

TRANSLOCATOR PROTEIN BINDING IN RELAPISING REMITTING MULTIPLE SCLEROSIS - REPEATED PET MEASUREMENTS USING [¹¹C]PK11195

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Changes in translocator protein (TSPO) expression in microglia have been related to neuroinflammation. Whether TSPO binding is elevated in the brain of patients with multiple sclerosis (MS) is still debated. Objective: The purpose was to examine TSPO binding in patients with relapsing-remitting MS (RRMS) in relation to disease phase (relapse vs. remission) and in comparison to controls.

Methods: Ten patients with RRMS and six control subjects were examined with PET using [¹¹C](R)-PK11195 at two separate occasions, six weeks apart. Data were analyzed using wavelet based parametric imaging with a linear graphical approach and a metabolite corrected arterial plasma input function. Regional TSPO binding was expressed as the total distribution volume (V_T). MRI gadolinium enhanced (Gd+) imaging was used to identify white matter lesions.

Results: V_T across anatomical brain regions was 10-14% higher in RRMS patients in clinical relapse when compared to the control group. Mean regional V_T decreased by 3-8% in remission when compared to relapse phase. Mean V_T in the Gd+ lesions decreased by 13% in clinical remission compared to relapse (n=9, p=0.07).

Conclusion: The study showed global elevated TSPO in the group of patients with RRMS compared to controls and disease phase dependent changes in TSPO binding across brain regions and in white matter lesions. This observation suggests that there may be a window of changes in MS biology that may be captured using molecular imaging, provided optimised study design and novel radioligands with improved binding characteristics to TSPO or other inflammation markers are available.