

Table S1 The fiber bundles extracted

No.	X	Y	Z	Name
1	69	83	36	Middle cerebellar peduncle
2	89	97	40	Pontine crossing tract (a part of MCP)
3	93	152	77	Genu of corpus callosum
4	95	100	97	Body of corpus callosum
5	85	89	88	Splenium of corpus callosum
6	89	116	88	Fornix (column and body of fornix)
7	82	103	43	Corticospinal tract R
8	97	103	43	Corticospinal tract L
9	84	89	40	Medial lemniscus R
10	95	89	40	Medial lemniscus L
11	83	83	20	Inferior cerebellar peduncle R
12	96	83	20	Inferior cerebellar peduncle L
13	84	93	53	Superior cerebellar peduncle R
14	95	93	53	Superior cerebellar peduncle L
15	75	107	60	Cerebral peduncle R
16	104	107	60	Cerebral peduncle L
17	75	129	79	Anterior limb of internal capsule R
18	104	129	79	Anterior limb of internal capsule L
19	66	108	85	Posterior limb of internal capsule R
20	113	108	85	Posterior limb of internal capsule L
21	61	101	78	Retrolenticular part of internal capsule R
22	117	101	78	Retrolenticular part of internal capsule L
23	69	163	73	Anterior corona radiata R
24	110	163	73	Anterior corona radiata L
25	63	109	96	Superior corona radiata R
26	116	109	96	Superior corona radiata L
27	64	99	99	Posterior corona radiata R
28	115	99	99	Posterior corona radiata L
29	57	64	73	Posterior thalamic radiation (include optic radiation) R
30	122	64	73	Posterior thalamic radiation (include optic radiation) L
31	48	97	60	Sagittal stratum (include inferior longitudinal fasciculus and inferior fronto-occipital fasciculus) R
32	131	97	60	Sagittal stratum (include inferior longitudinal fasciculus and inferior fronto-occipital fasciculus) L
33	58	131	64	External capsule R
34	121	131	64	External capsule L
35	83	132	105	Cingulum (cingulate gyrus) R
36	97	110	108	Cingulum (cingulate gyrus) L
37	66	101	53	Cingulum (hippocampus) R
38	112	99	54	Cingulum (hippocampus) L
39	62	100	66	Fornix (cres) / Stria terminalis (cannot be resolved with current resolution) R
40	117	100	66	Fornix (cres) / Stria terminalis (cannot be resolved with current resolution) L
41	53	103	102	Superior longitudinal fasciculus R
42	126	103	102	Superior longitudinal fasciculus L
43	69	121	93	Superior fronto-occipital fasciculus (could be a part of anterior internal capsule) R
44	110	121	93	Superior fronto-occipital fasciculus (could be a part of anterior internal capsule) L
45	55	127	54	Uncinate fasciculus R
46	123	125	58	Uncinate fasciculus L
47	60	78	86	Tapetum R
48	117	76	87	Tapetum L

**Table S2** Demographic and behavioral characteristics of the included participants

	HC		PD		P	
	HC-G/G	HC-G/A	PD-G/G	PD-G/A	P <sub>1</sub>	P <sub>2</sub>
No. (male)	15 (6)	13 (6)	12 (8)	14 (6)	0.743 <sup>d</sup>	0.255 <sup>d</sup>
Age	61.9±6.6	62.7±5.5	66.3±6.1	64.8±7.5	0.744 <sup>b</sup>	0.574 <sup>b</sup>
MMSE	25.8±2.2	25.4±2.9	25.3±2.7	24.7±2.2	0.87 <sup>a</sup>	0.436 <sup>c</sup>
H-Y	/	/	2.2±0.3	2.5±0.4	/	0.053 <sup>c</sup>
UPDRS-III	/	/	30.3±7.7	36.5±9.9	/	0.089 <sup>b</sup>

<sup>a</sup>, Chi-square test; <sup>b</sup>, independent sample *t*-test; <sup>c</sup>, Mann-Whitney U test; <sup>d</sup>, Fisher's exact probability method. P<0.05 was considered statistically significant. P<sub>1</sub>: the significance between HC-G/G and HC-G/A group; P<sub>2</sub>: the significance between PD-G/G and PD-G/A group; HC-G/G and HC-G/A respectively refer to the G/G subgroup and G/A subgroup in the HC group; PD-G/G and PD-G/A respectively refer to the G/G subgroup and G/A subgroup in the PD group. G/G-HC and G/G-PD respectively refer to the HC subgroup and PD subgroup in the G/G group. G/A-HC and G/A-PD refer to the HC subgroup and the PD subgroup in the G/A group. HC, Healthy control; PD, Parkinson's disease; G/G, Gene S/N167mutation noncarrier; G/A, Gene S/N167mutation carrier; MMSE, Mini Mental State Scale; H-Y, Hoehn-Yahr Stage scale; UPDRS-III, Unified Parkinson's Disease Rating scale.

