Supporting Information

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SI Materials and Methods

Cognitively Normal Control and AD Groups. The CTRL group consisted of 28 subjects without any neurological or neuropsychiatric symptoms, 19 males and 9 females, with ages of 30–84 y (mean ± SD: 64.3 ± 14.1 y). The AD group consisted of 24 subjects with AD, 12 males and 12 females, with ages of 51–87 y (mean ± SD: 73.5 ± 9.7 y). Both CTRL and AD group subjects were scanned as a part of a larger study on [F-18]FDDNP PET imaging in aging and AD conducted earlier at UCLA, and their cortical [F-18]FDDNP values were reported previously (1). Their [F-18]FDDNP PET scans were reanalyzed for this study using a more complex set of ROIs as defined in *Materials and Methods* with additional regions that were not part of the previous publication (including ACG in the cortex, amygdala in the limbic medial temporal lobe, and a number of ROIs in subcortical regions). All PET scans of the CTRL and AD groups were performed at the UCLA Ahmanson Biomedical Imaging Center PET with the ECAT HR or ECAT EXACT HR+ scanner (Siemens CTI), with subjects in the supine position and with the imaging plane parallel to the orbito-meatal line. A bolus of FDDNP (320–550 MBq) was injected through an indwelling venous catheter, and consecutive dynamic PET scans were obtained for 2 h. Scans were corrected for decay and reconstructed with the use of filtered back-projection (Hann filter, 5.5-mm full width at half maximum), with correction for scatter and measured attenuation. The resulting images contained either 47 contiguous slices with a plane separation of 3.37 mm (with the ECAT HR) or 63 contiguous slices with a plane separation of 2.42 mm (with the EXACT HR+). Imaging results did not differ significantly with the scanner used.

Subjects from the AD group met the standard diagnostic criteria of memory impairment, impairment in at least one other cognitive domain, gradual onset and progressive decline, and impaired occupational or social functioning or both (2, 3). Control subjects had normal cognitive functioning for their age and did not meet the criteria for mild cognitive impairment (4) or AD.

Subjects from the CTRL and AD groups who received an MRI scan were scanned on a 1.5-T (Signa) or 3T (General Electric or Siemens) scanner. For each of these subjects, 54 transverse planes were collected throughout the brain, superior to the cerebellum, with the use of a double-echo, fast spin-echo series with a 24-cm field of view and 256 × 256 matrix and 3-mm slices with no gap [repetition time, 6,000 (3 T) or 2,000 (1.5 T); echo time, 17/85 (3 T) or 30/90 (1.5 T)] (1).

1. Small GW, et al. (2006) PET of brain amyloid and tau in mild cognitive impairment. *N Engl J Med* 355(25):2652–2663.
2. McKhann G, et al. (1984) Clinical diagnosis of Alzheimer's disease: Report of the NINCDS-ADRDA Work Group under the auspices of Department of Health and Human Services Task Force on Alzheimer's Disease. *Neurology* 34(7):939–944.
3. American Psychiatric Association (2000) *Diagnostic and Statistical Manual of Mental Disorders*, 4th Ed (American Psychiatric Association, Washington, DC).
4. Petersen RC (2004) Mild cognitive impairment as a diagnostic entity. *J Intern Med* 256(3):183–194.

