

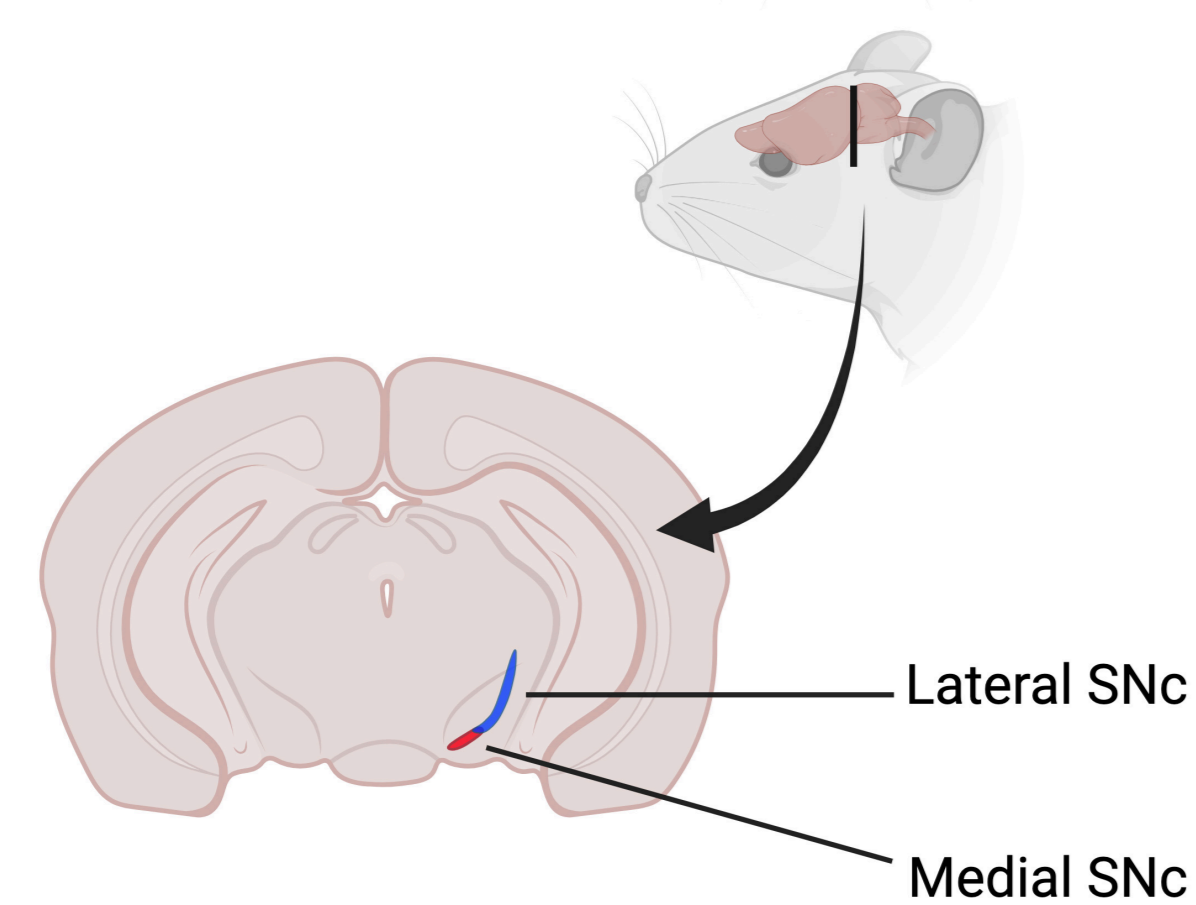
Examining $\alpha 4$ nicotinic acetylcholine receptor expression in the substantia nigra

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Introduction

The substantia nigra pars compacta (SNc) is a midbrain structure containing dopaminergic neurons primarily involved in motor movement pathways. It has previously been shown in our lab that dopaminergic neuron populations in medial versus lateral SNc differ in their activity levels and their effect on locomotion.