**Table S3** Comparison of DTI imaging (FA) indices between the healthy controls and the patients with PD

Tracts	HC	PD	Voxel	Coordinate			P	Cohen's d	Cohen's r
				X	Y	Z			
Anterior corona radiata L	0.46±0.04	0.44±0.04	1004	71	158	63	*0.045 <sup>a</sup>	0.5	0.24
Anterior corona radiata R	0.51±0.03	0.48±0.04	268	103	138	67	**0.003 <sup>a</sup>	0.85	0.39
Anterior limb of internal capsule L	0.53±0.03	0.5±0.04	404	77	138	68	**0.009 <sup>a</sup>	0.85	0.39
Anterior limb of internal capsule R	0.58±0.03	0.55±0.04	1085	91	144	89	**0.007 <sup>b</sup>	0.85	0.39
Body of corpus callosum	0.44±0.02	0.42±0.03	758	123	115	59	**0.006 <sup>a</sup>	0.78	0.37
External capsule L	0.42±0.03	0.4±0.03	328	53	115	59	*0.013 <sup>b</sup>	0.67	0.32
External capsule R	0.56±0.03	0.54±0.03	207	122	110	61	**0.008 <sup>a</sup>	0.67	0.32
Fornix Stria terminalis L	0.56±0.04	0.54±0.04	92	58	111	61	*0.032 <sup>a</sup>	0.57	0.27
Fornix Stria terminalis R	0.65±0.03	0.62±0.04	772	87	155	78	**0.008 <sup>a</sup>	0.85	0.39
Genu of corpus callosum	0.44±0.02	0.42±0.03	279	118	85	91	*0.011 <sup>a</sup>	0.78	0.37
Posterior corona radiata L	0.42±0.02	0.4±0.03	133	65	101	97	**0.006 <sup>a</sup>	0.67	0.32
Posterior corona radiata R	0.58±0.04	0.55±0.04	331	56	65	69	*0.027 <sup>a</sup>	0.75	0.35
Posterior thalamic radiation R	0.57±0.02	0.56±0.02	263	127	100	69	*0.017 <sup>a</sup>	0.5	0.24
Retrolenticular part of internal capsule L	0.57±0.03	0.55±0.03	301	51	97	69	*0.031 <sup>a</sup>	0.67	0.32
Retrolenticular part of internal capsule R	0.59±0.03	0.57±0.03	97	106	82	96	*0.022 <sup>a</sup>	0.67	0.32
Splenium of corpus callosum	0.46±0.03	0.44±0.04	342	107	140	102	**0.009 <sup>b</sup>	0.57	0.27
Superior corona radiata L	0.44±0.03	0.42±0.04	219	64	109	107	*0.02 <sup>a</sup>	0.57	0.27
Superior corona radiata R	0.49±0.02	0.47±0.02	85	120	105	107	***0 <sup>a</sup>	1	0.45
Superior longitudinal fasciculus L	0.49±0.02	0.47±0.02	85	120	105	107	***0 <sup>a</sup>	1	0.45

<sup>a</sup>, independent sample *t*-test; <sup>b</sup>, Mann-Whitney U test; \*, P<0.05, \*\*, P<0.01, \*\*\*, P<0.001. L, left; R, right; FA, Fractional anisotropy; HC, Healthy control; PD, Parkinson's disease.

**Table S4** Comparison of DTI imaging (MD) indices between the healthy controls and the patients with PD

Tracts	HC (×10 <sup>-3</sup> )	PD (×10 <sup>-3</sup> )	Voxel	Coordinate			P	Cohen's d	Cohen's r
				X	Y	Z			
Posterior corona radiata L	0.78±0.02	0.82±0.05	81	116	96	95	**0.001 <sup>a</sup>	1.05	0.46
Posterior corona radiata R	0.82±0.04	0.87±0.07	231	59	80	91	*0.025 <sup>b</sup>	0.88	0.4
Posterior thalamic radiation R	0.85±0.04	0.90±0.07	51	59	60	81	*0.002 <sup>b</sup>	0.88	0.88
Superior corona radiata L	0.76±0.03	0.79±0.03	190	115	103	97	***0 <sup>a</sup>	1	0.45
Superior corona radiata R	0.77±0.03	0.80±0.04	464	65	103	96	**0.001 <sup>a</sup>	0.85	0.39
Superior longitudinal fasciculus R	0.74±0.03	0.77±0.038	263	52	86	97	**0.002 <sup>a</sup>	0.85	0.39

<sup>a</sup>, independent sample *t*-test; <sup>b</sup>, Mann-Whitney U test; \*, P<0.05, \*\*, P<0.01, \*\*\*, P<0.001. L, left; R, right; MD, mean diffusivity; HC, Healthy control; PD, Parkinson's disease.