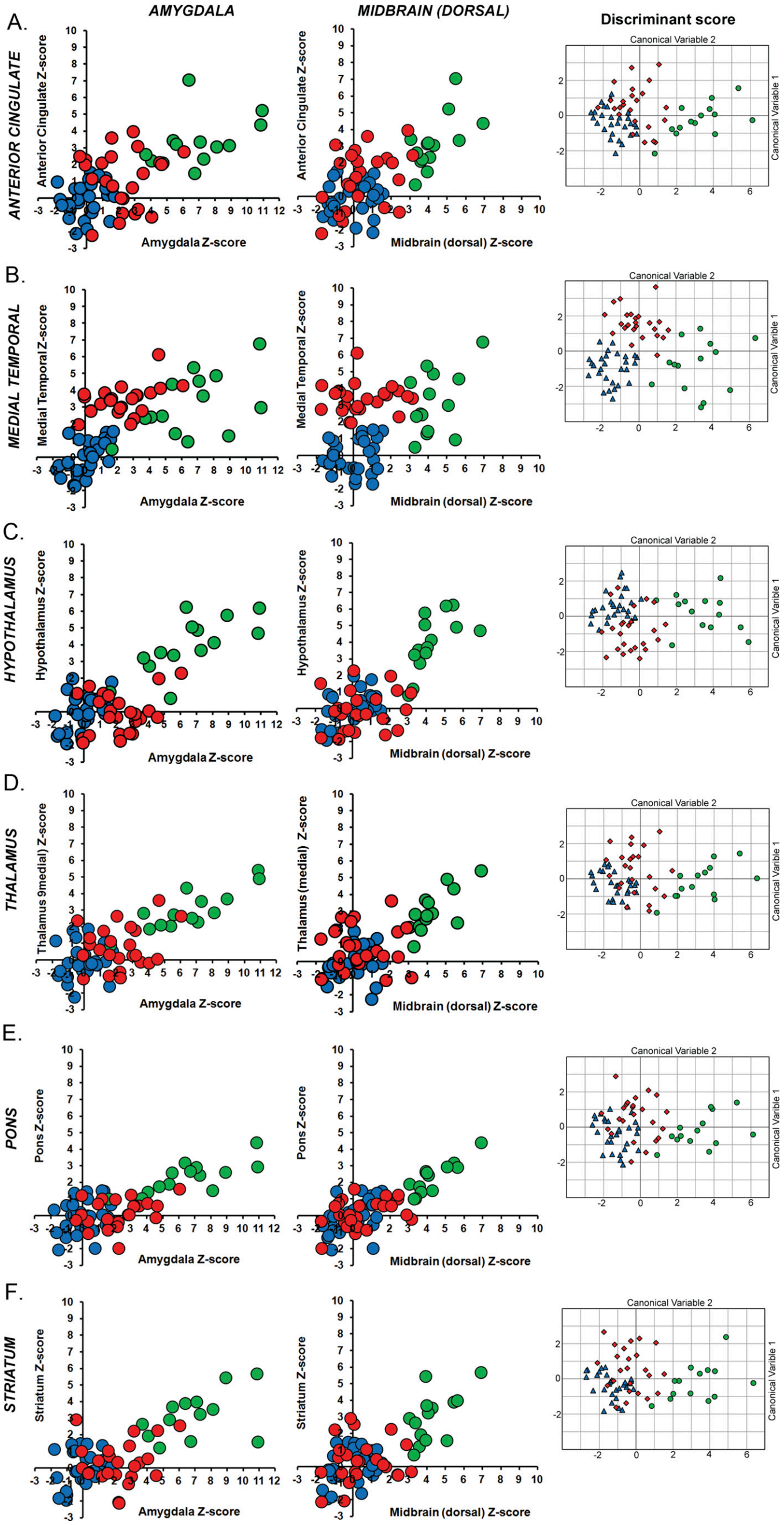

Fig. S1. Correlations of the core regions, amygdala (*A–F*, *Left*), and dorsal midbrain (*A–F*, *Center*) show that these two regions efficiently separate the mTBI group (green circles) from the AD group (red circles) and CTRL group (blue circles) in several cortical and limbic temporal lobe areas [anterior cingulate gyrus (*A*), medial temporal lobe (*B*), hypothalamus (*C*), thalamus (*D*), pons (*E*), and striatum (*F*)]. [F-18]FDDNP binding is expressed as Z-scores in reference to CTRL group (Tables S7–S9), all values higher than Z = 2 are considered significantly higher than the CTRL group values. (*A–F*, *Right*) Results of discriminant analysis for each region. Note that in subcortical regions AD and CTRL groups show no separation.

