

**Table S1: Regions with significantly reduced grey matter MT saturation in MS patients compared to healthy controls.**

Cluster-level		Voxel-level		MNI coordinates of local maxima			Side	Anatomical regions
Number of voxels	p-FWER corr.	F-value (1, 66)	p-FWER corr.					
<b>1987</b>	<0.0001	84.42	<0.0001	45	-18	6	R	Heschl's gyrus
		53.33	<0.0001	37	-21	0	R	Insula
<b>463</b>	<0.0001	40.10	0.009	25	-31	-4	R	Hippocampus
<b>166</b>	0.014	41.48	0.006	69	-23	3	R	Superior temporal gyrus
<b>107</b>	0.071	38.03	0.016	47	-14	-6	R	Superior temporal gyrus
<b>297</b>	0.001	30.47	0.139	38	8	-17	R	Superior temporal gyrus
<b>130</b>	0.037	30.40	0.142	28	52	7	R	Superior frontal gyrus
<b>127</b>	0.040	29.15	0.201	29	-59	51	R	Angular gyrus
<b>157</b>	0.017	36.99	0.022	38	-15	39	R	Precentral gyrus
<b>220</b>	0.004	39.38	0.011	-37	-28	10	L	Heschl's gyrus
<b>220</b>	0.004	36.36	0.026	-34	-23	1	L	Heschl's gyrus
<b>857</b>	<0.0001	40.09	0.009	-31	-27	-7	L	Hippocampus
<b>135</b>	0.032	37.70	0.018	0	-26	36	L	Cingulum
<b>189</b>	0.008	36.14	0.028	-43	-14	42	L	Postcentral gyrus
<b>120</b>	0.049	28.86	0.217	-34	-6	46	L	Precentral gyrus
<b>844</b>	<0.0001	33.38	0.061	0	-1	-9	L	Caudate

**Tables S2: Regions with significantly reduced grey matter R1 in MS patients compared to healthy controls.**

Cluster-level		Voxel-level		MNI coordinates of local maxima			Side	Anatomical regions
Number of voxels	p-FWER corr.	F-value (1, 66)	p-FWER corr.					
<b>319</b>	0.001	55.88	<0.0001	-46	3	-25	L	Middle temporal gyrus
<b>143</b>	0.030	45.57	0.004	-44	-52	19	L	Middle temporal gyrus
<b>727</b>	<0.0001	39.09	0.011	-33	-19	17	L	Insula
		35.14	0.035	-40	-27	9	L	Heschl's gyrus
<b>295</b>	0.001	37.56	0.018	-46	-60	-15	L	Inferior temporal gyrus
<b>153</b>	0.023	34.57	0.041	-52	-8	-5	L	Superior temporal gyrus
<b>130</b>	0.042	32.26	0.080	-34	-23	1	L	Insula
<b>1330</b>	<0.0001	48.75	0.001	-30	-31	-4	L	Hippocampus
<b>266</b>	0.002	26.60	0.375	-22	-54	-3	L	Lingual gyrus
<b>351</b>	<0.0001	43.91	0.003	47	-44	10	R	Middle temporal gyrus
<b>721</b>	<0.0001	35.18	0.035	27	-24	-9	R	Hippocampus
<b>132</b>	0.040	29.98	0.153	38	-30	45	R	Postcentral gyrus
<b>116</b>	0.062	35.29	0.034	38	-14	39	R	Precentral gyrus
<b>142</b>	0.030	27.45	0.303	0	-23	27	R	Cingulum

**Tables S3: Regions with significantly reduced grey matter R2\* in MS patients compared to healthy controls.**

Cluster-level		Voxel-level		MNI coordinates of local maxima			Side	Anatomical regions
Number of voxels	p-FWER corr.	F-value (1, 66)	p-FWER corr.					
<b>331</b>	<0.0001	33.76	0.055	-55	-24	-32	L	Inferior temporal gyrus
<b>181</b>	0.009	31.95	0.092	-49	6	-28	L	Middle temporal gyrus
<b>136</b>	0.031	30.04	0.157	-42	-15	40	L	Postcentral gyrus

**Tables S4: Regions with significantly reduced grey matter volume (VBM) in MS patients compared to healthy controls.**

Cluster-level		Voxel-level		MNI coordinates of local maxima			Side	Anatomical regions
Number of voxels	p-FWER corr.	F-value (1, 66)	p-FWER corr.					
<b>1486</b>	<0.0001	129.82	<0.0001	38	-21	63	R	Precentral gyrus
<b>1509</b>	<0.0001	109.51	<0.0001	5	-12	-12	R	Thalamus
		78.59	<0.0001	18	-26	-9	R	Hippocampus
		64.73	<0.0001	5	-33	-9	L	Superior and inferior colliculi
<b>460</b>	<0.0001	71.79	<0.0001	41	-23	9	R	Heschl's gyrus
<b>421</b>	<0.0001	43.59	<0.0001	8	-81	-3	R	Lingual gyrus
<b>72</b>	0.027	41.27	0.03	15	-51	-2	R	Lingual gyrus
<b>333</b>	<0.0001	43.59	0.002	6	-84	17	R	Cuneus
<b>263</b>	<0.0001	36.17	0.013	33	9	-3	R	Putamen
<b>263</b>	<0.0001	36.17	0.013	33	9	-3	R	Putamen
<b>1467</b>	<0.0001	148.63	<0.0001	-27	-27	57	L	Precentral gyrus
<b>555</b>	<0.0001	57.83	<0.0001	-42	-21	5	L	Superior temporal gyrus
		48.23	<0.0001	-38	-24	11	L	Heschl's gyrus
<b>294</b>	<0.0001	42.81	0.002	-14	-95	-6	L	Lingual gyrus
<b>118</b>	0.004	27.90	0.146	-6	-89	2	L	Cuneus
<b>535</b>	<0.0001	39.93	0.005	-30	8	-9	L	Putamen
<b>65</b>	<0.0001	39.93	0.005	-30	8	-6	L	Putamen
<b>62</b>	0.043	27.87	0.148	-30	-59	50	L	Inferior parietal gyrus

**Tables S5: Clusters where regional MT, R1 and R2\* decrease with lesion fraction.**

qMRI	Anatomical regions	Side	MNI coordinates of local maxima			Number of voxels	Local maximum F-value (1,66)	p-FWER corr.
MT	Medial superior frontal cortex	L	2	51	20	<b>172</b>	6.75	0.006
MT	Thalamus	R	14	-15	18	<b>1316</b>	6.08	<0.0001
	Caudate	R	13	9	20		5.85	
MT	Thalamus	R	2	-13	6	<b>416</b>	5.45	<0.0001
	Thalamus	L	1	-4	-7		5.00	
MT	Caudate	L	-7	7	8	<b>138</b>	5.35	0.018
MT	Thalamus	L	-10	-13	17	<b>116</b>	5.00	0.036
R1	Thalamus	L	-6	-29	4	<b>3643</b>	8.05	<0.0001
	Caudate	R	19	-6	24		7.40	
	Thalamus	R	2	-19	5		7.14	
R2	Thalamus	R	13	-14	18	<b>196</b>	6.12	0.006
R2	Anterior cingulum	L	-2	26	24	<b>160</b>	6.04	0.015

**Table S6: Clusters where cognitive score decreases with regional reduction of R1.**

qMRI	Anatomical regions	Side	MNI coordinates of local maxima			Number of voxels	Local maximum F-value (1,66)	p-FWER corr.
R1	Middle frontal gyrus, orbital part	R	39	56	-3	<b>126</b>	7.54	0.039