Table S1. List of the top seven inhibited canonical pathways identified through integrative omics analysis.

No.	Ingenuity canonical pathways	−log(*p*-value)	Activation z-score	Related molecules
1	Neutrophil degranulation	2.96	-2.121	CO3, CD44, CH3L1, GROA, SAP3, HPT, PTPR2, TTHY
2	Neurotransmitter clearance	4.97	-2.000	3,4-dihydroxyphenylacetic acid, 5-hydroxyindol-3-acetic acid, 5-hydroxytryptamine, homovanillic acid
3	UFMylation signaling	3.66	-2.000	IL1B, IL6, L-glutamic acid, TNF
4	Sulfur amino acid metabolism	3.57	-2.000	betaine, glutathione disulfide, L-glutamic acid, taurine
5	Cargo recognition for clathrin-mediated endocytosis	2.77	-2.000	AP2B1, APOB, TGFA, TGON2
6	Clathrin-mediated endocytosis	2.44	-2.000	AP2B1, APOB, TGFA, TGON2
7	IL-10 signaling	2.28	-2.000	IL1B, IL6, nitric oxide, TNF

Table S2. List of the top seven activated canonical pathways identified through integrative omics analysis.

No.	Ingenuity canonical pathways	−log(*p*-value)	Activation z-score	Related molecules
1	Communication between innate and adaptive immune cells	1.31	2.828	IGHG4, HV102, KV401, LV147, IL1B, IL4, IL6, TNF
2	IL-33 signaling	3.77	2.449	CCL2, IL1B, IL4, IL6, nitric oxide, TNF
3	Activin inhibin signaling	2.63	2.236	IGHG4, IL1B, IL6, TGFB1, TNF
4	FCGR dependent phagocytosis	3.04	2.236	arachidonic acid, IGHG4, HV102, KV401, LV147
5	MAPK signaling (inhibiting influenza)	4.54	2.236	arachidonic acid, CCL2, IL1B, IL6, TNF
6	NAFLD signaling	4.99	2.121	APOB, D-fructose, IL17A, IL1B, IL4, IL6, TGFB1, TNF
7	Dendritic cell maturation	0.59	2.000	IGHG4, IL1B, IL6, TNF

Table S3. List of the top seven inhibited diseases and biological functions identified through integrative omics analysis.

No.	Diseases or functions annotation	−log(*p*-value)	Activation z-score	Related molecules
1	Tubulation of vascular endothelial cells	8.86	-2.894	5-hydroxytryptamine, APOH, CD44, GROA, SCF, SCG2, PEDF, TGFB1, TNF, VEGFA
2	Respiration of mitochondria	7.28	-2.63	betaine, inosine, L-glutamic acid, nitric oxide, spermidine, TGFB1, TNF
3	Mobilization of Ca2+	11.91	-2.579	5-hydroxytryptamine, CO3, CO4A/B, CCL2, CCL23, CCL28, CCL8, CD44, corticosterone, GROA, IL16, IL4, SCF, L-glutamic acid, NGF, NPY, TGFB1, TNF, VEGFA
4	Release of neurotransmitter	9.15	-2.578	2-phenethylamine, 5-hydroxytryptamine, CO3, corticosterone, IL1B, L-glutamic acid, levodopa, NGF, nitric oxide, NPY, PARK7, TNF
5	Proliferation of neuronal cells	9.67	-2.389	5-hydroxytryptamine, APOE, CCL2, CLUS, CSF1, ENPP2, IL17A, IL1B, IL6, inosine, SCF, levodopa, NGF, nitric oxide, NPY, putrescine, TGFA, TGFB1, TNF,VEGFA,VGF
6	Transmembrane potential of mitochondria	6.48	-2.354	arachidonic acid, IL1B, IL4, IL6, L-glutamic acid, levodopa, N-methyl-(R)-salsolinol, NGF, nitric oxide, PARK7, TGFB1, TNF
7	Growth of epithelial tissue	10.97	-2.894	5-hydroxytryptamine, APOH, CD44, GROA, SCF, SCG2, PEDF, TGFB1, TNF, VEGFA

Table S4. List of the top seven activated diseases and biological functions identified through integrative omics analysis.