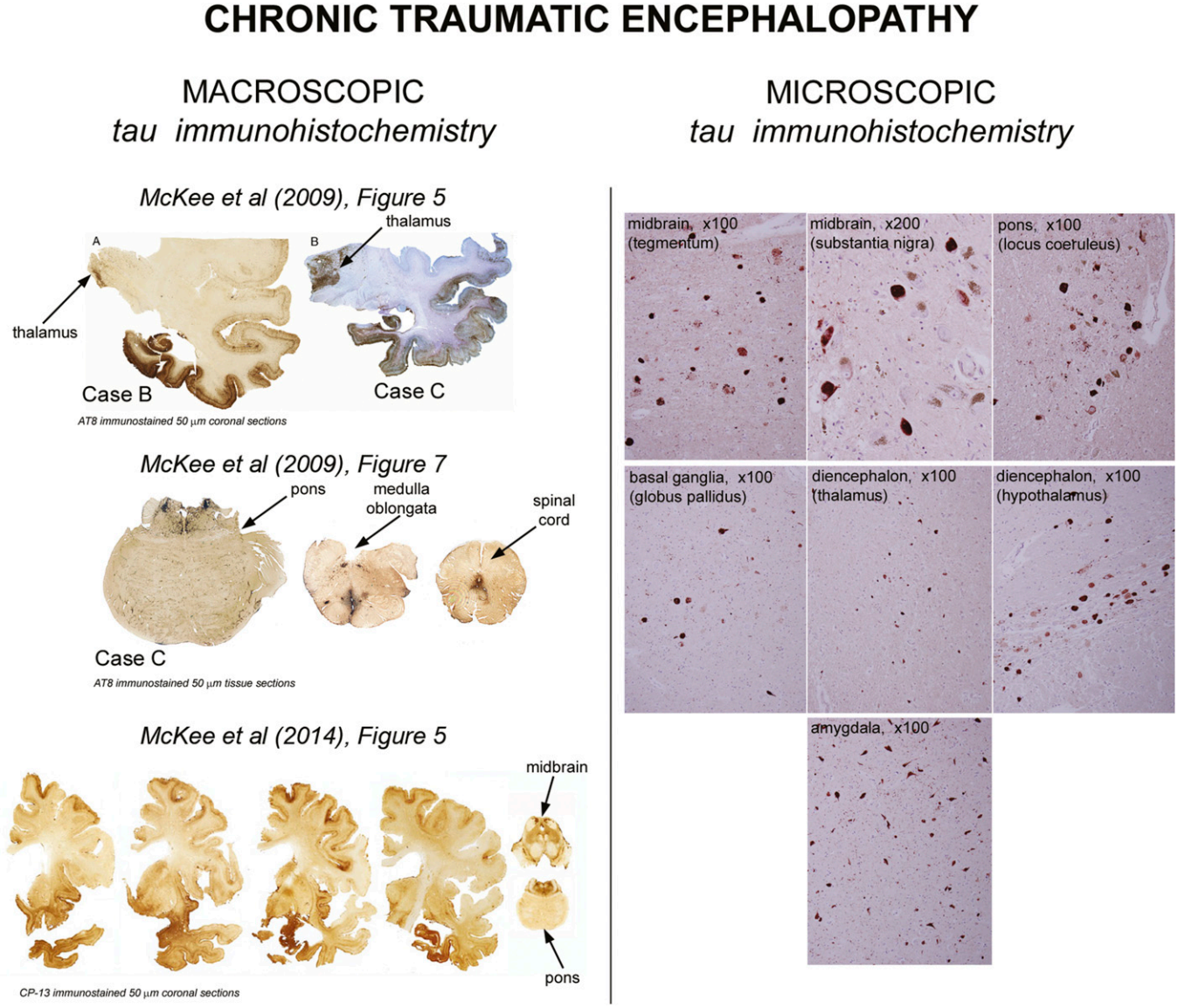

Fig. S2. CTE related hyperphosphorylated tau pathology distribution in subcortical brain regions. (*Left*) Examples of hyperphosphorylated tau immunohistochemistry (IHC) on brain tissue samples from CTE cases published in papers by McKee's group clearly show involvement of basal ganglia and diencephalon in stage IV as shown in refs. 1 and 2. The top and middle sections of the left panel show two cases of pathologically confirmed CTE with more advanced distribution of cortical pathology labeled as cases B and C in ref. 2: large coronally cut tissue sections of cases B and C clearly demonstrate tau IHC in thalamic region at variable levels in the upper section (figure 5 in ref. 2) and the middle section shows dense tau IHC in parts of pons, medulla oblongata, and spinal cord of case C (figure 7 in ref. 2); the bottom section shows a case of Australian rugby player with stage IV CTE with variable levels of tau IHC labeling throughout the cortex, basal ganglia, diencephalon, midbrain, and pons regions (figure 5 in ref. 1). Tissue samples from cases B and C (top and middle section, fully described in ref. 2) were independently analyzed as a part of analysis of neurochemical profile of dementia pugilistica (3), confirming McKee's observation. (*Right*) Additional evidence of the presence of tau deposits in subcortical structures of confirmed CTE is provided by tau IHC in microscopy slides performed on tissues samples from an 80-y-old retired NFL player from the CTE brain collection of Dr. Omalu. Different areas of midbrain (tegmentum, substantia nigra), pons (locus coeruleus), diencephalon (thalamus, hypothalamus), basal ganglia (globus pallidus), and amygdala clearly show presence of tau IHC positive aggregates. [*Top* and *Middle*, reproduced with permission from Wolters Kluwer Health; *Bottom*, reproduced with permission from Springer Science and Business Media.]

1. McKee AC, Daneshvar DH, Alvarez VE, Stein TD (2014) The neuropathology of sport. *Acta Neuropathol* 127(1):29–51.
2. McKee AC, et al. (2009) Chronic traumatic encephalopathy in athletes: Progressive tauopathy after repetitive head injury. *J Neuropathol Exp Neurol* 68(7):709–735.
3. Kokjohn TA, et al. (2013) Neurochemical profile of dementia pugilistica. *J Neurotrauma* 30(11):981–997.

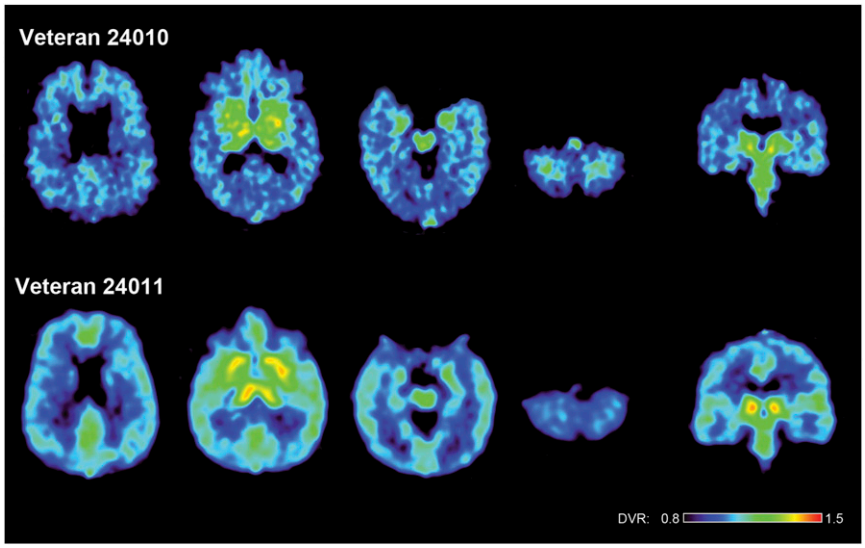

Fig. S3. [F-18]FDDNP DVR parametric images of the brains of two war veterans with the history of multiple blast concussions (mTBIs) during their war zone deployment. The upper row shows a 48-y-old male (veteran 24010) and the lower row a 36-y-old male (veteran 24011). Left four images in each row show transaxial brain images from top of the brain to the bottom. The right image shows a coronal cut through the midbrain. Note different [F-18]FDDNP signal distribution from the patterns T1–T4 described for retired professional American football players (Fig. 1) and a pattern of lower signal in midbrain and amygdala.

