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Center for Vital Longevity

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*Altered Cerebellar Connectivity in Parkinson's  
Patients ON and OFF L-DOPA Medication—  
Supplement*

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## Supplementary Material

### Altered cerebellar connectivity in Parkinson's patients ON and OFF L-DOPA medication

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#### 1. Supplementary Tables

**Supplementary Table 1.** MNI coordinates of the local maxima of brain regions showing significant functional connectivity with cerebellar seed regions in Parkinson's patients ON medication. Peak values for each cluster are shown in bold.

Seed	Region	BA	MNI coordinates			Cluster size	T-Value
			x	y	z		
Right I-IV	<b>Thalamus</b>	--	<b>14</b>	<b>-20</b>	<b>14</b>	<b>192</b>	<b>13.05</b>
	Thalamus	--	12	-30	10	192	10.53
	Hippocampus	--	22	-34	-2	192	9.40
	<b>Posterior Cingulate</b>	<b>30</b>	<b>-4</b>	<b>-48</b>	<b>22</b>	<b>229</b>	<b>11.35</b>

	Precuneus	23	6	-48	24	229	10.39
	Cingulate gyrus	23	0	-26	28	229	10.23
Right V	<b>Posterior Cingulate</b>	<b>23</b>	<b>-6</b>	<b>-50</b>	<b>22</b>	<b>210</b>	<b>11.08</b>
	Precuneus	23	6	-48	26	210	10.66
	Posterior Cingulate	23	-6	-38	28	210	10.10

**Supplementary Table 2.** MNI coordinates of the local maxima of brain regions showing significant functional connectivity with cerebellar seed regions in Parkinson's patients OFF medication. Peak values for each cluster are shown in bold.

Seed	Region	BA	MNI coordinates			Cluster size	T-Value
			x	y	z		
Right Crus I	<b>Precuneus</b>	<b>7</b>	<b>2</b>	<b>-68</b>	<b>40</b>	<b>1697</b>	<b>14.05</b>
	Cuneus	19	-6	-80	38	1697	11.61
	Cuneus	19	12	-70	40	1697	11.56
	<b>Caudate</b>	<b>--</b>	<b>16</b>	<b>16</b>	<b>16</b>	<b>102</b>	<b>11.63</b>
	Caudate	--	20	8	20	102	7.91
	<b>Superior Frontal Gyrus</b>	<b>46</b>	<b>26</b>	<b>48</b>	<b>10</b>	<b>198</b>	<b>11.31</b>
	Superior Frontal Gyrus	46	24	48	18	198	11.01
	Middle Frontal Gyrus	11	30	54	4	198	9.62
	<b>Superior Occipital Gyrus</b>	<b>18</b>	<b>-20</b>	<b>-100</b>	<b>16</b>	<b>392</b>	<b>11.13</b>
	Middle Occipital	18	-30	-94	6	392	10.60
	<b>Angular Gyrus</b>	<b>7</b>	<b>-36</b>	<b>-62</b>	<b>38</b>	<b>340</b>	<b>10.98</b>
	Inferior Parietal Gyrus	40	-48	-50	40	340	10.72

	Angular Gyrus	39	-46	-60	28	340	9.26
	<b>Inferior Temporal Gyrus</b>	<b>20</b>	<b>-46</b>	<b>-26</b>	<b>-8</b>	<b>183</b>	<b>10.87</b>
	Inferior Temporal Gyrus	20	-44	-28	-16	183	10.00
	Hippocampus	20	-36	-22	-14	183	8.73
	<b>Middle Temporal Gyrus</b>	<b>37</b>	<b>42</b>	<b>-62</b>	<b>12</b>	<b>127</b>	<b>10.84</b>
	Middle Occipital Gyrus	39	34	-72	20	127	9.88
	Middle Occipital Gyrus	39	38	-76	30	127	9.70
	<b>Medial Superior Frontal Gyrus</b>	<b>9</b>	<b>4</b>	<b>52</b>	<b>44</b>	<b>119</b>	<b>10.54</b>
	Medial Superior Frontal Gyrus	8	0	40	52	119	10.53
	<b>Middle Frontal Gyrus</b>	<b>46</b>	<b>-26</b>	<b>48</b>	<b>32</b>	<b>367</b>	<b>10.49</b>
	Middle Frontal Gyrus	46	-28	40	30	367	10.45
	Middle Frontal Gyrus	46	-40	42	24	367	10.00
	<b>Orbital Medial Frontal Cortex</b>	<b>11</b>	<b>-32</b>	<b>56</b>	<b>-6</b>	<b>153</b>	<b>9.48</b>
	Orbital Superior Frontal Cortex	11	-26	56	0	153	9.28
	Middle Frontal Gyrus	47	-34	46	4	153	8.67
Right Crus II	<b>Superior Frontal Gyrus</b>	<b>46</b>	<b>24</b>	<b>46</b>	<b>14</b>	<b>433</b>	<b>14.89</b>
	Middle Frontal Gyrus	46	44	52	8	433	10.79
	Orbital Superior Frontal Cortex	11	22	58	0	433	9.31

