

Supplementary table e1 lists the segmented regions of interest (ROIs) of the brain according to the Johns Hopkins University white matter atlas.

1	SFG_L	Superior frontal gyrus (posterior segment) left
2	SFG_R	Superior frontal gyrus (posterior segment) right
3	SFG_PFC_L	Superior frontal gyrus (prefrontal cortex) left
4	SFG_PFC_R	Superior frontal gyrus (prefrontal cortex) right
5	SFG_pole_L	superior frontal gyrus (frontal pole) left
6	SFG_pole_R	superior frontal gyrus (frontal pole) right
7	MFG_L	Middle frontal gyrus (posterior segment) left
8	MFG_R	Middle frontal gyrus (posterior segment) right
9	MFG_DPFC_L	Middle frontal gyrus (dorsal prefrontal cortex) left
10	MFG_DPFC_R	Middle frontal gyrus (dorsal prefrontal cortex) right
11	IFG_opercularis_L	inferior frontal gyrus pars opercularis left
12	IFG_opercularis_R	inferior frontal gyrus pars opercularis right
13	IFG_orbitalis_L	inferior frontal gyrus pars orbitalis left
14	IFG_orbitalis_R	inferior frontal gyrus pars orbitalis right
15	IFG_triangularis_L	inferior frontal gyrus pars triangularis left
16	IFG_triangularis_R	inferior frontal gyrus pars triangularis right
17	LFOG_L	Lateral Fronto-orbital gyrus left
18	LFOG_R	Lateral fronto-orbital right
19	MFOG_L	Middle fronto—orbital gyrus left
20	MFOG_R	Middle fronto-orbital gyrus right
21	RG_L	Gyrus rectus left
22	RG_R	Gyrus rectus right
23	PoCG_L	Postcentral gyrus left
24	PoCG_R	Postcentral gyrus right
25	PrCG_L	Precentral gyrus left
26	PrCG_R	Precentral gyrus right

27	SPG_L	Superior parietal gyrus left
28	SPG_R	Superior parietal gyrus right
29	SMG_L	Supramarginal gyrus left
30	SMG_R	Supramarginal gyrus right
31	AG_L	Angular gyrus left
32	AG_R	Angular gyrus right
33	PrCu_L	Pre-cuneus left
34	PrCu_R	Pre-cuneus right
35	STG_L	Superior temporal gyrus left
36	STG_R	Superior temporal gyrus right
37	STG_L_pole	Pole of superior temporal gyrus left
38	STG_R_pole	Pole of superior temporal gyrus right
39	MTG_L	Middle temporal gyrus left
40	MTG_R	Middle temporal gyrus right
41	MTG_L_pole	Pole of middle temporal gyrus left
42	MTG_R_pole	Pole of middle temporal gyrus right
43	ITG_L	Inferior temporal gyrus left
44	ITG_R	Inferior temporal gyrus right
45	PHG_L	Parahippocampal gyrus left
46	PHG_R	Parahippocampal gyrus right
47	ENT_L	Entorhinal area left
48	ENT_R	Entorhinal area right
49	FuG_L	Fusiform gyrus left
50	FuG_R	Fusiform gyrus right
51	SOG_L	Superior occipital gyrus left
52	SOG_R	Superior occipital gyrus right
53	MOG_L	Middle occipital gyrus left
54	MOG_R	Middle occipital gyrus right
55	IOG_L	Inferior occipital gyrus left
56	IOG_R	Inferior occipital gyrus right

57	Cu_L	Cuneus left
58	Cu_R	Cuneus right
59	LG_L	Lingual gyrus left
60	LG_R	Lingual gyrus right
61	rostral_ACC_L	rostral anterior cingulate gyrus left
62	rostral_ACC_R	rostral anterior cingulate gyrus right
63	subcallosal_ACC_L	subcallosal anterior cingulate gyrus left
64	subcallosal_ACC_R	subcallosal anterior cingulate gyrus right
65	subgenual_ACC_L	subgenual anterior cingulate gyrus left
66	subgenual_ACC_R	subgenual anterior cingulate gyrus right
67	dorsal_ACC_L	dorsal anterior cingulate gyrus left
68	dorsal_ACC_R	dorsal anterior cingulate gyrus right
69	PCC_L	posterior cingulate gyrus left
70	PCC_R	posterior cingulate gyrus right
71	Ins_L	Insular left
72	Ins_R	Insular right
73	Amyg_L	Amygdala left
74	Amyg_R	Amygdala right
75	Hippo_L	Hippocampus left
76	Hippo_R	Hippocampus right
77	Caud_L	Caudate nucleus left
78	Caud_R	Caudate nucleus right
79	Put_L	Putamen left
80	Put_R	Putamen right
81	GP_L	Globus pallidus left
82	GP_R	Globus pallidus right
83	Thal_L	Thalamus left
84	Thal_R	Thalamus right
85	Hypothalamus_L	Hypothalamus left
86	Hypothalamus_R	Hypothalamus right

