

Supplementary Tables

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Table S1 Information of four-cohort studies

Group		Cohort1 (Y2006)	Cohort2 (Y2009)	Cohort3 (Y2011)	Cohort4 (Y2014)	Total, mean or median
CN	N	43	36	16	16	111
	Age (year)	64.95±7.55	64.17±9.63	65.56±8.93	66.38±7.08	64.99±8.34
	Gender (M/ F)	15/28	10/26	3/13	3/13	31/80
	K-MMSE	27.98±2.40	27.50±2.52	28.00±1.86	28.06±1.65	27.84±2.26
	CDR(range)	0(0-0.5)	0(0-0.5)	0(0-0.5)	0(0-0.5)	0(0-0.5)
MCI	N	43	24	18	16	101
	Age (year)	67.72±7.78	68.88±6.75	74.22±5.56	71.31±7.10	69.73±7.39
	Gender (M/ F)	19/24	7/17	3/15	4/12	33/68
	K-MMSE	26.65±3.77	24.29±4.69	24.39±3.38	26.50±2.42	25.66±3.89
	CDR(range)	0.5(0-0.5)	0.5(0.5-1)	0.5(0.5-0.5)	0.5(0-0.5)	0.5(0-1)
AD	N	34	29	28	23	114
	Age(year)	72.47±9.30	75.83±7.51	74±8.10	77.35±7.53	74.68±8.33
	Gender(M/F)	7/27	7/22	4/24	4/19	22/92
	K-MMSE	17.44±4.84	18.38±4.87	16.89±5.20	18.09±5.96	17.68±5.14
	CDR(range)	1(0.5-2)	1(0.5-2)	1(0-2)	1(0.5-2)	1(0-2)

This table summarizes the demographic data and the result of the neuropsychological tests in participants with cognitively normal (CN) elderly, amnesic mild cognitive impairment (MCI), and Alzheimer's disease (AD) obtained from four different cohort studies.

The data of age and K-MMSE scores are presented as the mean ± standard deviation, but those of CDR scores are presented as the median (range) value.
K-MMSE, Korean version of the Mini-Mental State Examination; CDR, Clinical Dementia Rating

Table S2 Results of the comparisons of brain tissue volumes between the left and right areas

ROI		Left (mm ³)	Right (mm ³)	*P-value
Amygdala	CN	598.51±60.77	603.87±61.63	P = 0.1325
	MCI	545.77±90.24	550.08±88.45	P = 0.4553
	AD	420.42±79.55	427.42±83.42	P = 0.2848
	All	520.11±108.10	525.69±108.18	P = 0.0750
Parahippocampal Gyrus	CN	433.42±40.49	433.67±39.56	P = 0.8774
	MCI	402.45±49.40	402.44±51.22	P = 0.9976
	AD	327.77±41.22	328.77±42.05	P = 0.7238
	All	387.01±62.52	387.43±62.73	P = 0.7511
Posterior Cingulate	CN	325.25±41.04	325.64±38.00	P = 0.8487
	MCI	313.60±45.29	316.39±45.48	P = 0.2441
	AD	273.46±38.02	273.17±34.80	P = 0.8817
	All	303.66±47.03	304.60±45.72	P = 0.4423
Corpus callosum	CN	98.13±10.57	109.20±12.93	P < 0.0001
	MCI	96.20±11.61	109.13±12.81	P < 0.0001
	AD	94.92±16.45	107.18±17.04	P < 0.0001
	All	96.40±13.21	108.48±14.42	P < 0.0001
Anterior Cingulate	CN	308.44±37.15	298.12±33.92	P < 0.0001
	MCI	295.53±38.67	283.80±37.80	P < 0.0001
	AD	257.89±34.65	251.66±29.36	P = 0.0013
	All	286.86±42.60	277.48±38.97	P < 0.0001
Hippocampus	CN	501.89±51.49	515.94±51.58	P < 0.0001
	MCI	458.09±68.60	470.03±70.77	P = 0.0048
	AD	355.09±56.71	363.22±64.77	P = 0.0551
	All	437.14±85.17	448.49±89.95	P < 0.0001
Insula	CN	361.92±35.71	358.70±38.00	P = 0.0719
	MCI	350.47±41.96	343.49±40.86	P < 0.0001
	AD	307.82±34.58	302.97±32.06	P = 0.0062
	All	339.60±44.14	334.59±43.91	P < 0.0001
Precuneus	CN	313.64±31.62	304.93±30.06	P < 0.0001
	MCI	301.04±35.19	294.94±33.48	P = 0.0001
	AD	266.91±33.81	260.72±34.52	P = 0.0001
	All	293.47±38.93	286.48±37.83	P < 0.0001
Putamen	CN	370.57±42.81	380.16±41.75	P < 0.0001
	MCI	356.35±39.73	365.15±43.00	P = 0.0003
	AD	333.24±42.36	344.15±46.09	P < 0.0001
	All	353.10±44.33	362.89±46.01	P < 0.0001
Thalamus	CN	416.45±37.29	421.80±45.11	P = 0.0211
	MCI	393.54±51.39	396.33±58.76	P = 0.3656
	AD	355.22±46.25	351.72±51.78	P = 0.2095
	All	387.93±51.87	389.41±59.62	P = 0.3428

