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# How to Perform Translocator Protein PET-CT Scanning for Microglial Activation in Schizophrenia Patients.

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**Introduction** Activated microglia express translocator protein (TSPO) on the outer mitochondrial membrane. PET ligands targeting TSPO allow *in vivo* non-invasive visualization and quantification of neuroinflammation. Whereas inflammation in schizophrenia was previously studied using $^{11}$C-PK11195, $^{18}$F-PBR111 is a novel second-generation tracer, with high specific TSPO binding and longer half-life.
**Objective** To establish a protocol for $^{18}$F-PBR111 TSPO PET in schizophrenia.
**Methods** A pilot study on a Siemens Biograph mCT PET-scanner in healthy controls and schizophrenia patients (n=9).
**Results** Subjects underwent a 90-minute dynamic brain PET-CT, following i.v. bolus injection of 214±13 MBq $^{18}$F-PBR111. An arterial input function was measured using continuous blood sampling (Twilite, Switzerland) with discrete samples for metabolite analysis. The metabolite corrected plasma input function (IPF) was calculated from the whole blood input function, individual plasma to whole blood and parent fraction data as determined by a SEP-PAK procedure. Dynamic PET data were reconstructed and a post-reconstruction motion correction was applied. Regional tissue time activity curves (TACs) were extracted from the PET images for regions of interest determined from individual MRI images. Total volume of distribution ($V_T$) was then calculated from fitting a reversible two-tissue compartmental model to the measured TACs using the individual IPF. Prior genotyping for TSPO receptor polymorphism (rs6971) allowed to exclude low-affinity binders (estimated 10% of European population). The procedure was well tolerated.
**Conclusions** We established a protocol for $^{18}$F-PBR111 TSPO PET in healthy subjects and schizophrenia patients, thereby providing useful information for others considering $^{18}$F-PBR111 TSPO PET imaging for evaluation of neuroinflammation.

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