

## Supplementary Material

**Supplementary Table 1. Demographics, genetic and clinical features for each patient.**

| Pt | Gene    | Diagnosis | Sex | Age at PET | Age at Diagnosis | Age at Onset | Disease duration at PET | Years of Education | ACE-R /100 |
|----|---------|-----------|-----|------------|------------------|--------------|-------------------------|--------------------|------------|
| A  | MAPT    | bvFTD     | F   | 51         | 51               | 46           | 5.5                     | 16                 | 43         |
| B  | MAPT    | bvFTD     | F   | 61         | 60               | 52           | 9                       | 16                 | 44         |
| C  | GRN     | bvFTD     | F   | 71         | 70               | 66           | 4.8                     | 10                 | 33         |
| D  | GRN     | nfPPA     | M   | 66         | 65               | 63           | 2.4                     | 10                 | 76         |
| E  | C9orf72 | bvFTD     | M   | 56         | 56               | 54           | 2.8                     | 10                 | 53         |
| F  | C9orf72 | bvFTD     | F   | 51         | 51               | 47           | 4.5                     | 10                 | 41         |
| G  | C9orf72 | bvFTD     | M   | 59         | 58               | 56           | 3                       | 9                  | 46         |

Abbreviations: Pt=patient; bvFTD=behavioural variant frontotemporal dementia; nfPPA=non-fluent primary progressive aphasia; F=Female; M=Male; ACE-R= Addenbrooke's Cognitive Examination Revised

**Supplementary Table 2. Demographics of the two age- and sex-matched control groups compared to each patient in radioligand-specific tests. Age, years of education, and ACE-R scores were compared between the two groups of controls with independent-samples t-tests, while sex was compared with the Chi-square test.**

| Group control                 | N  | Sex (F/M) | Age (mean $\pm$ SD) | Education (mean $\pm$ SD) | ACE-R (mean $\pm$ SD) |
|-------------------------------|----|-----------|---------------------|---------------------------|-----------------------|
| [ <sup>11</sup> C]PK11195     | 15 | 8/7       | 68.8 $\pm$ 5.5      | 14.4 $\pm$ 2.8            | 93.3 $\pm$ 4.4        |
| [ <sup>18</sup> F]AV-1451     | 15 | 7/8       | 67.3 $\pm$ 7.6      | 15.5 $\pm$ 2.3            | 95.7 $\pm$ 3.2        |
| Difference controls (p-value) | -  | 0.72      | 0.56                | 0.26                      | 0.11                  |

Abbreviations: F/M= female/male; SD=standard deviation; ACE-R= Addenbrooke's Cognitive Examination Revised

**Supplementary Table 3. [<sup>11</sup>C]PK11195 binding potential (BP<sub>ND</sub>) values and Z-scores (Z) for brain regions with statistically significant increased BP<sub>ND</sub> in each patient (Pt) compared to controls at p < 0.05 uncorrected (tests surviving FDR correction are in bold). Mean and standard deviation (SD) BP<sub>ND</sub> values for controls are also reported.**

