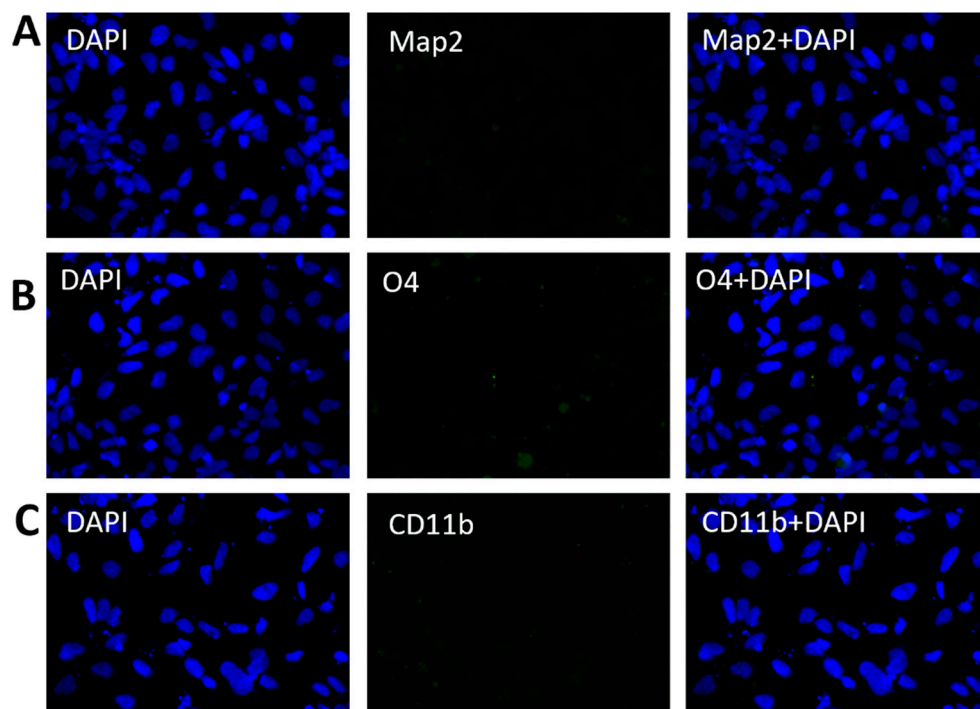
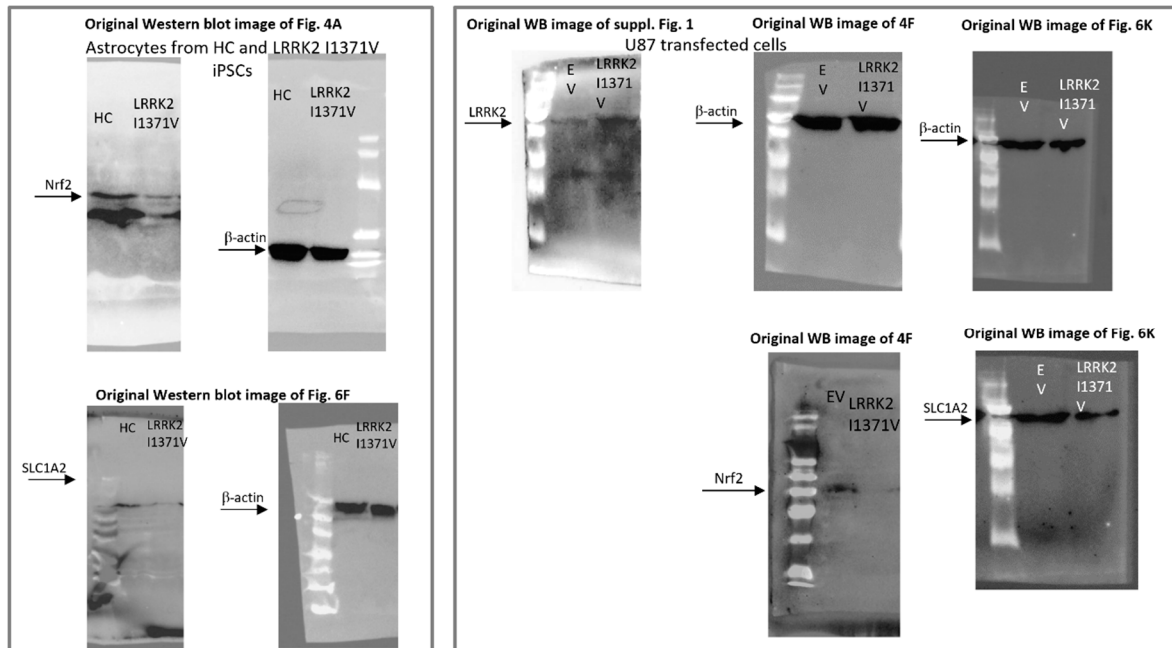