*P-value by paired samples t-test.

Data show mean ± standard deviation values. The entire corpus callosum was defined as a representative ROI for white matter.

ROI, region-of-interest; CN, cognitively normal; MCI, mild cognitive impairment; AD, Alzheimer's disease; All, the three groups together.

Table S3 Results of the voxel-based comparisons of gray matter volume (GMV) among the three participant groups without separating the gender (3A), with only the female group (3B), with only the male group (3C), and comparison between the male and female groups (3D).

A) Without separating gender

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN>MCI					
	641	Rt middle temporal gyrus	21	53.22, -20.44, -8.92	6.386
		Rt insula	13	40.64, -21.02, -2.43	5.337
	1037	Lt medial globus pallidus		-16.14, -6.1, -8.74	6.335
		Lt parahippocampal gyrus	34	-24.32, 6.04, -17.18	5.556
	456	Lt parahippocampal gyrus	27, 35, 36	-10.86, -36.91, 3.3	5.863
	1624	Rt parahippocampal gyrus	30, 35	17.03, -31.95, -5.22	5.811
		Rt amygdala		26.9, -7.59, -9.5	5.745
CN>AD					
	221705	Lt amygdala		-17.52, -8.76, -10.36	65535
		Lt parahippocampal gyrus	34	-18.87, -0.24, -10.93	65535
		Rt amygdala		26.88, -9.12, -8.29	65535
	261	Lt cerebellar tonsil		-34.1, -64.27, -33.47	5.416
MCI>AD					
	180222	Rt anterior cingulate	32	3.39, 34.32, -4.58	65535
		Lt frontal subcallosal gyrus	34	-25.77, 4.25, -13.32	65535
		Lt amygdala		-18.89, -8.62, -11.72	65535

Rt, right; Lt, left; BA, Brodmann area

B) Only the Female

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN>AD					
	172463	Lt amygdala		-17.52, -8.76, -10.36	65535
		Lt frontal subcallosal gyrus	34	-25.74, 5.78, -14.53	65535
		Lt parahippocampal gyrus	34	-20.24, 1.3, -12.16	65535
MCI>AD					
	122110	Lt cingulate gyrus	31	-0.17, -27.66, 38.14	65535
		Rt occipital precuneus	31	1.31, -66.75, 19.6	65535
		Lt anterior cingulate	32	-4.93, 35.76, -4.58	65535
	677	Rt precentral gyrus	6	37.44, 1.88, 37.52	6.666
	213	Rt middle frontal gyrus	6	24.74, -5.08, 51.51	6.279
	178	Lt occipital cuneus	18	-4.23, -87.16, 12.16	5.839
	346	Lt precentral gyrus	6	-45.87, -6.07, 35.36	5.625