**Table S5** Comparison of DTI imaging (RD) indices between the healthy controls and the patients with PD

Tracts	HC ( $\times 10^{-3}$ )	PD ( $\times 10^{-3}$ )	Voxel	Coordinate			P	Cohen's d	Cohen's r
				X	Y	Z			
Anterior corona radiata L	0.57±0.04	0.6±0.07	546	109	153	63	*0.025 <sup>a</sup>	0.53	0.25
Anterior corona radiata R	0.57±0.05	0.59±0.06	772	74	162	67	0.077 <sup>a</sup>	0.36	0.18
Anterior limb of internal capsule L	0.5±0.05	0.56±0.09	262	103	138	67	*0.015 <sup>b</sup>	0.82	0.38
Anterior limb of internal capsule R	0.51±0.05	0.56±0.08	358	76	139	68	*0.016 <sup>b</sup>	0.75	0.35
Body of corpus callosum	0.56±0.05	0.59±0.06	862	91	144	89	*0.023 <sup>a</sup>	0.54	0.26
External capsule L	0.58±0.03	0.61±0.06	781	123	115	59	*0.011 <sup>a</sup>	0.63	0.3
External capsule R	0.59±0.05	0.63±0.07	288	62	141	63	*0.038 <sup>a</sup>	0.66	0.31
Fornix Stria terminalis L	0.52±0.03	0.55±0.04	91	118	99	66	**0.001 <sup>a</sup>	0.85	0.39
Genu of corpus callosum	0.49±0.05	0.53±0.07	698	85	154	79	**0.008 <sup>a</sup>	0.66	0.31
Posterior corona radiata L	0.6±0.04	0.63±0.06	409	119	75	91	*0.041 <sup>a</sup>	0.59	0.28
Posterior corona radiata R	0.6±0.04	0.63±0.06	300	59	78	91	*0.02 <sup>a</sup>	0.59	0.28
Posterior thalamic radiation L	0.54±0.05	0.57±0.06	245	125	67	69	*0.036 <sup>a</sup>	0.54	0.26
Posterior thalamic radiation R	0.53±0.04	0.56±0.06	513	56	65	69	*0.014 <sup>a</sup>	0.59	0.28
Retrolenticular part of internal capsule L	0.51±0.03	0.53±0.03	183	122	102	69	*0.01 <sup>a</sup>	0.67	0.32
Retrolenticular part of internal capsule R	0.54±0.05	0.57±0.05	117	51	95	69	0.075 <sup>a</sup>	0.6	0.29
Sagittal stratum L	0.59±0.03	0.61±0.05	82	129	113	58	0.069 <sup>a</sup>	0.49	0.24
Splenium of corpus callosum	0.49±0.04	0.51±0.04	100	107	82	96	*0.026 <sup>a</sup>	0.5	0.24
Superior corona radiata L	0.56±0.04	0.59±0.04	540	115	105	96	*0.012 <sup>a</sup>	0.75	0.35
Superior corona radiata R	0.57±0.03	0.6±0.05	590	65	103	96	**0.007 <sup>a</sup>	0.73	0.34
Superior fronto-occipital fasciculus L	0.54±0.05	0.58±0.09	44	112	126	91	0.063 <sup>b</sup>	0.55	0.26

<sup>a</sup>, independent sample *t*-test; <sup>b</sup>, Mann-Whitney U test. \*,  $P < 0.05$ , \*\*,  $P < 0.01$ . L, left; R, right; RD: radial diffusivity; HC, Healthy control; PD, Parkinson's disease.

