11C PBR28 positron emission tomography

[11C]-PBR28 is a positron emission tomography (PET) radiotracer that binds to a 18pkD translocator protein (TSPO)8, which is expressed in activated microglia, reactive astrocytes, vascular endothelium, and to a much lower degree in neurons.

Tran et al. performed a feasibility study to prospectively evaluate 11C methionine positron emission tomography and [11C]PBR28 using PET in 5 patients with 7 previously SRS-treated brain metastases demonstrating regrowth to differentiate tumor regrowth (TR) from radiation necrosis (RN).

Sequential imaging with dual tracers was well-tolerated. [11C]methionine was accurate for detecting pathologically confirmed TR in 7/7 lesions, whereas [11C]PBR28 was only accurate in 3/7 lesions. Tumor PBR-TSPO expression was elevated in both melanoma and lung cancer cells, contributing to lack of specificity of [11C]PBR28-PET.

Sequential use of PET tracers is safe and effective. [11C]Methionine was a reliable TR marker, but [11C]PBR28 was not a reliable marker of RN. Studies are needed to determine the causes of post-radiation inflammation and identify specific markers of RN to improve diagnostic imaging [1].

[1]
Tran TT, Gallezot JD, Jilaveanu LB, Zito C, Turcu G, Lim K, Nabulsi N, Huang H, Huttner A, Kluger HM, Chiang VL, Carson R. [11C]Methionine and [11C]PBR28 as PET Imaging Tracers to Differentiate Metastatic Tumor Recurrence or Radiation Necrosis. Mol Imaging. 2020 Jan-Dec;19:1536012120968669. doi: 10.1177/1536012120968669. PMID: 33147119.