Rt, right; Lt, left; BA, Brodmann area

C) Only the Male

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN>MCI					
	160	Lt anterior cingulate	32	-4.94, 34.37, -4.71	5.619
CN>AD					
	35526	Rt putamen		26.86, -9.25, -6.95	65535
		Lt anterior cingulate	32	-0.77, 34.34, -4.64	65535
		Rt medial globus pallidus		17.17, -6.27, -8.19	65535
	446	Lt thalamus, medial dorsal nucleus		-2.5, -12.06, 8.5	6.6857
		Rt thalamus	*	1.75, -16.89, 0	5.532
		Lt thalamus	*	0.37, -5.84, 2.38	5.081
	229	Rt fusiform gyrus	37	42.05, -59.24, -15.49	6.605
	312	Rt middle frontal gyrus	6	26.08, -9.54, 53.81	6.387
	451	Lt inferior temporal gyrus	20	-51.02, -57.89, -11.53	6.317
		Lt fusiform gyrus	37	-50.89, -43.26, -16.9	5.517
		Lt cerebellum culmen	*	-42.46, -38.46, -23.06	5.431
	454	Rt middle frontal gyrus	10	35.04, 47.18, 21.5	6.228
		Rt superior frontal gyrus	10	23.92, 49.9, 22.92	5.991
	458	Lt cingulate gyrus	31	-5.74, -27.76, 39.39	6.116
	157	Rt middle frontal gyrus	11	25.6, 39.67, -2.34	6.056
	331	Lt cingulate gyrus	31	-1.55, -57.74, 28.51	6.016
		Lt posterior cingulate	23	-5.59, -58.2, 18.94	5.273
	277	Rt middle temporal gyrus	39	47.15, -62.67, 19.41	6.005
		Rt superior temporal gyrus	39	52.62, -60.56, 26.46	5.509
	109	Lt superior temporal gyrus	39	-55.57, -60.74, 17.85	5.774
	140	Rt superior frontal gyrus	10	20.04, 57.47, 3.3	5.586
MCI>AD					
	3071	Rt amygdala		26.88, -7.72, -8.16	7.119
		Rt parahippocampal gyrus	28	15.8, -7.53, -9.68	7.041
	3356	Lt amygdala		-17.5, -8.63, -11.7	7.061
	1146	Rt anterior cingulate	24	2, 32.93, -4.73	6.935
		Rt caudate, caudate head		7.49, 13.21, -5.15	5.099
	286	Rt inferior parietal lobule	40	37.14, -38.68, 48.54	6.369
	186	Rt inferior temporal gyrus	37	54.42, -54.76, -4.04	6.150
	147	Lt caudate, caudate head		-2.34, 4.22, 0.58	5.906
	104	Lt inferior temporal gyrus	20	-51.02, -57.89, -11.53	5.905
	238	Lt insula	13	-42.63, -13.6, -3.14	5.882
		Lt superior temporal gyrus	22	-45.29, -3.16, -8.95	5.621
	124	Lt middle temporal gyrus	21	-49.12, -0.65, -34.45	5.722
		Lt inferior temporal gyrus	20	-43.65, -6.79, -29.54	5.125

Rt, right; Lt, left; BA, Brodmann area

D) Comparison between female and male

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN: Female<Male					
	304	Lt middle temporal gyrus	38	-33.73, 2.85, -41.97	6.025
	225	Lt frontal precentral gyrus	6	-32.3, -11.16, 58.08	5.801
		Lt middle frontal gyrus	6	-26.76, -3.06, 61.64	5.504
	331	Rt middle temporal gyrus	38	45.35, 6.24, -36.25	5.762
		Rt superior temporal gyrus	38	32.9, 16.22, -36.87	5.302
	240	Lt limbic lobe, uncus	28	-17.34, -6.05, -23.62	5.635

CN, cognitively normal; MCI, mild cognitive impairment; AD, Alzheimer's disease; Rt, right; Lt, left; BA, Brodmann area

Subject's total intracranial volume (TIV), age, gender, and education-year were used as covariates. A significance level of $p = 0.01$ was applied with correction for multiple comparisons using the family-wise error (FWE) method and clusters with at least 50 contiguous voxels. In this list, we list the cluster areas, which have the cluster size of greater than 100.

Table S4 Results of the voxel-based comparison of white matter volume (WMV) among the three participant groups without separating the gender (4A), with only the female group (4B), with only the male group (4C), and comparison between the male and female groups (4D).

