Contribution ID : **104** Type : **Poster**

Characterisation of a gadolinium-based neutron capture agent in a glioblastoma xenograft model using XFM and ICP-MS

Neutron Capture Enhanced Particle Therapy (NCEPT) is a novel adjunct to particle therapy that increases its efficacy by using tumour-specific neutron-capture agents (NCA) to capture internally generated thermal neutrons and increase the dose to the target site. Ideally a NCA would have high accumulation and homogenous distribution throughout the tumour. Therefore, the aim of this study was to evaluate the uptake and distribution of a novel gadolinium-based NCA in a glioblastoma xenograft model.

The gadolinium-based NCA was administered via intravenous injection to nude mice bearing U87MG tumours. Mice were sacrificed at four time points post injection and tumours were excised. A bulk concentration analysis (ICP-MS) was performed to provide quantitative data on the retention of gadolinium in the tumours, but was unable to answer the crucial question – where does the NCA accumulate in the heterogenous tumour microenvironment? We used the XFM beamline to build on the ICP-MS data and prepared high resolution spatial maps of tumours that showed the distribution of gadolinium and other biologically relevant elements.

We found gadolinium distribution was highly correlated with iron and determined that there was high deposition of gadolinium throughout the vasculature. Gadolinium concentrations averaged 6 ppm in tumours and peaked above 800 ppm in hot spots – well above the predicted threshold required for effective neutron capture.

These results allowed us to further refine methodology that will be used to perform the first in vivo proof of concept studies for NCEPT.

Level of Expertise

Early Career <5 years

Presenter Gender

Woman

Pronouns

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Session Classification : Poster

Track Classification : Biomedicine & Health