87	Mynert_L	Nucleus innominata of Mynert left
88	Mynert_R	Nucleus innominata of Mynert right
89	NucAccumbens_L	Nucleus accumbens left
90	NucAccumbens_R	Nucleus accumbens right
91	RedNc_L	Red Nucleus left
92	RedNc_R	Red Nucleus right
93	Snigra_L	Substantia Nigra left
94	Snigra_R	Substantia Nigra right
95	cerebellum_L	Cerebellum left
96	cerebellum_R	Cerebellum right
97	CP_L	Cerebral peduncle left
98	CP_R	Cerebral peduncle right
99	Midbrain_L	Midbrain left
100	Midbrain_R	Midbrain right
101	CST_L	Corticospinal tract left
102	CST_R	Corticospinal tract right
103	SCP_L	Superior cerebellar peduncle left
104	SCP_R	Superior cerebellar peduncle right
105	MCP_L	Middle cerebellar peduncle left
106	MCP_R	Middle cerebellar peduncle right
107	PCT_L	Pontine crossing tract (a part of MCP) left
108	PCT_R	Pontine crossing tract (a part of MCP) right
109	ICP_L	Inferior cerebellar peduncle left
110	ICP_R	Inferior cerebellar peduncle right
111	ML_L	Medial lemniscus left
112	ML_R	Medial lemniscus right
113	Pons_L	Pons left
114	Pons_R	Pons right
115	Medulla_L	Medulla left
116	Medulla_R	Medulla right

117	ACR_L	Anterior corona radiata left
118	ACR_R	Anterior corona radiata right
119	SCR_L	Superior corona radiata left
120	SCR_R	Superior corona radiata right
121	PCR_L	Posterior corona radiata left
122	PCR_R	Posterior corona radiata right
123	GCC_L	Genu of corpus callosum left
124	GCC_R	Genu of corpus callosum right
125	BCC_L	Body of corpus callosum left
126	BCC_R	Body of corpus callosum right
127	SCC_L	Splenium of corpus callosum left
128	SCC_R	Splenium of corpus callosum right
129	TAP_L	Tapatum left
130	TAP_R	Tapatum right
131	ALIC_L	Anterior limb of internal capsule left
132	ALIC_R	Anterior limb of internal capsule right
133	PLIC_L	Posterior limb of internal capsule left
134	PLIC_R	Posterior limb of internal capsule right
135	RLIC_L	Retrolenticular part of internal capsule left
136	RLIC_R	Retrolenticular part of internal capsule right
137	EC_L	External capsule left
138	EC_R	External capsule right
139	CGC_L	Cingulum (cingulate gyrus) left
140	CGC_R	Cingulum (cingulate gyrus) right
141	CGH_L	Cingulum (hippocampus) left
142	CGH_R	Cingulum (hippocampus) right
143	Fx/ST_L	Fornix (cres) / Stria terminalis left
144	Fx/ST_R	Fornix (cres) / Stria terminalis right
145	Fx_L	Fornix (column and body of fornix) left
146	Fx_R	Fornix (column and body of fornix) right