**Supplementary Figure S1:** (A,B) Representative FACS histogram of U87 cells transfected with empty vector (A) and U87 cells transfected with LRRK2 I1371V (B). Cells were identified by light scatter for 10,000 gated events. n=5. (C) Western blot bands obtained using antibodies against LRRK2 from 40μg of extracted cell lysate (EV: U87 cells transfected with EV, IV: U87 cells transfected with LRRK2 I1371V). (D) Densitometry plot of the bands obtained in western blot. Increased protein levels detected with IV cells [\*\*\*p < 0.001], Student's t-Test result: t = 5.6319.



**Supplementary Figure S2: Characterization of astrocytes for neuronal, oligodendrocyte and microglial markers:** (A-C) Representative ICC images of astrocytes from HC and PD iPSC lines immunostained for neuronal marker MAP2 (A), oligodendrocyte marker O4 (B), microglial marker CD11b (C), expression.



**Supplementary Figure S3:** Images of the whole western blots.

Supplementary Table S1: Research Resource Identifiers (RRID) and other details of the antibodies used in the study.

<u>S. No.</u>	<u>Name (target)</u>	<u>RRID citation</u>	<u>Species raised in</u>	<u>Concentration used</u>	<u>Link to website</u>
1	Anti-SSEA4 (SSEA4)	Thermo Fisher Scientific Cat# MA1-021, RRID:AB_2536687	Mouse	1:100 (Immunocytochemistry and Flow cytometry)	<a href="https://www.thermofisher.com/antibody/product/SSEA4-Antibody-clone-MC-813-70-Monoclonal/MA1-021">https://www.thermofisher.com/antibody/product/SSEA4-Antibody-clone-MC-813-70-Monoclonal/MA1-021</a>

2	Anti-A2B5 (A2B5)	Innovative Research Cat# 433110, RRID:AB_1501794	Mouse	1:100 (Immunocyto- chemistry and Flow cytometry)	<a href="https://www.thermofisher.com/antibody/product/A2B5-Antibody-clone-105-Monoclonal/433110">https://www.thermofisher.com/antibody/product/A2B5-Antibody-clone-105-Monoclonal/433110</a>
3	Anti-NF1A (NF1A)	Thermo Fisher Scientific Cat# PA5- 79735, RRID:AB_2746850	Rabbit	1:100 (Immunocyto- chemistry and Flow cytometry)	<a href="https://www.thermofisher.com/antibody/product/NF1A-Antibody-Polyclonal/PA5-79735">https://www.thermofisher.com/antibody/product/NF1A-Antibody-Polyclonal/PA5-79735</a>
4	Anti-GFAP (GFAP)	Thermo Fisher Scientific Cat# PA5- 16291, RRID:AB_10980769	Rabbit	1:100 (Immunocyto- chemistry and Flow cytometry)	<a href="https://www.thermofisher.com/antibody/product/GFAP-Antibody-Polyclonal/PA5-16291">https://www.thermofisher.com/antibody/product/GFAP-Antibody-Polyclonal/PA5-16291</a>
5	Anti- SLC1A2 (SLC1A2)	Sigma-Aldrich Cat# WH0006506M10, RRID:AB_1841786	Mouse	1:100 (Immunocyto- chemistry and Flow cytometry)	<a href="https://www.sigmaaldrich.com/IN/en/product/sigma/wh0006506m10">https://www.sigmaaldrich.com/IN/en/product/sigma/wh0006506m10</a>
6	Anti-Nanog (Nanog)	Abcam Cat# ab21624, RRID:AB_446437	Rabbit	1:100 (Immunocyto- chemistry and Flow cytometry)	<a href="https://www.abcam.com/nanog-antibody-ab21624.html">https://www.abcam.com/nanog-antibody-ab21624.html</a>
7	Recombinant Anti-Oct4 (Oct4)	Abcam Cat# ab21624, RRID:AB_446437	Rabbit	1:100 (Immunocyto- chemistry)	<a href="https://www.abcam.com/oct4-antibody-epr17929-chip-">https://www.abcam.com/oct4-antibody-epr17929-chip-</a>

