

CORRECTION

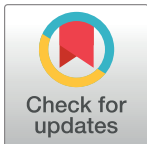
Correction: GABAergic regulation of striatal spiny projection neurons depends upon their activity state

Michelle Day, Marziyeh Belal, William C. Surmeier, Alexandria Melendez, David Wokosin, Tatiana Tkatch, Vernon R. J. Clarke, D. James Surmeier

In Figs 3 and 4, there is an error in panel E. The inset cartoon in Fig 3E is incorrectly labelled as NGFi/THi. It should show optogenetic activation of NGFIs and LTSIs and be labelled as NGFi/THi and the cholinergic interneuron (ChI) part should have been removed.

In Fig 4E, the y-axis of the right panel is mislabeled as '0.2 and 0.3'. It should have been '0.1 and 0.2'. Please see the correct version of Figs 3 and 4 here.

The Data Availability statement for this paper is incorrect. The correct statement is: All datasets are publicly available: Figs 1–8: [dx.doi.org/10.5281/zenodo.10386854](https://doi.org/10.5281/zenodo.10386854). S1–S4 Figs: [dx.doi.org/10.5281/zenodo.10387118](https://doi.org/10.5281/zenodo.10387118). R code for graphical outputs and statistical analyses of Figs 1–4: <https://doi.org/10.5281/zenodo.10386496>. Modelling code and R code to recreate all modelling figures <https://doi.org/10.5281/zenodo.10162264>.



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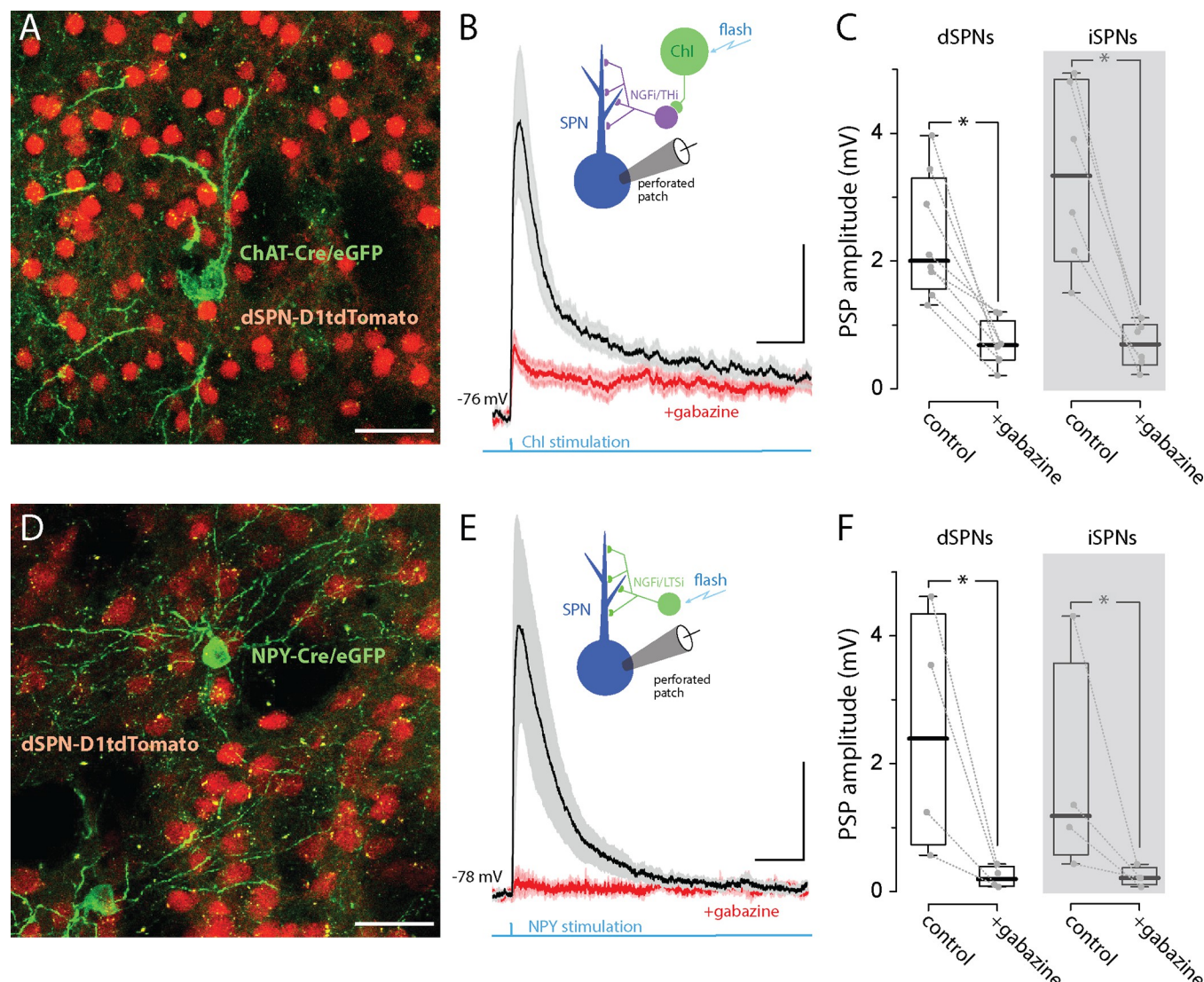