147	IFO_L	Inferior fronto-occipital fasciculus left
148	IFO_R	Inferior fronto-occipital fasciculus right
149	PTR_L	Posterior thalamic radiation (include optic radiation) left
150	PTR_R	Posterior thalamic radiation (include optic radiation) right
151	SS_L	Sagittal stratum (include inferior longitudinal fasciculus and inferior fronto-occipital fasciculus) left
152	SS_R	Sagittal stratum (include inferior longitudinal fasciculus and inferior fronto-occipital fasciculus) right
153	SFO_L	Superior fronto-occipital fasciculus (could be a part of anterior internal capsule) left
154	SFO_R	Superior fronto-occipital fasciculus (could be a part of anterior internal capsule) right
155	SLF_L	Superior longitudinal fasciculus left
156	SLF_R	Superior longitudinal fasciculus right
157	UNC_L	Uncinate fasciculus left
158	UNC_R	Uncinate fasciculus right
159	AnsaLenticularis_L	Ansa lenticularis left
160	AnsaLenticularis_R	Ansa lenticularis right
161	AnteriorCom_L	Anterior commissure left
162	AnteriorCom_R	Anterior commissure right
163	LenticularFasc_L	Lenticular fasciculus left
164	LenticularFasc_R	Lenticular fasciculus right
165	OlfactoryRadiation_L	olfactory radiation left
166	OlfactoryRadiation_R	olfactory radiation right
167	Mammillary_L	Mammillary body left
168	Mammillary_R	Mammillary body right
169	OpticTract_L	Optic tract left

170	OpticTract_R	Optic tract right
171	LV_frontal_L	lateral ventricle_frontal left
172	LV_body_L	lateral ventricle_body left
173	LV_atrium_L	lateral ventricle_atrium left
174	LV_occipital_L	lateral ventricle_occipital left
175	LV_temporal_L	lateral ventricle_temporal left
176	LV_frontal_R	lateral ventricle_frontal right
177	LV_body_R	lateral ventricle_body right
178	LV_atrium_R	lateral ventricle_atrium right
179	LV_occipital_R	lateral ventricle_occipital right
180	LV_temporal_R	lateral ventricle_temporal right
181	III_and_IV_ventricle	III and IV ventricle

The bolded regions include the 48 ROIs representing the deep white matter structures that were subsequently selected for the statistical analyses.

Table e2 shows the results of the unadjusted (univariable) analyses of the associations of rFA of the subcortical white matter regions of interest and ceramide subtypes in the study cohort.

Variable	R Cer 18:0	R Cer 20:0	R Cer 22:0	R Cer 24:0	R Cer 22:1	R Cer 24:1	P Cer 18:0	P Cer 20:0	P Cer 22:0	P Cer 24:0	P Cer 22:1	P Cer 24:1
ACR_L	-0.188	-0.139	-0.091	0.075	-0.058	-0.067	0.047	0.144	0.341	0.434	0.543	0.484
ACR_R	-0.171	-0.070	-0.026	0.156	-0.084	-0.07	0.071	0.466	0.784	0.101	0.377	0.466
SCR_L	-0.204	-0.143	-0.106	0.083	-0.049	-0.019	0.031	0.134	0.265	0.386	0.605	0.839
SCR_R	-0.190	-0.095	-0.071	0.135	-0.087	-0.122	0.045	0.318	0.455	0.154	0.364	0.199
PCR_L	-0.054	0.032	0.085	0.215	0.155	0.136	0.572	0.741	0.371	0.023	0.102	0.153
PCR_R	-0.146	0.026	0.028	0.177	0.064	-0.119	0.125	0.782	0.770	0.063	0.499	0.213
GCC_L	-0.386	-0.270	-0.146	0.011	-0.137	-0.089	2.59E-05*	0.004	0.125	0.908	0.149	0.353
GCC_R	-0.220	-0.139	-0.011	0.12	0.008	-0.033	0.02	0.144	0.906	0.208	0.93	0.730
BCC_L	-0.254	-0.250	-0.143	0.003	-0.099	-0.035	0.007	0.008	0.130	0.977	0.301	0.710
BCC_R	-0.311	-0.274	-0.186	-0.04	-0.093	-0.074	0.001	0.003	0.049	0.676	0.33	0.437
SCC_L	-0.196	-0.139	-0.013	0.048	-0.090	-0.033	0.038	0.144	0.885	0.619	0.345	0.733
SCC_R	-0.207	-0.130	-0.003	0.091	-0.044	-0.054	0.028	0.170	0.971	0.339	0.646	0.569
RAP_L	-0.206	-0.126	-0.122	-0.055	-0.137	-0.148	0.029	0.184	0.198	0.567	0.150	0.12
RAP_R	-0.197	-0.004	0.039	0.114	0.048	-0.086	0.037	0.967	0.683	0.230	0.613	0.367
ALIC_L	-0.050	-0.034	0.045	0.245	-0.038	-0.123	0.597	0.739	0.637	0.009	0.694	0.198
ALIC_R	0.039	0.020	0.103	0.339	-0.045	0.054	0.680	0.835	0.281	0.0003	0.639	0.571
PLIC_L	0.019	0.146	0.129	0.337	0.096	0.17	0.838	0.124	0.176	0.0003	0.311	0.073
PLIC_R	-0.085	0.002	-0.021	0.259	-0.043	-0.033	0.375	0.98	0.825	0.006	0.655	0.728
RLIC_L	-0.081	-0.025	-0.027	0.098	0.09	0.132	0.395	0.792	0.774	0.303	0.346	0.165
RLIC_R	-0.110	-0.069	-0.04	0.126	-0.085	-0.226	0.247	0.473	0.678	0.185	0.376	0.016
EC_L	-0.264	-0.128	-0.112	0.106	-0.108	-0.218	0.005	0.180	0.241	0.267	0.258	0.021
EC_R	-0.150	-0.082	-0.02	0.114	0.013	0.026	0.115	0.391	0.836	0.232	0.887	0.79
CGC_L	-0.138	-0.141	-0.121	0.057	-0.081	-0.147	0.146	0.139	0.205	0.55	0.394	0.122
CGC_R	-0.088	-0.095	-0.097	0.039	-0.185	-0.158	0.358	0.318	0.307	0.687	0.051	0.1
CGH_L	-0.094	-0.070	-0.005	0.14	0.042	0.041	0.326	0.460	0.955	0.142	0.657	0.667
CGH_R	-0.120	-0.094	-0.131	0.083	-0.157	-0.082	0.209	0.324	0.17	0.382	0.099	0.391
Fx/ST_L	-0.265	-0.147	-0.131	0.1	-0.045	0.031	0.005	0.121	0.17	0.312	0.638	0.747
Fx/ST_R	-0.229	-0.119	-0.081	0.122	-0.141	-0.221	0.015	0.211	0.4	0.198	0.136	0.019
Fx_L	-0.092	-0.187	-0.181	-0.108	-0.113	-0.197	0.333	0.048	0.056	0.258	0.235	0.038
Fx_R	-0.400	-0.413	-0.327	-0.167	-0.216	-0.175	1.27E-05*	6.09E-	0.0004	0.079	0.022	0.065