Table S1. Pathology distribution in CTE (1)

CTE	Hyperphosphorylated tau	TDP-43	β-Amyloid
Stage I	Focal perivascular NFTs at depth of cortical sulci	Sparse TDP-43 neurites in cortex, medial temporal lobe, brainstem	None
Stage II	NFTs adjacent to focal epicenters, Nucleus basalis of Meynert, Locus coeruleus	Sparse TDP-43 neurites in cortex, medial temporal lobe, brainstem	2 out of 14 cases
Stage III	Dense: medial temporal lobes; Widespread: cortex, diencephalon, brainstem, and spinal cord	Sparse TDP-43 neurites in cortex, medial temporal lobe, brainstem	3 out of 15 cases
Stage IV	Dense and widespread throughout the brain including white matter	Severe intraneuronal and intraglial inclusions in cortex, white matter, diencephalon, basal ganglia, brainstem	9 out of 15 cases; as diffuse and neuritic plaques or vascular amyloid - but less than what required for AD diagnosis

1. McKee AC, et al. (2013) The spectrum of disease in chronic traumatic encephalopathy. *Brain* 136(Pt 1):43–64.

Table S2. Comparison of tau pathology in CTE and AD (1)

Hyperphosphorylated tau pathology	CTE	AD
Mild pathology	CTE stages I–II: NFTs in focal epicentres in cerebral cortex, usually frontal lobe	Braak NFT stages I–III: NFTs in entorhinal cortex, hippocampus and amygdala
Advanced pathology	CTE stages III–IV:	Braak NFT stages IV–VI:
Cortical	High density of NFTs in widespread cortical areas and medial temporal lobe, patchy irregular distribution	High density of NFTs in widespread cortical areas and medial temporal lobe, uniform distribution
Subcortical	High densities of NFTs in thalamus, hypothalamus, mamillary bodies, brainstem; Moderate densities of NFTs in basal ganglia, especially nucleus accumbens	Low densities of NFTs in basal ganglia and brainstem, none in mammillary bodies
White matter	Prominent pathology	Relatively uninvolved

1. McKee AC, et al. (2013) The spectrum of disease in chronic traumatic encephalopathy. *Brain* 136(Pt 1):43–64.

Table S3. Significance of Spearman's rank correlations for ROI combinations within the mTBI group

	Amygd	MTL	Midb-V	Midb-D	Hypo-Th	Th	Pons	Str	F	ACG	P	PCG	LTL	Occ
Amygd	—													
MTL	NS	—												
Midb-V	NS	NS	—											
Midb-D	$P < 0.01$	NS	NS	-										
Hypo-Th	NS	NS	$P < 0.01$	$P < 0.01$	—									
Th	$P < 0.001$	NS	$P < 0.05$	$P < 0.01$	$P < 0.01$	—								
Pons	$P < 0.01$	NS	$P < 0.001$	$P < 0.001$	$P < 0.01$	$P < 0.01$	—							
Str	$P < 0.05$	NS	$P < 0.05$	$P < 0.05$	NS	$P < 0.05$	NS	—						
F	$P < 0.001$	NS	NS	$P < 0.001$	NS	NS	$P < 0.05$	NS	—					
ACG	$P < 0.05$	NS	$P < 0.05$	$P < 0.05$	NS	$P < 0.05$	$P < 0.01$	NS	$P < 0.001$	—				
P	$P < 0.05$	NS	NS	$P < 0.01$	$P < 0.01$	NS	$P < 0.05$	NS	$P < 0.001$	$P < 0.05$	—			
PCG	NS	NS	NS	$P < 0.05$	NS	NS	NS	NS	$P < 0.001$	$P < 0.001$	$P < 0.01$	—		
LTL	$P < 0.05$	NS	NS	$P < 0.001$	NS	$P < 0.05$	$P < 0.001$	NS	$P < 0.01$	$P < 0.05$	$P < 0.001$	$P < 0.01$	—	
OCC	NS	NS	NS	NS	NS	NS	NS	NS	$P < 0.01$	$P < 0.001$	NS	$P < 0.05$	NS	—

Areas shaded in orange and green show significant correlations of limbic medial temporal lobe areas with subcortical (orange) and cortical (green) regions. Areas shaded in blue show significant correlations of subcortical areas with cortical areas. Significant cortico-cortical and subcortico-subcortical correlations are highlighted in purple and yellow, respectively. NS, not significant ($P > 0.05$).