	<b>Posterior Cingulate</b>	<b>23</b>	<b>-10</b>	<b>-50</b>	<b>28</b>	<b>1992</b>	<b>14.81</b>
	Thalamus	--	6	-20	12	1992	11.73
	Thalamus	--	-2	-18	10	1992	11.71
	<b>Fusiform Gyrus</b>	<b>20</b>	<b>-42</b>	<b>-26</b>	<b>-14</b>	<b>387</b>	<b>12.39</b>
	Middle Temporal Gyrus	20	-60	-18	-22	387	10.70
	Middle Temporal Gyrus	20	-52	-14	-12	387	9.95
	<b>Orbital Medial Frontal Cortex</b>	<b>11</b>	<b>-4</b>	<b>50</b>	<b>-12</b>	<b>238</b>	<b>12.12</b>
	Anterior Cingulate	10	-6	44	-4	238	10.17
	Orbital Medial Frontal Cortex	10	10	44	-8	238	10.10
	<b>Hippocampus</b>	<b>--</b>	<b>40</b>	<b>-22</b>	<b>-16</b>	<b>507</b>	<b>11.73</b>
	Inferior Temporal Gyrus	20	62	-28	-16	507	11.03
	Inferior Temporal Gyrus	20	52	-14	-24	507	10.81
	<b>Angular Gyrus</b>	<b>39</b>	<b>-48</b>	<b>-68</b>	<b>40</b>	<b>125</b>	<b>10.39</b>
	Angular Gyrus	39	-44	-60	26	125	9.34
	Angular Gyrus	39	-42	-62	36	125	9.31
	<b>Caudate</b>	<b>--</b>	<b>-18</b>	<b>-10</b>	<b>22</b>	<b>113</b>	<b>9.84</b>
Right I-IV	<b>Inferior Parietal Gyrus</b>	<b>40</b>	<b>42</b>	<b>-48</b>	<b>44</b>	<b>688</b>	<b>13.15</b>
	Inferior Parietal Gyrus	40	48	-54	50	688	11.05
	Angular Gyrus	39	42	-58	44	688	10.36
	<b>Inferior Temporal Gyrus</b>	<b>20</b>	<b>48</b>	<b>-38</b>	<b>-20</b>	<b>255</b>	<b>12.87</b>
	Inferior Temporal Gyrus	20	50	-28	-24	255	9.88

	<b>Angular Gyrus</b>	<b>39</b>	<b>-54</b>	<b>-66</b>	<b>34</b>	<b>339</b>	<b>11.80</b>
	Angular Gyrus	40	-40	-50	36	339	9.55
	Angular Gyrus	39	-44	-58	44	339	9.50
	<b>Middle Frontal Gyrus</b>	<b>46</b>	<b>28</b>	<b>52</b>	<b>30</b>	<b>234</b>	<b>10.58</b>
	Middle Frontal Gyrus	44	40	24	38	234	10.44
	Middle Frontal Gyrus	9	26	28	34	234	9.84
	<b>Middle Occipital Gyrus</b>	<b>19</b>	<b>-32</b>	<b>-86</b>	<b>34</b>	<b>102</b>	<b>9.84</b>
	Superior Occipital Gyrus	19	-24	-82	34	102	9.33
Right V	<b>Inferior Parietal Gyrus</b>	<b>40</b>	<b>46</b>	<b>-54</b>	<b>42</b>	<b>1270</b>	<b>12.22</b>
	Angular Gyrus	7	34	-68	54	1270	11.21
	Inferior Parietal Gyrus	2	52	-36	50	1270	10.40
	<b>Rostral Cingulate Zone</b>	<b>24</b>	<b>-8</b>	<b>34</b>	<b>14</b>	<b>222</b>	<b>11.46</b>
	Rostral Cingulate Zone	32	-6	30	24	222	9.25
	Rostral Cingulate Zone	32	-6	42	16	222	9.25
	<b>Middle Temporal Gyrus</b>	<b>20</b>	<b>56</b>	<b>-26</b>	<b>-8</b>	<b>790</b>	<b>11.40</b>
	Inferior Temporal Gyrus	20	56	-20	-22	790	11.30
	<b>Middle Frontal Gyrus</b>	<b>46</b>	<b>-36</b>	<b>28</b>	<b>34</b>	<b>372</b>	<b>11.20</b>
	Middle Frontal Gyrus	9	-28	32	46	372	11.20
	Inferior Frontal Gyrus	48	-46	24	26	372	9.89

