

Single dose of amphetamine induces delayed subregional attenuation of striatal cholinergic interneuron activity

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Manuscript Source: <https://www.biorxiv.org/content/10.1101/2021.03.22.436417v1>

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Research Paper Sections:

The sections of the research paper input text parsed in this audit.

[illegible]

Title **Single dose of amphetamine induces delayed subregional attenuation of striatal cholinergic interneuron activity**

S1 [001] Abstract

S1 [002] Psychostimulants such as amphetamine target dopamine neuron synapses to engender drug-induced plasticity.

Psychostimulants ...
... such as amphetamine target dopamine neuron synapses ...
... to engender drug-induced plasticity.

S1 [003] While dopamine neurons modulate the activity of striatal cholinergic interneurons (ChIs) with regional heterogeneity, how amphetamine affects ChI activity has not been elucidated.

While dopamine neurons modulate the activity ...
... of striatal cholinergic interneurons ...
... (ChIs) ...
... with regional heterogeneity, ...
... how amphetamine affects ChI activity has not been elucidated.

S1 [004] Here, we applied quantitative fluorescence imaging approaches to map the dose-dependent effects of a single dose of amphetamine on ChI activity at 2.5 and 24 hours after injection across the mouse striatum using the activity-dependent marker phosphorylated ribosomal protein S6 (p-rpS6).

Here, ...
... we applied quantitative fluorescence imaging approaches ...
... to map the dose-dependent effects ...
... of a single dose ...
... of amphetamine ...
... on ChI activity ...
... at 2.5 ...
... and 24 hours ...
... after injection ...
... across the mouse striatum ...
... using the activity-dependent marker phosphorylated ribosomal protein S6 ...
... (p-rpS6).

S1 [005] We found that amphetamine did not induce neurotoxic effects on ChIs, as their distribution and morphology were not affected.

We found ...
... that amphetamine did not induce neurotoxic effects ...
... on ChIs, ...
... as their distribution ...
... and morphology were not affected.

S1 [006] While low- or high-dose amphetamine did not affect ChI activity after 2.5 hours, ChI activity was significantly reduced in all striatal subregions after 24 hours, with a dose-dependent effect in the nucleus accumbens.

While low- ...
... or high-dose amphetamine did not affect ChI activity ...
... after 2.5 hours, ...
... ChI activity was significantly reduced ...
... in all striatal subregions ...
... after 24 hours, ...
... with a dose-dependent effect ...
... in the nucleus accumbens.

S1 [007] Thus, our findings suggest that a single dose of amphetamine has delayed regionally heterogeneous effects on ChI activity.

Thus, ...
... our findings suggest ...
... that a single dose ...
... of amphetamine has delayed regionally heterogeneous effects ...
... on ChI activity.

S1 [008] Significance statement Using the activity dependent marker phosphorylated ribosomal protein S6 (p-rpS6), we mapped amphetamine effects on the activity of cholinergic interneurons (ChIs) across the striatum.

Significance statement Using the activity dependent marker phosphorylated ribosomal protein S6 ...
... (p-rpS6), ...
... we mapped amphetamine effects ...
... on the activity ...
... of cholinergic interneurons ...
... (ChIs) ...
... across the striatum.

S1 [009] Amphetamine caused a delayed attenuation of ChI activity in all striatal subregions, and a dose-dependent effect in the ventral striatum/nucleus accumbens, a critical site of psychostimulant action.

Amphetamine caused a delayed attenuation ...
... of ChI activity ...
... in all striatal subregions, ...
... and a dose-dependent effect ...
... in the ventral striatum/nucleus accumbens, ...
... a critical site ...
... of psychostimulant action.

S2 [011] Psychostimulants such as amphetamine (AMPH) target DA neuron terminals (Pierce and Kalivas, 1997; Luscher and Malenka, 2011; Sulzer, 2011) and engender dose-dependent behavioral effects.

