



OFFICE OF SPONSORED RESEARCH



TECHNOLOGY OPPORTUNITY

Histone mutations as marker for Glioblastoma

McGill is looking for a partner to commercialize a diagnostic test initially for the field of basic or clinical research, to develop a companion diagnostic tool for brain cancer drug development which could subsequently be used in CLIA accredited laboratories. Brain tumours, such as the highly aggressive glioblastoma multiforme (GBM), are currently the leading cause of cancer-related mortality and morbidity in children. Current diagnosis of brain cancers involves MRI, PET and CT scans, angiographies, followed by biopsies performed either during the resection of the tumor or as a separate procedure via a burr hole. A blood-based test would provide a more economical, i.e. accessible and less invasive diagnostic tool. The GBM specific biomarker has been protected under a provisional patent application.

Applications

The identification of two H3.3 mutations allows the categorization of pediatric brain cancer patients into patients with grade IV pediatric GBM ($P < 0.0001$) and grade III pediatric anaplastic astrocytoma ($p < 0.0078$) and diffuse intrinsic pontine gliomas. Occurrence of these mutations is linked to lower survival rates and helps physicians in the clinical decision-making process.

Advantages

- An antibody-based test identifying both mutations in cells shed from a brain tumour is less expensive but more predictive than any PET, MRI or CT scan.
- An antibody-based test identifying both mutations in cells shed from a brain tumour is less invasive than a biopsy taken after surgery or burr hole intervention.
- Identification of a mutation in histone might be a more direct test as it is the origin of multiple changes in the transcriptome and subsequent epigenetic effects.
- H3.3 adds to the diagnostic potential of IDH-1 tests in adult glioblastoma.

Technology

Whole exome sequencing (WES) led to the identification of two mutations (K27M and G34R/V) in histone 3.3 as closely correlated to pediatric but not adult GBM and pediatric anaplastic astrocytoma. Sanger sequencing verified single nucleotide variants (SNV) on 48 well-characterized paediatric GBM samples containing more than 90% neoplastic tissue collected from patients aged between 3 and 20 years, including 6 patients for whom we had matched non-tumour (germline) DNA. Both mutations have been confirmed by an independent research group.

The Inventors



Dr. Nada Jabado is an Associate Professor in the Department of Pediatrics and an Associate member of the Department of Human Genetics, The Goodman Cancer Centre and the Division of Experimental Medicine at McGill University. Her research focuses on uncovering genetic defects in inherited disorders affecting the immune system and on pediatric astrocytomas, the most common group of pediatric brain tumours. Her objective is to identify causative genes, explore their function and provide patients and families with improved diagnostic tools and management of often lethal defects.



Dr Stefan Pfister combines the experience of physician and researcher working at the Heidelberg University Hospital and the German Cancer Research Institute (DKFZ). He focuses on the best possible diagnosis of his young patients, to adjust the highest intensity of therapy with the lowest impact on healthy brain function. He is recipient of awards and research prizes (Kind-Philip, Assmus, Maresch-Klingelhoefler, Hella-Buehler).

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Opportunity: Exclusive license or research collaboration