Table S4. mTBI group [F-18]FDDNP DVR values

	Amygd	MTL	Midb-V	Midb-D	Hypo-Th	Th	Pons	Str	F	ACG	P	PCG	LTL	Occ
TBI01	1.553	1.265	1.478	1.517	1.465	1.713	1.476	1.716	1.167	1.282	1.119	1.271	1.168	1.088
TBI02	1.356	1.211	1.269	1.304	1.274	1.425	1.287	1.525	1.132	1.241	1.080	1.120	1.098	1.012
TBI03	1.483	1.141	1.433	1.352	1.517	1.564	1.341	1.700	1.109	1.228	1.114	1.092	1.097	0.923
TBI04	1.454	1.222	1.244	1.372	1.437	1.495	1.258	1.568	1.170	1.225	1.121	1.158	1.113	0.986
TBI05	1.333	1.168	1.375	1.333	1.409	1.430	1.277	1.408	1.110	1.184	1.108	1.129	1.111	0.963
TBI06	1.392	1.133	1.421	1.436	1.541	1.623	1.385	1.592	1.244	1.397	1.176	1.305	1.189	1.110
TBI07	1.425	1.196	1.245	1.359	1.415	1.552	1.327	1.546	1.132	1.194	1.080	1.206	1.132	0.978
TBI08	1.417	1.215	1.402	1.447	1.475	1.447	1.364	1.598	1.215	1.238	1.154	1.158	1.189	1.011
TBI09	1.556	1.179	1.387	1.416	1.539	1.669	1.365	1.433	1.198	1.319	1.149	1.288	1.201	1.008
TBI10	1.308	1.167	1.172	1.338	1.369	1.410	1.252	1.457	1.129	1.189	1.067	1.110	1.097	0.986
TBI11	1.404	1.233	1.286	1.353	1.483	1.467	1.346	1.433	1.082	1.157	1.056	1.083	1.118	0.955
TBI12	1.295	1.165	1.285	1.321	1.393	1.491	1.224	1.506	1.106	1.206	1.014	1.095	1.044	1.004
TBI13	1.363	1.144	1.361	1.356	1.400	1.485	1.339	1.578	1.142	1.232	1.043	1.100	1.080	0.979
TBI14	1.220	1.123	1.257	1.318	1.292	1.327	1.220	1.371	1.082	1.124	1.056	1.118	1.077	0.951

Table S5. CTRL group [F-18]FDDNP DVR values

	Amygd	MTL	Midb-V	Midb-D	Hypo-Th	Th	Pons	Str	F	ACG	P	PCG	LTL	Occ
CTRL01	1.155	1.095	1.180	1.122	1.169	1.238	1.161	1.425	1.025	1.108	1.016	1.107	1.038	0.961
CTRL02	1.124	1.145	1.179	1.162	1.300	1.233	1.193	1.210	1.005	1.064	1.052	1.126	1.054	0.948
CTRL03	1.143	1.087	1.081	1.190	1.274	1.290	1.239	1.307	1.025	1.082	1.083	1.078	1.045	1.091
CTRL04	1.135	1.074	1.081	1.141	1.331	1.403	1.149	1.421	1.045	1.118	1.042	1.076	1.047	0.983
CTRL05	1.157	1.116	1.204	1.077	1.152	1.195	1.094	1.277	1.015	1.033	1.078	1.152	1.065	1.057
CTRL06	1.138	1.073	1.165	1.193	1.240	1.058	1.194	1.390	1.056	1.002	1.007	1.016	1.046	1.005
CTRL07	1.213	1.107	1.160	1.195	1.229	1.302	1.105	1.342	1.033	1.033	1.024	1.109	1.046	0.997
CTRL08	1.170	1.123	1.080	1.088	1.214	1.410	1.257	1.423	1.059	1.159	1.033	1.040	1.079	1.014
CTRL09	1.209	1.146	1.201	1.223	1.229	1.242	1.257	1.339	1.049	1.102	1.078	1.071	1.032	0.998
CTRL10	1.096	1.095	1.140	1.139	1.222	1.350	1.173	1.399	1.123	1.136	1.068	1.074	1.072	1.051
CTRL11	1.142	1.094	1.198	1.208	1.271	1.367	1.250	1.394	1.024	1.090	1.026	1.040	1.022	0.995
CTRL12	1.162	1.081	1.136	1.142	1.204	1.277	1.147	1.277	0.978	1.014	1.017	1.088	1.058	0.955
CTRL13	1.167	1.135	1.140	1.151	1.242	1.192	1.125	1.257	1.060	1.142	1.092	1.100	1.107	0.974
CTRL14	1.205	1.138	1.135	1.162	1.260	1.315	1.260	1.417	1.073	1.146	1.070	1.085	1.071	0.985
CTRL15	1.185	1.132	1.046	1.078	1.271	1.241	1.078	1.311	1.055	1.149	1.092	1.155	1.058	1.084
CTRL16	1.189	1.122	1.096	1.195	1.269	1.225	0.997	1.287	1.043	1.153	1.074	1.114	1.076	1.107
CTRL17	1.218	1.137	1.156	1.206	1.244	1.115	1.140	1.308	1.069	1.111	1.044	1.127	1.074	1.020
CTRL18	1.123	1.102	1.067	1.061	1.141	1.123	1.048	1.188	1.005	1.075	1.092	1.097	1.068	1.072
CTRL19	1.167	1.094	1.218	1.150	1.224	1.241	1.114	1.362	1.074	1.099	1.057	1.087	1.060	0.987
CTRL20	1.147	1.136	1.145	1.064	1.227	1.222	1.056	1.309	1.066	1.119	1.062	1.061	1.022	1.031
CTRL21	1.172	1.118	1.195	1.183	1.227	1.337	1.222	1.300	1.071	1.130	1.033	1.097	1.082	0.982
CTRL22	1.102	1.101	1.039	1.096	1.163	1.170	1.069	1.282	0.996	1.090	1.025	1.035	1.066	0.998
CTRL23	1.122	1.105	1.056	1.046	1.174	1.163	1.102	1.224	0.988	1.042	1.059	0.984	1.102	0.998
CTRL24	1.106	1.084	1.051	1.072	1.169	1.193	0.990	1.197	1.038	1.076	1.027	1.116	1.023	0.979
CTRL25	1.205	1.131	1.151	1.169	1.242	1.339	1.151	1.355	1.072	1.119	1.077	1.052	1.102	1.051
CTRL26	1.224	1.147	1.236	1.195	1.321	1.296	1.195	1.327	1.047	1.098	1.093	1.055	1.059	1.074
CTRL27	1.173	1.102	1.108	1.066	1.277	1.226	1.146	1.306	1.009	1.057	1.051	1.042	1.097	1.111
CTRL28	1.177	1.112	1.138	1.079	1.269	1.231	1.144	1.368	0.999	1.069	1.036	1.115	1.115	1.072

