

Table S1 Comparison of regional GM volumetry between multiple sclerosis (MS) patients and healthy controls (HC)

Regional GM volumetry	HC	MS	T	P (Bonferroni-corrected)
Precentral	16.128±4.315	13.661±3.842	1.5399	1.0000
Frontal	102.563±12.226	89.211±10.118	3.3770	0.0365*
Rolandic	8.169±1.110	6.927±1.144	3.1769	0.0685
Supp_Motor	12.513±2.152	10.453±1.863	2.9862	0.1218
Olfactory	2.770±0.397	2.311±0.344	3.6996	0.0126*
Rectus	6.624±0.704	5.661±0.693	4.6053	0.0005***
OFC	13.562±1.538	12.326±1.293	1.8576	1.0000
Insula	16.086±1.570	13.940±1.779	3.9722	0.0049**
Cingulate	17.136±2.149	13.887±2.416	4.6432	0.0004***
Hippocampus	8.032±0.857	6.866±1.030	4.0618	0.0036**
ParaHippocampal	6.941±1.268	6.276±0.918	1.0951	1.0000
Amygdala	2.038±0.453	1.833±0.376	1.4841	1.0000
Calcarine	10.680±2.612	9.050±2.105	1.7171	1.0000
Cuneus	7.682±1.456	6.664±1.422	1.8428	1.0000
Lingual	12.512±2.421	11.369±1.757	0.9659	1.0000
Occipital	27.835±5.016	24.339±4.706	1.7920	1.0000
Fusiform	19.863±2.631	17.220±2.139	3.0624	0.0970
Postcentral	18.204±4.144	15.543±3.646	1.6709	1.0000
Parietal	21.203±4.709	18.654±3.960	1.5235	1.0000
SupraMarginal	9.567±1.709	7.981±1.806	2.5687	0.3945
Angular	9.525±1.541	8.364±1.531	1.9806	1.0000
Precuneus	19.967±3.182	17.284±2.801	2.3493	0.6973
Paracentral_Lobule	4.874±1.247	3.998±1.000	2.2413	0.9113
Caudate	4.797±1.154	3.110±1.463	4.2038	0.0021**
Putamen	7.215±2.448	5.841±1.699	2.0535	1.0000
Pallidum	0.840±0.229	0.790±0.264	0.6333	1.0000
Thalamus	6.779±2.180	4.231±1.978	4.1212	0.0029**
Heschl	1.605±0.282	1.306±0.270	3.2832	0.0492*
Temporal	88.490±11.810	74.900±10.553	3.6469	0.0151*
Cerebellum	67.128±13.097	62.026±10.191	1.0235	1.0000
Vermis	5.403±0.895	4.783±0.984	2.0430	1.0000
ACC	9.436±1.176	7.946±0.908	4.5909	0.0005***
NAC	1.409±0.249	0.988±0.322	5.1787	0.0000***

*, P<0.05; **, P<0.01; ***, P<0.001.

Table S2 Comparison of regional GM relaxometry between multiple sclerosis (MS) patients and healthy controls (HC)

