

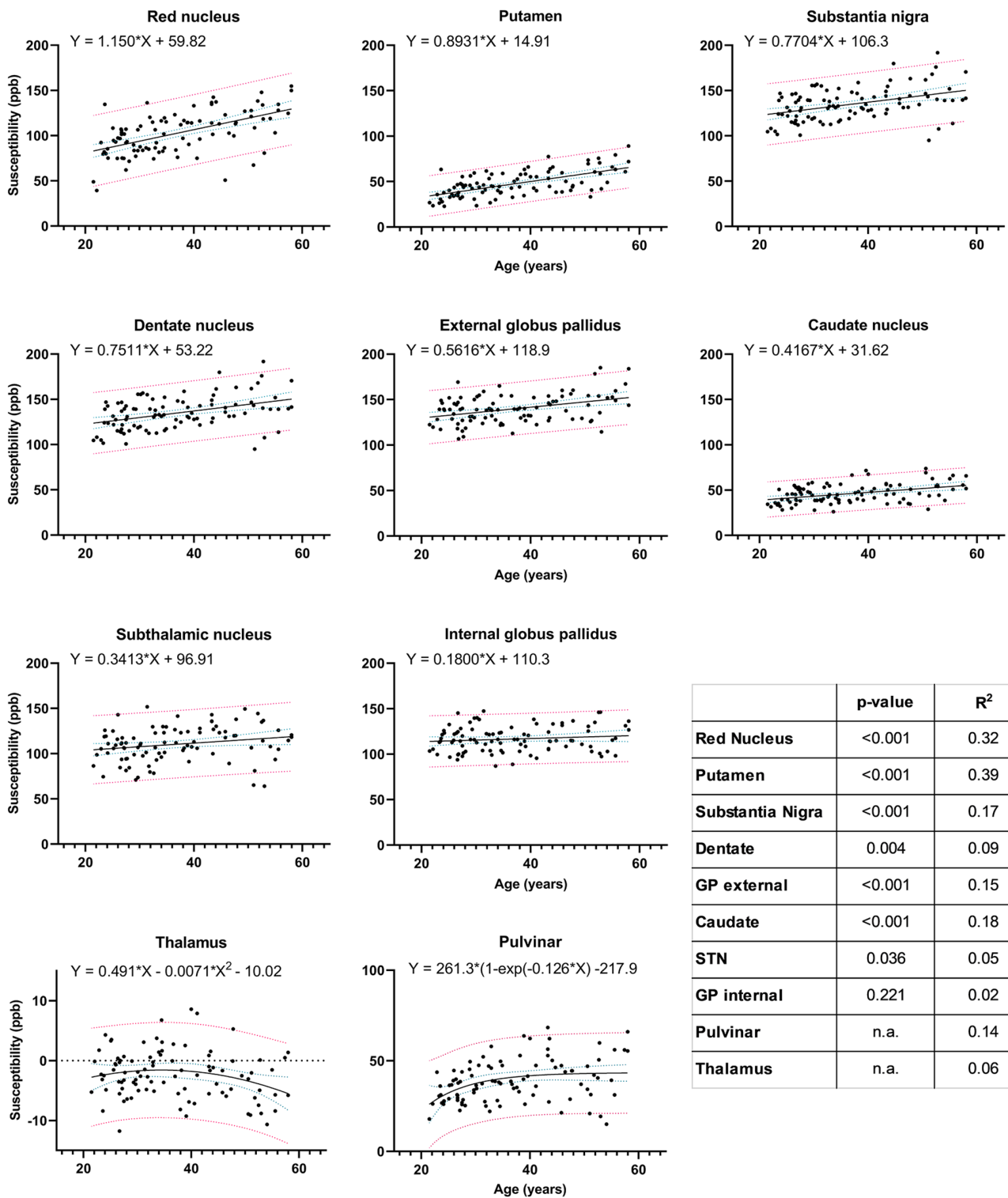
**Figure S1** Cortical regions of interest manually segmented on a mask containing cortical voxels with positive association between magnetic susceptibility and age are shown A) on axial T1WI anatomical images and B) as an 3D reconstruction (left frontolateral view). Cortical ROIs include precentral gyrus (blue), postcentral gyrus (yellow), dorsolateral prefrontal cortex (green), medial prefrontal cortex (red), insular cortex (cyan), precuneus (magenta), occipital cortex (dark blue), occipito-temporal cortex (beige), and cerebellar vermis (brown). Abbreviations: T1WI = T1-weighted image; ROI = region of interest.