**Table S6** Comparison of DTI imaging (FA) indices between G/A group and G/G group

Tracts	G/G	G/A	Voxel	Coordinate			P	Cohen's d	Cohen's r
				X	Y	Z			
Anterior corona radiata L	0.47±0.03	0.45±0.03	587	104	156	60	**0.01 <sup>a</sup>	0.67	0.32
Anterior corona radiata R	0.47±0.04	0.45±0.03	571	70	148	62	*0.024 <sup>a</sup>	0.57	0.27
Anterior limb of internal capsule L	0.57±0.03	0.54±0.03	656	103	138	67	***0 <sup>a</sup>	1	0.45
Anterior limb of internal capsule R	0.58±0.03	0.56±0.03	556	78	136	68	**0.003 <sup>a</sup>	0.67	0.32
Body of corpus callosum	0.61±0.04	0.59±0.03	676	85	96	93	*0.017 <sup>a</sup>	0.57	0.27
Cerebral peduncle L	0.7±0.02	0.68±0.02	512	99	96	51	***0 <sup>a</sup>	1	0.45
Cerebral peduncle R	0.7±0.02	0.68±0.02	349	78	99	51	***0 <sup>a</sup>	1	0.45
Cingulum cingulate gyrus L	0.54±0.04	0.52±0.03	35	100	92	104	*0.032 <sup>a</sup>	0.57	0.27
Corticospinal tract L	0.64±0.02	0.62±0.02	82	97	104	41	***0.001 <sup>a</sup>	1	0.45
External capsule L	0.46±0.03	0.44±0.02	943	123	115	59	**0.002 <sup>a</sup>	0.78	0.37
External capsule R	0.49±0.03	0.47±0.03	411	53	115	59	**0.002 <sup>a</sup>	0.67	0.32
Fornix Stria terminalis L	0.56±0.03	0.53±0.03	214	120	112	61	***0.001 <sup>a</sup>	1	0.45
Fornix Stria terminalis R	0.53±0.04	0.5±0.03	59	60	97	68	*0.031 <sup>a</sup>	0.85	0.39
Genu of corpus callosum	0.69±0.03	0.66±0.03	1413	101	153	64	**0.003 <sup>a</sup>	1	0.45
Inferior cerebellar peduncle L	0.51±0.03	0.49±0.03	54	99	77	45	*0.033 <sup>a</sup>	0.67	0.32
Inferior cerebellar peduncle R	0.53±0.03	0.5±0.03	65	84	83	21	**0.005 <sup>a</sup>	1	0.45
Medial lemniscus L	0.49±0.03	0.47±0.03	30	92	90	28	*0.018 <sup>a</sup>	0.67	0.32
Medial lemniscus R	0.6±0.03	0.58±0.03	106	86	91	28	**0.01 <sup>a</sup>	0.67	0.32
Middle cerebellar peduncle	0.54±0.02	0.51±0.02	534	65	62	32	***0 <sup>a</sup>	1.5	0.6
Pontine crossing tract	0.53±0.04	0.5±0.04	74	85	93	35	*0.025 <sup>a</sup>	0.75	0.35
Posterior corona radiata L	0.5±0.03	0.48±0.03	213	118	85	91	**0.008 <sup>a</sup>	0.67	0.32
Posterior corona radiata R	0.5±0.03	0.48±0.02	157	60	88	91	*0.011 <sup>a</sup>	0.78	0.37
Posterior limb of internal capsule L	0.68±0.02	0.66±0.02	838	110	107	68	***0 <sup>a</sup>	0.5	0.24
Posterior limb of internal capsule R	0.67±0.03	0.65±0.02	735	68	107	68	**0.002 <sup>a</sup>	0.78	0.37
Posterior thalamic radiation L	0.59±0.03	0.57±0.03	604	125	63	69	**0.007 <sup>a</sup>	0.67	0.32
Posterior thalamic radiation R	0.6±0.04	0.58±0.04	294	53	67	69	0.075 <sup>a</sup>	0.5	0.24
Retrolicular part of internal capsule L	0.6±0.02	0.58±0.02	684	129	98	69	***0 <sup>a</sup>	1	0.45
Retrolicular part of internal capsule R	0.58±0.03	0.56±0.02	449	50	88	69	**0.009 <sup>a</sup>	0.78	0.37
Sagittal stratum L	0.54±0.02	0.52±0.03	60	128	80	62	**0.01 <sup>a</sup>	0.78	0.37
Sagittal stratum R	0.52±0.03	0.5±0.03	397	50	114	56	*0.032 <sup>a</sup>	0.67	0.32
Splenium of corpus callosum	0.75±0.02	0.73±0.03	1244	73	84	79	**0.003 <sup>a</sup>	0.78	0.37
Superior cerebellar peduncle L	0.64±0.02	0.63±0.02	49	96	92	49	*0.025 <sup>a</sup>	0.5	0.24
Superior corona radiata L	0.49±0.03	0.47±0.02	1101	117	103	91	**0.001 <sup>a</sup>	0.78	0.37
Superior corona radiata R	0.48±0.03	0.46±0.02	813	63	103	91	**0.004 <sup>a</sup>	0.78	0.37
Superior fronto-occipital fasciculus L	0.46±0.05	0.43±0.03	50	112	126	91	0.022 <sup>b</sup>	0.73	0.34
Uncinate fasciculus L	0.52±0.04	0.49±0.04	43	125	124	51	*0.03 <sup>a</sup>	0.75	0.35
Uncinate fasciculus R	0.53±0.04	0.5±0.03	49	54	126	51	**0.004 <sup>a</sup>	0.85	0.39

<sup>a</sup>, independent sample *t*-test; <sup>b</sup>, Mann-Whitney U test; \*, P<0.05, \*\*, P<0.01,\*\*\*, P<0.001. L, left; R, right; FA, Fractional anisotropy; G/G, Gene S/N167 polymorphism Noncarriers; G/A, Gene S/N167 polymorphism Carriers.