Brain region	T1				T2				PD			
	HC	MS	T	P	HC	MS	T	P	HC	MS	T	P
Precentral	1411.655±162.223	1536.238±195.443	-3.0633	0.0967	117.091±14.936	143.195±44.066	-3.5297	0.0223	82.063±2.870	82.876±2.773	-1.5234	1.0000
Frontal	1424.104±65.595	1519.273±77.484	-5.3246	0.0000***	116.495±8.842	130.693±17.302	-4.6166	0.0005***	83.550±1.659	83.927±1.338	-1.4110	1.0000
Rolandic	1328.826±140.706	1507.805±124.322	-5.2122	0.0000***	108.439±11.839	132.999±22.074	-5.9566	0.0000***	79.770±3.185	82.257±1.763	-3.7579	0.0103*
Supp_Motor	1422.831±94.587	1503.147±131.365	-3.2571	0.0534	120.091±15.646	133.570±26.674	-2.8802	0.1659	81.894±2.963	82.072±3.243	-0.5165	1.0000
Olfactory	1268.269±87.037	1354.272±62.428	-4.4505	0.0009***	101.456±7.634	110.817±8.890	-4.6928	0.0003***	82.860±1.820	82.325±1.364	1.3012	1.0000
Rectus	1304.687±73.312	1420.138±101.597	-5.4460	0.0000***	98.353±4.806	106.691±8.070	-5.2937	0.0000***	83.713±2.018	84.036±1.677	-1.0601	1.0000
OFC	1386.150±133.326	1468.596±81.730	-3.2772	0.0501	102.453±5.343	108.808±6.153	-4.9923	0.0001***	83.444±3.163	84.659±2.113	-2.8641	0.1738
Insula	1322.590±102.269	1454.614±72.524	-6.2098	0.0000***	107.458±6.769	125.683±15.463	-7.0713	0.0000***	80.913±2.580	82.545±0.824	-3.5242	0.0227*
Cingulate	1314.415±94.945	1446.856±87.550	-5.6758	0.0000***	96.364±4.549	106.851±11.783	-5.0748	0.0001***	82.610±2.279	83.427±0.806	-1.7023	1.0000
Hippocampus	1257.193±103.403	1393.245±107.632	-5.1608	0.0001***	102.471±6.379	122.668±22.082	-5.4240	0.0000***	81.631±2.827	84.066±1.527	-3.7733	0.0098**
ParaHippocampal	1331.919±76.794	1403.944±82.553	-4.0526	0.0037**	103.567±7.294	113.233±13.66	-4.1980	0.0022**	83.194±1.869	84.006±1.136	-2.1684	1.0000
Amygdala	1175.373±76.369	1253.377±80.384	-4.5857	0.0005***	92.683±3.660	101.713±8.950	-6.1113	0.0000***	80.765±2.054	81.355±1.238	-1.5104	1.0000
Calcarine	1232.061±123.880	1399.298±130.842	-4.8494	0.0002***	97.145±10.048	113.047±19.467	-4.0230	0.0041**	77.668±2.943	79.868±2.311	-3.2429	0.0558
Cuneus	1283.989±125.185	1465.207±187.758	-4.2182	0.0020**	95.381±7.936	113.888±33.080	-2.9276	0.1446	79.364±2.109	81.267±1.873	-3.5962	0.0179*
Lingual	1165.043±77.825	1287.562±68.574	-6.1729	0.0000***	86.663±3.181	94.344±6.338	-5.9314	0.0000***	78.095±2.233	79.578±0.996	-3.0974	0.0873
Occipital	1235.124±86.244	1329.778±84.413	-4.2580	0.0017**	91.978±4.909	98.654±10.998	-3.3558	0.0391*	80.979±1.845	83.002±2.214	-4.5644	0.0006***
Fusiform	1241.730±74.165	1348.623±67.124	-6.1864	0.0000***	91.716±2.880	100.003±8.577	-5.6106	0.0000***	81.831±1.917	83.322±0.821	-4.1074	0.0030**
Postcentral	1526.828±170.774	1663.012±153.953	-3.3628	0.0382*	136.446±26.934	169.617±50.478	-3.7402	0.0110*	82.631±2.526	83.436±1.561	-1.5343	1.0000
Parietal	1437.522±142.766	1546.329±141.643	-3.1674	0.0705	118.741±18.553	141.829±33.350	-3.9696	0.0050**	82.553±1.779	82.749±1.351	-0.7719	1.0000
SupraMarginal	1387.245±184.821	1493.729±156.696	-2.5383	0.4277	111.936±17.482	131.434±32.760	-3.4158	0.0323*	80.168±2.635	81.586±2.746	-2.9374	0.1405
Angular	1317.795±115.456	1405.753±112.106	-2.9504	0.1353	98.568±7.453	106.783±15.377	-3.1453	0.0754	82.755±1.939	83.755±2.014	-2.3219	0.7468
Precuneus	1316.013±99.369	1444.809±116.541	-4.6535	0.0004***	101.271±9.051	116.841±25.194	-3.4861	0.0257*	81.013±1.802	82.173±0.918	-2.8377	0.1875
Paracentral_Lobule	1444.213±162.843	1590.526±296.095	-2.7857	0.2173	116.513±15.904	144.838±60.710	-2.9100	0.1522	82.226±2.878	82.539±4.312	-0.6023	1.0000
Caudate	1241.583±113.921	1294.622±165.944	-1.1942	1.0000	100.161±18.549	109.316±25.882	-1.3399	1.0000	81.807±1.877	81.320±2.030	0.9856	1.0000
Putamen	969.412±79.372	994.481±33.751	-1.7302	1.0000	72.023±2.982	71.782±2.896	-0.6683	1.0000	77.016±2.770	77.531±1.850	-0.9038	1.0000
Pallidum	965.500±66.709	953.775±72.075	0.2631	1.0000	69.088±4.413	67.170±5.316	0.8712	1.0000	76.498±2.359	75.466±3.370	1.1901	1.0000
Thalamus	1013.351±126.173	1182.432±294.583	-3.1868	0.0664	82.952±10.051	106.221±46.782	-2.9824	0.1231	75.726±2.454	76.771±3.738	-1.2156	1.0000
Heschl	1403.241±199.762	1599.822±229.666	-3.6106	0.0170*	114.456±30.031	146.295±51.174	-2.8972	0.1580	80.600±2.758	82.567±2.660	-2.9466	0.1368
Temporal	1362.011±71.507	1459.109±60.272	-5.4545	0.0000***	102.713±4.956	112.793±11.776	-4.7053	0.0003***	82.632±1.921	84.041±1.042	-4.3477	0.0013**
Cerebellum	1267.722±134.560	1395.009±70.884	-4.1435	0.0027**	93.058±7.710	100.943±5.941	-4.0252	0.0041**	81.041±6.895	84.851±1.605	-1.9907	1.0000
Vermis	1394.479±91.143	1494.077±133.648	-4.2572	0.0018**	111.248±10.196	121.496±17.142	-3.2957	0.0473*	83.853±1.465	85.029±1.389	-3.5463	0.0211*
ACC	1350.055±87.546	1454.549±82.395	-4.9471	0.0001***	104.669±6.168	115.303±12.923	-4.8192	0.0002***	82.814±1.915	83.515±0.882	-1.6264	1.0000
NAC	1130.935±74.210	1173.442±48.857	-2.7704	0.2268	87.800±6.254	89.645±6.781	-1.3672	1.0000	81.527±1.471	81.582±1.010	-0.1115	1.0000

