

Study	Study Aim	Study Groups	Number of Participants	Regions of Interest (ROI)	Brain Regions Identified	Interpretation Framework	Study Statistics	Statistically Significant
<a href="#">Ragothaman et al., 2022</a>	Can resting-state functional connectivity (rsFC) predict aspects of balance and posture control?	PwPD vs HOA	63 PwPD; 45 HOA	1. Cortical Areas: 360 ROIs from Human Connectome Project 2. Subcortical Areas: 16 ROIs from MN1-PD25 (Multi-Contrast Population Averaged PD Patients) atlas and 8 ROIs from the FreeSurfer ROIs	Auditory Cortex, Cingulo-Opercular Network, Dorsal-Attention Network, Default Mode Network, Frontoparietal Network, Language Network, Orbito-Affective Network, Posterior-Multimodal Network, Somatomotor Cortex, Ventral-Multimodal Network, and Visual Cortex	While at rest, alterations in brain communication are linked to dysfunction in various regions involved in postural control	Predictive Modeling & Partial Least Square Regression	PwPD have higher-order cortical networks associated with posture control
<a href="#">Müller-Oehring et al., 2016</a>	Does early stage PD showcase an abnormal modulation of functional connectivity at rest, completing a task, or both within the basal ganglia and its associated brain regions and networks when measured using fMRI?	PwPD vs HOA	11 PwPD; 11 HOA	Pu, Cd, GP, Th	Pu, Cd, GP, Th	Inherent differences are present in resting state functionality between the fMRI's of healthy older adults and PwPD	ANOVA, Rho Correlations, Multiple Linear Regression	Regression model testing all 4 PD severity factors was found to not be significant
<a href="#">Kaut et al., 2020</a>	Are there neural mechanisms that lead to postural instability between PwPD who fall, PwPD who do not fall, and HOA?	PwPD vs HOA	13 PwPD Fall Risk; 19 PwPD Non-Fall Risk; 13 HOA	Cerebellar cortex, Ver, PCun	Cb, Cd, PCun, Ver, BC, Posterior Cingulate Cortex, IPL	PwPD who fall show distinct patterns of brain connectivity compared to PwPD who do not fall and HOA	Multivariate Regression Analysis, T-tests, Linear Regression	In PwPD who fall, there was increased connectivity within the cerebellum compared to HOA. In PwPD who do not fall, there was decreased connectivity between the PCun and Cd compared to HOA
<a href="#">Rodriguez-Sahate et al., 2019</a>	Is the basal ganglia a “decentralized network” (DCN) and are there functional connectivity changes within the DCN in PwPD?	PwPD vs HOA	20 PwPD; 18 HOA	M1, S1, Pu, External Pd, Internal Pd, STN, SN, Th	M1, S1, Pu, External Pd, Internal Pd, STN, SN, Th	There are inherent differences in viewing the BG as a decentralized network as it reveals changes in connectivity patterns in Parkinson's disease patients	Multiple Correspondence Analysis, Correspondance Coefficient, Chi Squared	Statistically significant differences between configurations of BC activity between HOA and PwPD during resting state fMRIs and motor task fMRIs
<a href="#">Veréb et al., 2022</a>	What are the brain regions associated with visual dysfunction in PwPD?	PwPD vs HOA	15 PwPD; 16 HOA	Shaefer Atlas: Cortex divided into 100 parcels	Bilateral Frontal Eye Fields, IFG, ips, Visual Cortices, Th	PwPD exhibit altered functional connectivity in the visual and attentional networks of the brain	T-tests & Fisher Exact Tests	No significant differences in resting state functional connectivity between the PCun and VMPFC. Functional connectivity between the PPC, V1, SFG, and Op was less variable in PwPD
<a href="#">Ycager et al., 2024</a>	How do variations in intra-network functional connectivity of the FPN and inter-network functional connectivity between the SAL, BGN, and DMN correlate with cognitive impairments in PwPD?	PwPD vs HOA	82 PwPD; 19 HOA	BGN, SAL, FPN, DMN	L & R Cd, L&R Pu, L & R Pd, L & R Ac	While at rest, cognitive impairments in PwPD are related to changes in the communication between different brain areas	ANOVA, Fisher r-to-z transformation, Spearman Correlation Coefficient	Lower MoCA scores were significantly associated with lower intra-FPN functional connectivity, lower inter-network SAL-BGN functional connectivity, and lower inter-network FPN-DMN functional connectivity
