

Pathology Trainee Project Grants In Healthcare Innovation

LETTER OF INTENT

Title: Slide-free Histology via *Microscopy using Ultraviolet Surface Excitation* – Applications in Neuropathology

Summary of the proposed project: Slide-free methods for rapid tissue histological analysis can drastically shorten pathology assessment turn-around times, may eliminate a need for frozen section and can reduce cost. **MUSE** (*Microscopy using Ultraviolet Surface Excitation*), is a straightforward and inexpensive microscopy approach that can provide diagnostic-quality images, with enhanced information, **directly and quickly from fresh or fixed tissue** without destroying it. Thus, this **sample-sparing method** has potential to ensure availability of tissue from small brain biopsies for downstream molecular analyses; to provide novel appreciation of brain cancer biology; and to enable histology and pathology diagnostics in low-resource environments.

In this application, we propose to optimize and validate this non-destructive technique that obviates requirements for conventional histology processing, formalin-fixation, paraffin-embedding (FFPE), or thin-sectioning in diagnosis of human brain tumors. MUSE is easy to implement and use, requires no lasers, beam-scanning, or sophisticated optics, and can eventually cost a few thousands of dollars or even less. Image contrast is generated using familiar histology stains, such as eosin and DAPI, and the resulting well-resolved histology-grade images are as easy to interpret as those from conventional hematoxylin- and eosin- stained glass slides, while containing spatial and tissue constituent information beyond what is visible on conventional H&E slides.

Research aims: In this project we intend to *establish optimal methods* for brain tissue sample collection and preparation for MUSE analysis and *compare diagnostic accuracy* of MUSE images analysis versus standard processing in diagnosis and grading of human brain tumors.

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