No.	Diseases or functions annotation	−log(*p*-value)	Activation z-score	Related molecules
1	Apoptosis of vascular cells	8.95	3.147	5-hydroxytryptamine, arachidonic acid, PD1L1, IL1B, IL6, SCF, RET4, SCG2, taurine, TGFB1, TNF, VEGFA
2	Apoptosis of vascular endothelial cells	7.12	2.72	5-hydroxytryptamine, arachidonic acid, PD1L1, IL1B, RET4, SCG2, TGFB1, TNF, VEGFA
3	Visceromegaly	7.50	2.586	5-hydroxytryptamine, APOE, CO3, CO4A/B, CMGA, corticosterone, CSF1, HPT, IL17A, IL1B, IL4, IL6, nitric oxide, PARK7, NEC1, putrescine, RET4, 7B2, spermidine, taurine, TGFB1, TNF, VEGFA
4	Adhesion of connective tissue cells	7.28	2.449	CCL2, CD44, corticosterone, CSF1, IL1B, IL4, IL6, TGFB1, TNF, VEGFA
5	Aggregation of phagocytes	10.08	2.384	CD44, IL1B, IL4, IL6, SCF, KLKB1, TGFB1, TNF
6	Adhesion of lymphocytes	7.39	2.377	arachidonic acid, CCL2, CCL28, CD44, IL1B, IL4, IL6, TGFB1, TNF
7	Abnormal morphology of body cavity	8.15	2.356	5-hydroxytryptamine, APOE, CO3, CO4A/B, CCL28, PD1L1, CD44, CMGA, CLUS, corticosterone, CSF1, DNS2A, FGF19, HPT, SIAL, IL17A, IL1B, IL4, IL6, nitric oxide, PARK7, NEC1, PTPR2, putrescine, RET4, 7B2, spermidine, taurine, TGFA, TGFB1, TNF, VEGFA, VGF

Table S5. Ingenuity Pathway Analysis (IPA)-based Parkinson's disease-related microRNAs.

Symbol	Synonyms	Increased/ decreased	Source	Reference
miR-126a-5p	hsa-miR-126, hsa-miR-126-5p, miR-126, miR-126-5p, miR-126a-5p	Decreased	PBMC	[143]
miR-151-3p	hsa-miR-151-3p, hsa-miR-151a-3p, miR-151, miR-151-3p, miR-151a-3p	Decreased	PBMC	
miR-151-5p	hsa-miR-151-5p, hsa-miR-151a-5p, hsa-miR-151b, miR-151, miR-151-5p, miR-151a-5p, miR-151b	Decreased	PBMC	
miR-199a-5p	hsa-miR-199-s, hsa-miR-199a, hsa-mir-199a-1-5p, hsa-mir-199a-2-5p, hsa-miR-199a-5p, hsa-miR-199b-5p, miR-199a-5p, miR-199b, miR-199b-5p, Mir199-5p	Decreased	PBMC	
miR-23a-3p	hsa-miR-23a-3p, hsa-miR-23b-3p, hsa-miR-23c, miR-23a, miR-23a-3p, miR-23b-3p, miR-23c	Increased Decreased	Plasma Small extracellular vesicles from plasma	[144]
miR-708-5p	hsa-miR-3139, hsa-miR-28-5p, hsa-miR-708-5p, miR-3139, miR-28-5p, miR-708-5p, MIR28A-5p	Decreased	PBMC	[143]
mir-126	HSA-MIR-123, hsa-miR-126, MI0000149, microRNA 123, microRNA 126, microRNA 126a, microRNA 126b, Mir3567, miR-123, Mir126a, Mir126b, MIRN123, MIRN126, miRNA126	Decreased	PBMC	
mir-130	HSA-MIR-130, hsa-miR-301, hsa-miR-130a, hsa-miR-130b, hsa-miR-301a, hsa-miR-301b, microRNA 130, microRNA 301, microRNA 130a, microRNA 130b, microRNA 301a, microRNA 301b, MIR301, MIR130A, MIR130B, MIR301A, MIR301B, Mirn130, MIRN301, MIRN130A, MIRN130B, MIRN301A, MIRN301B, miRNA130A	Decreased	PBMC	
mir-147	hsa-mir-147, hsa-mir-147a, hsa-miR-147b, microRNA 147, microRNA 147a, microRNA 147b, MIR147A, MIR147B, MIRN147, MIRN147B	Decreased	PBMC	
mir-19	C13orf25, HSA-MIR-19A, hsa-miR-19b, hsa-mir-19b-1, hsa-mir-19b-2, microRNA 19, microRNA 19a, microRNA 19b, microRNA 19b-1, microRNA 19b-2, MIR17HG, MIR19A, MIR19A., miR-19a/b, MIR19B, MIR19B1, MIR19B2, MIRH1, MIRHG1, MIRN19A, Mirn19b, MIRN19B1, MIRN19B2, miRNA19A, miRNA19B1	Decreased	PBMC	
mir-199	HSA-MIR-199A, hsa-mir-199a-1, hsa-mir-199a-2, Hsa-mir199a-as, hsa-miR-199b, hsa-miR-199-s, MI0000280, microRNA 199, microRNA 199a-1, microRNA 199a-2, microRNA 199b, mir199 3p, mir199 5p, MIR199A, MIR199A1, MIR199A2, miR-199a-3p(2), miR-199a-5p(2), MIR199B, MIR-199-s, Mirn199, Mirn199a, MIRN199A1, MIRN199A2, Mirn199a-as, MIRN199B	Decreased	PBMC	

