Science Advances
AAAS

Supplementary Materials for

Intensive exercise ameliorates motor and cognitive symptoms in experimental Parkinson's disease restoring striatal synaptic plasticity

Gioia Marino *et al.*

Corresponding author: Paolo Calabresi, paolo.calabresi@policlinicogemelli.it

Sci. Adv. **9**, eadh1403 (2023)
DOI: 10.1126/sciadv.adh1403

This PDF file includes:

Supplementary Text

Four-week exercise training does not perturb intrinsic membrane properties and spontaneous glutamatergic activity of striatal neurons

To test whether treadmill exercise could alter membrane and firing responses of striatal neurons, we studied the intrinsic membrane properties of SPNs of all active and sedentary groups. Results indicate that intrastriatal α-syn-PFFs injection did not exert effects on the membrane properties of striatal cells in sedentary groups and that exercise did not change either I-V relationship [two-way ANOVA: interaction group x treatment, $F_{(18, 636)} = 1{,}55$, $p > 0.05$, group effect, $F_{(3, 106)} = 0.49$, $p > 0.05$, n = 19 (PBS sed), 34 (PBS act), 21 (PFF sed), 36 (PFF act)] or the number of spikes in response to a step eliciting a maximum response [one-way ANOVA $F_{(3, 69)} = 2.12$, $p > 0.05$; n = 8 (PBS sed), 33 (PBS act), 10 (PFF sed), 22 (PFF act)] (Fig. S1A-C).

Since α-syn aggregates alter glutamate-dependent plasticity, we also examined spontaneous glutamatergic transmission in all the experimental groups (*22, 40, 41*). Measurement of amplitude and frequency of spontaneous excitatory post synaptic currents (sEPSCs), recorded from corticostriatal rat slices using the whole-cell patch-clamp technique, show that both frequency [one-way ANOVA $F_{(3, 35)} = 0.65$, $p > 0.05$, n = 9 (PBS sed and act), 11 (PFF sed), 10 (PFF act)] and amplitude [one-way ANOVA $F_{(3, 35)} = 2.11$, $p > 0.05$, n = 9 (PBS sed and act), 11 (PFF sed), 10 (PFF act)] were found unchanged in multiple comparisons among groups (Fig. S2).

Fig. S1.