| Region                                |    | Controls BP <sub>ND</sub> |      | Pt A             |             | Pt B             |             | Pt C             |             | Pt D             |             | Pt E             |             | Pt F             |             | Pt G             |      |
|---------------------------------------|----|---------------------------|------|------------------|-------------|------------------|-------------|------------------|-------------|------------------|-------------|------------------|-------------|------------------|-------------|------------------|------|
| Name                                  | #  | Mean                      | SD   | BP <sub>ND</sub> | Z           | BP <sub>ND</sub> | Z           | BP <sub>ND</sub> | Z           | BP <sub>ND</sub> | Z           | BP <sub>ND</sub> | Z           | BP <sub>ND</sub> | Z           | BP <sub>ND</sub> | Z    |
| Hippocampus R                         | 1  | 0.01                      | 0.07 | 0.28             | <b>3.81</b> | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | -                | -    |
| Hippocampus L                         | 2  | 0.04                      | 0.07 | -                | -           | 0.29             | <b>3.75</b> | -                | -           | -                | -           | -                | -           | -                | -           | -                | -    |
| Amygdala R                            | 3  | 0.01                      | 0.07 | 0.37             | <b>4.95</b> | 0.21             | 2.72        | -                | -           | -                | -           | 0.22             | 2.87        | -                | -           | -                | -    |
| Amygdala L                            | 4  | 0.06                      | 0.04 | 0.34             | <b>6.35</b> | 0.34             | <b>6.40</b> | -                | -           | -                | -           | -                | -           | -                | -           | -                | -    |
| Anterior temporal lobe medial part R  | 5  | 0.04                      | 0.06 | 0.23             | <b>3.11</b> | -                | -           | -                | -           | -                | -           | 0.35             | <b>5.10</b> | 0.19             | 2.50        | -                | -    |
| Anterior temporal lobe medial part L  | 6  | 0.04                      | 0.06 | 0.25             | <b>3.14</b> | 0.22             | 2.68        | -                | -           | -                | -           | -                | -           | -                | -           | -                | -    |
| Anterior temporal lobe lateral part R | 7  | 0.10                      | 0.07 | 0.26             | 2.42        | 0.33             | <b>3.46</b> | -                | -           | -                | -           | -                | -           | -                | -           | -                | -    |
| Anterior temporal lobe lateral part L | 8  | 0.03                      | 0.05 | 0.27             | <b>4.70</b> | 0.26             | <b>4.38</b> | -                | -           | -                | -           | 0.19             | 3.11        | 0.27             | <b>4.70</b> | -                | -    |
| Parahippocampal and ambient gyri R    | 9  | 0.05                      | 0.05 | 0.27             | <b>4.08</b> | 0.19             | 2.56        | -                | -           | -                | -           | 0.22             | 3.05        | -                | -           | -                | -    |
| Parahippocampal and ambient gyri L    | 10 | 0.07                      | 0.05 | 0.28             | <b>3.79</b> | 0.41             | <b>6.23</b> | -                | -           | -                | -           | 0.22             | 2.73        | -                | -           | -                | -    |
| Middle and inferior temporal gyrus R  | 13 | 0.01                      | 0.04 | -                | -           | 0.14             | <b>3.32</b> | -                | -           | 0.11             | 2.56        | -                | -           | -                | -           | -                | -    |
| Middle and inferior temporal gyrus L  | 14 | -0.02                     | 0.03 | 0.14             | <b>6.02</b> | 0.08             | <b>3.77</b> | 0.08             | <b>3.70</b> | -                | -           | 0.08             | <b>3.95</b> | 0.10             | <b>4.50</b> | -                | -    |
