[18F]DPA-714-PET-MRI

[18F]DPA-714 successfully evaluates for the specific imaging of inflammation in various models of neuroinflammation and in a brain tumor model.

Zinnhardt et al. aimed (i) to evaluate the role of [18F]DPA-714 (TSPO) PET-MRI in the assessment of the immunosuppressive tumor microenvironment in glioma patients and (ii) to cross-correlate imaging findings with in-depth immunophenotyping.

To characterize the glioma TME, a mixed collective of nine glioma patients underwent [18F]DPA-714-PET-MRI in addition to [18F]FET-PET-MRI. Image-guided biopsy samples were immuno-phenotyped by multiparametric flow cytometry and immunohistochemistry. In vitro autoradiography was performed for image validation and assessment of tracer binding specificity.

We found a strong relationship ($r = 0.84$, $p = 0.009$) between the [18F]DPA-714 uptake and the number and activation level of glioma-associated myeloid cells (GAMs). TSPO expression was mainly restricted to HLA-DR+ activated GAMs, particularly to tumor-infiltrating HLA-DR+ MDSCs and TAMs. [18F]DPA-714-positive tissue volumes exceeded [18F]FET-positive volumes and showed a differential spatial distribution.

[18F]DPA-714-PET may be used to non-invasively image the glioma-associated immunosuppressive TME in vivo. This imaging paradigm may also help to characterize the heterogeneity of the glioma TME with respect to the degree of myeloid cell infiltration at various disease stages. [18F]DPA-714 may also facilitate the development of new image-guided therapies targeting the myeloid-derived TME. [1)].

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1)

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