<a href="#">Sang et al., 2015</a>	What are the altered topological properties of resting-state functional brain networks in early-stage PD?	PwPD vs HOA	26 PwPD; 30 HOA	Pd, IPL, SFG, Cd, SMA, PrG, MFG	Amg, AG, acs, Cd, Pu, CB, Cun, FuG, Hi, Ins, LgG, OB, Pd, PHG, PoG, PrG, PCL, PCun, Pu, SG, Th	Alterations in the topological properties of the resting-state functional brain network in early-stage PD are associated with changes in global efficiency and nodal centrality	Nonparametric tests, Pearson's Correlation Coefficient, Two sample t-tests, Chi-squared tests	Statistically significant negative correlations between the Unified Parkinson Disease Rating Scale motor scores and nodal centralities of SPG
<a href="#">Fang et al., 2017</a>	Does PD disrupts the global topological organization of whole-brain networks?	PwPD vs HOA	26 PwPD; 19 HOA	None	R IFG, R SFG, L cg, L Amg, R Amg, L IPL, R IPL, R AG, L Pd, R Pd, R Pu, L PrG, R SPFG, R MFG, L MFG, R MFG, L IFG, L SMA, R OC, L Cun, R Cun, R FuG, L SPG, L Cd	Changes in the topological organization of functional brain network in early-stage Parkinson's disease are linked to alterations in connectivity patterns of cognition-related brain regions	Pearson's Correlation Coefficient, Nonparametric Permutation Test, Multiple Linear Regression, Area Under the Curve, One-tailed Sign Test	Our results further revealed lower global and local efficiency in the sensorimotor and visual networks, and higher global and local efficiency in DMN and the Cb in PwPD vs HOA.
<a href="#">Schipper et al., 2018</a>	What changes occur in functional brain connectivity architecture on a whole brain and network level in patients with Parkinson's disease?	PwPD vs HOA	107 PwPD; 58 HOA	None	PCun, cg, Cun, LgG, cg, cg, SPG, R MFG, RTL, R Th, R Hi, R Pd, Pu	Changes in the functional brain connectivity in Parkinson's disease is associated with alterations in connectivity brain regions involved in motor control and cognitive function in PD patients	T-test, Chi-squared Test	Increased connectivity in the PCun and PCC and increased functional connectivity within S1

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<a href="#"><u>Hon et al., 2018</u></a>	What is the relationship between disrupted topographic organization and disease severity in Parkinson's Disease?	PwPD vs HOA	20 PwPD; 20 HOA	OL, Amg, Acs, LgG, SOG	OL, Amg, Acs, LgG, SOG	Disrupted topographic organization and changes in functional brain connectivity affect the severity of PD patients	T-test, Chi-squared Test, Pearson's Correlation Coefficient, Non-Parametric Permutation Method	Occipital regions was significantly correlated with UPDRS-III scores
<a href="#"><u>Tuovinen et al., 2018</u></a>	Are there longitudinal abnormalities of functional connectivity and its relation to motor disability in early to moderately advanced stages of Parkinson's disease patients?	PwPD vs HOA	16 PwPD; 16 HOA	Cb, S1	PrG, SMA, PoG, cg, eg, PCL, IFG, R Ins, R LgG, L MOG, L SMG, SMN, SAL, Cb	Alterations of functional connectivity longitudinally revealed that Parkinson's disease impacts the overall architecture of connectivity in the brain	T-tests, Pearson's Correlation Coefficient	The Cb showed additional hyperconnectivity within itself and to the Cd, Th, and Amg compared to controls
<a href="#"><u>Wu et al., 2009</u></a>	What is the functional connectivity of brain motor networks in the resting state in patients with Parkinson's disease (PD)?	PwPD vs HOA	22 PwPD; 22 HOA	Cb, cg, GP, M1, PMC, Pu, SMA, Th	Cb, cg, GP, M1, PMC, Pu, SMA, Th	Inherent differences are present in resting state functionality between the resting state fMRI of healthy older adults and older adults with PD	Paired T-tests, Correlation Analysis	PwPD had significantly decreased functional connectivity in the SMA, PFC, and Pu. PwPD had increased functional connectivity in the L Pu, Cb, and M1
<a href="#"><u>Wu et al., 2011</u></a>	What are the functional connectivity of brain networks during resting state in PD?	PwPD vs HOA	18 PwPD; 18 HOA	cg, M1, SMA	M1, SMA, PMC, MFG, Ins, IPL, Pu, MFG, cg, PCun, cg, PHG, STL, MTL, Cb	Inherent differences are present in resting state functionality between the resting state fMRI of healthy older adults and older adults with PD	One Sample T-test, Correlation Analysis	Positive and negative networks are in functionally abnormal patterns in PD. Networks related to motor preparation and initiation have more abnormalities than that of motor execution networks.