Table S6. AD group [F-18]FDDNP DVR values

	Amygd	MTL	Midb-V	Midb-D	Hypo-Th	Th	Pons	Str	F	ACG	P	PCG	LTL	Occ
AD01	1.159	1.194	1.108	1.234	1.157	1.154	1.236	1.321	1.126	1.192	1.121	1.165	1.201	1.092
AD02	1.380	1.209	1.196	1.140	1.348	1.477	1.267	1.500	1.148	1.213	1.172	1.175	1.179	1.039
AD03	1.288	1.176	1.123	1.155	1.215	1.241	1.190	1.343	1.108	1.158	1.143	1.193	1.122	1.019
AD04	1.242	1.180	1.130	1.111	1.168	1.190	1.116	1.179	1.137	1.055	1.153	1.162	1.138	1.053
AD05	1.235	1.174	1.156	1.103	1.219	1.477	1.220	1.294	1.096	1.029	1.191	1.209	1.175	1.068
AD06	1.308	1.200	1.078	1.094	1.236	1.235	1.202	1.361	1.112	1.045	1.173	1.203	1.143	1.035
AD07	1.173	1.176	1.085	1.143	1.165	1.332	1.065	1.301	1.123	1.144	1.177	1.181	1.140	1.224
AD08	1.205	1.199	1.188	1.270	1.288	1.402	1.222	1.288	1.108	1.137	1.097	1.182	1.159	0.981
AD09	1.220	1.192	1.196	1.118	1.237	1.346	1.096	1.371	1.075	1.125	1.136	1.156	1.163	1.065
AD10	1.173	1.174	1.071	1.042	1.309	1.365	1.120	1.298	1.101	0.999	1.146	1.200	1.118	1.084
AD11	1.196	1.185	1.090	1.207	1.263	1.304	1.198	1.353	1.113	1.183	1.168	1.143	1.171	1.110
AD12	1.159	1.198	1.069	1.097	1.144	1.276	1.149	1.392	1.052	1.179	1.128	1.166	1.151	1.034
AD13	1.217	1.190	1.280	1.311	1.282	1.168	1.129	1.301	1.085	1.200	1.184	1.184	1.124	1.075
AD14	1.271	1.164	1.162	1.271	1.170	1.274	1.240	1.287	1.094	1.054	1.146	1.161	1.128	1.061
AD15	1.277	1.196	1.145	1.227	1.206	1.277	1.190	1.331	1.077	1.065	1.068	1.213	1.135	1.119
AD16	1.243	1.207	1.089	1.043	1.148	1.159	0.997	1.174	1.115	1.092	1.150	1.204	1.146	1.095
AD17	1.326	1.251	1.134	1.147	1.218	1.257	1.138	1.290	1.108	1.185	1.109	1.170	1.203	1.083
AD18	1.239	1.179	1.138	1.149	1.260	1.261	1.095	1.345	1.096	1.094	1.119	1.137	1.151	0.973
AD19	1.276	1.196	1.034	1.084	1.228	1.403	1.188	1.477	1.142	1.227	1.166	1.168	1.188	1.006
AD20	1.218	1.189	1.126	1.177	1.219	1.280	1.080	1.393	1.104	1.249	1.157	1.162	1.151	1.116
AD21	1.264	1.157	1.102	1.126	1.171	1.330	1.151	1.255	1.108	1.120	1.154	1.167	1.154	1.038
AD22	1.330	1.206	1.264	1.251	1.332	1.559	1.190	1.477	1.142	1.181	1.147	1.192	1.173	0.951
AD23	1.146	1.157	1.103	1.131	1.289	1.454	1.126	1.523	1.163	1.200	1.195	1.208	1.165	1.051
AD24	1.267	1.192	1.215	1.296	1.233	1.422	1.150	1.414	1.163	1.264	1.151	1.215	1.137	1.046

Table S7. mTBI group Z-score values

	Amygd	MTL	Midb-V	Midb-D	Hypo-Th	Th	Pons	Str	F	ACG	P	PCG	LTL	Occ
TBI01	10.824	6.782	6.069	6.903	4.702	5.420	4.400	5.704	3.885	4.372	2.443	4.711	4.053	1.412
TBI02	5.381	4.379	2.363	3.032	0.814	2.044	1.892	2.941	2.815	3.427	0.966	0.953	1.322	−0.179
TBI03	8.885	1.304	5.276	3.901	5.769	3.678	2.599	5.466	2.133	3.138	2.264	0.247	1.294	−2.057
TBI04	8.097	4.882	1.927	4.271	4.130	2.872	1.508	3.562	3.978	3.058	2.547	1.902	1.931	−0.728
TBI05	4.747	2.484	4.251	3.558	3.552	2.104	1.752	1.246	2.143	2.107	2.044	1.177	1.824	−1.202
TBI06	6.364	0.945	5.066	5.438	6.251	4.358	3.193	3.910	6.227	7.054	4.606	5.552	4.874	1.865
TBI07	7.287	3.698	1.946	4.038	3.678	3.530	2.421	3.251	2.837	2.348	0.988	3.102	2.659	−0.902
TBI08	7.060	4.576	4.725	5.631	4.898	2.303	2.911	4.001	5.370	3.360	3.766	1.901	4.882	−0.197
TBI09	10.903	2.984	4.455	5.060	6.201	4.901	2.926	1.608	4.851	5.236	3.593	5.150	5.322	−0.267
TBI10	4.049	2.422	0.655	3.656	2.738	1.869	1.423	1.962	2.732	2.218	0.484	0.687	1.294	−0.726
TBI11	6.719	5.366	2.665	3.925	5.066	2.539	2.664	1.609	1.313	1.479	0.060	0.019	2.105	−1.371
TBI12	3.690	2.356	2.652	3.342	3.233	2.819	1.046	2.672	2.031	2.611	−1.501	0.313	−0.779	−0.352
TBI13	5.575	1.440	4.000	3.981	3.371	2.745	2.574	3.710	3.137	3.217	−0.398	0.453	0.644	−0.874
TBI14	1.615	0.497	2.159	3.285	1.183	0.903	1.004	0.717	1.304	0.701	0.091	0.893	0.500	−1.460