A) Without separating gender

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN>MCI					
	1236	Rt frontal lobe, sub-gyral		21.45, 43.88, -2.01	7.106
	1214	Lt frontal lobe, sub-gyral		-23.16, 31.76, 8.25	6.656
	206	Rt middle temporal gyrus		49.17, -11.38, -14.89	5.772
		Rt temporal lobe, sub-gyral		38, -21.36, -13.32	5.441
	316	Lt frontal lobe, sub-gyral		-26.23, 20.03, 27.35	5.561
		Lt cingulate gyrus		-17.93, 21.12, 30.3	5.139
CN>AD					
	142102	Lt frontal lobe, sub-gyral		-20.4, 33.01, 9.76	65535
	286	Rt cerebellar tonsil		11.78, -51.67, -34.2	5.361
MCI>AD					
	116760	Lt frontal lobe, sub-gyral		-20.41, 34.27, 11.23	65535
		Rt frontal lobe, corpus callosum		13.07, 31.22, -2	65535

Rt, right; Lt, left; BA , Brodmann area

B) Only the Female

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN>AD					
	105204	Lt frontal lobe, sub-gyral		-21.81, 32.88, 11.08	65535
		Lt parietal lobe, sub-gyral		-29.28, -47.82, 28.98	65535
	117	Rt extra-nuclear		14.21, 4.75, 9.02	5.523
MCI>AD					
	73532	Lt frontal lobe, sub-gyral		-20.39, 35.8, 10.03	65535
		Rt limbic anterior cingulate		14.47, 31.34, -3.32	65535
		Lt frontal lobe, corpus callosum		-14.7, 29.96, -2.59	65535

Rt, right; Lt, left; BA, Brodmann area

C) Only the Male

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN>MCI					
	130	Lt caudate head		-11.95, 18.77, -3.61	5.868
	180	Rt frontal lobe, sub-gyral		18.67, 42.5, -2.19	5.632
CN>AD					
	3777	Rt parahippocampal gyrus		25.56, -22.3, -17.67	6.580
		Rt temporal lobe, sub-gyral		39.45, -14.12, -15.31	6.251
	12074	Lt frontal lobe, sub-gyral		-20.38, 33.14, 8.42	65535
	14647	Rt frontal lobe, sub-gyral		21.24, 31.39, 10.31	7.795
		Rt caudate head		10.26, 18.65, -3.24	7.095
	3880	Lt temporal lobe, sub-gyral		-31.2, -3.06, -24.92	6.764
MCI>AD					
	495	Lt temporal lobe, sub-gyral		-42.69, -33.3, -3.65	5.806
	1093	Rt frontal lobe, sub-gyral		23.49, -17.74, 36.78	5.757
		Rt limbic cingulate gyrus		20.86, -2.97, 30.02	5.070
	579	Lt frontal lobe, sub-gyral		-26.45, -26.87, 31.01	5.707
	648	Rt frontal lobe, sub-gyral		19.85, 31.4, 10.29	5.548
		Rt limbic anterior cingulate gyrus		17.16, 37.53, 5.42	5.431
		Rt extra-nuclear		21.15, 23.88, 15.01	5.380
	161	Lt temporal lobe, sub-gyral		-32.59, -3.05, -24.94	5.531
		Lt limbic lobe, uncus		-32.62, 4.94, -20.13	5.010
	141	Rt limbic parahippocampal gyrus		25.52, -23.96, -15.13	5.275
	185	Rt extra-nuclear		19.93, -47.42, 23.08	5.346
		Rt parietal lobe, sub-gyral		27.72, -46.06, 23.35	5.166
	171	Lt frontal lobe, sub-gyral		-18.88, 42.17, 2.55	5.303

Rt, right; Lt, left; BA, Brodmann area

D) Comparison between female and male

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN: Female<Male					
	144	Rt middle frontal gyrus		24.81, -4.56, 46.15	5.223
		Rt frontal lobe, sub-gyral		27.51, 0.37, 53.42	5.186
MCI: Female<Male					
	9316	Lt brainstem, midbrain		-0.88, -33.61, -16.49	5.196

CN, cognitively normal; MCI, mild cognitive impairment; AD, Alzheimer's disease; Rt, right; Lt, left; BA, Brodmann area

Subject's total intracranial volume (TIV), age, gender, and education-year were used as covariates. A significance level of $p = 0.01$ was applied with correction for multiple comparisons using the family-wise error (FWE) method and clusters with at least 50 contiguous voxels. In this list, we list the cluster areas, which have the cluster size of greater than 100.

