MULTIMODAL INDIVIDUAL ANALYSES IN TWO CASES WITH MILD COGNITIVE IMPAIRMENT ILLUSTRATING THE COMPLEMENTARITY OF DIFFERENT NEUROIMAGING TECHNIQUES

G. Chételat¹, R. La Joie¹, K. Mevel¹, F. Mézenge¹, B. Landeau¹, M. Fouquet¹, N. Villain¹, A. Abbas¹, A. Perrotin¹, A. Pélerin¹, F. Viader¹, V. Camus², V. de la Sayette¹, L. Barré³, D. Guilloteau¹, F. Eustache¹, B. Desgranges¹

¹Inserm-EPHE-Université de Caen/Basse-Normandie, Unité U923, GIP Cyceron, CHU Côte de Nacre, Caen, ²CHRU de Tours, Service de Médecine Nucléaire In Vitro-U 930, Tours, ³GDM-TEP, UMR CEA-CNRS 6232, Caen, France

The present study aims at comparing the information provided by different neuroimaging modalities in two cases with single-domain amnestic mild cognitive impairment (MCI), P1 and P2 (71/62 years old, 9/10 years of education, MMSE 27/28, Mattis 138/137) compared to 21 age-matched controls. Examination included

(1) a PET scan using an 18-F labeled radiotracer binding to β-amyloid depositions (AV-45);

(2) a structural MR scan;

(3) a resting-state fMRI scan used to assess the functional connectivity between the posterior cingulate cortex (PCC) and the rest of the brain; and

(5) an FDG-PET scan to measure brain resting-state metabolism.

The visual assessment of the AV-45 PET scan showed a control-like pattern for P1 with high β-amyloid burden in the white matter only while P2 demonstrated increased β-amyloid deposition in the PCC and precuneus. No area of significant atrophy or hypometabolism was found in P1, and PCC connectivity was found to be merely increased compared to controls in a large network including the whole hippocampus and extending to the PCC-precuneus cortex, as well as in medial prefrontal and temporo-parietal areas. As for P2, while the structural scan showed no atrophy, hypometabolism was found in the PCC-precuneus, temporo-parietal and prefrontal dorsolateral cortex. The pattern of PCC connectivity in P2 demonstrated significant decreases compared to controls in the parahippocampal cortex and posterior hippocampus while increases were confined to the angular gyrus and anterior hippocampus. Altogether, PCC connectivity and both AV-45 and FDG-PET scans consistently suggest that P2 only is at a predementia stage of Alzheimer's disease.