Z-score defined as $(DVR_{(mTBI\text{-}ROI)} - DVR_{(CTRLgroup\text{-}mean)})/SD_{(CTRLgroup)}$; CTRL group DVR mean values and SDs for each ROI are provided in the Table 2.

Table S8. CTRL group Z-score values

	Amygd	MTL	Midb-V	Midb-D	Hypo-Th	Th	Pons	Str	F	ACG	P	PCG	LTL	Occ
CTRL01	−0.194	−0.755	0.791	−0.286	−1.324	−0.139	0.218	1.493	−0.433	0.331	−1.421	0.623	−1.002	−1.246
CTRL02	−1.048	1.460	0.778	0.445	1.352	−0.192	0.639	−1.607	−1.050	−0.685	−0.086	1.104	−0.374	−1.517
CTRL03	−0.505	−1.099	−0.958	0.954	0.813	0.474	1.246	−0.209	−0.447	−0.263	1.085	−0.092	−0.744	1.483
CTRL04	−0.728	−1.667	−0.965	0.064	1.980	1.793	0.050	1.440	0.170	0.574	−0.451	−0.164	−0.641	−0.793
CTRL05	−0.137	0.175	1.220	−1.095	−1.669	−0.639	−0.673	−0.649	−0.727	−1.399	0.898	1.755	0.043	0.751
CTRL06	−0.646	−1.713	0.523	1.009	0.112	−2.248	0.658	0.996	0.494	−2.125	−1.755	−1.657	−0.703	−0.323
CTRL07	1.432	−0.231	0.441	1.049	−0.094	0.615	−0.535	0.295	−0.197	−1.402	−1.139	0.665	−0.668	−0.504
CTRL08	0.233	0.502	−0.981	−0.912	−0.414	1.872	1.483	1.465	0.592	1.528	−0.781	−1.049	0.591	−0.144
CTRL09	1.307	1.500	1.173	1.551	−0.107	−0.093	1.493	0.246	0.307	0.191	0.923	−0.269	−1.223	−0.482
CTRL10	−1.816	−0.728	0.093	0.026	−0.242	1.170	0.370	1.123	2.560	0.984	0.525	−0.200	0.323	0.640
CTRL11	−0.542	−0.777	1.120	1.281	0.750	1.375	1.396	1.049	−0.478	−0.077	−1.046	−1.053	−1.627	−0.544
CTRL12	0.016	−1.379	0.016	0.084	−0.622	0.322	0.032	−0.638	−1.868	−1.856	−1.395	0.145	−0.235	−1.372
CTRL13	0.144	1.007	0.088	0.250	0.166	−0.671	−0.269	−0.926	0.617	1.122	1.444	0.440	1.690	−0.988
CTRL14	1.185	1.148	0.000	0.447	0.532	0.763	1.532	1.386	1.024	1.221	0.599	0.063	0.267	−0.741
CTRL15	0.645	0.879	−1.570	−1.093	0.747	−0.106	−0.885	−0.155	0.489	1.302	1.425	1.821	−0.238	1.330
CTRL16	0.756	0.458	−0.684	1.046	0.714	−0.290	−1.956	−0.499	0.110	1.377	0.755	0.786	0.495	1.814
CTRL17	1.557	1.108	0.366	1.250	0.199	−1.572	−0.066	−0.202	0.907	0.412	−0.362	1.123	0.383	−0.020
CTRL18	−1.076	−0.437	−1.198	−1.390	−1.900	−1.483	−1.286	−1.932	−1.034	−0.424	1.443	0.373	0.159	1.068
CTRL19	0.159	−0.781	1.467	0.227	−0.206	−0.102	−0.403	0.584	1.064	0.126	0.116	0.119	−0.160	−0.709
CTRL20	−0.396	1.073	0.170	−1.338	−0.145	−0.331	−1.183	−0.174	0.810	0.600	0.319	−0.515	−1.631	0.210
CTRL21	0.280	0.275	1.053	0.823	−0.138	1.018	1.018	−0.304	0.969	0.849	−0.781	0.363	0.691	−0.804
CTRL22	−1.652	−0.489	−1.702	−0.752	−1.445	−0.934	−1.004	−0.573	−1.326	−0.079	−1.077	−1.176	0.077	−0.474
CTRL23	−1.091	−0.295	−1.397	−1.668	−1.231	−1.013	−0.571	−1.410	−1.560	−1.188	0.179	−2.452	1.501	−0.481
CTRL24	−1.548	−1.234	−1.489	−1.197	−1.320	−0.663	−2.057	−1.805	−0.040	−0.414	−1.000	0.838	−1.578	−0.876
CTRL25	1.192	0.868	0.280	0.563	0.153	1.043	0.082	0.478	0.995	0.601	0.870	−0.760	1.489	0.628
CTRL26	1.718	1.546	1.788	1.043	1.764	0.534	0.666	0.080	0.233	0.111	1.492	−0.671	−0.200	1.113
CTRL27	0.320	−0.436	−0.474	−1.306	0.865	−0.285	0.019	−0.226	−0.934	−0.849	−0.099	−0.991	1.306	1.901
CTRL28	0.437	0.022	0.053	−1.073	0.711	−0.219	−0.013	0.672	−1.244	−0.568	−0.679	0.831	2.005	1.081