	<b>Postcentral Gyrus</b>	<b>48</b>	<b>54</b>	<b>-20</b>	<b>36</b>	<b>138</b>	<b>9.26</b>
	<b>Middle Occipital Gyrus</b>	<b>19</b>	<b>-32</b>	<b>-84</b>	<b>32</b>	<b>138</b>	<b>11.06</b>
	Superior Occipital Gyrus	19	-24	-84	36	138	9.68
	Superior Occipital Gyrus	19	-22	-92	34	138	9.39
	<b>Rostral Cingulate Zone</b>	<b>32</b>	<b>6</b>	<b>40</b>	<b>18</b>	<b>131</b>	<b>9.38</b>
	Rostral Cingulate Zone	24	6	38	10	131	8.28
	<b>Middle Occipital Gyrus</b>	<b>19</b>	<b>-32</b>	<b>-68</b>	<b>36</b>	<b>274</b>	<b>9.76</b>
	Angular Gyrus	39	-42	-66	52	274	9.44
	Inferior Parietal Gyrus	40	-50	-44	40	274	9.26
Right VI	<b>Middle Frontal Gyrus</b>	<b>46</b>	<b>-36</b>	<b>42</b>	<b>26</b>	<b>277</b>	<b>11.48</b>
	Middle Frontal Gyrus	46	-40	52	16	277	9.90
	Middle Frontal Gyrus	46	-28	40	32	277	9.09
	<b>Middle Frontal Gyrus</b>	<b>46</b>	<b>40</b>	<b>50</b>	<b>14</b>	<b>257</b>	<b>11.09</b>
	Middle Frontal Gyrus	10	34	60	8	257	10.43
	Middle Frontal Gyrus	10	28	50	8	257	9.90
	<b>Superior Temporal Gyrus</b>	<b>48</b>	<b>-56</b>	<b>0</b>	<b>0</b>	<b>136</b>	<b>10.74</b>
	Superior Temporal Gyrus	48	-52	12	-2	136	10.25
	Inferior Frontal Gyrus	38	-48	18	-10	136	8.38

	<b>Postcentral Gyrus</b>	<b>2</b>	<b>-40</b>	<b>-44</b>	<b>64</b>	<b>117</b>	<b>10.48</b>
	Postcentral Gyrus	2	-56	-26	50	117	9.80
	Postcentral Gyrus	2	-50	-34	56	117	8.90
	<b>Rostral Cingulate Zone</b>	<b>32</b>	<b>-8</b>	<b>38</b>	<b>24</b>	<b>115</b>	<b>9.11</b>
	Rostral Cingulate Zone	32	-8	32	16	115	9.04
Right VIIIa	<b>Precuneus</b>	<b>5</b>	<b>0</b>	<b>-46</b>	<b>54</b>	<b>243</b>	<b>10.50</b>
	Precuneus	5	10	-54	68	243	10.08
	Precuneus	7	-2	-58	56	243	9.45

**Supplementary Table 3.** MNI coordinates of the local maxima of cerebellar regions showing significant functional connectivity with each cerebellar seed in Parkinson's patients ON medication. Peak values for each cluster are shown in bold.