**Table S7** Comparison of DTI imaging (MD) indices between G/A group and G/G group

Tracts	G/G ( $\times 10^{-3}$ )	G/A ( $\times 10^{-3}$ )	Voxel	Coordinate			P	Cohen's d	Cohen's r
				X	Y	Z			
Anterior corona radiata L	0.77±0.05	0.8±0.04	43	105	146	98	*0.021 <sup>a</sup>	0.66	0.31
Anterior limb of internal capsule L	0.73±0.03	0.78±0.06	126	106	143	70	***0 <sup>a</sup>	1.05	0.47
Anterior limb of internal capsule R	0.76±0.03	0.79±0.03	31	78	125	72	**0.008	1	0.45
Body of corpus callosum	0.88±0.05	0.93±0.04	138	91	116	97	***0 <sup>a</sup>	1.1	0.48
Cerebral peduncle R	0.73±0.03	0.78±0.03	69	78	99	51	***0 <sup>a</sup>	1.67	0.64
Corticospinal tract R	0.71±0.03	0.74±0.03	32	79	100	45	***0 <sup>a</sup>	1	0.45
External capsule L	0.77±0.04	0.81±0.04	435	124	124	67	**0.005 <sup>a</sup>	0.88	0.4
External capsule R	0.78±0.03	0.81±0.05	180	55	118	71	**0.003 <sup>b</sup>	0.73	0.34
Fornix Stria terminalis L	0.75±0.03	0.79±0.03	74	118	100	64	***0 <sup>a</sup>	1.33	0.55
Fornix Stria terminalis R	0.72±0.02	0.74±0.03	386	109	112	68	**0.002 <sup>a</sup>	0.57	0.27
Posterior limb of internal capsule R	0.74±0.03	0.76±0.03	270	76	119	68	**0.004 <sup>a</sup>	0.67	0.32
Posterior thalamic radiation L	0.82±0.04	0.86±0.05	200	125	71	69	**0.005 <sup>a</sup>	0.88	0.4
Posterior thalamic radiation R	0.81±0.03	0.84±0.05	301	54	62	69	**0.004 <sup>b</sup>	0.73	0.34
Retrolenticular part of internal capsule L	0.77±0.02	0.79±0.03	328	126	101	69	**0.001 <sup>a</sup>	2.75	0.81
Retrolenticular part of internal capsule R	0.8±0.03	0.82±0.03	95	54	88	79	**0.009 <sup>a</sup>	0.67	0.32
Sagittal stratum L	0.82±0.03	0.84±0.04	46	128	79	63	*0.011 <sup>a</sup>	0.57	0.27
Sagittal stratum R	0.82±0.03	0.85±0.04	246	46	99	57	*0.024 <sup>b</sup>	0.85	0.39
Superior corona radiata L	0.75±0.03	0.77±0.03	366	117	104	91	*0.011 <sup>a</sup>	0.67	0.32
Superior corona radiata R	0.75±0.03	0.78±0.03	142	63	104	91	**0.008 <sup>a</sup>	1	0.45
Superior longitudinal fasciculus L	0.73±0.02	0.75±0.03	323	124	96	97	**0.003 <sup>a</sup>	0.78	0.37
Superior longitudinal fasciculus R	0.75±0.03	0.77±0.03	126	55	94	97	**0.004 <sup>b</sup>	0.67	0.32

<sup>a</sup>, independent sample *t*-test; <sup>b</sup>, Mann-Whitney U test. \*,  $P < 0.05$ , \*\*,  $P < 0.01$ , \*\*\*,  $P < 0.001$ . L, left; R, right; MD, mean diffusivity; G/G, Gene S/N167 polymorphism Noncarriers; G/A, Gene S/N167 polymorphism Carriers.

