

11C-acetate positron emission tomography

The specific intermediate metabolites contributing to [reactive gliosis](#) remain unknown. This study investigated how glioblastomas induce reactive astrogliosis in the neighboring microenvironment and explored 11C-acetate PET as an imaging technique for detecting reactive astrogliosis.

Through in vitro, [mouse models](#), and human tissue experiments, we examined the association between elevated 11C-acetate uptake and reactive astrogliosis in gliomas. We explored acetate from glioblastoma cells, which triggers reactive astrogliosis in neighboring astrocytes by upregulating MAO-B and MCT1 expression. We evaluated the presence of cancer stem cells in the reactive astrogliosis region of glioblastomas and assessed the correlation between the volume of 11C-acetate uptake beyond MRI and prognosis.

Elevated 11C-acetate uptake is associated with reactive astrogliosis and astrocytic MCT1 in the periphery of glioblastomas in human tissues and mouse models. Glioblastoma cells exhibit increased acetate production as a result of [glucose](#) metabolism, with subsequent secretion of [acetate](#). Acetate derived from glioblastoma cells induces reactive astrogliosis in neighboring astrocytes by increasing the expression of MAO-B and MCT1. They found cancer stem cells within the reactive astrogliosis at the tumor periphery. Consequently, a larger volume of 11C-acetate uptake beyond contrast-enhanced MRI was associated with a worse prognosis.

The results highlight the role of acetate derived from [glioblastoma](#) cells in inducing reactive astrogliosis and underscore the potential value of 11C-acetate PET as an imaging technique for detecting reactive astrogliosis, offering important implications for the diagnosis and treatment of glioblastomas ¹⁾.

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Kim D, Ko HY, Chung JI, Park YM, Lee S, Kim SY, Kim J, Chun JH, Han KS, Lee M, Ju YH, Park SJ, Park KD, Nam MH, Kim SH, Shim JK, Park Y, Lim H, Park J, Kim H, Kim S, Park U, Ryu H, Lee SY, Park S, Kang SG, Chang JH, Lee CJ, Yun M. Visualizing Cancer-Originating Acetate Uptake Through MCT1 in Reactive Astrocytes in the Glioblastoma Tumor Microenvironment. *Neuro Oncol*. 2023 Dec 12;noad243. doi: 10.1093/neuonc/noad243. Epub ahead of print. PMID: 38085571.

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