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IFO_L	-0.058	-0.209	-0.270	-0.19	-0.179	-0.220	0.545	0.027	0.004	0.045	0.058	0.02
IFO_R	-0.007	-0.135	-0.176	-0.074	-0.092	-0.098	0.939	0.155	0.064	0.439	0.332	0.30
PTR_L	-0.156	-0.013	0.058	0.19	-0.029	-0.01	0.101	0.892	0.541	0.045	0.759	0.3
PTR_R	-0.142	-0.095	-0.099	0.068	-0.088	-0.21	0.136	0.319	0.301	0.475	0.357	0.027
SS_L	-0.173	-0.095	-0.028	0.101	-0.048	-0.062	0.068	0.317	0.77	0.289	0.617	0.514
SS_R	-0.145	-0.076	-0.1	0.088	-0.119	-0.184	0.127	0.426	0.3	0.358	0.212	0.052
SFO_L	-0.148	-0.134	-0.148	-0.035	-0.141	-0.114	0.118	0.157	0.12	0.714	0.138	0.233
SFO_R	-0.021	0.107	0.162	0.235	-0.007	-0.068	0.825	0.261	0.087	0.012	0.945	0.475
SLF_L	-0.245	-0.145	-0.094	0.089	-0.022	-0.056	0.01	0.126	0.323	0.348	0.821	0.561
SLF_R	-0.176	-0.085	-0.061	0.068	-0.042	-0.186	0.063	0.376	0.526	0.465	0.656	0.05
UNC_L	-0.126	-0.113	-0.102	0.043	-0.03	-0.052	0.185	0.234	0.286	0.651	0.755	0.59
UNC_R	-0.138	-0.110	-0.026	0.103	-0.035	-0.057	0.147	0.248	0.784	0.279	0.711	0.55
AnsaLentricularis_L	-0.114	-0.134	-0.153	0.038	-0.236	-0.207	0.229	0.160	0.108	0.688	0.012	0.029
AnsaLentricularis_R	-0.182	-0.259	-0.255	-0.104	-0.226	-0.254	0.055	0.006	0.007	0.273	0.016	0.007
AnteriorCom_L	-0.147	-0.184	-0.145	0.034	-0.185	-0.192	0.121	0.053	0.128	0.724	0.051	0.043
AnteriorCom_R	-0.198	-0.217	-0.164	0.014	-0.143	-0.176	0.037	0.021	0.083	0.882	0.133	0.063
LenticularFasc_L	0.148	0.134	0.043	0.061	0.115	0.061	0.12	0.159	0.654	0.521	0.223	0.526
LenticularFasc_R	-0.049	0.001	0.058	0.139	-0.018	0.060	0.607	0.993	0.543	0.144	0.847	0.527

