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Comparative *In Vitro* Study of ¹¹C-Methionine and ¹¹C-Deuterodeprenyl Uptake in Three Human Glioma Cell Lines

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ABSTRACT

Aim: To compare the uptake of ¹¹C-deuterodeprenyl (¹¹C-DED) and ¹¹C-methionine (¹¹C-MET) in three human glioma cell lines and study the relationship with glial fibrillary acid protein (GFAP) and monoamine oxidase B (MAO B) expression. ¹¹C-DED is used in positron emission tomography imaging as a marker of astrocytosis in various central nervous system pathologies. It binds irreversibly to MAO B, a glial dimeric enzyme with increased activity in some neurological pathologies.

Materials and Methods: Binding and internalization studies of ¹¹C-MET and ¹¹C-DED were performed in astrocytoma grade III, glioblastoma grade IV, and radio-resistant glioblastoma grade IV cells. Immunofluorescence was used.

Results: ¹¹C-MET specific activity bound to membrane was 9.0%–11.1% and that internalized was 88.9%–91.0%. ¹¹C-DED specific activity bound to membrane was 34.8%–58.0% and that internalized was 38.7%–65.2%. Immunocytochemistry revealed GFAP and MAO B expression.

Conclusions: The expression of MAO B measured by ¹¹C-DED uptake or immunocytochemistry was not significantly different in grade III or IV cells. The GFAP signal was higher for grade IV compared to grade III. ¹¹C-MET uptake was high in all the tumor cells. ¹¹C-DED is a dopamine analogue and the transport across cell membranes is expected to be mediated by DAT receptors present in astrocytes. Reactive astrocytes surround tumor lesions; so the authors suggest that the ¹¹C-DED uptake might be caused by the reactive astrocytosis and not by MAO B expression in tumor cells.

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