



Development of a Graft Tumor Model of Glioblastoma in Mice

Fábio Fernando Alves da Silva^{1-3*}; Emerson Soares Bernardes³; Carmen Sílvia Passos Lima^{1,2}

¹Laboratory of Cancer Genetics, School of Medical Sciences, University of Campinas, Campinas, São Paulo, Brazil.

²Department of Radiology and Oncology, School of Medical Sciences, University of Campinas, Campinas, São Paulo, Brazil.

³Centro de Radiofarmácia, Comissão Nacional de Energia Nuclear, Instituto de Pesquisas Energéticas e Nucleares, São Paulo, São Paulo, Brazil.

***Corresponding Author(s): Fábio Fernando Alves da Silva**

Laboratory of Cancer Genetics, School of Medical Sciences,
University of Campinas, Campinas, São Paulo, Brazil.

Email: fabiofufg@gmail.com

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Clinical Image Description

Glioblastoma (GB) is the most aggressive brain tumor [1], with a high recurrence rate and an overall survival of only 12–14 months. Treatment involves surgical tumor resection followed by radiotherapy and/or temozolomide-based chemoradiation. However, extensive resections may cause neurological deficits that negatively affect patients quality of life, whereas incomplete resections often lead to tumor recurrence [2]. Thus, the development of in vivo models is necessary to identify more effective alternatives for the treatment and diagnosis of GB. In addition, integrins are cell-surface adhesion receptors that are overexpressed in GB [3] and have been investigated as targets for compounds labeled with positron emission tomography (PET) isotopes, such as ⁶⁸Ga [4].

Therefore, this scientific communication aimed to describe the preclinical imaging obtained using an anti-integrin radiopharmaceutical with micro-PET coupled with computed tomography (μPET/CT) in a heterotopic GB graft tumor model

produced with GL261 cells in female C57BL/6 mice. This study was carried out in accordance with the ARRIVE guidelines and was approved by the Ethics and Biosafety Committee of the University of Campinas (UNICAMP) under registration number CEUA/UNICAMP No. 6753-1/2025. Ten female C57BL/6 mice were used for the experiments. Each animal was injected subcutaneously on the right side of the back with 2×10^6 GL261 cells in a 1:1 mixture of phosphate-buffered saline and Corning® Matrigel® Basement Membrane Matrix (catalog number 356234, Corning Life Sciences, Bedford, MA). Animals were monitored for 2–4 weeks to verify tumor growth. When the tumors reached 200 mm³, the animals were anesthetized with 2% isoflurane and positioned for imaging. For μPET/CT imaging, a ⁶⁸Gaanti-RGD-integrin radiopharmaceutical (3.7–6.0 MBq) was administered intravenously to the tumor-bearing mice. Dynamic images were acquired for up to 1 hour using an Albira μPET/CT system (Bruker Biospin Corporation, Woodbridge, CT, USA). Images were processed and quantified using PMOD software (PMOD Technologies, Zurich, Switzerland).



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These representative images demonstrated that this protocol efficiently produces a heterotopic tumor-bearing in vivo model in female C57BL/6 mice, confirming successful localization of the GL261 tumor in the animals backs and supporting

the use of the ^{68}Ga -anti-RGD-integrin radiopharmaceutical as a proof of concept. Together, these results provide a reliable in vivo tumorbearing animal model for future preclinical studies aimed at developing new pharmaceutical agents against GB.

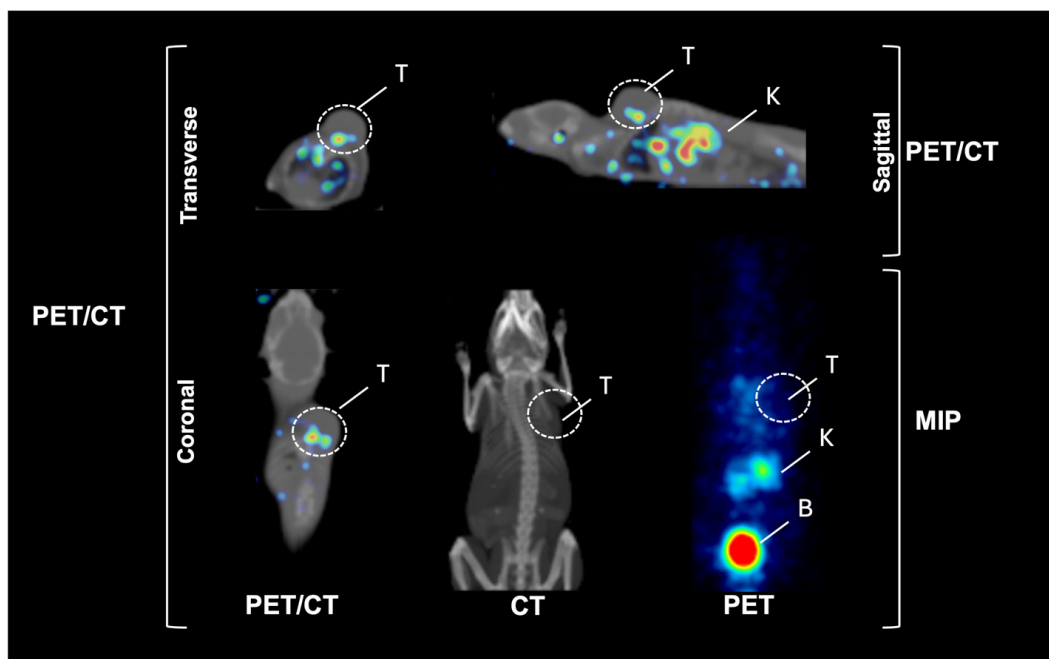


Figure 1: Non-invasive in vivo whole-body biodistribution of the ^{68}Ga -anti-RGD-integrin radiopharmaceutical in female C57BL/6 tumor-bearing mice using positron emission tomography/computed tomography (PET/CT) imaging at 1 hour. Transverse, coronal, and sagittal profile images were obtained for imaging demonstration.

T: tumor; K: kidney; B: bladder. MIP: maximum intensity projection. Data are presented for one representative animal, identified as the biological experimental unit (n = 10).

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