

## **Description of Additional Supplementary Files**

File Name: Supplementary Movie 1

Description: A movie of a WT littermate (age P92) walking in the catwalk setup tunnel.

File Name: Supplementary Movie 2

Description: A movie of a R6/2 mouse (age P92) walking in the catwalk setup.

File Name: Supplementary Movie 3

Description: A typical video of R6/2 mouse that were received mCherry control virus injection. Virus was injected at age of 2 month and the behavior test was performed at 34 days post AAV injection.

File Name: Supplementary Movie 4

Description: Catwalk behavior test movie of R6/2 mouse that were treated by NeuroD1 + Dlx2 AAV. Virus was injected at age of 2 month and the behavior test was performed at 34 days post AAV injection.

File Name: Supplementary Movie 5

Description: A clasping behavior test video of a R6/2 mouse was treated by control virus. AAV was injected at age of 2 month and the behavior test was performed at 30 days post AAV injection.

File Name: Supplementary Movie 6

Description: A clasping behavior test video of a R6/2 mouse was treated by NeuroD1 + Dlx2. AAV was injected at age of 2 month and the behavior test was performed at 30 days post AAV injection.