Published in final edited form as:
Mov Disord. 2013 March ; 28(3): . doi:10.1002/mds.25309.

Reply: Beyond the Limits of Detection: Failure of PiB Imaging to Capture True Aβ Burden

Stephen N. Gomperts, MD, PhD[1,*], **Keith A. Johnson, MD**[1,2], and **John Growdon, MD**[1]
[1]Department of Neurology, Massachusetts General Hospital, Boston, Massachusetts, USA
[2]Department of Radiology, Massachusetts General Hospital, Boston, Massachusetts, USA

We thank the authors for their interesting comment in reference to the cross-sectional study of PiB imaging of amyloid burden in Parkinson's disease (PD), PD with mild cognitive impairment, PD dementia (PDD), and dementia with Lewy bodies (DLB).[1] The authors assert that in this study we "described no striatal β-amyloid (Aβ) deposition." This is incorrect. In fact, our SPM analyses showed higher PiB DVR in DLB compared with HCS in both cortical and subcortical structures. The goal of the study was to relate cortical PiB binding to cognitive performance. We did not focus on striatal PiB burden. In a previous study,[2] we reported higher striatal PiB burden in DLB than in HCS, whereas striatal PiB burden was comparable between PDD, PD, and HCS. These data are consistent with prior neuropathological reports comparing β-amyloid burden in the striatum in DLB and PDD,[3,4] which differ from that of the authors.[5]

We agree with the authors that PiB differentially labels β-amyloid species. PiB binds neuritic (cored) plaques, binds some but not all diffuse plaques, and does not bind soluble β-amyloid species.[6–8] PiB is unable to report on β-amyloid variants that it does not bind. Differential PiB binding of amyloid species may indeed contribute to differences between pathologic studies and amyloid imaging reports. Molecular brain imaging assesses mean levels on a macroscopic scale of a signal of interest, in this case PiB binding. Such a tool cannot provide the microscopic resolution of neuropathology. Despite these caveats, PiB's capacity for antemortum assessment of amyloid burden, years before pathological evaluation is available, is proving useful in exploring the contributions of molecular species to disease. For example, we have found that baseline amyloid burden is a risk factor for subsequent cognitive decline in a longitudinal cohort of nondemented PD subjects.[9]

References

1. Gomperts SN, Locascio JJ, Marquie M, et al. Brain amyloid and cognition in Lewy body diseases. Mov Disord. 2012; 27:965–973. [PubMed: 22693110]
2. Gomperts SN, Rentz DM, Moran E, et al. Imaging amyloid deposition in Lewy body diseases. Neurology. 2008; 71:903–910. [PubMed: 18794492]
3. Jellinger KA, Attems J. Does striatal pathology distinguish Parkinson disease with dementia and dementia with Lewy bodies? Acta Neuropathol. 2006; 112:253–260. [PubMed: 16804711]
4. Liang T, Noorigian JV, Duda JE. Does striatal pathology distinguish dlb from pdd? Mov Disord. 2006; 21:S69–S70.

[*]Correspondence to: Stephen N. Gomperts, MD, PhD, Department of Neurology, Massachusetts General Hospital, Boston, Massachusetts, USA; sgomperts@partners.org.

Relevant conflicts of interest/financial disclosures: Nothing to report. Full financial disclosures and author roles may be found in the online version of this article.

5. Kalaitzakis ME, Walls AJ, Pearce RK, Gentleman SM. Striatal Abeta peptide deposition mirrors dementia and differentiates DLB and PDD from other parkinsonian syndromes. Neurobiol Dis. 2011; 41:377–384. [PubMed: 20951207]

6. Kantarci K, Yang C, Schneider JA, et al. Ante mortem amyloid imaging and β-amyloid pathology in a case with dementia with Lewy bodies. Neurobiol Aging. 2012; 33:878–885. [PubMed: 20961664]

7. Burack MA, Hartlein J, Flores HP, Taylor-Reinwald L, Perlmutter JS, Cairns NJ. In vivo amyloid imaging in autopsy-confirmed Parkinson disease with dementia. Neurology. 2010; 74:77–84. [PubMed: 20038776]

8. Ikonomovic MD, Klunk WE, Abrahamson EE, et al. Post-mortem correlates of in vivo PiB-PET amyloid imaging in a typical case of Alzheimer's disease. Brain. 2008; 131:1630–1645. [PubMed: 18339640]

9. Gomperts SN, Locascio JJ, Rentz D, et al. Amyloid is linked to cognitive decline in patients with Parkinson disease without dementia. Neurology. 2013; 80:85–91. [PubMed: 23243071]