**Table S1** Comparison of linear, quadratic, and exponential models for age-related susceptibility changes (best model fit based on Akaike information criterion with correction for small sample sizes,  $R^2$ , and RMSE is shown in blue)

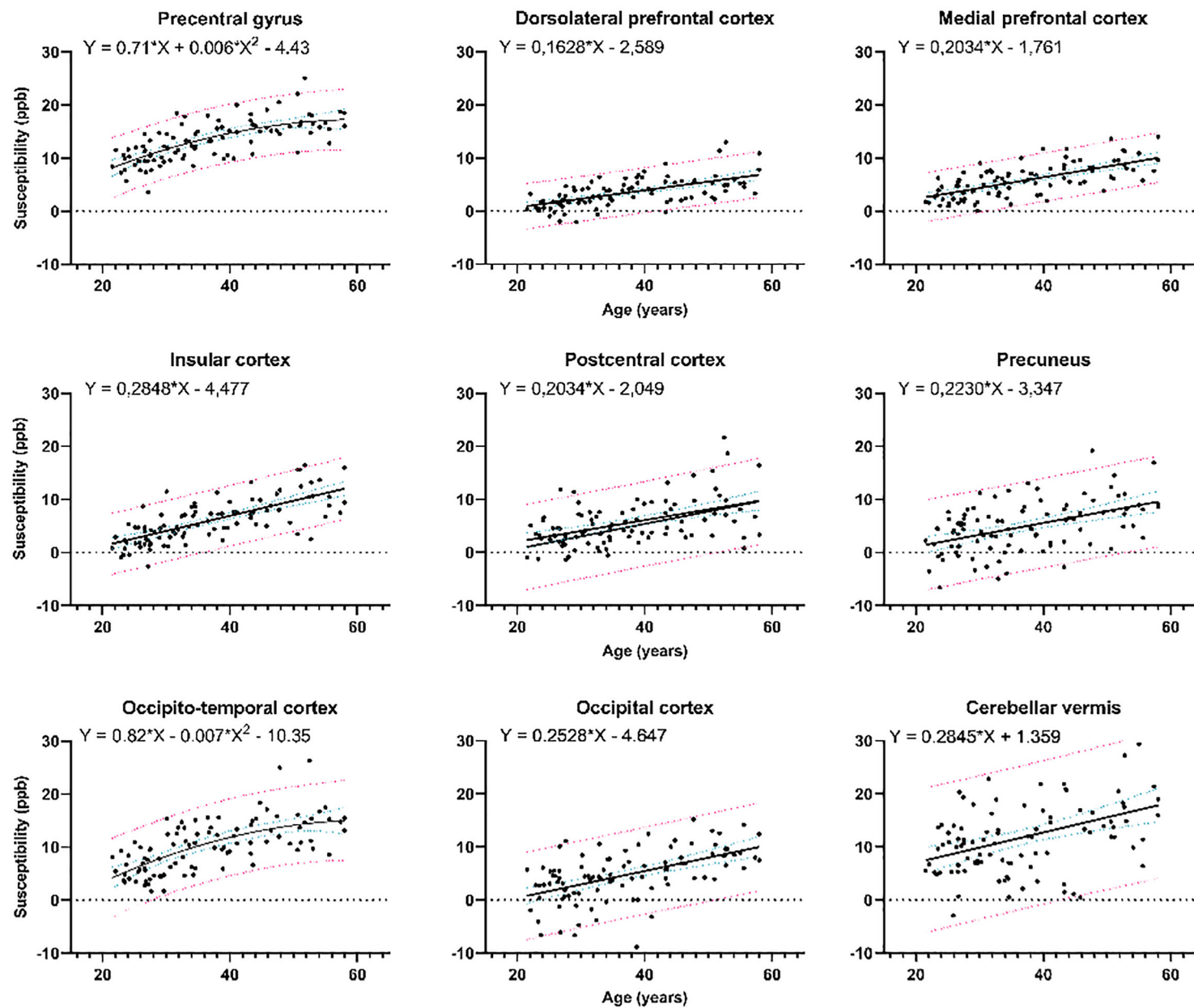
| Region                   | Model  |           |       |       |           |           |       |       |             |           |       |       |
|--------------------------|--------|-----------|-------|-------|-----------|-----------|-------|-------|-------------|-----------|-------|-------|
|                          | linear |           |       |       | quadratic |           |       |       | exponential |           |       |       |
|                          | $R^2$  | $R^2$ adj | RMSE  | AICc  | $R^2$     | $R^2$ adj | RMSE  | AICc  | $R^2$       | $R^2$ adj | RMSE  | AICc  |
| red nucleus              | 0.33   | 0.32      | 19.39 | 568.6 | 0.33      | 0.31      | 19.38 | 570.6 | 0.33        | 0.31      | 19.37 | 570.5 |
| putamen                  | 0.39   | 0.39      | 11.38 | 467.3 | 0.39      | 0.38      | 11.38 | 469.5 | 0.39        | 0.38      | 11.38 | 469.5 |
| substantia nigra         | 0.18   | 0.17      | 16.76 | 540.9 | 0.19      | 0.17      | 16.65 | 541.8 | 0.19        | 0.17      | 16.64 | 541.7 |
| dentate nucleus          | 0.09   | 0.08      | 23.42 | 604.5 | 0.10      | 0.08      | 23.41 | 606.5 | 0.10        | 0.08      | 23.39 | 606.4 |
| external globus pallidus | 0.17   | 0.16      | 14.4  | 512   | 0.19      | 0.17      | 14.24 | 512   | 0.17        | 0.15      | 14.4  | 514.2 |
| caudate nucleus          | 0.18   | 0.18      | 9.98  | 442.4 | 0.18      | 0.17      | 9.98  | 444.5 | 0.18        | 0.17      | 9.98  | 444.5 |
| subthalamic nucleus      | 0.05   | 0.04      | 18.6  | 560.6 | 0.07      | 0.05      | 18.39 | 560.7 | 0.07        | 0.05      | 18.48 | 561.6 |
