Potential targeted LAT1 focused on the management of glioblastoma in nuclear medicine perspective: A literature review

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ABSTRACT

Introduction: Aggressive brain tumour glioblastoma multiforme (GBM) has few therapeutic choices and a dismal prognosis. Conventional treatments only marginally improve survival, which leads to the hunt for new targets like LAT1 (L-type amino acid transporter 1). From the standpoint of nuclear medicine, this literature review assesses the possibility of LAT1-targeted treatments in the treatment of glioblastoma. By examining preclinical and clinical research, we examine the role of LAT1 in glioblastoma metabolism, its utility for diagnosis, and the efficacy of radiopharmaceuticals targeting LAT1. Previous studies have established LAT1's overexpression in glioblastoma and its role in tumour metabolism but limited data appear, such as most studies are preclinical, with few clinical trials evaluating LAT1-targeted therapies in GBM patients, heterogeneous methodologies, diagnostic vs therapeutic focus, and long-term outcomes. **Materials and Methods:** A literature search was conducted using databases such as PubMed, Google Scholar, and ScienceDirect, covering publications from 2010 to 2024. Keywords included "glioblastoma," LAT1," "nuclear medicine," "targeted therapy," and "radiopharmaceuticals." The inclusion criteria were studies looking at LAT1 expression in glioblastoma, evaluating LAT1-targeted therapies, and using LAT1 in diagnostic imaging. Outcomes LAT1 expression on Glioblastoma LAT1 and Tumour Metabolism, LAT1-Targeted Radiopharmaceuticals radiolabelled amino acids, showed good specificity and sensitivity in glioblastoma imaging, according to several important findings in the literature study. **Results:** Several key findings in literature review identified that LAT 1 expression on Glioblastoma LAT1 and Tumour Metabolism, LAT1-Targeted Radiopharmaceuticals radiolabelled amino acids, demonstrated high specificity and sensitivity in glioblastoma imaging and Therapeutic Potential Combined treatment approaches in preclinical models. **Conclusion:** The substantial promise of LAT1-targeted therapeutics in the therapy of glioblastoma is highlighted by the review, especially when viewed from the nuclear medicine perspective. Due to its crucial involvement in tumour metabolism and overexpression in glioblastoma, LAT1 is a desirable target for both therapeutic and diagnostic applications. LAT1 inhibitors have the potential to increase therapeutic efficacy, whereas LAT1-targeted radiopharmaceuticals provide better imaging accuracy.