| Fusiform gyrus R                      | 15 | -0.01                     | 0.02 | 0.11             | <b>5.07</b> | 0.20             | <b>9.27</b> | 0.05             | 2.41        | 0.19             | <b>8.68</b> | 0.16             | <b>7.42</b> | 0.09             | <b>4.14</b> | -                | -    |
| Fusiform gyrus L                      | 16 | -0.01                     | 0.05 | 0.16             | <b>3.36</b> | 0.24             | <b>4.84</b> | -                | -           | 0.10             | 2.21        | 0.37             | <b>7.33</b> | -                | -           | 0.11             | 2.37 |
| Insula L                              | 20 | 0.02                      | 0.05 | -                | -           | -                | -           | -                | -           | -                | -           | 0.16             | 2.92        | -                | -           | -                | -    |
| Middle frontal gyrus L                | 28 | -0.05                     | 0.06 | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | 0.09             | 2.28        | -                | -    |
| Middle frontal gyrus R                | 29 | -0.01                     | 0.05 | -                | -           | 0.08             | 1.84        | -                | -           | -                | -           | -                | -           | 0.11             | 2.63        | -                | -    |
| Nucleus accumbens L                   | 36 | 0.11                      | 0.07 | -                | -           | 0.33             | <b>3.06</b> | -                | -           | -                | -           | -                | -           | -                | -           | -                | -    |
| Nucleus accumbens R                   | 37 | 0.08                      | 0.08 | 0.45             | <b>4.84</b> | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | -                | -    |
| Putamen L                             | 38 | 0.06                      | 0.05 | -                | -           | -                | -           | 0.29             | <b>4.85</b> | 0.16             | 1.98        | -                | -           | -                | -           | -                | -    |
| Putamen R                             | 39 | 0.08                      | 0.04 | 0.15             | 1.83        | 0.18             | 2.59        | 0.19             | 3.07        | 0.15             | 1.98        | -                | -           | -                | -           | -                | -    |
| Pallidum L                            | 42 | 0.03                      | 0.10 | 0.27             | 2.40        | -                | -           | 0.25             | 2.13        | -                | -           | -                | -           | 0.27             | 2.40        | -                | -    |
| Straight gyrus L                      | 52 | 0.18                      | 0.07 | 0.43             | <b>3.55</b> | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | -                | -    |
| Straight gyrus R                      | 53 | 0.16                      | 0.09 | 0.44             | <b>3.20</b> | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | -                | -    |
| Anterior orbital gyrus L              | 54 | 0.04                      | 0.06 | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | 0.37             | <b>5.27</b> | -                | -    |
| Anterior orbital gyrus R              | 55 | 0.07                      | 0.06 | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | 0.27             | <b>3.15</b> | 0.23             | 2.56 |
| Inferior frontal gyrus L              | 56 | 0.09                      | 0.05 | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | 0.23             | 2.83        | -                | -    |
| Inferior frontal gyrus R              | 57 | 0.12                      | 0.06 | -                | -           | 0.25             | 2.31        | -                | -           | -                | -           | -                | -           | 0.23             | 2.03        | -                | -    |
| Superior frontal gyrus L              | 58 | 0.07                      | 0.05 | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | 0.18             | 2.48 |
| Superior frontal gyrus R              | 59 | 0.04                      | 0.06 | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | -                | -           | 0.17             | 2.11 |

