

## Supplementary Information

Supplementary Table 1. iPSC Line Information

| <b>Lab identifier</b> | <b>Cell Line Name</b> | <b>Healthy (WT) or Patient (PD) Origin</b> | <b>Sex</b> | <b>Age Of sampling</b>   | <b>Age of onset</b> | <b>Source</b>                | <b>Ref #</b>     | <b>Karyotype</b>         |
|-----------------------|-----------------------|--------------------------------------------|------------|--------------------------|---------------------|------------------------------|------------------|--------------------------|
| 201                   | WT 1                  | WT                                         | F          | Cord<br>Blood<br>derived | -                   | GIBCO                        | A13777           | Normal                   |
| 232                   | WT 2                  | WT                                         | F          | 53                       | -                   | Reinhardt <i>et al.</i> 2013 |                  | Normal                   |
| 317                   | 3xSNCA<br>1           | PD                                         | F          | 55                       | 50                  | Coriell                      | ND2776<br>0      | 100kb<br>gain in<br>Chr1 |
| 336                   | 3xSNCA<br>2           | PD                                         | F          | 55                       | 50                  | EBISC - EDi001-A             | EDi001-<br>A     | Normal                   |
| 374                   | SNCA<br>KO            | PD                                         | F          | 55                       | 50                  | Chen <i>et al.</i> 2019      | AST23-<br>4KO-5B | Normal                   |

Supplementary Table 2. Antibody List

| <b>Antibody</b>                               | <b>Species</b> | <b>Concentration</b> | <b>Source</b>             | <b>Catalogue Number</b> | <b>RRID</b>      | <b>Used In</b>                |
|-----------------------------------------------|----------------|----------------------|---------------------------|-------------------------|------------------|-------------------------------|
| $\alpha$ -synuclein                           | rabbit         | 1:1000               | Santa Cruz                | sc-7011-R               | RRID:AB_2192953  | Western Blot                  |
| $\alpha$ -synuclein (2A7)                     | mouse          | 1:1000               | NOVUS Biologicals         | NBP1-05194              | RRID:AB_1555287  | Immunostaining / Western Blot |
| GFAP                                          | chicken        | 1:1000               | Millipore                 | AB5541                  | RRID:AB_177521   | Immunostaining                |
| Lamin B1                                      | rabbit         | 1:1000               | Abcam                     | ab16048                 | RRID:AB_443298   | Immunostaining                |
| MAP2                                          | chicken        | 1:1000               | Abcam                     | ab92434                 | RRID:AB_2138147  | Immunostaining                |
| MAP2                                          | mouse          | 1:1000               | Millipore                 | MAB3418                 | RRID:AB_11212326 | Immunostaining                |
| pH2AX                                         | rabbit         | 1:500                | Cell signaling technology | 2577S                   | RRID:AB_2118010  | Immunostaining                |
| Phospho- $\alpha$ -Synuclein (Ser129) (D1R1R) | rabbit         | 1:500                | Cell Signaling            | 23706S                  | RRID:AB_2798868  | Immunostaining / Western Blot |

|                      |         |          |                           |        |                     |                               |
|----------------------|---------|----------|---------------------------|--------|---------------------|-------------------------------|
| S100 $\beta$         | mouse   | 1:1000   | Sigma                     | S2532  | RRID:AB_4774<br>99  | Immunostaining                |
| $\beta$ -actin       | mouse   | 1:50,000 | Cell signaling technology | 3700   | RRID:AB_2242<br>334 | Western Blot                  |
| $\beta$ III Tubulin  | chicken | 1:1000   | Millipore                 | AB9354 | RRID:AB_5709<br>18  | Immunostaining                |
| $\beta$ III Tubulin  | mouse   | 1:20,000 | BioLegend                 | 801201 | RRID:AB_2313<br>773 | Western Blot                  |
| Tyrosine Hydroxylase | rabbit  | 1:1000   | Abcam                     | ab112  | RRID:AB_2978<br>40  | Immunostaining / Western Blot |
| Tyrosine Hydroxylase | mouse   | 1:400    | Sigma/Merck               | MAB318 | RRID:AB_2201<br>528 | Immunostaining                |