**Table S8** Comparison of DTI imaging (RD) indices between G/A group and G/G group

Tracts	G/G ( $\times 10^{-3}$ )	G/A ( $\times 10^{-3}$ )	Voxel	Coordinate			P	Cohen's d	Cohen's r
				X	Y	Z			
Anterior corona radiata L	0.56±0.05	0.58±0.04	493	103	157	60	0.056 <sup>a</sup>	0.44	0.22
Anterior corona radiata R	0.56±0.06	0.59±0.05	256	70	148	62	0.063 <sup>a</sup>	0.54	0.26
Anterior limb of internal capsule L	0.47±0.04	0.51±0.04	580	103	138	67	***0 <sup>a</sup>	1	0.45
Anterior limb of internal capsule R	0.48±0.04	0.51±0.04	433	78	136	68	**0.004 <sup>a</sup>	0.75	0.35
Body of corpus callosum	0.52±0.05	0.55±0.04	481	86	129	96	**0.006 <sup>a</sup>	0.66	0.31
Cerebral peduncle L	0.36±0.02	0.4±0.02	426	99	96	51	***0 <sup>a</sup>	2	0.71
Cerebral peduncle R	0.38±0.03	0.41±0.02	286	78	99	51	***0 <sup>a</sup>	1.18	0.51
Corticospinal tract L	0.4±0.03	0.42±0.03	64	97	104	41	***0 <sup>a</sup>	0.67	0.32
Corticospinal tract R	0.38±0.04	0.4±0.03	28	78	101	47	*0.02 <sup>a</sup>	0.57	0.27
External capsule L	0.56±0.05	0.59±0.04	944	125	119	59	**0.007 <sup>a</sup>	0.66	0.31
External capsule R	0.55±0.04	0.59±0.04	259	55	122	69	**0.002 <sup>a</sup>	0.88	0.4
Fornix Stria terminalis L	0.51±0.03	0.55±0.04	151	120	109	62	***0 <sup>a</sup>	1.13	0.49
Genu of corpus callosum	0.42±0.05	0.46±0.04	1165	101	153	64	**0.008 <sup>a</sup>	0.88	0.4
Inferior cerebellar peduncle R	0.47±0.02	0.49±0.03	52	82	83	26	**0.002 <sup>a</sup>	0.78	0.37
Medial lemniscus R	0.44±0.03	0.46±0.02	46	83	86	40	**0.005 <sup>a</sup>	0.78	0.37
Middle cerebellar peduncle	0.43±0.02	0.45±0.03	551	59	69	29	**0.001 <sup>b</sup>	0.78	0.37
Pontine crossing tract	0.48±0.03	0.5±0.03	56	80	94	39	**0.002 <sup>a</sup>	0.67	0.32
Posterior corona radiata L	0.55±0.04	0.58±0.04	177	118	85	91	*0.028 <sup>a</sup>	0.75	0.35
Posterior corona radiata R	0.55±0.04	0.57±0.04	133	60	88	91	*0.048 <sup>a</sup>	0.5	0.24
Posterior limb of internal capsule L	0.38±0.02	0.41±0.03	819	110	107	68	***0 <sup>a</sup>	1.18	0.51
Posterior limb of internal capsule R	0.4±0.03	0.42±0.03	704	68	107	68	**0.003 <sup>a</sup>	0.67	0.32
Posterior thalamic radiation L	0.51±0.04	0.54±0.05	466	125	63	69	*0.012 <sup>a</sup>	0.66	0.31
Posterior thalamic radiation R	0.51±0.05	0.54±0.05	442	54	62	69	*0.048 <sup>b</sup>	0.6	0.29
Retrolicular part of internal capsule L	0.47±0.03	0.5±0.03	637	127	100	69	***0	1	0.45
Retrolicular part of internal capsule R	0.5±0.04	0.52±0.03	410	51	88	69	**0.006 <sup>a</sup>	0.57	0.27
Sagittal stratum L	0.55±0.03	0.57±0.04	67	128	80	62	*0.014 <sup>b</sup>	0.57	0.27
Sagittal stratum R	0.56±0.04	0.58±0.04	396	50	114	56	*0.032 <sup>a</sup>	0.5	0.24
Splenium of corpus callosum	0.31±0.04	0.34±0.03	741	72	82	80	**0.004 <sup>a</sup>	0.85	0.39
Superior corona radiata L	0.53±0.03	0.56±0.03	1059	117	103	91	**0.003 <sup>a</sup>	1	0.45
Superior corona radiata R	0.54±0.04	0.56±0.03	714	63	104	91	**0.007 <sup>a</sup>	0.57	0.27
Superior fronto-occipital fasciculus L	0.54±0.08	0.57±0.05	41	112	126	91	*0.02 <sup>b</sup>	0.45	0.22
Superior longitudinal fasciculus L	0.52±0.03	0.54±0.03	439	122	128	90	**0.003 <sup>a</sup>	0.67	0.32
Superior longitudinal fasciculus R	0.53±0.03	0.56±0.03	318	57	128	90	**0.002 <sup>b</sup>	1	0.45
Uncinate fasciculus R	0.51±0.04	0.54±0.05	46	54	126	52	*0.025 <sup>b</sup>	0.66	0.31

<sup>a</sup>, independent sample *t*-test; <sup>b</sup>, Mann-Whitney U test. \*,  $P < 0.05$ , \*\*,  $P < 0.01$ , \*\*\*,  $P < 0.001$ . L, left; R, right; RD, radial diffusivity; G/G, Gene S/N167 polymorphism Noncarriers; G/A, Gene S/N167 polymorphism Carriers.

**Table S9** Comparison of DTI imaging (FA) indices between PD- G/A group and PD-G/G group

Tracts	PD-GG	PD-GA	Voxel	Coordinate			P
				X	Y	Z	
Corticospinal tract L	0.5±0.09	0.46±0.05	82	97	104	41	**0.005
External capsule L	0.66±0.05	0.64±0.03	943	123	115	59	*0.036
External capsule R	0.46±0.04	0.43±0.02	411	53	115	59	*0.01
Fornix Stria terminalis L	0.27±0.03	0.25±0.02	214	120	112	61	*0.039
Genu of corpus callosum	0.53±0.04	0.5±0.03	1413	101	153	64	*0.023
Middle cerebellar peduncle	0.59±0.03	0.57±0.02	534	65	62	32	*0.024
Retrolenticular part of internal capsule L	0.59±0.04	0.57±0.04	684	129	98	69	*0.014

Bonferroni tests were used to assess between-group differences; \*, P<0.05, \*\*, P<0.01. L, left; R, right; FA, Fractional anisotropy; HC, Healthy control; PD, Parkinson's disease; G/G, Gene S/N167 polymorphism Noncarriers; G/A, Gene S/N167 polymorphism Carriers.