Seed	Region	MNI coordinates			Cluster size	T-Value
		x	y	z		
Right Crus I	<b>Right VI</b>	<b>14</b>	<b>-67</b>	<b>-12</b>	<b>1316</b>	<b>21.24</b>
	Left V	-3	-69	-11	1316	13.03
	Right I-IV	9	-52	-7	1316	10.79
	<b>Right VI</b>	<b>37</b>	<b>-63</b>	<b>-25</b>	<b>9935</b>	<b>21.22</b>
	Right VI	30	-71	-23	9935	19.62
	<b>Right VIIb</b>	<b>31</b>	<b>-59</b>	<b>-45</b>	<b>817</b>	<b>16.84</b>
	Right Crus II	35	-68	-48	817	10.87
	<b>Right IX</b>	<b>9</b>	<b>-55</b>	<b>-40</b>	<b>287</b>	<b>11.50</b>
	Right IX	9	-47	-46	287	10.64
	<b>Left Crus I</b>	<b>-27</b>	<b>-71</b>	<b>-28</b>	<b>313</b>	<b>11.05</b>
	Left Crus I	-39	-64	-29	313	10.24
Right Crus II	<b>Right Crus I</b>	<b>14</b>	<b>-79</b>	<b>-31</b>	<b>7798</b>	<b>17.64</b>



	Right Crus I	39	-73	-28	7798	16.55
	<b>Right IX</b>	<b>8</b>	<b>-51</b>	<b>-45</b>	<b>451</b>	<b>15.68</b>
	<b>Left VI</b>	<b>-23</b>	<b>-68</b>	<b>-30</b>	<b>574</b>	<b>14.67</b>
	Left VI	-28	-58	-33	574	10.37
	<b>Left Crus I</b>	<b>-10</b>	<b>-78</b>	<b>-25</b>	<b>498</b>	<b>12.98</b>
	Left Crus II	-13	-89	-34	498	11.71
	Left Crus II	-10	-80	-38	498	9.25
	<b>Left Crus II</b>	<b>-26</b>	<b>-76</b>	<b>-42</b>	<b>330</b>	<b>12.72</b>
	Left Crus I	-27	-68	-37	330	10.47
	Left Crus I	-34	-64	-38	330	9.19
	<b>Left IX</b>	<b>-4</b>	<b>-54</b>	<b>-45</b>	<b>224</b>	<b>12.38</b>
	<b>Right VIIb</b>	<b>26</b>	<b>-66</b>	<b>-50</b>	<b>203</b>	<b>10.63</b>
	Right VIIb	22	-72	-54	203	9.11
	<b>Left Crus II</b>	<b>-15</b>	<b>-81</b>	<b>-50</b>	<b>133</b>	<b>10.39</b>
Right I-IV	<b>Left I-IV</b>	<b>-10</b>	<b>-39</b>	<b>-21</b>	<b>272950</b>	<b>25.42</b>
	<b>Vermis VI</b>	<b>-2</b>	<b>-64</b>	<b>-29</b>	<b>232</b>	<b>14.85</b>
	<b>Left Crus I</b>	<b>-11</b>	<b>-87</b>	<b>-28</b>	<b>128</b>	<b>11.00</b>
Right V	<b>Left Crus I</b>	<b>-29</b>	<b>-69</b>	<b>-28</b>	<b>441</b>	<b>11.32</b>
	Left VI	-12	-70	-24	441	9.66
	<b>Left Crus I</b>	<b>-44</b>	<b>-67</b>	<b>-32</b>	<b>173</b>	<b>10.37</b>
Right VI	<b>Right V</b>	<b>24</b>	<b>-47</b>	<b>-23</b>	<b>23786</b>	<b>23.84</b>
	<b>Vermis IX</b>	<b>-3</b>	<b>-58</b>	<b>-36</b>	<b>894</b>	<b>12.90</b>
	Vermis VIIIa	1	-55	-32	894	10.43
	Right IX	7	-52	-36	894	9.61
	<b>Left IX</b>	<b>-13</b>	<b>-53</b>	<b>-51</b>	<b>108</b>	<b>12.56</b>
	<b>Left Crus I</b>	<b>-38</b>	<b>-66</b>	<b>-35</b>	<b>190</b>	<b>12.32</b>
	Left Crus I	-37	-76	-34	190	10.54

	<b>Left Crus I</b>	<b>-11</b>	<b>-77</b>	<b>-27</b>	<b>158</b>	<b>11.40</b>
Right VIIIa	<b>Right VIIIb</b>	<b>27</b>	<b>-44</b>	<b>-45</b>	<b>2334</b>	<b>7.13</b>
Right VIIIb	<b>Left VIIIb</b>	<b>-15</b>	<b>-45</b>	<b>-54</b>	<b>491</b>	<b>13.02</b>
	Left VIIIb	-24	-43	-53	491	11.20

**Supplementary Table 4.** MNI coordinates of the local maxima of cerebellar regions showing significant functional connectivity with each cerebellar seed in Parkinson's patients OFF medication. Peak values for each cluster are shown in bold.