Z-score defined as $(DVR_{(CTRL\text{-}ROI)} - DVR_{(CTRLgroup\text{-}mean)})/SD_{(CTRLgroup)}$; CTRL group DVR mean values and SDs for each ROI are provided in the Table 2.

Table S9. AD group Z-score values

	Amygd	MTL	Midb-V	Midb-D	Hypo-Th	Th	Pons	Str	F	ACG	P	PCG	LTL	Occ
AD01	−0.070	3.644	−0.486	1.760	−1.571	−1.126	1.215	−0.005	2.643	2.298	2.540	2.062	5.327	1.495
AD02	6.054	4.312	1.086	0.048	2.312	2.650	1.616	2.572	3.314	2.771	4.440	2.314	4.495	0.383
AD03	3.508	2.814	−0.216	0.312	−0.385	−0.101	0.593	0.318	2.098	1.492	3.375	2.777	2.250	−0.046
AD04	2.230	3.008	−0.088	−0.490	−1.345	−0.699	−0.383	−2.060	2.979	−0.904	3.754	2.004	2.885	0.669
AD05	2.026	2.727	0.373	−0.633	−0.317	2.658	1.002	−0.398	1.737	−1.492	5.166	3.166	4.309	0.985
AD06	4.041	3.882	−1.013	−0.795	0.048	−0.179	0.762	0.574	2.208	−1.130	4.501	3.030	3.086	0.309
AD07	0.324	2.815	−0.888	0.103	−1.405	0.960	−1.054	−0.299	2.565	1.171	4.641	2.463	2.956	4.267
AD08	1.193	3.866	0.944	2.406	1.107	1.774	1.021	−0.487	2.092	1.015	1.607	2.503	3.713	−0.828
AD09	1.618	3.536	1.085	−0.355	0.049	1.126	−0.651	0.721	1.100	0.735	3.082	1.835	3.849	0.929
AD10	0.321	2.766	−1.138	−1.743	1.523	1.344	−0.335	−0.335	1.868	−2.207	3.484	2.943	2.114	1.337
AD11	0.941	3.219	−0.800	1.261	0.591	0.633	0.707	0.457	2.242	2.088	4.323	1.514	4.148	1.876
AD12	−0.086	3.806	−1.172	−0.745	−1.834	0.307	0.053	1.015	0.381	1.997	2.781	2.096	3.397	0.286
AD13	1.525	3.441	2.556	3.156	0.984	−0.955	−0.214	−0.294	1.390	2.477	4.910	2.541	2.344	1.144
AD14	3.013	2.315	0.468	2.419	−1.297	0.281	1.258	−0.498	1.666	−0.921	3.465	1.972	2.499	0.844
AD15	3.202	3.726	0.174	1.632	−0.569	0.318	0.595	0.132	1.143	−0.661	0.542	3.279	2.786	2.061
AD16	2.245	4.217	−0.810	−1.724	−1.746	−1.067	−1.969	−2.127	2.320	−0.029	3.632	3.037	3.203	1.566
AD17	4.557	6.143	−0.016	0.171	−0.326	0.080	−0.097	−0.454	2.098	2.125	2.092	2.183	5.415	1.304
AD18	2.151	2.967	0.056	0.204	0.519	0.129	−0.660	0.344	1.718	0.017	2.464	1.375	3.397	−0.992
AD19	3.166	3.735	−1.790	−0.983	−0.131	1.792	0.567	2.245	3.124	3.095	4.218	2.132	4.814	−0.305
AD20	1.566	3.415	−0.155	0.716	−0.303	0.348	−0.860	1.031	1.966	3.607	3.900	1.984	3.405	2.000
AD21	2.829	2.012	−0.581	−0.215	−1.293	0.939	0.079	−0.955	2.086	0.628	3.775	2.130	3.492	0.352
AD22	4.656	4.147	2.275	2.063	1.993	3.612	0.594	2.253	3.133	2.024	3.508	2.750	4.227	−1.467
AD23	−0.435	1.977	−0.570	−0.126	1.108	2.389	−0.249	2.918	3.778	2.489	5.329	3.132	3.949	0.633
AD24	2.901	3.540	1.414	2.875	−0.032	2.015	0.072	1.336	3.761	3.964	3.645	3.327	2.849	0.535

Z-score defined as $(DVR_{(AD\text{-}ROI)} - DVR_{(CTRLgroup\text{-}mean)})/SD_{(CTRLgroup)}$; CTRL group DVR mean values and SDs for each ROI are provided in the Table 2.