<a href="#"><u>Baudrexel et al., 2011</u></a>	How do alterations in the subthalamic nuclei indicate motor network functional connectivity in PD patients?	PwPD vs HOA	31 PwPD; 44 HOA	M1, PMC, SMA	L PrG, L PoG, L PCL, R PCL, R SMA	Changes in the subthamic nuclei connectivity to motor areas of the brain in PD patients	Correlation Analysis, One Sample T-Test, ANOVA	Tremor patients showed increased functional connectivity of the M1. Non-tremor patients showed increased functional connectivity between the STN and SMA
<a href="#"><u>Hacker et al., 2012</u></a>	Which brain structures are more functionally affected by PD?	PwPD vs HOA	13 PwPD; 19 HOA	cortico-striatal-thalamic loops	Th, Cb	Changes in Parkinson's disease appear primarily in the lower brainstem with anatomical progression to other parts of the neuroaxis	Correlation Analysis	Parkinson's disease group was markedly lower striatal correlations with thalamus, midbrain, pons and cerebellum

KEY: PwPD = People with Parkinson's Disease; PD = Parkinson's Disease; HOA = Healthy Older Adults; fMRI = functional magnetic resonance imaging; L = Left; R = Right; Pu = Putamen; Cd = Caudate Nucleus; GP = Globus Pallidus; Th = Thalamus; Ver = Vermis; PCun = Precuneus; Cb = Cerebellum; BC = Basal Nucleus (Basal Ganglia); IPL = Inferior Parietal Lobule; IFG = Inferior Frontal Gyrus; Ips = Intraparietal Sulcus; VMPFC = Ventromedial Prefrontal Cortex; PPC = Posterior Parietal Cortex; V1 = Primary Visual Cortex; SFG = Superior Frontal Gyrus; Op = Opercular Cortex; FPN = Frontoparietal Network; SAL = Salience Network; BGN = Basal Ganglia Network; DMN = Default Mode Network; Pd = Pallidum; SMA = Supplementary Motor Area; PrG = Precentral Gyrus; MFG = Middle Frontal Gyrus; Amg = Amygdala; AG = Angular Gyrus; Acs = Calcarine Sulcus; CB = Cingulum Bundle; Cun = Cuneus; FuG = Fusiform Gyrus; Hi = Hippocampus; Ins = Insula; LgG = Lingual Gyrus; OB = Olfactory Bulb; PHG = Parahippocampal Gyrus; PoG = Postcentral Gyrus; PCL = Paracentral Lobule; SG = Gyrus Rectus; SPG = Superior Parietal Gyrus; cg = Cingulate Gyrus; SPFG = Superior Prefrontal Gyrus; OC = Olfactory Cortex; M1 = Primary Motor Cortex; STN = Subthalamic Nuclei; S1 = Primary Somatosensory Cortex; SN = Substantia Nigra; MOG = Middle Occipital Gyrus; OL = Occipital Lobe; SOG = Superior Occipital Gyrus; dlPFC = Dorsolateral Prefrontal Cortex; PMC = Premotor Cortex; STL = Superior Temporal Lobe; MTL = Middle Temporal Lobe.