Table S5 Results of the voxel-based multiple regression analyses between gray matter volume (GMV) and age in each participant group without separating the gender (5A) and with only the female group (5B).

A) Without separating gender

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN: (-) Age					
	1761	Rt insula	13	37.69, -20.92, 11.04	7.031
		Rt superior temporal gyrus	41	50.08, -27.23, 17.41	6.728
		Rt inferior parietal lobule	40	51.29, -28.54, 30.82	5.260
	1020	Rt cerebellum, culmen		22.77, -29.27, -18.38	6.603
	577	Rt thalamus, pulvinar		11.3, -33.23, 8.08	6.603
		Rt parahippocampal gyrus	27	12.82, -32.32, -1.27	6.008
		Rt thalamus		7.07, -21.41, 17.23	5.007
	2534	Rt limbic anterior cingulate	25	1.85, 0.27, -2.42	6.518
		Lt parahippocampal gyrus	36	-23.12, -32.35, -14.04	6.451
		Lt cerebellum, culmen		-19.05, -42.68, -9.55	6.390
	523	Rt cerebellum, culmen		38.01, -45.99, -21.06	6.401
	1445	Rt limbic posterior cingulate	30	4.24, -60.13, 9.46	6.376
		Lt occipital cuneus	30	-6.86, -65.54, 7.41	6.211
	368	Lt cerebellum, declive		-46.71, -55.47, -22.04	6.171
		Lt cerebellum, culmen		-41.1, -46.85, -23.83	5.263
	284	Lt limbic cingulate gyrus	31	-5.76, -27.89, 40.72	5.987
	228	Lt thalamus		-1.16, -15.13, 10.93	5.766
	388	Rt inferior frontal gyrus	47	36.76, 34.54, -8.04	5.705
		Rt insula	13	39.39, 19.77, -1.29	5.358
	144	Lt limbic, anterior cingulate	32	-0.77, 35.74, -4.51	5.616
	447	Rt inferior temporal gyrus	20	58.77, -43.83, -15.1	5.612
		Rt middle temporal gyrus	37	54.47, -54.37, -8.06	5.535
	162	Lt inferior frontal gyrus	47	-25.74, 7.18, -14.4	5.508
MCI: (-) Age					
	49437	Lt parahippocampal gyrus	34	-20.22, 2.83, -13.36	6.5535
		Lt amygdala		-18.93, -10.28, -9.18	6.5535
		Lt putamen		-27.28, -11.76, -8.11	6.5535
	847	Rt middle frontal gyrus	46	41.98, 34.83, 17.75	7.424
		Rt inferior frontal gyrus	46	44.9, 35.86, 7.08	5.821
	425	Rt occipital	19	41.96, -68.15, -10.93	6.656
	1788	Rt middle occipital gyrus		26.47, -88.94, 0.35	6.497
		Rt middle temporal gyrus	39	48.62, -64.82, 12.47	6.043
	2269	Lt occipital lobe, precuneus	31	-29.3, -73.98, 22.45	6.345
		Lt middle occipital gyrus	19	-30.51, -80.92, 6.91	6.276
	378	Lt medial frontal gyrus	9	-10.85, 44.1, 25.84	6.112
		Lt medial frontal gyrus	10	-10.71, 49.2, 16.87	5.639
	140	Lt parietal postcentral gyrus	2	-36.32, -25.2, 43.16	6.104
	302	Lt middle frontal gyrus	46	-41.42, 28.88, 23.88	6.059
	347	Lt thalamus		-1.13, -9.41, 10.12	6.058
	958	Lt cerebellum, uvula		-21.74, -69.44, -24.29	6.027
		Lt cerebellum, declive		-24.63, -79.86, -18.57	5.930
	233	Rt superior temporal gyrus	22	49.01, 6.62, 3.03	6.021