*Statistically significant association meeting the Bonferroni threshold for multiple hypotheses testing; R: correlation of spearman test, Cer: ceramide; P: P value; abbreviation of the white matter regions of interest are available in table e1.

Supplementary Table e3 shows the results of the unadjusted (univariable) sensitivity analyses of the associations of rFA of the subcortical white matter regions of interest and ceramide subtypes.

Variable	R Cer 18:0	R Cer 20:0	R Cer 22:0	R Cer 24:0	R Cer 22:1	R Cer 24:1	P Cer 18:0	P Cer 20:0	P Cer 22:0	P Cer 24:0	P Cer 22:1	P Cer 24:1
ACR_L	-0.211	-0.171	-0.101	0.051	-0.053	-0.039	0.029	0.079	0.3	0.599	0.585	0.692
ACR_R	-0.191	-0.097	-0.036	0.139	-0.082	-0.044	0.049	0.32	0.714	0.152	0.399	0.652
SCR_L	-0.214	-0.16	-0.139	0.045	-0.059	-0.022	0.027	0.099	0.153	0.645	0.546	0.819
SCR_R	-0.192	-0.108	-0.11	0.093	-0.113	-0.125	0.047	0.267	0.261	0.34	0.246	0.198
PCR_L	-0.068	0.013	0.07	0.179	0.16	0.149	0.49	0.897	0.474	0.065	0.099	0.126
PCR_R	-0.136	0.031	0.0002	0.136	0.045	-0.12	0.163	0.752	0.998	0.163	0.643	0.217
GCC_L	-0.388	-0.276	-0.169	-0.004	-0.162	-0.07	3.6E-05*	0.004	0.082	0.969	0.096	0.473
GCC_R	-0.211	-0.131	-0.022	0.108	-0.001	-0.007	0.029	0.178	0.82	0.267	0.988	0.943
BCC_L	-0.282	-0.284	-0.18	-0.017	-0.13	-0.026	0.003	0.003	0.063	0.86	0.183	0.792
BCC_R	-0.337	-0.305	-0.222	-0.06	-0.12	-0.063	0.0004	0.001	0.021	0.542	0.218	0.519
SCC_L	-0.225	-0.178	-0.035	0.033	-0.104	-0.029	0.02	0.067	0.717	0.739	0.286	0.766
SCC_R	-0.233	-0.164	-0.03	0.077	-0.07	-0.052	0.016	0.091	0.756	0.43	0.475	0.593
RAP_L	-0.21	-0.123	-0.131	-0.057	-0.151	-0.163	0.03	0.205	0.177	0.563	0.12	0.093
RAP_R	-0.197	-0.011	0.015	0.084	0.025	-0.078	0.041	0.911	0.88	0.389	0.802	0.427
ALIC_L	-0.05	-0.046	-0.014	0.218	-0.106	-0.149	0.606	0.641	0.883	0.024	0.278	0.126
ALIC_R	0.029	0.005	0.088	0.334	-0.061	0.047	0.764	0.961	0.368	0.0004	0.532	0.631
PLIC_L	0.003	0.134	0.134	0.324	0.107	0.194	0.972	0.168	0.17	0.001	0.271	0.045
PLIC_R	-0.074	0.003	-0.01	0.255	-0.031	0.01	0.447	0.975	0.917	0.008	0.749	0.915
RLIC_L	-0.106	-0.057	-0.042	0.076	0.098	0.137	0.275	0.563	0.665	0.434	0.317	0.16
RLIC_R	-0.106	-0.078	-0.056	0.111	-0.1	-0.227	0.277	0.425	0.568	0.256	0.305	0.019
EC_L	-0.25	-0.118	-0.124	0.109	-0.127	-0.198	0.01	0.225	0.203	0.263	0.191	0.041
EC_R	-0.162	-0.105	-0.073	0.09	-0.03	0.025	0.096	0.28	0.458	0.355	0.755	0.798
CGC_L	-0.157	-0.17	-0.167	0.027	-0.117	-0.159	0.107	0.079	0.085	0.785	0.229	0.101
CGC_R	-0.106	-0.125	-0.156	0.006	-0.233	-0.184	0.279	0.2	0.109	0.947	0.016	0.057
CGH_L	-0.102	-0.096	-0.04	0.105	0.035	0.044	0.296	0.323	0.682	0.282	0.719	0.653
CGH_R	-0.138	-0.109	-0.158	0.071	-0.179	-0.123	0.156	0.262	0.104	0.465	0.065	0.208
Fx/ST_L	-0.294	-0.183	-0.158	0.064	-0.043	0.041	0.002	0.059	0.103	0.513	0.661	0.676
Fx/ST_R	-0.234	-0.14	-0.132	0.095	-0.196	-0.237	0.015	0.15	0.174	0.329	0.043	0.014
Fx_L	-0.101	-0.209	-0.186	-0.109	-0.116	-0.175	0.302	0.031	0.055	0.264	0.236	0.072
Fx_R	-0.421	-0.444	-0.354	-0.183	-0.234	-0.155	6.4E-06*	1.6E-06*	0.00018	0.059	0.015	0.111

