

**Table S1.** Concentrations (ng/10 mg tissue) of different molecular forms of sphingomyelins in the striatum and in the substantia nigra in mice two weeks after: the administration of 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) once at a single dose of 18 mg/kg (1x18), the administration of MPTP three times at a single dose of 10 mg/kg with a two-hour interval between injections (3x10), as well as after the of saline (control). The table shows mean values and standard error of the mean. \*p <0.05, significant differences compared to the control; # p <0.05, significant differences between the groups 1x18 and 3x10.

| Sphingomyelins<br>Groups |         | 14-0            | 16-1            | 16-0                             | 18-1                | 18-0                               | 20-1            | 20-0                               | 22-1              | 22-0            | 24-1                               | 24-0                | 26-1            | Total<br>concentration              |
|--------------------------|---------|-----------------|-----------------|----------------------------------|---------------------|------------------------------------|-----------------|------------------------------------|-------------------|-----------------|------------------------------------|---------------------|-----------------|-------------------------------------|
| Striatum                 | Control | 37.51<br>(2.63) | 33.52<br>(1.95) | 671.36<br>(22.89)                | 1917.46<br>(109.5)  | 12595.22<br>(319.91)               | 67.85<br>(3.02) | 2625.85<br>(69.53)                 | 207.96<br>(9.52)  | 13.57<br>(0.02) | 1820.82<br>(78.49)                 | 400.48<br>(15.15)   | 24.59<br>(1.04) | <b>20389.06</b><br><b>(469.25)</b>  |
|                          | 1x18    | 32.41<br>(0.86) | 32.65<br>(1.83) | 684.28<br>(39.77)                | 2082.71<br>(173.79) | 13741.3<br>(613.66)                | 60.79<br>(3.16) | <b>3794.40*</b><br><b>(137.36)</b> | 228.85<br>(14.20) | 13.63<br>(0.04) | 1648.24<br>(131.18)                | 457.41<br>(28.18)   | 24.58<br>(0.64) | <b>22801.25*</b><br><b>(895.48)</b> |
|                          | 3x10    | 31.93<br>(1.05) | 31.54<br>(1.29) | 678.83<br>(35.44)                | 1894.20<br>(128.80) | <b>11922.8#</b><br><b>(264.11)</b> | 59.41<br>(3.06) | <b>2780.12#</b><br><b>(79.81)</b>  | 231.86<br>(11.34) | 13.63<br>(0.03) | <b>2280.31#</b><br><b>(183.19)</b> | 547.41<br>(53.27)   | 19.95<br>(4.57) | <b>20491.94#</b><br><b>(618.58)</b> |
| SN                       | Control | 35.31<br>(0.95) | 27.85<br>(0.75) | 493.35<br>(41.63)                | 1380.62<br>(71.99)  | 11687.92<br>(479.81)               | 75.70<br>(2.60) | 2230.76<br>(106.93)                | 399.13<br>(18.51) | 14.05<br>(0.05) | 5915.17<br>(366.41)                | 1441.18<br>(102.52) | 57.06<br>(4.21) | <b>23758.11</b><br><b>(1149.1)</b>  |
|                          | 1x18    | 36.09<br>(1.25) | 28.63<br>(1.21) | <b>651.91*</b><br><b>(26.10)</b> | 1587.92<br>(73.64)  | <b>13203.9*</b><br><b>(335.08)</b> | 87.73<br>(7.38) | <b>3346.73*</b><br><b>(104.37)</b> | 468.65<br>(30.85) | 14.23<br>(0.08) | 6299.35<br>(337.01)                | 1497.04<br>(82.37)  | 50.31<br>(2.79) | <b>27241.58*</b><br><b>(713.77)</b> |
|                          | 3x10    | 35.91<br>(0.98) | 28.83<br>(0.50) | 591.76<br>(17.77)                | 1575.80<br>(62.03)  | 12756.55<br>(315.85)               | 76.78<br>(2.67) | <b>2529.77#</b><br><b>(142.19)</b> | 413.89<br>(12.68) | 14.09<br>(0.03) | 5989.51<br>(260.24)                | 1446.37<br>(63.25)  | 61.04<br>(3.43) | <b>25520.31</b><br><b>(712.38)</b>  |

**Table S2.** Concentrations (ng/10 mg tissue) of different molecular forms of ceramides in the striatum and in the substantia nigra in mice two weeks after: the administration of 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) once at a single dose of 18 mg/kg (1x18), the administration of MPTP three times at a single dose of 10 mg/kg with a two-hour interval between injections (3x10), as well as after the administration of saline (control). The table shows mean values and standard error of the mean. \*p <0.05, significant differences compared to the control; # p <0.05, significant differences between the groups 1x18 and 3x10.

