**Supplementary Material**

**White Matter Microstructure Changes Revealed by Diffusion Kurtosis and Diffusion Tensor Imaging in Mutant Huntingtin Gene Carriers**

**Supplementary Table 1.** Regions with significant differences among three groups in MK values

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| **Regions** | ***p*** |
| Middle cerebellar peduncle | <0.05 |
| Pontine crossing tract | <0.05 |
| Genu of corpus callosum | <0.001 |
| Body of corpus callosum | <0.001 |
| Splenium of corpus callosum | <0.001 |
| Fornix (column and body of fornix) | <0.001 |
| Corticospinal tract R | <0.05 |
| Corticospinal tract L | <0.05 |
| Medial lemniscus R | <0.001 |
| Medial lemniscus L | <0.005 |
| Inferior cerebellar peduncle R | <0.05 |
| Inferior cerebellar peduncle L | <0.05 |
| Superior cerebellar peduncle R | <0.001 |
| Superior cerebellar peduncle L | <0.005 |
| Cerebral peduncle R | <0.05 |
| Cerebral peduncle L | <0.001 |
| Anterior limb of internal capsule R | <0.001 |
| Anterior limb of internal capsule L | <0.001 |
| Posterior limb of internal capsule R | <0.001 |
| Posterior limb of internal capsule L | <0.001 |
| Retrolenticular part of internal capsule R | <0.001 |
| Retrolenticular part of internal capsule L | <0.001 |
| Anterior corona radiata R | <0.001 |
| Anterior corona radiata L | <0.001 |
| Superior corona radiata R | <0.001 |
| Superior corona radiata L | <0.001 |
| Posterior corona radiata R | <0.001 |
| Posterior corona radiata L | <0.001 |
| Posterior thalamic radiation (include optic radiation) R | <0.001 |
| Posterior thalamic radiation (include optic radiation) L | <0.001 |
| Sagittal stratum (include inferior longitudinal fasciculus and inferior fronto-occipital fasciculus) R | <0.001 |
| Sagittal stratum (include inferior longitudinal fasciculus and inferior fronto-occipital fasciculus) L | <0.001 |
| External capsule R | <0.001 |
| External capsule L | <0.001 |
| Cingulum (cingulate gyrus) R | <0.001 |
| Cingulum (cingulate gyrus) L | <0.001 |
| Superior longitudinal fasciculus R | <0.001 |
| Superior longitudinal fasciculus L | <0.001 |
| Superior fronto-occipital fasciculus R | <0.001 |
| Superior fronto-occipital fasciculus L | <0.001 |
| Tapetum R | <0.001 |
| Tapetum L | <0.001 |

**Supplementary Table 2.** Regions with significant differences between three groups in FA values

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| --- | --- |
| **Regions** | ***p*** |
| Middle cerebellar peduncle | <0.05 |
| Genu of corpus callosum | <0.001 |
| Body of corpus callosum | <0.001 |
| Splenium of corpus callosum | <0.001 |
| Fornix (column and body of fornix) | <0.001 |
| Anterior corona radiata R | <0.001 |
| Anterior corona radiata L | <0.001 |
| Posterior corona radiata R | <0.005 |
| Posterior corona radiata L | <0.05 |
| Posterior thalamic radiation (include optic radiation) R | <0.001 |
| Posterior thalamic radiation (include optic radiation) L | <0.001 |
| Sagittal stratum (include inferior longitudinal fasciculus and inferior fronto-occipital fasciculus) R | <0.001 |
| Sagittal stratum (include inferior longitudinal fasciculus and inferior fronto-occipital fasciculus) L | <0.005 |
| External capsule R | <0.05 |
| Cingulum (cingulate gyrus) R | <0.001 |
| Cingulum (cingulate gyrus) L | <0.001 |
| Fornix (cres) / Stria terminalis R | <0.005 |
| Fornix (cres) / Stria terminalis L | <0.05 |
| Superior longitudinal fasciculus R | <0.005 |
| Superior longitudinal fasciculus L | <0.005 |
| Tapetum R | <0.001 |
| Tapetum L | <0.001 |

**Supplementary Table 3.** Results of ROC analysis

|  |  |  |
| --- | --- | --- |
| **Comparison** | **Values** | **AUC** |
| HC vs. m&lCAP | MK of Genu of corpus callosum | 0.830 |
| MK of Body of corpus callosum | 0.696 |
| MK of Splenium of corpus callosum | 0.848 |
| MK of Fornix | 0.759 |
| MK of Retrolenticular part of internal capsule R | 0.795 |
| MK of Retrolenticular part of internal capsule L | 0.759 |
| MK of Anterior corona radiata R | 0.750 |
| MK of Anterior corona radiata L | 0.821 |
| MK of Superior corona radiata R | 0.732 |
| MK of Superior corona radiata L | 0.759 |
| MK of Posterior corona radiata R | 0.786 |
| MK of Posterior corona radiata L | 0.759 |
| MK of Posterior thalamic radiation R | 0.777 |
| MK of Posterior thalamic radiation L | 0.750 |
| MK of Sagittal stratum L | 0.821 |
| MK of External capsule L | 0.786 |
| MK of Cingulum R | 0.768 |
| MK of Cingulum L | 0.759 |
| MK of Superior longitudinal fasciculus R | 0.750 |
| MK of Tapetum R | 0.759 |
| MK of Tapetum L | 0.643 |
| FA of Superior longitudinal fasciculus L | 0.688 |
| FA of Genu of corpus callosum | 0.670 |
| FA of Body of corpus callosum | 0.571 |
| FA of Fornix | 0.759 |
| FA of Posterior thalamic radiation R | 0.920 |
| FA of Posterior thalamic radiation L | 0.821 |
| FA of Sagittal stratum L | 0.804 |
| FA of Cingulum R | 0.741 |
| FA of Cingulum L | 0.679 |
| FA of Superior longitudinal fasciculus R | 0.866 |
| FA of Anterior corona radiata R | 0.795 |
| FA of Splenium of corpus callosum | 0.732 |
| m&lCAP vs. hCAP | MK of Genu of corpus callosum | 0.884 |
| MK of Body of corpus callosum | 0.875 |
| MK of Inferior cerebellar peduncle L | 0.839 |
| MK of Superior cerebellar peduncle L | 0.830 |
| MK of Posterior corona radiata L | 0.848 |
| MK of Superior corona radiata R | 0.839 |
| MK of Superior longitudinal fasciculus L | 0.911 |
| MK of Posterior limb of internal capsule L | 0.821 |
| FA of Tapetum L | 0.830 |

**Supplementary Figure 1.** Participants were recruited and finally included in the analysis process



m*HTT*, mutation *HTT* gene carrier; HC, healthy control; PreHD, Pre-manifest HD patients; mHD, manifest HD patients.

**Supplementary Figure 2.** The ROC analysis results

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A) The AUC of MK values at the superior longitudinal fasciculus L to distinguish hCAP group from m&lCAP group; B) The AUC of FA values at Tapetum L to distinguish hCAP group from m&lCAP group; C) The AUC of MK values at the splenium of corpus callosum to distinguish m&lCAP group from HC group; D) The AUC of FA values at the posterior thalamic radiation R to distinguish m&lCAP group from HC group; E) The AUC of MK values at the left superior longitudinal fasciculus combined with FA values at the left tapetum to distinguish hCAP group from m&lCAP group; F) The AUC of MK values at the splenium of corpus callosum combined with FA at the posterior thalamic radiation R to distinguish m&lCAP group from HC group.