| pulvinar                 | 0.12   | 0.12      | 11.3  | 465.9 | 0.15      | 0.13      | 11.17 | 465.9 | 0.15        | 0.14      | 11.11 | 464.9 |
| internal globus pallidus | 0.02   | 0.01      | 13.98 | 506.4 | 0.02      | 0.00      | 13.97 | 508.5 | 0.02        | 0.00      | 13.98 | 508.6 |
| thalamus                 | 0.01   | 0.00      | 3.88  | 262.8 | 0.05      | 0.02      | 3.81  | 261.4 | 0.00        | -0.02     | 3.90  | 265.8 |
| precentral gyrus         | 0.50   | 0.49      | 3.01  | 214.4 | 0.52      | 0.51      | 2.94  | 214.4 | 0.51        | 0.50      | 2.95  | 213.0 |
| DLPFC                    | 0.39   | 0.39      | 2.50  | 179.6 | 0.40      | 0.39      | 2.49  | 180.6 | 0.40        | 0.39      | 2.49  | 180.5 |
| MPFC                     | 0.53   | 0.53      | 2.29  | 162.5 | 0.54      | 0.53      | 2.27  | 163.3 | 0.54        | 0.53      | 2.27  | 163.4 |
| Insular cortex           | 0.57   | 0.56      | 2.86  | 205.2 | 0.58      | 0.57      | 2.83  | 205.2 | 0.58        | 0.57      | 2.83  | 205.3 |
| postcentral gyrus        | 0.27   | 0.26      | 3.987 | 267.8 | 0.27      | 0.26      | 3.98  | 270.0 | 0.27        | 0.26      | 3.98  | 270.0 |
| precuneus                | 0.28   | 0.27      | 4.20  | 278.1 | 0.28      | 0.27      | 4.20  | 280.3 | 0.28        | 0.27      | 4.20  | 280.3 |
| Occipitotemporal cortex  | 0.49   | 0.49      | 3.53  | 244.7 | 0.51      | 0.50      | 3.46  | 243.1 | 0.51        | 0.50      | 3.47  | 243.8 |
| Occipital cortex         | 0.33   | 0.32      | 4.21  | 278.1 | 0.33      | 0.32      | 4.20  | 280.1 | 0.33        | 0.31      | 4.21  | 280.3 |
| Cerebellar vermis        | 0.18   | 0.17      | 6.92  | 372.7 | 0.18      | 0.17      | 6.91  | 374.7 | 0.18        | 0.17      | 6.92  | 374.9 |
| total white matter       | 0.10   | 0.09      | 1.00  | 4.9   | 0.10      | 0.08      | 0.995 | 6.6   | 0.10        | 0.08      | 1.0   | 6.69  |