|   |    |      |      |      |             |      |      |      |             |   |   |      |      |      |             |      |      |
|---|----|------|------|------|-------------|------|------|------|-------------|---|---|------|------|------|-------------|------|------|
| Lingual gyrus L                         | 64 | 0.15 | 0.07 | -    | -           | -    | -    | -    | -           | - | - | -    | -    | -    | -           | 0.29 | 2.10 |
| Lingual gyrus R                         | 65 | 0.11 | 0.06 | -    | -           | -    | -    | -    | -           | - | - | -    | -    | -    | -           | 0.23 | 1.96 |
| Cuneus L                                | 66 | 0.17 | 0.05 | -    | -           | -    | -    | -    | -           | - | - | -    | -    | 0.35 | <b>3.74</b> | 0.27 | 2.12 |
| Cuneus R                                | 67 | 0.12 | 0.05 | -    | -           | -    | -    | -    | -           | - | - | -    | -    | -    | -           | 0.23 | 1.88 |
| Medial orbital gyrus L                  | 68 | 0.12 | 0.06 | 0.25 | 1.97        | -    | -    | -    | -           | - | - | -    | -    | 0.36 | <b>3.82</b> | -    | -    |
| Lateral orbital gyrus L                 | 70 | 0.13 | 0.06 | -    | -           | -    | -    | 0.28 | 2.42        | - | - | -    | -    | 0.52 | <b>6.22</b> | -    | -    |
| Lateral orbital gyrus R                 | 71 | 0.13 | 0.06 | -    | -           | -    | -    | -    | -           | - | - | -    | -    | 0.52 | <b>6.27</b> | -    | -    |
| Posterior orbital gyrus L               | 72 | 0.10 | 0.07 | 0.29 | 2.55        | -    | -    | -    | -           | - | - | -    | -    | -    | -           | -    | -    |
| Posterior orbital gyrus R               | 73 | 0.14 | 0.06 | -    | -           | -    | -    | -    | -           | - | - | -    | -    | 0.27 | 2.32        | -    | -    |
| Substantia nigra L                      | 74 | 0.22 | 0.07 | -    | -           | -    | -    | -    | -           | - | - | -    | -    | 0.44 | 2.91        | -    | -    |
| Substantia nigra R                      | 75 | 0.15 | 0.07 | -    | -           | -    | -    | 0.60 | <b>6.47</b> | - | - | -    | -    | -    | -           | -    | -    |
| Subgenual frontal cortex L              | 76 | 0.01 | 0.07 | 0.30 | <b>4.13</b> | -    | -    | -    | -           | - | - | -    | -    | -    | -           | -    | -    |
| Subcallosal area L                      | 78 | 0.17 | 0.12 | -    | -           | -    | -    | -    | -           | - | - | 0.43 | 2.10 | -    | -           | -    | -    |
| Subcallosal area R                      | 79 | 0.23 | 0.16 | -    | -           | -    | -    | 0.68 | 2.91        | - | - | -    | -    | -    | -           | -    | -    |
| Presubgenual frontal cortex L           | 80 | 0.15 | 0.10 | 0.35 | 1.87        | -    | -    | -    | -           | - | - | -    | -    | -    | -           | -    | -    |
| Presubgenual frontal cortex R           | 81 | 0.10 | 0.08 | 0.25 | 1.83        | -    | -    | -    | -           | - | - | -    | -    | -    | -           | -    | -    |
| Superior temporal gyrus anterior part L | 82 | 0.09 | 0.09 | 0.32 | 2.53        | -    | -    | -    | -           | - | - | -    | -    | -    | -           | -    | -    |
| Superior temporal gyrus anterior part R | 83 | 0.11 | 0.10 | 0.29 | 1.93        | 0.30 | 1.99 | -    | -           | - | - | 0.35 | 2.48 | -    | -           | -    | -    |