	Rt frontal precentral gyrus	6	48.91, -3.68, 7.46	5.076
237	Rt middle frontal gyrus	10	31.17, 52.08, 0.28	5.663
	Rt superior frontal gyrus	10	26.88, 51.19, 9.58	5.429
160	Lt superior temporal gyrus	41	-45.72, -36.51, 14.91	5.563
202	Rt inferior frontal gyrus	47	25.57, 28.49, -3.4	5.443
	Rt middle frontal gyrus	47	32.56, 35.7, -5.3	5.247
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AD: (-) Age				
487	Lt cerebellum, uvula		-17.59, -73.65, -24.62	5.543
	Lt cerebellum, culmen		-31.4, -60.74, -26.33	5.320
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All Group: (-) Age				
190935	Rt limbic parahippocampal gyrus	27	11.35, -34.23, 3.93	65535
	Lt limbic anterior cingulate	25	-0.94, 1.55, -1	65535
	Lt limbic parahippocampal gyrus	27	-13.64, -35.5, 3.39	65535
166	Lt inferior parietal lobule	40	-33.64, -53.29, 41.9	5.311

B) Only the Female

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN: (-) Age					
	1089	Rt superior temporal gyrus	41	40.33, -34.29, 17.93	6.312
		Rt insula	13	36.3, -22.31, 10.89	5.745
	308	Rt thalamus	*	9.93, -34.49, 6.58	6.150
	251	Lt occipital lingual gyrus	18	-9.59, -61.07, 5.09	5.740
	151	Rt cerebellum, culmen	*	25.56, -27.76, -19.54	5.648
	100	Rt insula	13	37.97, 20.91, 1.5	5.410
MCI: (-) Age					
	8290	Rt parahippocampal gyrus	34	20.04, -11.09, -16.7	7.299
		Rt temporal lobe, sub-gyral	21	39.42, -3.33, -10.24	6.806
		Rt parahippocampal gyrus	27	12.79, -35.25, -0.2	6.757
	3942	Rt occipital lingual gyrus	18	1.52, -78.9, -0.47	7.057
		Lt occipital cuneus	30	-6.85, -62.74, 7.68	6.214
		Rt cingulate gyrus	31	2.65, -38.33, 31.77	6.124
	4534	Lt putamen		-27.3, -11.89, -6.77	6.974
		Lt frontal subcallosal gyrus	34	-21.6, 4.23, -13.25	6.764
	1179	Rt limbic anterior cingulate	25	0.43, 1.41, 0.36	6.874
		Lt limbic anterior cingulate	32	-0.77, 35.74, -4.51	6.365
		Lt medial frontal gyrus	10	-6.22, 42.01, -10.77	5.098
	1086	Lt insula	13	-34.34, 14.78, 9.15	6.534
	346	Rt middle frontal gyrus	46	40.62, 32.3, 14.78	6.251
	286	Rt cerebellum, declive	*	12.86, -75.86, -17.56	6.071
	319	Lt cerebellum, declive	*	-41.15, -54.1, -21.81	6.061
	181	Rt medial frontal gyrus	9	9.87, 29.49, 30.21	5.975
	465	Rt transverse temporal gyrus	41	43.18, -30.99, 12.88	5.725
		Rt insula	13	44.42, -34.84, 23.35	5.445
		Rt inferior parietal lobe	40	55.49, -31.09, 27.94	5.345
	150	Rt occipital fusiform gyrus	19	41.94, -68.28, -9.59	5.644
	160	Lt middle occipital gyrus	19	-30.67, -73.84, 21.09	5.568
	114	Rt insula	13	32.29, 18.63, 10.64	5.351

CN, cognitively normal; MCI, mild cognitive impairment; AD, Alzheimer's disease; Rt, right; Lt, left; BA, Brodmann area

Subject's total intracranial volume (TIV), gender, and education-year were used as covariates. (-) indicates the negative correlation. A significance level of $p = 0.01$ was applied with correction for multiple comparisons using the family-wise error (FWE) method and clusters with at least 50 contiguous voxels. In this list, we list the cluster areas, which have the cluster size of greater than 100. For only the male, there are no correlations between GMV and age for all three participant groups.