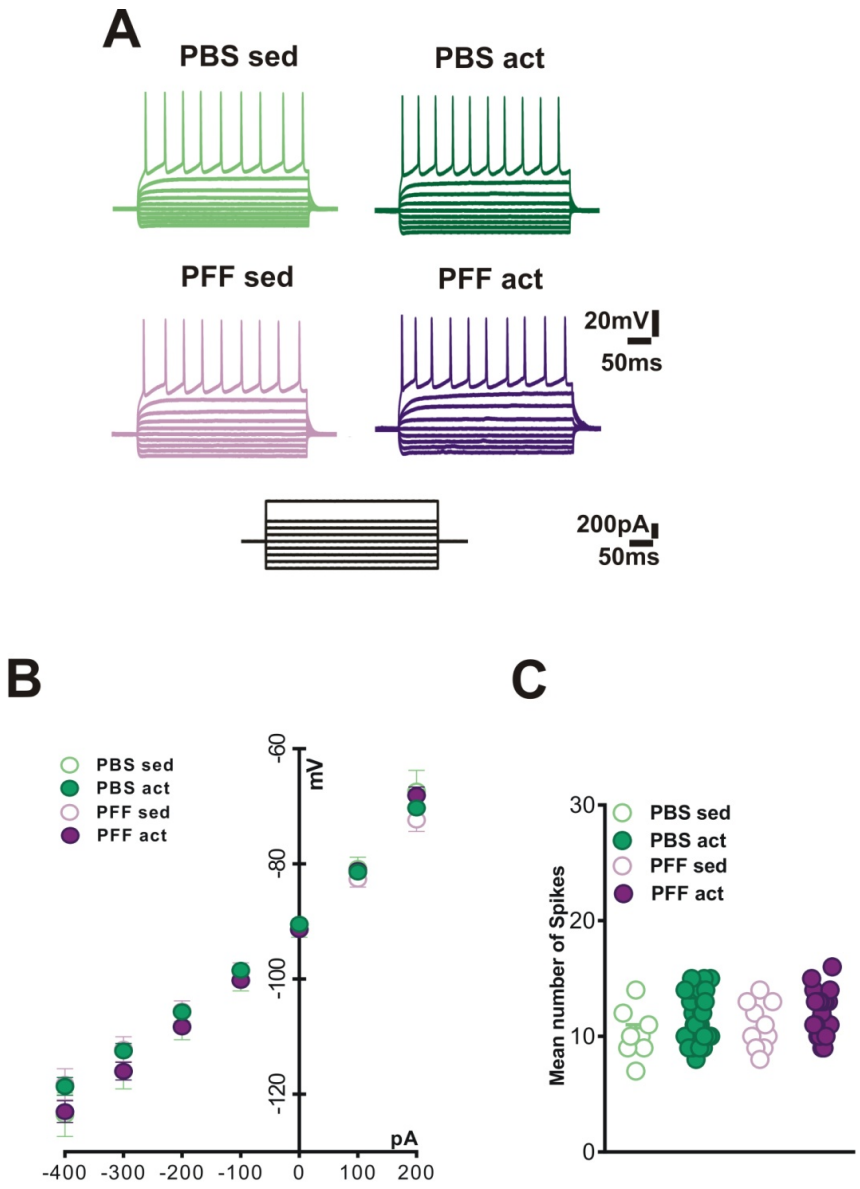

Fig. S1. Intrinsic membrane properties of SPNs in PBS- and PFF-injected active and sedentary animals. (A) Representative traces and (B) current-voltage (I-V) graphs obtained after applying hyperpolarizing and depolarizing steps of current (from -400 to +200pA) to SPNs, recorded in the dorsolateral striatum region from corticostriatal rat slices. (C) Scatter dot plots showing the mean number of spikes triggered by a step that generates a maximum response.

Fig. S2.

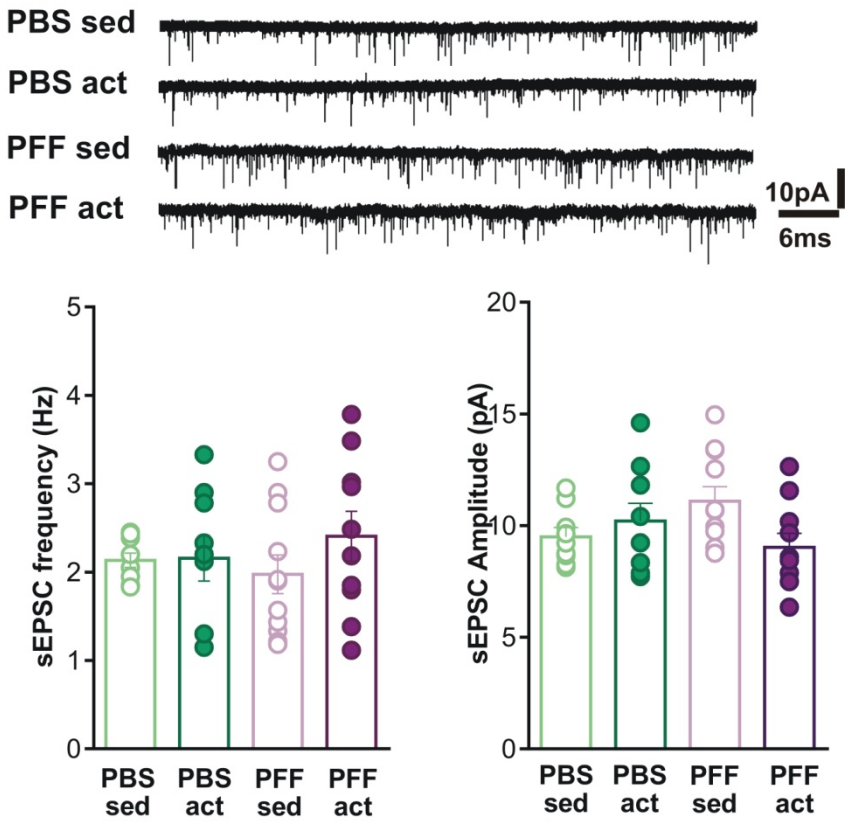

Fig. S2. Analysis of spontaneous glutamatergic activity in parkinsonian and healthy animals subjected or not to intensive exercise. Averaged values of frequency and amplitude of sEPSCs. The lower panel shows representative traces from patch-clamp recorded SPNs in corticostriatal slices from rats under different experimental conditions.

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