Fig 3. Optogenetic stimulation of ChIs or NPY-expressing interneurons evokes robust GABA_A-mediated PSPs in both iSPNs and dSPNs. (A) AAV9-hSyn-chronos-flex-eGFP was stereotactically injected into the striatum of two-month-old ChAT-Cre X D1tdTomato mice (Stereotaxic coordinate injection: ML = -1.2, AP = -0.7, DV = -3.4). The coronal confocal slice image shows the expression of Chronos (green cells) in a ChAT-cre neuron (cholinergic interneurons) along with dSPNs expressing tdTomato (red cells, scale bar = 40 μ m). The tissue was dissected and recorded from 21 days postinjection. (B) The mean ($\pm$ SEM) of ChI-evoked EPSP responses recorded from visually identified SPNs in gramicidin perforated patch in current-clamp mode in the presence of synaptic blockers: NBQX (5 μ M), AP5 (50 μ M), CGP-55845 (1 μ M), MPEP (1 μ M), and CPCCOEt (50 μ M). The LED pulse (470 nm, 5 ms) was applied at an interval of 60 s. The traces recorded before and after the addition of gabazine (10 μ M). Scale bars = 1 mV/100 ms. (C) Box plots of data from dSPNs (n = 8) and iSPNs (n = 6). (D) NPY-Cre X D1tdTomato mice were injected as described in (A). Confocal image showing NPY-Cre neurons expressing Chronos (green) and dSPNs expressing tdTomato (red, scale bar = 40 μ m). (E) Mean ($\pm$ SEM) of NPY-Cre-evoked EPSP responses recorded from visually identified dSPNs in gramicidin perforated patch in current-clamp mode in the presence of blockers as described in (B) before and after the addition of Gabazine (10 μ M). Traces from dSPN recorded in NPY (n = 4). Scale bars = 1 mV/100 ms. (F) Summary data for dSPNs (n = 4) and for iSPNs (n = 4). The data underlying the graphs shown in the figure can be found in [dx.doi.org/10.5281/zenodo.10386854](https://doi.org/10.5281/zenodo.10386854). ChAT, choline acetyltransferase; ChI, cholinergic interneuron; PSP, postsynaptic potential; SPN, spiny projection neuron.

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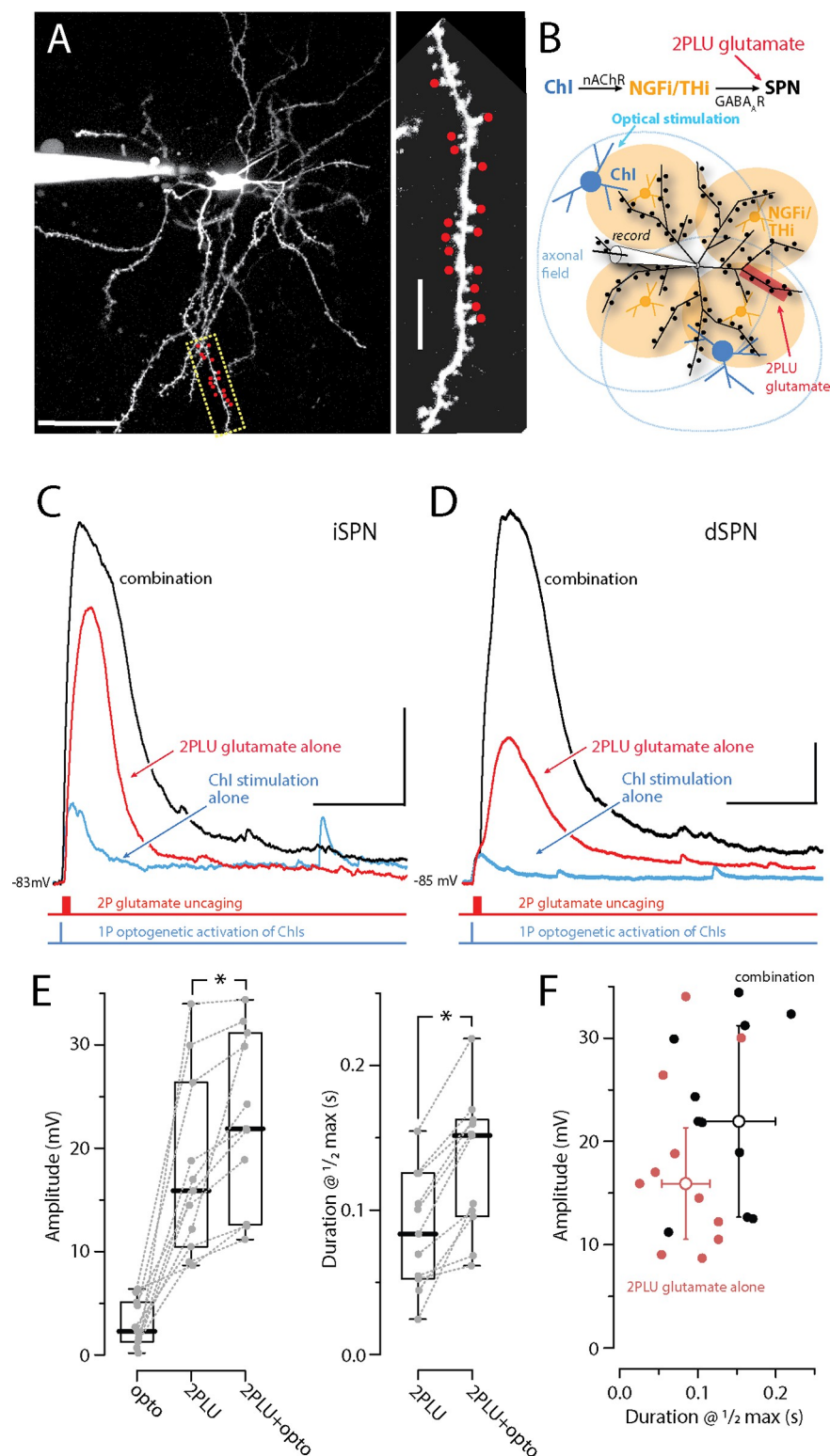