IFO_L	-0.044	-0.209	-0.298	-0.201	-0.21	-0.211	0.656	0.031	0.002	0.038	0.03	0.029
IFO_R	-0.008	-0.145	-0.19	-0.073	-0.113	-0.088	0.936	0.136	0.05	0.453	0.248	0.369
PTR_L	-0.167	-0.03	0.016	0.145	-0.068	-0.121	0.085	0.761	0.871	0.135	0.485	0.215
PTR_R	-0.138	-0.099	-0.119	0.039	-0.114	-0.215	0.156	0.312	0.223	0.687	0.243	0.026
SS_L	-0.196	-0.125	-0.062	0.073	-0.073	-0.078	0.043	0.201	0.524	0.452	0.452	0.422
SS_R	-0.162	-0.099	-0.144	0.063	-0.161	-0.21	0.096	0.31	0.14	0.521	0.099	0.03
SFO_L	-0.158	-0.144	-0.148	-0.023	-0.131	-0.133	0.105	0.138	0.127	0.813	0.179	0.173
SFO_R	-0.034	0.084	0.136	0.204	-0.019	-0.072	0.725	0.392	0.164	0.035	0.846	0.463
SLF_L	-0.264	-0.17	-0.118	0.068	-0.035	-0.062	0.006	0.08	0.228	0.484	0.72	0.523
SLF_R	-0.175	-0.097	-0.101	0.038	-0.08	-0.193	0.071	0.321	0.302	0.699	0.415	0.046
UNC_L	-0.135	-0.119	-0.118	0.058	-0.054	-0.068	0.165	0.221	0.225	0.553	0.583	0.489
UNC_R	-0.15	-0.133	-0.025	0.11	-0.035	-0.024	0.122	0.17	0.796	0.258	0.721	0.805
AnsaLentricularis_L	-0.13	-0.162	-0.196	-0.006	-0.264	-0.212	0.181	0.095	0.043	0.95	0.006	0.029
AnsaLenticularis_R	-0.196	-0.293	-0.309	-0.154	-0.262	-0.267	0.043	0.002	0.001	0.113	0.006	0.005
AnteriorCom_L	-0.159	-0.205	-0.162	0.008	-0.18	-0.195	0.103	0.034	0.095	0.931	0.063	0.044
AnteriorCom_R	-0.208	-0.239	-0.193	-0.022	-0.149	-0.179	0.032	0.013	0.046	0.822	0.126	0.065
LenticularFasc_L	0.143	0.128	0.003	0.05	0.085	0.01	0.142	0.19	0.973	0.608	0.386	0.919
LentricularFasc_R	-0.054	-0.003	0.022	0.12	-0.049	0.022	0.581	0.973	0.822	0.218	0.615	0.825

*Statistically significant association meeting the Bonferroni threshold for multiple hypotheses testing; R: correlation of spearman test, Cer: ceramide; P: P value; abbreviation of the white matter regions of interest are available in table e1.