		Abcam Cat# ab27985, RRID:AB_776898	Goat	1:100 (Flow cytometry)	grade- ab181557.html  <a href="https://www.abcam.com/oct4-antibody-ab27985.html">https://www.abcam.com/oct4-antibody-ab27985.html</a>
8	Anti-TRA-1-60 (TRA-1-60)	Abcam Cat# ab16288, RRID:AB_778563	Mouse	1:100 (Immunocytochemistry and Flow cytometry)	<a href="https://www.abcam.com/tra-1-60-r-antibody-tra-1-60-ab16288.html">https://www.abcam.com/tra-1-60-r-antibody-tra-1-60-ab16288.html</a>
9	Recombinant Anti-Nestin (Nestin)	Abcam Cat# ab176571, RRID:AB_2895536	Rabbit	1:100 (Immunocytochemistry and Flow cytometry)	<a href="https://www.abcam.com/nestin-antibody-epr13012-ab176571.html">https://www.abcam.com/nestin-antibody-epr13012-ab176571.html</a>
10	Recombinant Anti- Musashi1 (Musashi1 [Msi1])	Abcam Cat# ab52865, RRID:AB_881168	Rabbit	1:100 (Immunocytochemistry and Flow cytometry)	<a href="https://www.abcam.com/musashi-1-msi1-antibody-ep1302-ab52865.html">https://www.abcam.com/musashi-1-msi1-antibody-ep1302-ab52865.html</a>
11	Anti-S100 $\beta$ (S100-A1)	Abcam Cat# ab868, RRID:AB_306716	Rabbit	1:100 (Immunocytochemistry and flow cytometry)	<a href="https://www.citeab.com/antibodies/760370-ab868-anti-s100-antibody-astrocyte-marker">https://www.citeab.com/antibodies/760370-ab868-anti-s100-antibody-astrocyte-marker</a>
12	Anti- Aquaporin (Aquaporin 4)	Abcam Cat# ab46182, RRID:AB_955676	Rabbit	1:100 (Immunocytochemistry and flow cytometry)	<a href="https://www.abcam.com/aquaporin-4-antibody-ab46182.html">https://www.abcam.com/aquaporin-4-antibody-ab46182.html</a>
13	Anti-MAP2	Thermo Fisher Scientific Cat# MA5-	Mouse	1:100 (Immunocyto-	<a href="https://www.thermo-fisher.com/antibody">https://www.thermo-fisher.com/antibody</a>

