

Supplementary materials (Online Resources)

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In vivo imaging of synaptic loss in Alzheimer's disease with [18F]UCB-H Positron Emission
Tomography

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Online Resource 1. SPM12 analysis of [18F]UCB-H PVE-corrected Vt maps: Peak MNI coordinates of brain regions showing significant reduction in synaptic density in mild AD patients (n = 14) compared to controls

Regions	Cluster size	x	y	z	Z score
Right anterior hippocampus*	218	14	-8	-18	4.02
Right superior temporal**	55	62	-16	42	4.32
Right middle frontal*	50	34	50	30	4.01

* p < 0.10 FWE-corrected at the voxel-level; ** p < 0.05 FWE-corrected at the voxel-level. PVE, partial volume effect; Vt, distribution volume; MNI, Montreal Neurological Institute; FWE, family-wise error.

Online Resource 2. [¹⁸F]UCB-H mean values from PVE-corrected Vt maps in ROIs as a function of group (mild AD only versus controls)

ROI	Mild AD	Controls		% diff	Effect size (d)
Hippocampus	3.8 (0.7)	5.4 (1.4)	t(31)=3.6, p<0.001	-29.0	1.29
Basal forebrain Ch1-3	1.5 (0.8)	2.3 (1.5)	t(31)=1.9, p=0.05	-37.7	0.69
Basal forebrain Ch4	4.5 (1.1)	5.1 (1.3)	t(31)=1.4, p=0.15	-12.3	0.49
Parahippocampal	4.8 (0.9)	5.6 (1.2)	t(31)=2.1, p<0.05	-14.6	0.72
Thalamus	4.5 (0.9)	5.4 (1.2)	t(31)=2.1, p<0.05	-15.7	0.74
Parietal	4.0 (0.9)	4.9 (1.2)	t(31)=2.2, p<0.05	-18.3	0.77
Posterior cingulate	4.7 (1.2)	5.3 (1.2)	t(31)=1.3, p=0.18	-10.8	0.45
Prefrontal	4.3 (0.8)	5.0 (1.1)	t(31)=2.0, p=0.05	-14.2	0.69
Temporal	4.7 (1.0)	5.5 (1.2)	t(31)=2.0, p<0.05	-15.2	0.70
Occipital	3.7 (1.2)	4.5 (1.1)	t(31)=1.9, p=0.06	-17.7	0.65
<i>“Control” regions</i>					
Centrum semiovale	3.7 (0.8)	3.9 (0.9)	t(31)=0.6, p=0.55	-4.7	0.20
Cerebellum	3.7 (0.8)	4.0 (0.9)	t(31)=1.2, p=0.23	-9.2	0.40

Note: Standard deviations in parentheses. ROI, region of interest. % diff = (mean AD – mean controls)/mean controls x 100%. PVE, partial volume effect; Vt, distribution volume; ROI, region of interest.

Online Resource 3. [^{18}F]UCB-H mean values from non-PVE-corrected Vt maps in ROIs as a function of group (A β -positive patients versus controls)

ROI	A β - positive patients	Controls		% diff	Effect size (d)
Hippocampus	4.4 (1.0)	5.4 (1.3)	t(41)=2.7, p<0.01	-17.8	0.80
Basal forebrain Ch1-3	2.9 (1.0)	3.9 (1.1)	t(41)=2.8, p<0.01	-23.7	0.82
Basal forebrain Ch4	4.9 (0.9)	5.5 (1.4)	t(41)=1.8, p=0.06	-12.1	0.54
Parahippocampal	4.6 (1.1)	5.5 (1.3)	t(41)=2.4, p<0.05	-15.9	0.71
Thalamus	4.5 (1.0)	5.2 (1.2)	t(41)=2.1, p<0.05	-13.6	0.61
Parietal	4.2 (1.3)	4.8 (1.3)	t(41)=1.4, p=0.16	-11.2	0.42
Posterior cingulate	4.6 (0.9)	5.2 (1.3)	t(41)=1.9, p=0.05	-12.7	0.57
Prefrontal	4.2 (1.1)	4.7 (0.9)	t(41)=1.4, p=0.16	-9.9	0.42
Temporal	4.8 (1.1)	5.6 (1.3)	t(41)=1.9, p=0.05	-13.2	0.58
Occipital	4.1 (1.2)	4.8 (1.2)	t(41)=1.9, p=0.05	-15.1	0.58
<i>“Control” regions</i>					
Centrum semiovale	3.8 (0.8)	4.0 (0.9)	t(41)=0.9, p=0.36	-5.8	0.26
Cerebellum	4.0 (0.9)	4.5 (1.1)	t(41)=1.5, p=0.14	-9.9	0.44

Note: Standard deviations in parentheses. ROI, region of interest. % diff = (mean AD – mean controls)/mean controls x 100%. PVE, partial volume effect; Vt, distribution volume; ROI, region of interest; A β , amyloid beta.

Online Resource 4: Correlation between [18F]UCB-H uptake and grey matter density in the hippocampus in the AD group. Left: PVE-corrected PET images, correlation: $r = 0.78$, $p < 0.001$; right= PET images without any PVE-correction, correlation: $r = 0.44$, $p < 0.05$.