Abbreviations: L=Left; R=Right

**Supplementary Table 4. [<sup>18</sup>F]AV1451 binding potential (BP<sub>ND</sub>) values and Z-scores (Z) for brain regions with statistically significant increased BP<sub>ND</sub> in each patient (Pt) compared to controls at p < 0.05 uncorrected (tests surviving FDR correction are in bold). Mean and standard deviation (SD) BP<sub>ND</sub> values for controls are also reported.**

| Region                                      |    | Controls BP <sub>ND</sub> |      | Pt A             |             | Pt B             |             | Pt C             |      | Pt D             |   | Pt E             |             | Pt F             |   | Pt G             |   |
|---|----|---------------------------|------|------------------|-------------|------------------|-------------|------------------|------|------------------|---|------------------|-------------|------------------|---|------------------|---|
| Name  | #  | Mean                      | SD   | BP <sub>ND</sub> | Z           | BP <sub>ND</sub> | Z           | BP <sub>ND</sub> | Z    | BP <sub>ND</sub> | Z | BP <sub>ND</sub> | Z           | BP <sub>ND</sub> | Z | BP <sub>ND</sub> | Z |
| Hippocampus L                               | 2  | 0.07                      | 0.08 | -                | -           | -                | -           | 0.34             | 3.12 | -                | - | -                | -           | -                | - | -                | - |
| Amygdala R                                  | 3  | 0.06                      | 0.07 | 0.35             | <b>4.11</b> | -                | -           | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Amygdala L                                  | 4  | 0.05                      | 0.08 | 0.24             | <b>2.51</b> | -                | -           | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Anterior temporal lobe medial part R        | 5  | 0.00                      | 0.06 | 0.25             | <b>4.39</b> | 0.14             | 2.42        | -                | -    | -                | - | 0.15             | 2.59        | -                | - | -                | - |
| Anterior temporal lobe medial part L        | 6  | 0.01                      | 0.06 | 0.37             | <b>6.62</b> | -                | -           | 0.11             | 1.86 | -                | - | 0.27             | <b>4.80</b> | -                | - | -                | - |
| Anterior temporal lobe lateral part R       | 7  | 0.05                      | 0.08 | 0.35             | <b>3.67</b> | 0.24             | 2.27        | -                | -    | -                | - | 0.22             | 2.03        | -                | - | -                | - |
| Anterior temporal lobe lateral part L       | 8  | 0.04                      | 0.08 | 0.42             | <b>4.85</b> | 0.21             | 2.20        | -                | -    | -                | - | 0.32             | <b>3.55</b> | -                | - | -                | - |
| Parahippocampal and ambient gyri R          | 9  | 0.03                      | 0.06 | 0.29             | <b>4.11</b> | 0.16             | 2.11        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Parahippocampal and ambient gyri L          | 10 | 0.04                      | 0.06 | 0.27             | <b>3.66</b> | 0.19             | 2.37        | 0.17             | 2.17 | -                | - | -                | -           | -                | - | -                | - |
| Middle and inferior temporal gyrus R        | 13 | 0.01                      | 0.06 | 0.16             | <b>2.56</b> | 0.17             | 2.68        | -                | -    | -                | - | 0.12             | 1.82        | -                | - | -                | - |
| Middle and inferior temporal gyrus L        | 14 | 0.01                      | 0.05 | 0.29             | <b>6.01</b> | 0.13             | 2.67        | 0.15             | 3.04 | -                | - | 0.28             | <b>5.83</b> | -                | - | -                | - |
| Fusiform gyrus R                            | 15 | 0.02                      | 0.08 | 0.30             | <b>3.63</b> | 0.21             | 2.43        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Fusiform gyrus L                            | 16 | 0.03                      | 0.06 | 0.34             | <b>5.60</b> | -                | -           | -                | -    | -                | - | 0.27             | <b>4.36</b> | -                | - | -                | - |
| Insula L                                    | 20 | 0.02                      | 0.05 | 0.15             | 2.41        | -                | -           | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Lateral remainder of occipital lobe L       | 22 | -0.04                     | 0.06 | -                | -           | 0.09             | 2.04        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Cingulate gyrus anterior part L             | 24 | 0.13                      | 0.06 | 0.27             | 2.32        | -                | -           | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Cingulate gyrus anterior part R             | 25 | 0.09                      | 0.05 | -                | -           | 0.19             | 1.84        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Cingulate gyrus posterior part L            | 26 | 0.07                      | 0.05 | 0.16             | 1.84        | 0.18             | 2.17        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Cingulate gyrus posterior part R            | 27 | 0.05                      | 0.05 | 0.15             | 1.91        | -                | -           | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Middle frontal gyrus L                      | 28 | -0.06                     | 0.05 | 0.06             | 2.29        | 0.16             | <b>4.22</b> | -                | -    | -                | - | 0.07             | 2.58        | -                | - | -                | - |
| Middle frontal gyrus R                      | 29 | -0.02                     | 0.06 | -                | -           | 0.20             | 3.57        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Posterior temporal lobe L                   | 30 | -0.01                     | 0.06 | 0.13             | 2.33        | 0.13             | 2.32        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Posterior temporal lobe R                   | 31 | -0.01                     | 0.05 | 0.09             | 1.95        | 0.11             | 2.48        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Inferiolateral remainder of parietal lobe L | 32 | -0.01                     | 0.07 | 0.13             | 2.16        | 0.16             | 2.69        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Inferiolateral remainder of parietal lobe R | 33 | 0.01                      | 0.05 | -                | -           | 0.16             | 3.10        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Caudate nucleus L                           | 34 | 0.21                      | 0.10 | 0.40             | 1.85        | -                | -           | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Caudate nucleus R                           | 35 | 0.18                      | 0.11 | -                | -           | 0.43             | 2.34        | -                | -    | -                | - | -                | -           | -                | - | -                | - |
| Nucleus accumbens L                         | 36 | 0.16                      | 0.07 | 0.62             | <b>6.35</b> | 0.30             | 1.99        | 0.43             | 3.78 | -                | - | -                | -           | -                | - | -                | - |