Supplementary table e4 shows the results of spearman correlation of the regional fractional anisotropy (rFA) of the subcortical white matter regions of interest and grooved peg board test in the whole cohort and in the sensitivity analysis.

Subcortical white matter region	Whole study cohort		Sensitivity analysis	
	(R) GPBT	(P) GPBT	(R) GPBT	(P) GPBT
ACR_L	-0.31	0.00088*	-0.303	0.002
ACR_R	-0.285	0.002	-0.276	0.004
SCR_L	-0.136	0.152	-0.169	0.082
SCR_R	-0.147	0.123	-0.171	0.078
PCR_L	0.035	0.714	0.008	0.938
PCR_R	-0.15	0.115	-0.178	0.066
GCC_L	-0.314	0.00075*	-0.296	0.002
GCC_R	-0.158	0.09	-0.14	0.151
BCC_L	-0.236	0.0123	-0.222	0.022
BCC_R	-0.289	0.002	-0.268	0.005
SCC_L	-0.258	0.006	-0.253	0.009
SCC_R	-0.153	0.108	-0.143	0.142
TAP_L	-0.050	0.598	-0.065	0.504
TAP_R	-0.253	0.007	-0.27	0.005
ALIC_L	-0.056	0.556	-0.081	0.408
ALIC_R	0.07	0.465	0.056	0.569
PLIC_L	0.042	0.66	0.019	0.849
PLIC_R	-0.128	0.178	-0.111	0.257
RLIC_L	-0.018	0.848	-0.024	0.803
RLIC_R	-0.086	0.366	-0.087	0.375
EC_L	-0.344	0.0002*	-0.318	0.00085*
EC_R	-0.204	0.031	-0.207	0.033
CGC_L	-0.170	0.073	-0.174	0.074
CGC_R	-0.179	0.059	-0.183	0.059
CGH_L	0.0013	0.989	0.004	0.969
CGH_R	-0.136	0.153	-0.183	0.059
Fx/ST_L	-0.213	0.024	-0.227	0.018

Fx/ST_R	-0.169	0.076	-0.172	0.076
Fx_L	-0.335	0.000306*	-0.298	0.002
Fx_R	-0.446	8.2E-07*	-0.419	7.17E-06*
IFO_L	-0.087	0.36	-0.046	0.635
IFO_R	-0.103	0.281	-0.08	0.412
PTR_L	-0.034	0.718	-0.081	0.405
PTR_R	-0.136	0.153	-0.162	0.095
SS_L	-0.101	0.289	-0.121	0.213
SS_R	-0.102	0.285	-0.123	0.208
SFO_L	-0.232	0.014	-0.236	0.015
SFO_R	-0.080	0.40	-0.096	0.326
SLF_L	-0.186	0.049	-0.202	0.037
SLF_R	-0.222	0.019	-0.231	0.017
UNC_L	-0.091	0.34	-0.081	0.408
UNC_R	-0.113	0.237	-0.07	0.471
AnsaLenticularis_L	0.002	0.986	-0.006	0.951
AnsaLenticularis_R	-0.069	0.471	-0.087	0.374
AnteriorCom_L	0.048	0.618	0.038	0.7
AnteriorCom_R	0.014	0.886	-0.004	0.971
LenticularFasc_L	-0.107	0.259	-0.172	0.076
LenticularFasc_R	-0.084	0.381	-0.14	0.15

*Statistically significant association meeting the Bonferroni threshold, R: spearman correlation, P: p value; abbreviation of the white matter regions of interest are available in table e1.

Supplementary table e5 shows spearman correlation between ceramide subtypes and the grooved pegboard test in the whole study cohort and in the sensitivity analysis.

Variable	Whole study cohort		Sensitivity analysis	
	(R) GPBT	(P) GPBT	(R) GPBT	(P) GPBT
Ceramide 18:0	0.283	0.0025*	0.271	0.0048*
Ceramide 20:0	0.176	0.063	0.164	0.091
Ceramide 22:0	0.23	0.015	0.216	0.025
Ceramide 24:0	0.12	0.209	0.104	0.285
Ceramide 22:1	0.247	0.009	0.243	0.012
Ceramide 24:1	0.216	0.022	0.183	0.059

*met the Bonferroni threshold for significance; GPBT: grooved peg board test; P: p value; R: spearman correlation.