[18F]SynVesT-1 PET imaging detects tumour-associated reductions in synaptic density in orthotopic glioblastoma mouse models

D. SIMPSON[1], N. KIM[1,2], J. Tong[1], M. Alijaniaram[1], W. Yiyan[2,3], C. Loic[3], F Tamas[3], G. Federico[2,3,4], AJ. Boyle[1,2], N. Vasdev[1]

1 Centre for Addiction and Mental Health, Toronto, Canada
2 University of Toronto, Toronto, Canada
3 University Health Network
4 Ontario Institute for Cancer Research

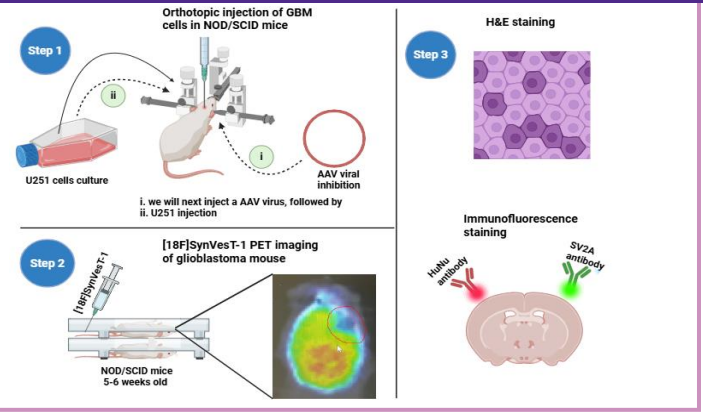
Background

Glioblastoma (GBM) is an aggressive brain tumor that disrupts normal neuronal function and alters the surrounding neural microenvironment. Increasing evidence shows that GBM affects synaptic integrity, contributing to changes in neuronal signaling[1]. Synaptic vesicle glycoprotein 2A (SV2A) is a reliable marker of synaptic density and can be measured in vivo using PET tracers such as [18F]SynVesT-1[2,3].

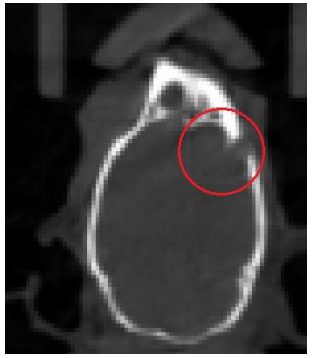
PURPOSE / OBJECTIVES

This study evaluates [18F]SynVesT-1 PET imaging to quantify SV2A changes in orthotopic glioblastoma mouse models and characterize tumour–neuron interactions in vivo.

MATERIAL & METHODS



RESULTS



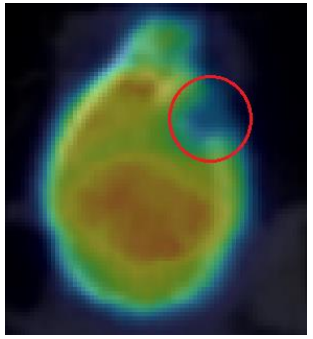
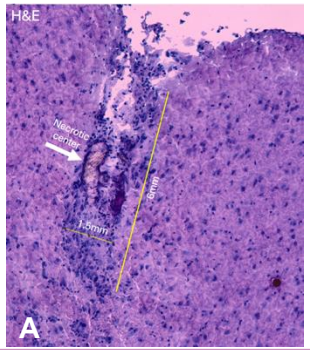
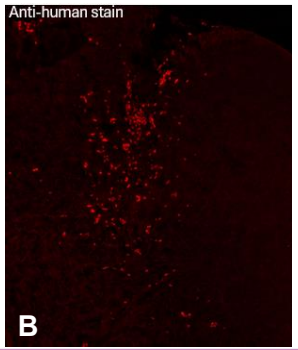


Figure 1. High energy CT scan of U251 tumor in NOD/SCID mice. High-energy CT scans of NOD/SCID mice, taken 3 weeks after intracranial injection of U251 cells, show a tumor measuring approximately 2 mm in size. X- ray power: 35kVp

Figure 2. PET/CT scan of U251 tumor with [18F]SynVesT-1. There is reduced binding of [18F]SynVesT-1 in the area of the U251 tumor.





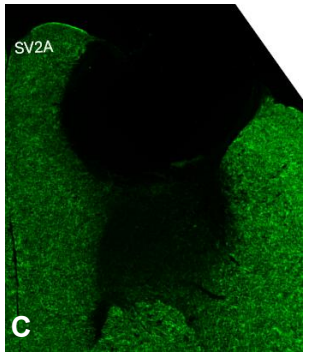


Figure 3. Confirmation of U251 tumor in NOD/SCID mice with H&E stain and HuNu/SV2A antibody. H&E staining shows tumor growth 2 weeks after injection [A]. The HuNu antibody confirms the presence of human U251 cells [B], and the SV2A antibody indicates a loss of synapses [C].

Summary/ Future Works

- An orthotopic U251 glioblastoma model was successfully imaged with [18F]SynVesT-1, showing reduced SV2A signal within tumour regions suggestive of altered synaptic density.
- *We will next inject an AAV virus prior to tumor implantation to investigate disruption of neuronal–tumor cross-talk and assess its effect on tumor growth and synaptic remodeling.*

References

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3. Naganawa, M. *et al*. First-in-Human Evaluation of 18F-SynVesT-1, a Radioligand for PET Imaging of Synaptic Vesicle Glycoprotein 2A. *J Nucl Med* **62**, 561–567 (2021).