

## Supplemental data

**Supplementary Table 1.** Regions of the WM groups used for calculation of regional LV

| <i>White matter group</i> | <i>Regions</i>                                                                                                                                                                                                                                                           |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Projection WM             | Cerebral peduncle, internal capsule (anterior and posterior limbs, retrolenticular part), posterior thalamic radiation, corona radiata (anterior, superior and posterior), sagittal stratum                                                                              |
| Association WM            | Superior longitudinal fascicle, superior fronto-occipital fascicle, inferior fronto-occipital fascicle, external capsule, uncinate fascicle, cingulum, fornix, stria terminalis                                                                                          |
| Commissural WM            | Corpus callosum (genu, body, splenium), tapetum                                                                                                                                                                                                                          |
| Subcortical WM            | Superior parietal, frontal (superior, middle, inferior), precentral, postcentral, angular, pre-cuneus, cuneus, lingual, fusiform, occipital (superior, inferior, middle), temporal (superior, inferior, middle), supramarginal, fronto-orbital (lateral, middle), rectus |
| Brainstem/Cerebellar WM   | Corticospinal tract, cerebellar peduncle (superior, inferior, middle), medial lemniscus, pontine crossing tract, cerebellar white matter                                                                                                                                 |

See text for abbreviations

**Supplementary Table 2.** Patterns of GM atrophy ( $p < 0.05$ , FDR-corrected) in MS patients with mild disability compared to NC in the Reliability dataset

| <i>GM atrophy pattern</i> | <i>Brain region<br/>(local maxima)</i> | <i>Side</i> | <i>MNI (x, y, z)</i> | <i>Z-value</i> | <i>P-value of pattern</i> |
|---------------------------|----------------------------------------|-------------|----------------------|----------------|---------------------------|
| 1                         | Caudate                                | R           | 13, 21, 4            | 7.8            | 0.004*                    |
|                           |                                        | L           | -12, 18, 7           | 8.1            |                           |
|                           | Thalamus                               | L           | -9, -23, 15          | 8.1            |                           |
|                           |                                        | R           | 10, -21, 15          | 8.6            |                           |
| 2                         | CG                                     | R           | 3, 6, 41             | 4.4            | 0.787                     |
|                           |                                        | L           | -3, 2, 44            | 4.7            |                           |
|                           | SFG                                    | R           | 4, 20, 50            | 4.1            |                           |
|                           |                                        | L           | -3, 19, 52           | 4.4            |                           |
|                           | SMC                                    | R           | 3, -9, 53            | 4.6            |                           |
|                           |                                        | L           | -1, -9, 60           | 4.4            |                           |
| 4                         | OFG                                    | L           | -18, -84, -20        | 5.8            | 0.787                     |
|                           |                                        | R           | 24, -72, -17         | 5.0            |                           |
|                           | LG                                     | L           | -7, -71, -12         | 5.9            |                           |
|                           |                                        | R           | 7, -61, -6           | 5.6            |                           |
|                           | CC                                     | L           | -2, -84, 10          | 4.6            |                           |
|                           |                                        | R           | 2, -84, 11           | 5.4            |                           |
|                           | PosC                                   | M           | 0, -65, 17           | 3.1            |                           |
|                           | MTG                                    | R           | 40, -67, 18          | 3.9            |                           |

Within each pattern, brain regions were ordered by increasing coordinates on the z-axis

Abbreviations

FDR: false discovery rate; L: left; R: right; CG: cingulate gyrus; SFG: superior frontal gyrus; SMC: supplementary motor cortex; OFG: occipital fusiform gyrus; LG: lingual gyrus; CC: cuneal cortex; PosC: posterior cingulate; MTG: middle temporal gyrus.

\*GM atrophy in MS patients compared with NC

**Supplementary Table 3.** Patterns of decreased FA ( $p < 0.05$ , FDR-corrected), reflecting microstructural damage along WM tracts, in MS with mild disability compared to NC in the Reliability dataset

| <i>FA pattern</i> | <i>Brain region<br/>(local maxima)</i> | <i>Side</i> | <i>MNI (x, y, z)</i> | <i>Z-value</i> | <i>P-value of<br/>pattern</i> |
|-------------------|----------------------------------------|-------------|----------------------|----------------|-------------------------------|
| 2                 | CST                                    | L           | -25, -18, 9          | 3.7            | 0.044*                        |
|                   | Splenium of CC                         | L           | -2, -37, 16          | 4.5            |                               |
|                   |                                        | R           | 11, -39, 20          | 4.4            |                               |
| 4                 | PTR/OR                                 | R           | 32, -60, 14          | 6.3            | < 0.001*                      |
|                   |                                        | L           | -32, -63, 15         | 5.9            |                               |

Within each pattern, brain regions were ordered by increasing coordinates on the z-axis

#### Abbreviations

FA: fractional anisotropy; FDR: false discovery rate; L: left; R: right; CST: corticospinal tract; CC: corpus callosum; PTR: posterior thalamic radiation; OR: optic radiation.

\*decreased FA in MS patients compared with NC