Degrees of freedom = 93 for linear models and 92 for quadratic and exponential models.

Abbreviations: RMSE = root-mean-square deviation, AICc = Akaike information criterion with correction for small sample sizes; adj = adjusted, DLPFC = dorsolateral prefrontal cortex, MPFC = medial prefrontal cortex



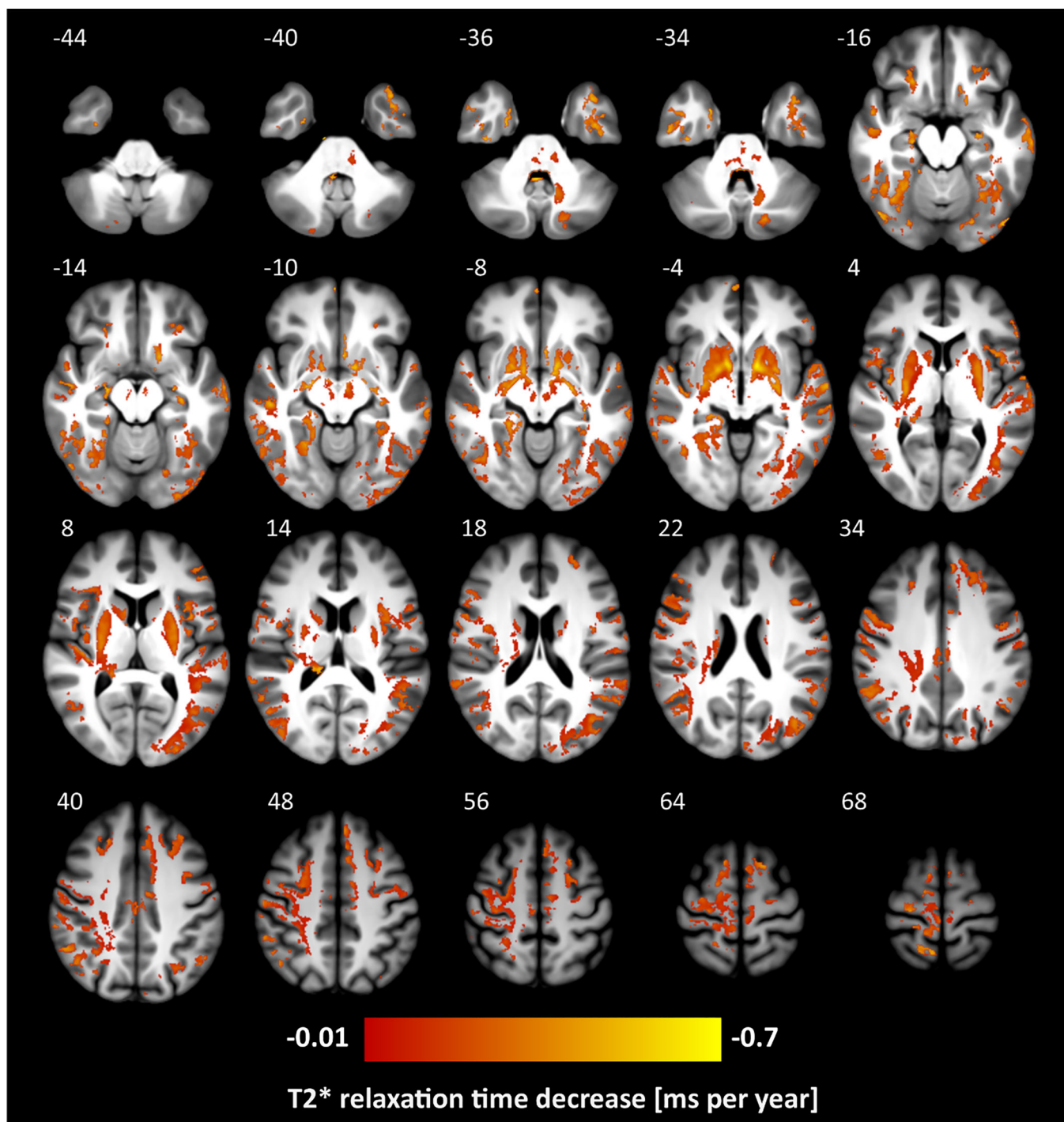
**Figure S2** Corrected bulk magnetic susceptibility values (reference region = total white matter) in ppb in deep gray matter structures as a function of age with their respective regression fits and coefficients. Blue dotted lines represent 95% confidence bands of the regression fit and red dotted lines represent 95% population prediction bands. Please note different Y-axis range for thalamus and pulvinar. Abbreviations: ppb = parts per billion; GP = globus pallidus; STN = subthalamic nucleus; n.a. = not available.