**Table S10** Comparison of DTI imaging (MD) indices between PD- G/A group and PD-G/G group

Tracts	PD-GG	PD-GA	Voxel	Coordinate			P
				X	Y	Z	
Anterior limb of internal capsule L	0.74±0.04	0.79±0.06	126	126	106	143	0.053
Corticospinal tract R	0.73±0.04	0.78±0.04	32	32	79	100	*0.023
External capsule L	0.78±0.05	0.82±0.04	435	435	124	124	0.05
Fornix Stria terminalis L	0.75±0.04	0.79±0.04	74	74	118	100	0.011

Bonferroni tests were used to assess between-group differences; \*, P<0.05, \*\*, P<0.01. L, left; R, right; MD, mean diffusivity; HC, Healthy control; PD, Parkinson's disease; G/G, Gene S/N167 polymorphism Noncarriers; G/A, Gene S/N167 polymorphism Carriers.

**Table S11** Comparison of DTI imaging (RD) indices between PD- G/A group and PD-G/G group

Tracts	PD-GG	PD-GA	Voxel	Coordinate			P
				X	Y	Z	
Anterior limb of internal capsule L	0.47±0.05	0.52±0.05	580	103	138	67	*0.049
Cerebral peduncle L	0.36±0.02	0.4±0.03	426	99	96	51	**0.002
Cerebral peduncle R	0.39±0.03	0.42±0.03	286	78	99	51	*0.048
Corticospinal tract L	0.4±0.03	0.43±0.03	64	97	104	41	**0.008
External capsule R	0.55±0.05	0.59±0.04	259	55	122	69	*0.046
Fornix Stria terminalis L	0.52±0.04	0.56±0.04	151	120	109	62	*0.01
Genu of corpus callosum	0.43±0.05	0.48±0.04	1165	101	153	64	*0.036
Retrolenticular part of internal capsule L	0.47±0.03	0.51±0.02	637	127	100	69	0.023

Bonferroni tests were used to assess between-group differences; \*, P<0.05, \*\*, P<0.01. L, left; R, right; RD, radial diffusivity; HC, Healthy control; PD, Parkinson's disease; G/G, Gene S/N167 polymorphism Noncarriers; G/A, Gene S/N167 polymorphism Carriers.

**Table S12** Comparison of DTI imaging (FA) indices between HC-G/A group and HC-G/G group

Tracts	HC-GG	HC-GA	Voxel	Coordinate			P
				X	Y	Z	
Anterior corona radiata L	0.48±0.03	0.48±0.03	587	104	156	60	0.564
Cerebral peduncle L	0.7±0.02	0.59±0.02	512	99	96	51	**0.001
Cerebral peduncle R	0.71±0.02	0.67±0.02	349	78	99	51	**0.001
Middle cerebellar peduncle	0.54±0.02	0.59±0.03	534	65	62	32	*0.037
Posterior limb of internal capsule L	0.69±0.02	0.48±0.03	838	110	107	68	**0.004
Posterior limb of internal capsule R	0.68±0.02	0.66±0.02	735	68	107	68	**0.002
Superior corona radiata L	0.49±0.02	0.63±0.03	1101	117	103	91	0.051
Superior corona radiata R	0.48±0.03	0.47±0.02	813	63	103	91	0.071

Bonferroni tests were used to assess between-group differences; \*, P<0.05, \*\*, P<0.01. L, left; R, right; FA, Fractional anisotropy; HC, Healthy control; PD, Parkinson's disease; G/G, Gene S/N167 polymorphism Noncarriers; G/A, Gene S/N167 polymorphism Carriers.

**Table S13** Comparison of DTI imaging (MD) indices between HC-G/A group and HC-G/G group

Tracts	HC-GG	HC-GA	Voxel	Coordinate			P
				X	Y	Z	
Anterior limb of internal capsule L	0.72±0.02	0.77±0.06	126	126	106	143	*0.032
Anterior limb of internal capsule R	0.76±0.02	0.8±0.03	31	31	78	125	*0.027
Body of corpus callosum	0.87±0.05	0.93±0.04	138	138	91	116	*0.013
Corticospinal tract R	0.73±0.03	0.78±0.02	32	32	79	100	**0.004
Superior corona radiata R	0.74±0.01	0.78±0.03	142	142	63	104	0.043

