Glucose transporter

see SGLT2

see Glucose Transporter Type 1 Deficiency Syndrome.

A novel glucose transporter, the sodium glucose cotransporter 2 (SGLT2), has been demonstrated to contribute to the demand for glucose by pancreatic and prostate tumors, and its functional activity has been imaged using a SGLT specific PET imaging probe, α-methyl-4-[F-18]fluoro-4-deoxy-D-glucopyaranoside (Me-4FDG). In this study, Me-4FDG PET was extended to evaluate patients with high-grade astrocytic tumors. Me-4FDG PET scans were performed in four patients diagnosed with WHO Grade III or IV astrocytomas and control subjects, and compared with 2-deoxy-2-[F-18]fluoro-D-glucose (2-FDG) PET and magnetic resonance imaging (MRI) of the same subjects. Immunocytochemistry was carried out on Grade IV astrocytomas to determine the cellular location of SGLT proteins within the tumors. Me-4FDG retention was pronounced in astrocytomas in dramatic contrast to the lack of uptake into the normal brain, resulting in a high signal-to-noise ratio. Macroscopically, the distribution of Me-4FDG within the tumors overlapped with that of 2-FDG uptake and tumor definition using contrast-enhanced MRI images. Microscopically, the SGLT2 protein was found to be expressed in neoplastic glioblastoma cells and endothelial cells of the proliferating microvasculature. This preliminary study shows that Me-4FDG is a highly sensitive probe for visualization of high-grade astrocytomas by PET. The distribution of Me-4FDG within tumors overlapped that for 2-FDG, but the absence of background brain Me-4FDG resulted in superior imaging sensitivity. Furthermore, the presence of SGLT2 protein in astrocytoma cells and the proliferating microvasculature may offer a novel therapy using the SGLT2 inhibitors already approved by the FDA to treat type 2 diabetes mellitus [1].

1)
Kepe V, Scafoglio C, Liu J, Yong WH, Bergsneider M, Huang SC, Barrio JR, Wright EM. Positron emission tomography of sodium glucose cotransport activity in high grade astrocytomas. J Neurooncol. 2018 Mar 10. doi: 10.1007/s11060-018-2823-7. [Epub ahead of print] PubMed PMID: 29525972.