		12823, RRID:AB_10982160		chemistry and flow cytometry)	/product/MAP2- Antibody-clone- AP20- Monoclonal/MA5- 12823
14	Anti-CD11b	Millipore Cat# CBL1512, RRID:AB_93253)	Mouse	1:100 (Immunocyto- chemistry and flow cytometry)	<a href="https://www.merckmillipore.com/IN/en/product/Anti-Integrin-M-CD11b-Antibody-clone-OX-42,MM_NF-CBL1512">https://www.merckmillipore.com/IN/en/product/Anti-Integrin-M-CD11b-Antibody-clone-OX-42,MM_NF-CBL1512</a>
15	Anti-O4	(R and D Systems Cat# MAB1326, RRID:AB_357617)	Mouse	1:100 (Immunocyto- chemistry and flow cytometry)	<a href="https://www.rndsystems.com/products/human-mouse-rat-chicken-oligodendrocyte-marker-o4-antibody-o4_mab1326#product-datasheets">https://www.rndsystems.com/products/human-mouse-rat-chicken-oligodendrocyte-marker-o4-antibody-o4_mab1326#product-datasheets</a>
16	Anti-MRP1 (MRP1)	Abcam Cat# ab24102, RRID:AB_447868	Mouse	1:100 (flow cytometry)	<a href="https://www.abcam.com/mrp1-antibody-mrpm5-ab24102.html">https://www.abcam.com/mrp1-antibody-mrpm5-ab24102.html</a>
17	Secondary antibody tagged with Alexa Fluor® 488 (IgG H&L)	Abcam Cat# ab150113, RRID:AB_2576208	Goat against mouse	1:200 (Immunocyto- chemistry and flow cytometry)	<a href="https://www.abcam.com/goat-mouse-igg-hl-alex-fluor-488-ab150113.html">https://www.abcam.com/goat-mouse-igg-hl-alex-fluor-488-ab150113.html</a>  <a href="https://www.abcam.com/goat-rabbit-igg-hl-alex-fluor-488-ab150113.html">abcam.com/goat-rabbit-igg-hl-alex-fluor-488-ab150113.html</a>

		Abcam Cat# ab150077, RRID:AB_2630356	Goat against rabbit		fluor-488- ab150077.html
18	Secondary antibody tagged with Alexa Fluor® 647 (IgG H&L)	Abcam Cat# ab150115, RRID:AB_2687948  Abcam Cat# ab150075, RRID:AB_2752244	Goat against mouse  Donkey against rabbit	1:200  (Immunocyto- chemistry and flow cytometry)	<a href="https://www.abcam.com/goat-mouse-igg-hl-alex-fluor-647-ab150115.html">https://www.abcam.com/goat-mouse-igg-hl-alex-fluor-647-ab150115.html</a>  <a href="https://www.abcam.com/donkey-rabbit-igg-hl-alex-fluor-647-ab150075.html">https://www.abcam.com/donkey-rabbit-igg-hl-alex-fluor-647-ab150075.html</a>
19	Anti-β-actin (β-actin)	(Abcam Cat# ab8227, RRID:AB_2305186)	Mouse	1:1000  (Western blot)	<a href="https://www.abcam.com/beta-actin-antibody-ab8227.html">https://www.abcam.com/beta-actin-antibody-ab8227.html</a>
20	HRP conjugated secondary antibody (IgG H&L)	Abcam Cat# ab97051, RRID:AB_10679369  Abcam Cat# ab97023, RRID:AB_10679675	Goat against rabbit  Goat against mouse	1:2000  (Western blot)	<a href="https://www.abcam.com/goat-rabbit-igg-hl-hrp-ab97051.html">https://www.abcam.com/goat-rabbit-igg-hl-hrp-ab97051.html</a>  <a href="https://www.abcam.com/goat-mouse-igg-hl-hrp-ab97023.html">https://www.abcam.com/goat-mouse-igg-hl-hrp-ab97023.html</a>
21	Anti- Vimentin antibody (Vimentin)	BD Biosciences Cat# 550513, RRID:AB_393716	Mouse	1:100  (Immunocyto- chemistry and flow cytometry)	<a href="https://www.bdbiosciences.com/ko-kr/products/reagents/microscopy-imaging-reagents/purified-mouse-anti-vimentin.550513">https://www.bdbiosciences.com/ko-kr/products/reagents/microscopy-imaging-reagents/purified-mouse-anti-vimentin.550513</a>