|                   | p-value | R <sup>2</sup> |
|-------------------|---------|----------------|
| Precentral        | n.a.    | 0.50           |
| DLPFC             | <0.001  | 0.39           |
| MPFC              | <0.001  | 0.46           |
| Insular           | <0.001  | 0.52           |
| Postcentral       | <0.001  | 0.24           |
| Precuneus         | <0.001  | 0.23           |
| Occipito-temporal | n.a.    | 0.45           |
| Occipital         | <0.001  | 0.29           |
| Vermis            | <0.001  | 0.16           |

**Figure S3** Corrected bulk magnetic susceptibility values (reference region = total white matter) in ppb in cortical regions of interest as a function of age with their respective regression fits. Blue dotted lines represent 95% confidence bands of the regression fit and red dotted lines represent 95% population prediction bands.

Abbreviations: ppb = parts per billion; DLPFC = dorsolateral prefrontal cortex; MPFC = medial prefrontal cortex; n.a. = not available.



**Figure S4** Statistical map of age-related  $T_2^*$  changes in the brain of normal adults represented as  $T_2^*$  relaxation time decrease in ms per year (thresholded at  $p < 0.05$  at cluster level and corrected for family-wise error; initial cluster definition threshold was set to  $p < 0.005$  uncorrected). Z-coordinate in the MNI space in [mm] is indicated for each slice.

**Table S2** Clusters with significant age-related T2\* relaxation time decrease identified by whole brain analysis with corresponding anatomical locations. Deep gray matter structures are in bold.