mir-23	hsa-miR-23a, hsa-miR-23a/b, hsa-miR-23b, microRNA 23a, microRNA 23b, MIR23A, MIR23B, MIRN23A, MIRN23B, miRNA23A, miRNA23B	Increased	Plasma	[144]
mir-26	HSA-MIR-26A, hsa-miR-26a-1, hsa-mir-26a-2, hsa-miR-26b, MI0000574, microRNA 26a, microRNA 26a-1, microRNA 26a-2, microRNA 26b, MIR26A1, MIR26A2, MIR26A, MIR26B, MIRN26A1, MIRN26A2, MIRN26A, MIRN26B	Decreased	PBMC	[143]
mir-28	hsa-miR-28, hsa-miR-151, hsa-mir-151a, hsa-mir-151b, microRNA 28, microRNA 151, microRNA 151a, microRNA 151b, microRNA 28A, microRNA 28c, MIR151, Mir3586, miR-28-A, MIR151A, MIR151B, Mir28c, MIRN28, MIRN151	Decreased	PBMC	
mir-29	hsa-miR-102, hsa-mir-29, hsa-miR-29a, HSA-MIR-29B, hsa-mir-29b-1, hsa-mir-29b-2, hsa-mir-29b-3, hsa-miR-29c, MI0000106, microRNA 29, microRNA 29a, microRNA 29b, microRNA 29b-1, microRNA 29b-2, microRNA 29c, microRNA 29 group, microRNA mir-29b-3, microRNA mir-29c-2, miR-102, MIR29A, MIR29B, MIR29B1, MIR29B2, Mir29b-3, MIR29C, Mir29c-2, miR-29 family, MIRN29, MIRN29A, MIRN29B, MIRN29B1, MIRN29B2, MIRN29C, miRNA29A, miRNA29B1, miRNA29C	Decreased	PBMC	
mir-30	hsa-miR-30, hsa-miR-30a, hsa-miR-30a-3p, hsa-miR-30b, HSA-MIR-30BN, HSA-MIR-30C, hsa-mir-30c-1, hsa-mir-30c-2, HSA-MIR-30D, hsa-miR-30e, hsa-miR-30e-5p, hsa-mir-97-6, MI0000099, microRNA 30a, microRNA 30B, microRNA 30C, microRNA 30c-1, microRNA 30c-2, microRNA 30d, microRNA 30e, miR-200, MIR30A, MIR30A3P, MIR30B, MIR30C, MIR30C1, MIR30C2, MIR30D, miR-30d-prec, MIR30E, Mir97, MIRN30A, MIRN30B, Mirn30c, MIRN30C1, MIRN30C2, MIRN30D, MIRN30E, MIRN30E-5P	Decreased	PBMC	
mir-335	hsa-miR-335, microRNA 335, microRNA mir-335, MIRN335, miRNA335	Decreased	PBMC	
mir-374	hsa-miR-374, hsa-miR-374a, hsa-miR-374b, hsa-miR-374c, microRNA 374, microRNA 374a, microRNA 374b, microRNA 374c, MIR374A, MIR374B, MIR374C, MIRN374, MIRN374A, MIRN374B`	Decreased	PBMC	

*PBMC: peripheral blood mononuclear cell