22	Anti-Nrf2 antibody (Nrf2)	Santa Cruz Biotechnology Cat# sc-365949, RRID:AB_10917561	Rabbit	1:1000 (Western blot) 1:100 (Immunocytochemistry)	<a href="https://www.scbt.com/p/nrf2-antibody-a-10">https://www.scbt.com/p/nrf2-antibody-a-10</a>
23	Anti-V5 tag antibody	Thermo Fisher Scientific Cat# MA1-34099, RRID:AB_1959285	Mouse	1:100 (Immunocytochemistry)	<a href="https://www.thermofisher.com/antibody/product/V5-Tag-Antibody-clone-SV5-Pk1-Monoclonal/MA1-34099">https://www.thermofisher.com/antibody/product/V5-Tag-Antibody-clone-SV5-Pk1-Monoclonal/MA1-34099</a>
24	Anti-LRRK2 antibody	Thermo Fisher Scientific Cat# PA5-18319, RRID:AB_10988665	Goat	1:1000 (Western blot)	<a href="https://www.thermofisher.com/antibody/product/LRRK2-Antibody-Polyclonal/PA5-18319">https://www.thermofisher.com/antibody/product/LRRK2-Antibody-Polyclonal/PA5-18319</a>

Supplementary Table S2: Primer list

Gene name	Forward/ Reverse	Sequence (5' – 3')
<i>18S</i>	Forward	CGGCTACCACATCCAAGGAA
	Reverse	GCTGGAATTACCGCGGCT
<i>CD44</i>	Forward	TTACACCTTTTCTACTGTACACCCC
	Reverse	TCAGATCCATGAGTGGTATGGGAC
<i>Nuclear factor 1 A-type (NF1A)</i>	Forward	GACTTCTGGCAAAGTTGCGG
	Reverse	TCGCATCTTGCCTTTCTGGT
<i>Glial fibrillary acidic protein (GFAP)</i>	Forward	ATCGAGAAGGTTGCTTCCTG
	Reverse	TGTTGGCGGTGAGTTGATCG
<i>S100β</i>	Forward	GGAGACAAGCACAAGCTGAAG
	Reverse	AGCTACAACACGGCTGGAAAG
<i>Aquaporin 4 (AQP4)</i>	Forward	GGAATCCTCTATCTGGTCACA
	Reverse	TGTTTGCTGGGCAGCTTTGCT
<i>Glutamine synthase (GS)</i>	Forward	CTGCCATACCAACTTCAGCACC
	Reverse	ATAGGCACGGATGTGGTACTGG

<i>System N amino acid transporter-1 (SN1)</i>	Forward	GCCACTTGTCATACAGACCTTCC
	Reverse	GGCAGAATGATGGTGACAGAGAC
<i>Solute carrier family 1, member 2 (SLC1A2)</i>	Forward	TGCCAACAGAGGACATCAGCCT
	Reverse	CAGCTCAGACTTGGAGAGGTGA
<i>Solute carrier family 1, member 3 (SLC1A3)</i>	Forward	GGTTGCTGCAAGCACTCATCAC
	Reverse	CACGCCATTGTTCTCTTCCAGG
<i>Glutamate dehydrogenase (GDH)</i>	Forward	CTCCAGACATGAGCACAGGTGA
	Reverse	CCAGTAGCAGAGATGCGTCCAT
<i>Glutathione synthetase (GSS)</i>	Forward	CCAAGACCGAAGGCTGTTTGTG
	Reverse	TGTGACCTCTCCAGCAGTAGAC
<i>Glutathione peroxidase (GPx)</i>	Forward	TTCGAGCCCAACTTCATGCT
	Reverse	CGATGTCAGGCTCGATGTCA
<i>Glutathione reductase (GR)</i>	Forward	TATGTGAGCCGCCTGAATGCCA
	Reverse	CACTGACCTCTATTGTGGGCTTG
<i>Glutamyl cysteine ligase C (GCLC)</i>	Forward	GGAAGTGGATGTGGACACCAGA
	Reverse	GCTTGTAGTCAGGATGGTTTGCG