precision Oncology at CR-CHUM and the Guy-Lafleur Program

Background and rationale: Cancer treatment is changing. Instead of giving all patients the same therapies, doctors can now use information from a tumor's DNA and from the patient's health record to better guide treatment. In Quebec, children already benefit from this kind of "precision medicine," but adults have had fewer opportunities. The Guy-Lafleur Program at CHUM was created to change this. Built on CHUM's specialized molecular pathology laboratory and connected to the national Marathon of Hope Cancer Centres Network (MOHCCN), the program combines genetic sequencing, informatics, and research biobanking to bring personalized treatment options to patients with cancer.

Objectives: The program's goal is to build the first adult precision oncology hub in Quebec. This means: (i) recruiting patients and collecting samples in a consistent way across all cancer types; (ii) analyzing tumors with broad DNA sequencing strategies; (iii) reviewing results through a team of experts (oncologists, pathologists, geneticists, pharmacists, researchers, and patient navigators); and (iv) helping patients access either standard treatments, new targeted therapies, or clinical trials.

Methods and results: Patients who agree to participate provide tissue and blood samples. These samples are processed and sequenced using advanced technology in partnership with the McGill Genome Center. The results will then be interpreted using specialized computer pipelines and discussed by a Molecular Tumor Board, which decides whether the information can help guide treatment. The program is also developing digital tools to combine genetic and clinical data across Quebec.

Conclusions: The Guy-Lafleur Program is a major step forward for cancer care in Quebec. It brings together genetics, data science, oncology, and patient partnership in a single ecosystem.

Anticipated impact: By offering advanced testing and personalized treatment plans, the program will give more adults in Quebec access to the right therapy at the right time. It also links local efforts to Canada's national network, ensuring discoveries benefit patients across the country.