Psychostimulants ...
... such as amphetamine ...
... (AMPH) ...
... target DA neuron terminals ...
... (Pierce ...
... and Kalivas, 1997; ...
... Luscher ...
... and Malenka, 2011; ...
... Sulzer, 2011) ...
... and engender dose-dependent behavioral effects.

S2 [012] DA release in the ventral Str/nucleus accumbens (NAc) is associated with hyperlocomotion whereas DA release in the dorsal Str is associated with stereotypies (Robinson and Becker, 1986; Kalivas and Stewart, 1991; Gaytan et al., 1998; Yates et al., 2007).

DA release ...
... in the ventral Str/nucleus accumbens ...
... (NAc) ...
... is associated ...
... with hyperlocomotion whereas DA release ...
... in the dorsal Str is associated ...
... with stereotypies ...
... (Robinson ...
... and Becker, 1986; ...
... Kalivas ...
... and Stewart, 1991; ...
... Gaytan et al., 1998; ...
... Yates et al., 2007).

S2 [013] DA neurons modulate the activity of cholinergic interneurons (ChIs), which comprise less than 2% of striatal (Str) neurons, and yet strongly control the Str circuitry (Goldberg and Wilson, 2010; Gonzales and Smith, 2015; Abudukeyoumu et al., 2019).

DA neurons modulate the activity ...
... of cholinergic interneurons ...
... (ChIs), ...
... which comprise less than 2% ...
... of striatal ...
... (Str) ...
... neurons, ...
... and yet strongly control the Str circuitry ...
... (Goldberg ...
... and Wilson, 2010; ...
... Gonzales ...
... and Smith, 2015; ...
... Abudukeyoumu et al., 2019).

S2 [014] Modulation of ChI activity is critical in processing and reinforcement of reward-related behaviors (Atallah et al., 2014; Gonzales and Smith, 2015).

Modulation ...
... of Chl activity is critical ...
... in processing ...
... and reinforcement ...
... of reward-related behaviors ...
... (Atallah et al., 2014; ...
... Gonzales ...
... and Smith, 2015).

S2 [015] ChIs in the ventral Str are crucial for psychostimulant-dependent behaviors (Sofuoglu and Mooney, 2009; Witten et al., 2010; Lee et al., 2020; Lewis and Borrelli, 2020).

ChIs ...
... in the ventral Str are crucial ...
... for psychostimulant-dependent behaviors ...
... (Sofuoglu ...
... and Mooney, 2009; ...
... Witten et al., 2010; ...
... Lee et al., 2020; ...
... Lewis ...
... and Borrelli, 2020).

S2 [016] However, whether the effects of AMPH on ChIs occur at specific striatal loci has not been elucidated.

However, ...
... whether the effects ...
... of AMPH ...
... on ChIs occur ...
... at specific striatal loci has not been elucidated.

S2 [017] Several studies have previously shown that the phosphorylated form of the ribosomal protein S6 (p-rpS6), a ubiquitous translational activation marker, can be used to estimate the cellular activity of ChIs under different pharmacological and/or behavioral conditions (Bertran-Gonzalez et al., 2012; Matamales et al., 2016a, 2016b).

Several studies have previously shown ...
... that the phosphorylated form ...
... of the ribosomal protein S6 ...
... (p-rpS6), ...
... a ubiquitous translational activation marker, ...
... can be used ...
... to estimate the cellular activity ...
... of ChIs ...
... under different pharmacological ...
... and/or behavioral conditions ...
... (Bertran-Gonzalez et al., 2012; ...
... Matamales et al., 2016a, 2016b).

S2 [018] Pharmacological silencing or increasing ChI firing lead to a striking decrease or increase of p-rpS6 signal in ChIs, respectively (Bertran-Gonzalez et al., 2012; Matamales et al., 2016b).

Pharmacological silencing ...
... or increasing ChI firing lead ...

End of Sample Audit

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