| Ceramides<br>Groups |         | 14-0            | 16-0                          | 16-1           | 18-0                | 18-1           | 20-0            | 22-0            | 22-1           | 24-0            | 24-1              | 26-0           | 26-1           | Total concentration               |
|---------------------|---------|-----------------|-------------------------------|----------------|---------------------|----------------|-----------------|-----------------|----------------|-----------------|-------------------|----------------|----------------|-----------------------------------|
| Striatum            | Control | 8.73<br>(1.65)  | 45.55<br>(5.36)               | 1.21<br>(0.07) | 1078.46<br>(94.29)  | 3.78<br>(0.22) | 40.00<br>(2.66) | 24.11<br>(1.96) | 8.67<br>(0.90) | 19.19<br>(2.16) | 103.46<br>(14.04) | 6.30<br>(0.28) | 1.42<br>(0.06) | <b>1340.87</b><br><b>(122.65)</b> |
|                     | 1x18    | 11.47<br>(2.22) | 48.50<br>(6.64)               | 1.32<br>(0.08) | 1185.41<br>(186.01) | 3.69<br>(0.35) | 38.35<br>(4.86) | 26.28<br>(2.03) | 9.77<br>(1.57) | 17.63<br>(1.57) | 106.43<br>(17.75) | 7.04<br>(0.32) | 1.38<br>(0.04) | <b>1457.27</b><br><b>(214.23)</b> |
|                     | 3x10    | 9.60<br>(1.08)  | 50.02<br>(6.29)               | 1.21<br>(0.07) | 1024.16<br>(98.83)  | 3.73<br>(0.31) | 38.95<br>(2.83) | 21.72<br>(1.50) | 9.30<br>(0.99) | 21.19<br>(1.48) | 122.13<br>(13.04) | 7.41<br>(0.54) | 1.56<br>(0.08) | <b>1310.99</b><br><b>(120.89)</b> |
| SN                  | Control | 6.56<br>(0.95)  | 15.90<br>(2.65)               | 1.22<br>(0.13) | 479.57<br>(49.15)   | 1.86<br>(0.13) | 22.17<br>(0.84) | 21.72<br>(1.50) | 7.98<br>(0.38) | 22.86<br>(2.25) | 120.39<br>(16.28) | 7.54<br>(0.52) | 1.76<br>(0.07) | <b>709.52</b><br><b>(73.03)</b>   |
|                     | 1x18    | 5.53<br>(1.44)  | <b>23.2*</b><br><b>(1.19)</b> | 1.21<br>(0.15) | 572.86<br>(47.44)   | 1.95<br>(0.12) | 22.32<br>(0.61) | 25.65<br>(2.13) | 8.71<br>(0.40) | 25.77<br>(4.85) | 133.68<br>(10.96) | 6.90<br>(0.82) | 1.67<br>(0.13) | <b>827.80</b><br><b>(59.14)</b>   |
|                     | 3x10    | 4.86<br>(0.77)  | 19.21<br>(1.35)               | 1.18<br>(0.15) | 606.13<br>(39.57)   | 2.18<br>(0.08) | 24.28<br>(1.08) | 23.11<br>(0.85) | 8.64<br>(0.19) | 19.46<br>(0.61) | 128.24<br>(7.30)  | 6.35<br>(0.41) | 1.56<br>(0.06) | <b>845.20</b><br><b>(41.87)</b>   |

**Table S3.** Concentrations (ng/10 mg tissue) of different molecular types of hexosylceramides in the striatum and in the substantia nigra in mice two weeks after: the administration of 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) once at a single dose of 18 mg/kg (1x18), the administration of MPTP three times at a single dose of 10 mg/kg with a two-hour interval between injections (3x10), as well as after the administration of saline (control). The table shows mean values and standard error of the mean. \*p <0.05, significant differences compared to the control.

| Hexosylceramides<br>Groups |         | HexCer<br>18-0   | HexCer<br>20-0  | HexCer<br>22-0  | HexCer<br>24-0   | HexCer<br>24-1     | Total<br>concentration |
|----------------------------|---------|------------------|-----------------|-----------------|------------------|--------------------|------------------------|
| Striatum                   | Control | 51.21<br>(2.56)  | 7.33<br>(0.28)  | 48.10<br>(1.86) | 72.90<br>(3.54)  | 180.15<br>(8.27)   | 359.68<br>(14.63)      |
|                            | 1x18    | 58.93<br>(4.72)  | 9.57*<br>(0.70) | 50.56<br>(2.67) | 85.54<br>(7.77)  | 212.91<br>(14.12)  | 385.24<br>(49.22)      |
|                            | 3x10    | 61.23<br>(5.37)  | 8.96*<br>(0.27) | 55.62<br>(2.67) | 90.23<br>(5.32)  | 220.74*<br>(10.78) | 436.78*<br>(23.21)     |
| SN                         | Control | 100.79<br>(9.59) | 15.87<br>(0.63) | 91.86<br>(3.95) | 166.69<br>(9.60) | 434.08<br>(17.29)  | 809.30<br>(40.18)      |
|                            | 1x18    | 117.42<br>(6.90) | 16.26<br>(0.78) | 89.33<br>(3.37) | 182.71<br>(7.29) | 491.78<br>(20.43)  | 897.51<br>(34.77)      |
|                            | 3x10    | 116.14<br>(6.40) | 16.00<br>(0.78) | 96.70<br>(4.10) | 179.81<br>(9.07) | 470.41<br>(19.37)  | 879.05<br>(36.43)      |