Fig 4. ChI-evoked stimulation of NGF interneurons and synaptic GABA release enhances glutamate-evoked state transitions. (A) Maximum projection image of a visually identified dSPN from a D1R-tdTomato x ChAT-cre mouse with a high magnification image of a distal dendrite where 720 nm 2PLSM spot uncaging of DNI-Glu (2PLU, 5 mM) was conducted (red dots). Tomato+ dSPNs were patched in whole-cell mode and the cells were loaded with Alexa 568 for clear identification of dendrites and spines. Scale bars = 40 μ m cell, 5 μ m dendrite. (B) Scheme for interrogating

endogenous GABA release from NGFIs onto SPNs via optogenetic stimulation of ChAT-cre mice expressing Chronos. (C, D) Throughout the dendrites, glutamate uPSPs in dSPNs and iSPNs can be evoked by uncaging DNI-Glu (5 mM, 1×15 spines, 1 ms pulses at 500 Hz, red traces, 720 nm laser) while stimulating GABA release from NGFIs with the blue laser (1 $\times$ 3 ms pulse, blue traces, 473 nm, within approximately 20 μ m of the dendrite). From the quiescent down-state, GABA_AR activation is depolarizing and pushes SPNs toward enhanced dendritic integration in both dSPN and iSPN dendrites (Glu-2PLU + GABA_A opto = black trace, scale bars = 5 mV/200 ms). (E) Summary data showing the enhancement in amplitude and duration of the plateaus at $\frac{1}{2}$ the maximum amplitude ($1/2_{\max}$) in iSPNs and dSPNs combined ($n = 11$ total: 3 iSPNs + 8 dSPNs; $p < 0.001$ for both amplitude and $1/2_{\max}$ duration, respectively). (F) Scatter plot of duration at $\frac{1}{2}$ maximum amplitude vs. amplitude for clustered glutamate alone (red) and following GABA_AR activation (black). Median effects (open circles) and the median absolute difference as capped lines are also illustrated. All experiments are conducted in the appropriate cocktail of synaptic blockers: CGP-55845 (1 μ M), MPEP (1 μ M), and CPCCOEt (50 μ M). The data underlying the graphs shown in the figure can be found in [dx.doi.org/10.5281/zenodo.10386854](https://doi.org/10.5281/zenodo.10386854). 2PLSM, two-photon laser scanning microscopy; ChAT, choline acetyltransferase; ChI, cholinergic interneuron; SPN, spiny projection neuron.

<https://doi.org/10.1371/journal.pbio.3002752.g002>

Reference

1. Day M, Belal M, Surmeier WC, Melendez A, Wokosin D, Tkatch T, et al. (2024) GABAergic regulation of striatal spiny projection neurons depends upon their activity state. PLOS Biol 22(1): e3002483. <https://doi.org/10.1371/journal.pbio.3002483> PMID: 38295323