| Cluster volume<br>[mm <sup>3</sup> ] | Peak T2* relaxation<br>time change [ms/year] | Peak<br>T value | MNI coordinates [mm] |     |     | Peak Structure       | Anatomical structures within cluster   |
|--------------------------------------|--|-----------------|----------------------|-----|-----|----------------------|--|
|                                      |  |                 | X                    | Y   | Z   |                      |  |
| 28449                                | -0.7   | 6.5             | -28                  | -34 | -24 | Inferior Temporal    | Left Inferior, Middle, and Superior Temporal, Fusiform, Lateral, Middle, and Inferior Occipital gyri |
| 52262                                | -0.7   | 9.6             | 14                   | -34 | -6  | Putamen              | Right Putamen, Caudate, Globus Pallidus, Thalamic Pulvinar, Substantia nigra, Nucleus Ruber          |
| 8498                                 | -0.7   | 8.4             | -12                  | 3   | -5  | Putamen              | Left Putamen, Caudate, Globus Pallidus, Substantia nigra, Nucleus Ruber                              |
| 191                                  | -0.7   | 4.9             | 31                   | -36 | 0   | Hippocampus          | Right Hippocampus  |
| 430                                  | -0.7   | 5.1             | -33                  | -29 | -8  | Hippocampus          | Left Hippocampus, Parahippocampal gyrus  |
| 760                                  | -0.6   | 4.3             | 36                   | -77 | -18 | Lateral Occipital    | Right Lateral Occipital, Inferior Occipital gyri, Occipital pole                                     |
| 527                                  | -0.6   | 6.2             | 48                   | -24 | 17  | Posterior Insula     | Right Posterior Insula, Supramarginal gyri   |
| 422                                  | -0.6   | 4.3             | 21                   | -6  | -27 | Fusiform             | Right Fusiform, Inferior Temporal, ParaHippocampal gyri  |
| 1051                                 | -0.6   | 5.9             | -3                   | -15 | -19 | Pons                 | Pons, Mesencephalon  |
| 191                                  | -0.5   | 6.3             | -3                   | 14  | -7  | Anterior Cingulum    | Left Anterior Cingulum, Subcallosal gyri   |
| 1543                                 | -0.5   | 4.8             | 21                   | 34  | -22 | OrbitoFrontal        | Right OrbitoFrontal, Inferior Frontal gyri, Orbital, Anterior Rostral sulci                          |
| 2186                                 | -0.5   | 5.0             | 67                   | -39 | 2   | Superior Temporal    | Right Superior, Middle, and Inferior Temporal, Middle and Inferior Occipital                         |
| 1227                                 | -0.5   | 5.2             | 1                    | -16 | 29  | Posterior Cingulate  | Right Posterior and Middle Cingulate, Cingulate sulcus, Corpus callosum                              |
| 572                                  | -0.5   | 4.8             | 31                   | 29  | 2   | Anterior Insula      | Right Anterior Insula, Inferior Frontal gyrus  |
| 3274                                 | -0.5   | 6.1             | -43                  | 10  | 3   | Anterior Insula      | Left Anterior Insula, Inferior Frontal, Precentral gyri, Rolandic Operculum                          |
| 528                                  | -0.5   | 4.3             | 32                   | -71 | 46  | Intraparietal sulcus | Right Intraparietal, Intraoccipital sulci, Middle Occipital gyrus                                    |
| 2405                                 | -0.5   | 5.5             | 53                   | -51 | 42  | Angular              | Right Angular, Supramarginal, Inferior Parietal, Superior Temporal gyri                              |
| 322                                  | -0.5   | 4.4             | 8                    | -53 | 68  | Precuneus            | Right Precuneus, Parietal Superior, Cingulate gyri   |
| 1577                                 | -0.5   | 5.3             | -39                  | 16  | -42 | Temporal Pole        | Left Temporal pole, Inferior Temporal gyrus  |
| 10299                                | -0.5   | 5.9             | -4                   | 16  | 50  | Superior Frontal     | Left Superior and Middle Frontal, Cingulate, Supplementary Motor area, Paracentral Lobule            |
| 359                                  | -0.5   | 5.5             | 7                    | -6  | 50  | Cingulate sulcus     | Right Cingulate, Paracentral Lobule  |
| 1950                                 | -0.5   | 5.1             | -59                  | -15 | 37  | Rolandic sulcus      | Left Rolandic, Precentral, Postcentral, Inferior and Middle Frontal                                  |
| 1379                                 | -0.4   | 4.5             | -53                  | 34  | 5   | Inferior Frontal     | Left Inferior Frontal  |
| 1392                                 | -0.4   | 4.8             | 49                   | 24  | 20  | Inferior frontal     | Right Inferior and Middle Frontal, Precentral sulcus   |
| 1433                                 | -0.4   | 5.2             | -21                  | -79 | -16 | Left Lingual         | Left Lingual, Calcarine gyri   |
| 500                                  | -0.4   | 5.5             | -18                  | -76 | -35 | Cerebellum           | Left Cerebellum  |
| 426                                  | -0.4   | 4.2             | -24                  | 28  | -19 | Orbital sulcus       | Left Orbital sulcus, Inferior Frontal gyrus  |
| 912                                  | -0.4   | 4.7             | 18                   | -75 | -53 | Cerebellum           | Right Cerebellum   |
| 644                                  | -0.4   | 5.2             | -25                  | -63 | 42  | Intraparietal sulcus | Left Intraparietal, Parietooccipital sulci, Precuneus  |
| 522                                  | -0.3   | 4.7             | -13                  | -56 | -36 | Dentate              | Left Dentate   |
| 313                                  | -0.3   | 5.2             | -63                  | -17 | 19  | Posterior Insula     | Left Posterior Insula, Rolandic Operculum, Postcentral gyrus   |