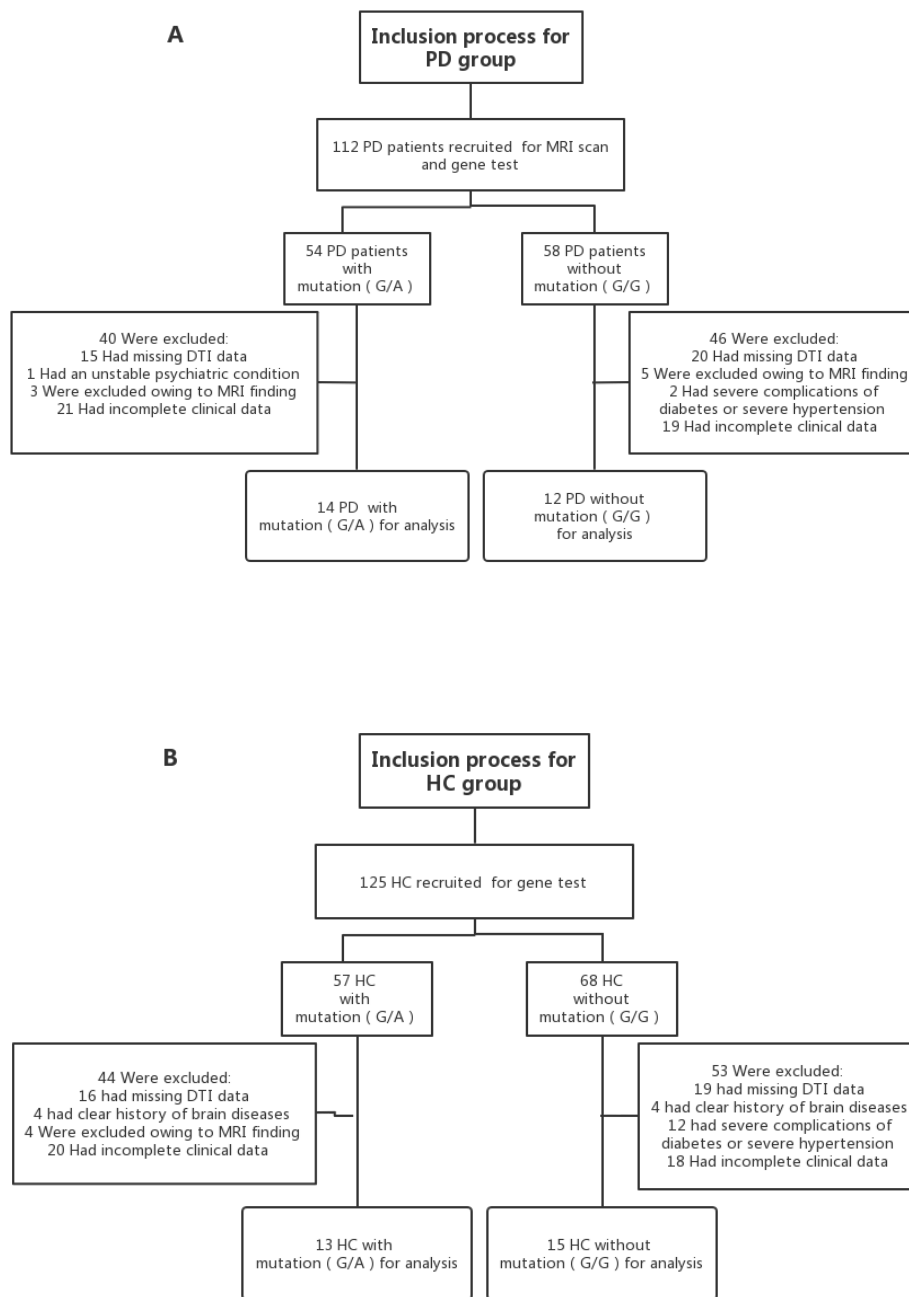
Bonferroni tests were used to assess between-group differences; \*, P<0.05, \*\*, P<0.01. L, left; R, right; MD, mean diffusivity; HC, Healthy control; PD, Parkinson's disease; G/G, Gene S/N167 polymorphism Noncarriers; G/A, Gene S/N167 polymorphism Carriers.

**Table S14** Comparison of DTI imaging (RD) indices between HC-G/A group and HC-G/G group

Tracts	PD-GG	PD-GA	Voxel	Coordinate			P
				X	Y	Z	
Anterior limb of internal capsule L	0.47±0.05	0.52±0.05	580	103	138	67	*0.049
Cerebral peduncle L	0.36±0.02	0.4±0.03	426	99	96	51	**0.002
Cerebral peduncle R	0.39±0.03	0.42±0.03	286	78	99	51	*0.048
Corticospinal tract L	0.4±0.03	0.43±0.03	64	97	104	41	**0.008
External capsule R	0.55±0.05	0.59±0.04	259	55	122	69	*0.046
Fornix Stria terminalis L	0.52±0.04	0.56±0.04	151	120	109	62	*0.01
Genu of corpus callosum	0.43±0.05	0.48±0.04	1165	101	153	64	*0.036
Retrolenticular part of internal capsule L	0.47±0.03	0.51±0.02	637	127	100	69	0.023

Bonferroni tests were used to assess between-group differences; \*, P<0.05, \*\*, P<0.01. L, left; R, right; RD, radial diffusivity; HC, Healthy control; PD, Parkinson's disease; G/G, Gene S/N167 polymorphism Noncarriers; G/A, Gene S/N167 polymorphism Carriers.





**Figure S1** The flow diagram of inclusion process for PD and HC group. (A) The flow diagram of inclusion process for PD group. (B) The flow diagram of inclusion process for HC group. HC, Healthy control; PD, Parkinson's disease; G/G, Gene S/N167 polymorphism noncarriers; G/A, Gene S/N167 polymorphism Carriers.