*, P<0.05; **, P<0.01; ***, P<0.001.

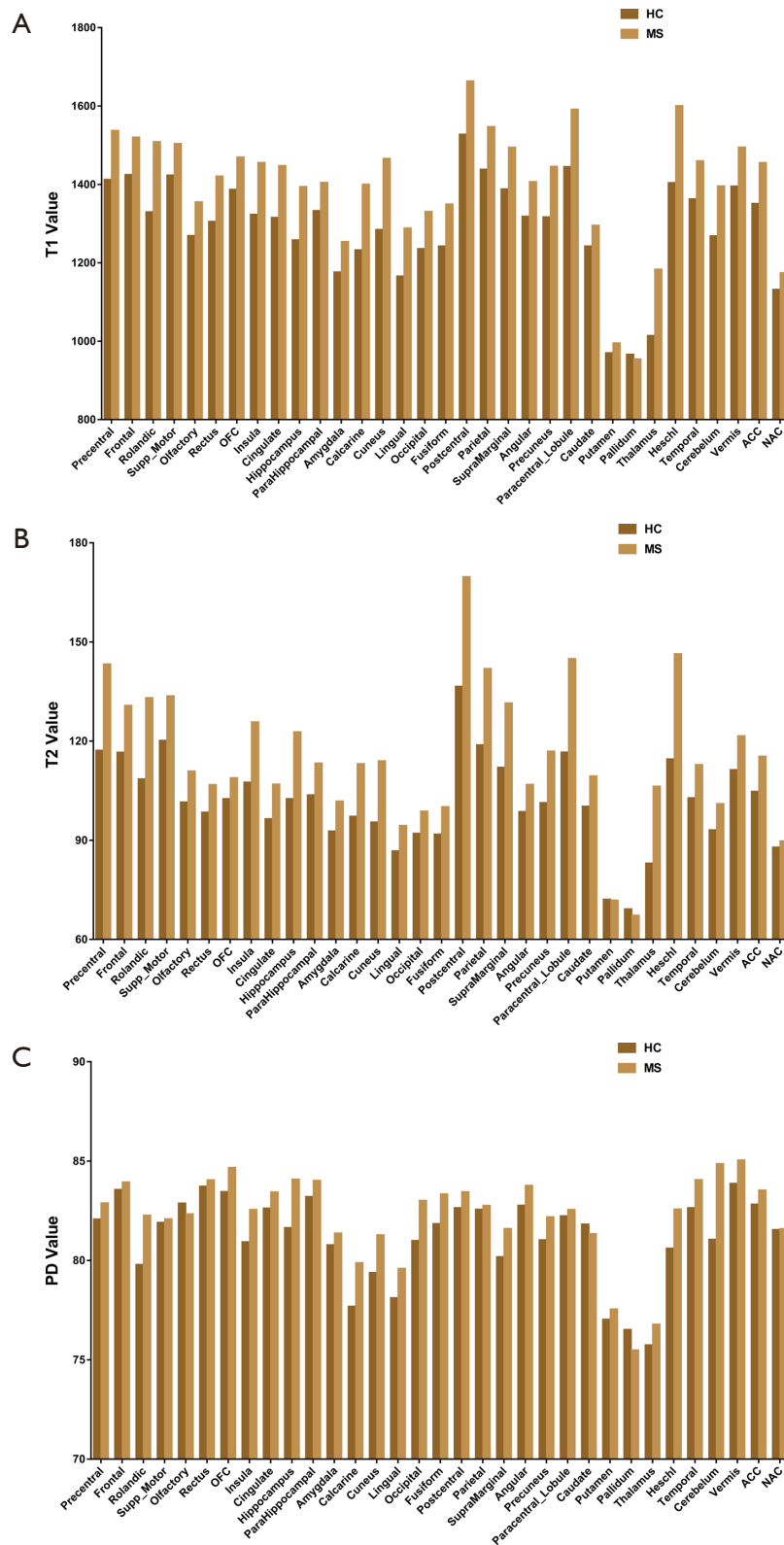


Figure S1 Regional GM relaxometry, the T1 (S1A), T2 (S1B) and PD values (S1C) of several regions showed significantly differences between MS patients and HCs ($P < 0.05$, corrected).