|   |    |       |      |      |             |      |      |      |      |   |   |      |             |      |      |   |   |
|---|----|-------|------|------|-------------|------|------|------|------|---|---|------|-------------|------|------|---|---|
| Nucleus accumbens R                     | 37 | 0.19  | 0.12 | 0.42 | 1.92        | 0.42 | 1.86 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Putamen L                               | 38 | 0.26  | 0.08 | -    | -           | 0.40 | 1.85 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Thalamus L                              | 40 | 0.23  | 0.06 | 0.34 | 1.84        | -    | -    | 0.39 | 2.59 | - | - | -    | -           | -    | -    | - | - |
| Pallidum L                              | 42 | 0.18  | 0.09 | 0.42 | <b>2.64</b> | 0.39 | 2.34 | -    | -    | - | - | 0.45 | 2.97        | -    | -    | - | - |
| Pallidum R                              | 43 | 0.21  | 0.13 | -    | -           | 0.47 | 2.03 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Straight gyrus L                        | 52 | 0.15  | 0.07 | 0.50 | <b>4.72</b> | -    | -    | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Straight gyrus R                        | 53 | 0.13  | 0.07 | 0.38 | <b>3.68</b> | -    | -    | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Anterior orbital gyrus L                | 54 | 0.01  | 0.07 | 0.15 | 1.92        | -    | -    | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Anterior orbital gyrus R                | 55 | 0.01  | 0.06 | 0.15 | 2.18        | -    | -    | -    | -    | - | - | -    | -           | 0.22 | 3.34 | - | - |
| Inferior frontal gyrus L                | 56 | 0.06  | 0.06 | 0.22 | <b>2.87</b> | 0.23 | 3.03 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Inferior frontal gyrus R                | 57 | 0.09  | 0.07 | -    | -           | 0.27 | 2.70 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Superior frontal gyrus L                | 58 | 0.04  | 0.05 | 0.20 | <b>2.94</b> | 0.15 | 2.11 | -    | -    | - | - | 0.17 | 2.46        | -    | -    | - | - |
| Superior frontal gyrus R                | 59 | 0.04  | 0.07 | -    | -           | 0.23 | 2.95 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Superior parietal gyrus L               | 62 | 0.01  | 0.06 | -    | -           | 0.15 | 2.48 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Medial orbital gyrus L                  | 68 | 0.08  | 0.07 | 0.30 | <b>3.35</b> | -    | -    | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Medial orbital gyrus R                  | 69 | 0.08  | 0.08 | 0.24 | 2.11        | 0.26 | 2.25 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Lateral orbital gyrus L                 | 70 | 0.05  | 0.07 | 0.36 | <b>4.50</b> | 0.18 | 1.87 | -    | -    | - | - | -    | -           | 0.29 | 3.43 | - | - |
| Lateral orbital gyrus R                 | 71 | 0.04  | 0.07 | 0.19 | 1.99        | -    | -    | -    | -    | - | - | -    | -           | 0.34 | 3.97 | - | - |
| Posterior orbital gyrus L               | 72 | 0.04  | 0.05 | 0.33 | <b>5.26</b> | -    | -    | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Posterior orbital gyrus R               | 73 | 0.07  | 0.08 | 0.30 | <b>2.79</b> | -    | -    | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Substantia nigra L                      | 74 | 0.26  | 0.11 | -    | -           | -    | -    | -    | -    | - | - | 0.54 | 2.56        | -    | -    | - | - |
| Substantia nigra R                      | 75 | 0.22  | 0.13 | 0.49 | 2.13        | -    | -    | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Subgenual frontal cortex L              | 76 | -0.01 | 0.08 | 0.24 | <b>3.09</b> | -    | -    | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Subgenual frontal cortex R              | 77 | -0.05 | 0.05 | 0.12 | <b>3.49</b> | 0.06 | 2.30 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Subcallosal area L                      | 78 | 0.14  | 0.12 | 0.39 | 2.05        | -    | -    | 0.47 | 2.63 | - | - | -    | -           | -    | -    | - | - |
| Subcallosal area R                      | 79 | 0.11  | 0.08 | 0.31 | 2.35        | 0.34 | 2.79 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Presubgenual frontal cortex L           | 80 | 0.11  | 0.09 | 0.32 | 2.29        | -    | -    | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Presubgenual frontal cortex R           | 81 | 0.02  | 0.07 | 0.19 | 2.24        | 0.25 | 3.10 | -    | -    | - | - | -    | -           | -    | -    | - | - |
| Superior temporal gyrus anterior part L | 82 | 0.08  | 0.08 | 0.38 | <b>3.72</b> | -    | -    | -    | -    | - | - | 0.39 | <b>3.87</b> | -    | -    | - | - |

Abbreviations: L=Left; R=Right

**Supplementary Figure 1. Axial slices of the [ $^{11}\text{C}$ ]PK11195 (left) and [ $^{18}\text{F}$ ]AV-1451 (right) binding potential ( $\text{BP}_{\text{ND}}$ ) maps for each patient (A-G). For comparison, the last row shows the corresponding average  $\text{BP}_{\text{ND}}$  maps across 15 controls. Patients A and B are MAPT mutation carriers; cases C and D are patients with GRN mutations; and patients E, F and G are C9orf72 mutation carriers. The  $\text{BP}_{\text{ND}}$  maps were spatially normalised to ICBM 152 2009a space, masked and smoothed (isotropic 6mm full width at half maximum Gaussian). The  $\text{BP}_{\text{ND}}$  maps are overlaid on the ICBM 152 2009a T1 MR template and the slices are reported in the neurological display convention (left on the left). The  $\text{BP}_{\text{ND}}$  scale applies to both radioligands.**