Table S6 Results of the voxel-based multiple regression analyses between white matter volume (WMV) and age in each participant group without separating the gender (6A) and with only the female group (6B).

A) Without separating gender

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN: (-) Age					
	148	Lt limbic cingulate gyrus		-9.83, -25.82, 34.1	5.521
	146	Rt inferior parietal lobule		37.41, -36.72, 28.46	4.968
MCI: (-) Age					
	64925	Lt temporal lobe, sub-gyral		-28.79, -30.45, -4.5	65535
		Rt frontal lobe, sub-gyral		26.68, 33.25, 20.04	65535
		Lt frontal lobe, sub-gyral		-16.07, 24.64, -5.82	7.774
	466	Lt parahippocampal gyrus		-27.18, -19.23, -18.27	6.277
AD: (-) Age					
	328	Rt extra-nuclear		25.33, -30.86, -2.27	6.225
	149	Lt medial frontal gyrus		-11.21, 18.12, 46.34	5.894
	3130	Rt limbic anterior cingulate		12.97, 41.48, 8.43	5.812
		Rt frontal lobe, sub-gyral		23.84, 31.47, 23.88	5.533
	2219	Lt frontal lobe, sub-gyral		-26.13, 30.33, 22.92	5.772
		Lt limbic anterior cingulate		-9.23, 36.14, 6.19	5.480
		Lt sub-lobar, extra-nuclear		-21.65, 27.2, -2.97	5.314
	342	Lt frontal lobe, sub-gyal		-27.8, -10.09, 32.58	5.339
	221	Rt brainstem, midbrain		12.98, -7.78, -7.05	5.322
	149	Rt frontal lobe, sub-gyral		24.84, -19.41, 39.34	5.105
All Group: (-) Age					
	146355	Rt limbic lobe, sub-gyral		23.96, -29.32, -3.5	65535
		Lt limbic parahippocampal gyrus		-27.4, -30.45, -4.48	65535
		Lt frontal lobe, sub-gyral		-24.66, 30.98, 16.25	65535

B) Only the Female

Group analysis	Cluster size	Cluster location	BA	Talairach coordinates	Z score
CN: (-) Age					
	127	Rt temporal lobe, sub-gyral		39.25, -34.73, -6.46	5.170
MCI: (-) Age					
	9559	Lt frontal lobe, sub-gyral		-16.07, 24.64, -5.82	7.396
		Lt limbic anterior cingulate		-17.63, 35.66, 11.41	6.221
		Lt limbic cingulate gyrus		-15.18, 19.58, 31.55	6.138
	11065	Rt frontal lobe, sub-gyral		24.16, 39.28, 1.65	7.384
		Rt limbic lobe, anterior cingulate		7.51, 31.24, -2.09	7.159
	496	Lt temporal lobe, sub-gyral		-28.79, -30.45, -4.5	6.849
	180	Rt limbic lobe, sub-gyral		23.96, -29.32, -3.5	6.629
	2564	Rt temporal lobe, sub-gyral		34.62, -61.47, 22.01	6.359
		Rt parietal lobe, sub-gyral		23.52, -54.55, 23.83	5.703
	263	Rt occipital fusiform gyrus		32.31, -51.2, -10.84	6.013
	1026	Lt limbic, cingulate gyrus		-13.99, -31.26, 32.16	5.988
		Lt parietal lobe, precuneus		-16.85, -51.07, 32.94	5.897
	279	Rt limbic parahippocampal gyrus		25.57, -19.51, -17.41	5.659
	184	Rt temporal lobe, sub-gyral		40.75, -21.64, -10.6	5.501
	355	Lt temporal lobe, sub-gyral		-26.43, -58.23, 19.93	5.427

CN, cognitively normal; MCI, mild cognitive impairment; AD, Alzheimer's disease; Rt, right; Lt, left; BA, Brodmann area

Subject's total intracranial volume (TIV), gender, and education-year were used as covariates. A significance level of $p = 0.01$ was applied with correction for multiple comparisons using the family-wise error (FWE) method and clusters with at least 50 contiguous voxels. In this list, we list the cluster areas, which have the cluster size of greater than 100. For only the male, there are no correlations between WMV and age for all three participant groups.