Cancer Biotherapy and Radiopharmaceuticals

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

To cite this article:
Vasilskis Elena, Kreimerman Ingrid, Olivera Silvia, Savio Eduardo, and Engler Henry. Cancer Biotherapy and Radiopharmaceuticals. November 2017, 32(9): 344-350. https://doi.org/10.1089/cbr.2017.2334

Published in Volume: 32 Issue 9: November 1, 2017

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ABSTRACT

Aim: To compare the uptake of ^{11}C-deuterodeprenyl (^{11}C-DED) and ^{11}C-methionine (^{11}C-MET) in three human glioma cell lines and study the relationship with glial fibrillary acid protein (GFAP) and monoamine oxidase B (MAO B) expression. ^{11}C-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 ^{11}C-MET and ^{11}C-DED were performed in astrocytoma grade III, glioblastoma grade IV, and radio-resistant glioblastoma grade IV cells. Immunofluorescence was used.

Results: ^{11}C-MET specific activity bound to membrane was 9.0%–11.1% and that internalized was 88.9%–91.0%. ^{11}C-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 ^{11}C-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. ^{11}C-MET uptake was high in all the tumor cells. ^{11}C-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 ^{11}C-DED uptake might be caused by the reactive astrocytosis and not by MAO B expression in tumor cells.

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