Seed	Region	MNI coordinates			Cluster size	T-Value
		x	y	z		
Right Crus I	<b>Right VI</b>	<b>17</b>	<b>-74</b>	<b>-25</b>	<b>411260</b>	<b>25.26</b>
	<b>Left V</b>	<b>-19</b>	<b>-48</b>	<b>-24</b>	<b>483</b>	<b>13.79</b>
	<b>Right I-IV</b>	<b>1</b>	<b>-51</b>	<b>-1</b>	<b>423</b>	<b>12.30</b>
	<b>Left IX</b>	<b>-10</b>	<b>-52</b>	<b>-45</b>	<b>847</b>	<b>12.13</b>
	Left VIIIb	-17	-44	-52	847	10.34
Right Crus II	<b>Right Crus I</b>	<b>42</b>	<b>-68</b>	<b>-25</b>	<b>419870</b>	<b>21.77</b>
	<b>Left IX</b>	<b>-10</b>	<b>-54</b>	<b>-44</b>	<b>847</b>	<b>15.62</b>
	Left IX	-13	-47	-52	847	10.87
	<b>Right X</b>	<b>26</b>	<b>-38</b>	<b>-40</b>	<b>409</b>	<b>13.34</b>
	Right X	20	-40	-47	409	10.40
Right I-IV	<b>Right V</b>	<b>25</b>	<b>-40</b>	<b>-27</b>	<b>330810</b>	<b>21.89</b>
Right V	<b>Left Crus I</b>	<b>-42</b>	<b>-73</b>	<b>-31</b>	<b>107</b>	<b>11.66</b>
Right VI	<b>Left Crus II</b>	<b>-32</b>	<b>-63</b>	<b>-46</b>	<b>11599</b>	<b>13.24</b>
	Left VIIb	-24	-66	-48	11599	11.36
	Left VIIb	-28	-72	-53	11599	11.13
	<b>Right Crus I</b>	<b>42</b>	<b>-75</b>	<b>-34</b>	<b>111</b>	<b>10.86</b>
	<b>Vermis IX</b>	<b>2</b>	<b>-61</b>	<b>-46</b>	<b>156</b>	<b>10.85</b>

	Right IX	6	-56	-53	156	10.05
Right VIIIa	<b>Right VI</b>	<b>16</b>	<b>-67</b>	<b>-23</b>	<b>2543</b>	<b>12.54</b>
	Right VI	31	-58	-31	2543	12.07
	Right VI	20	-60	-24	2543	10.98
	<b>Right Crus I</b>	<b>46</b>	<b>-60</b>	<b>-31</b>	<b>104</b>	<b>12.47</b>
	<b>Left VI</b>	<b>-30</b>	<b>-52</b>	<b>-30</b>	<b>619</b>	<b>12.43</b>
	Left Crus I	-37	-62	-30	619	10.20
	<b>Left VIIIb</b>	<b>-21</b>	<b>-51</b>	<b>-57</b>	<b>194</b>	<b>12.29</b>
	Left VIIIb	-26	-45	-52	194	10.39
	Left VIIIa	-34	-49	-50	194	10.33
	Left VIIIa	<b>-7</b>	<b>-67</b>	<b>-47</b>	<b>221</b>	<b>12.17</b>
Right VIIIb	<b>Right IX</b>	<b>6</b>	<b>-61</b>	<b>-47</b>	<b>3725</b>	<b>14.63</b>
	<b>Right VI</b>	<b>10</b>	<b>-63</b>	<b>-23</b>	<b>565</b>	<b>20.70</b>
	Right V	10	-54	-19	565	10.24
	<b>Left VIIIb</b>	<b>-15</b>	<b>-46</b>	<b>-59</b>	<b>1944</b>	<b>15.53</b>
	Left VIIIb	-24	-49	-56	1944	12.43
	Left VIIIb	-14	-57	-59	1944	12.19
	<b>Left VI</b>	<b>-6</b>	<b>-68</b>	<b>-22</b>	<b>210</b>	<b>12.03</b>
	Left V	-2	-58	-23	210	10.84