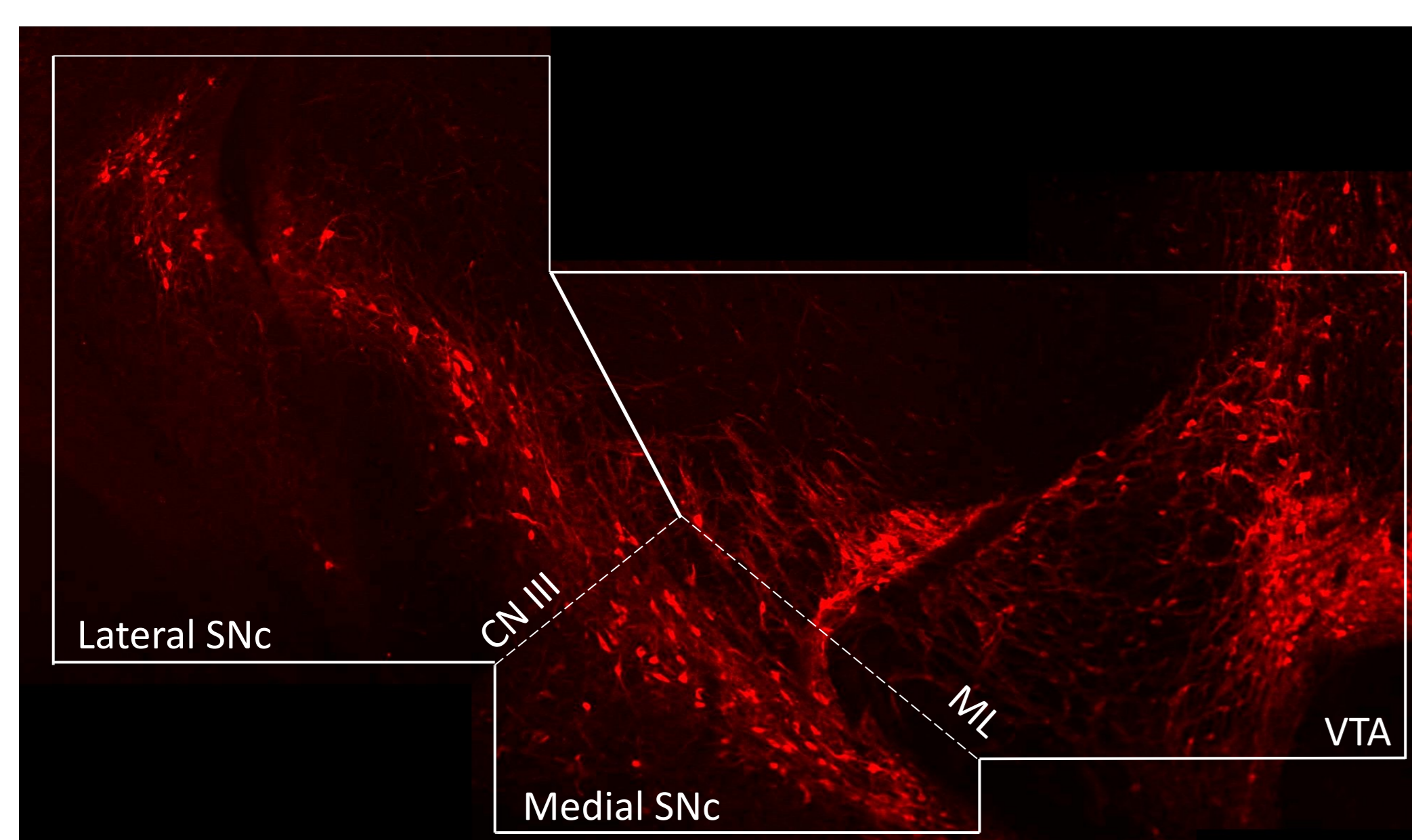


We aim to further investigate the differences between the medial and lateral SNc by examining the expression of nicotinic acetylcholine receptors containing $\alpha 4$ subunits. The $\alpha 4$ subunit is highly expressed in the SNc, however, it has not yet been examined if $\alpha 4$ receptor expression differs in the medial versus lateral SNc.

Hypothesis

Dopaminergic cells in the medial versus lateral SNc differ in their expression of $\alpha 4$ nicotinic acetylcholine receptors.

Localization of the SNc



Methods

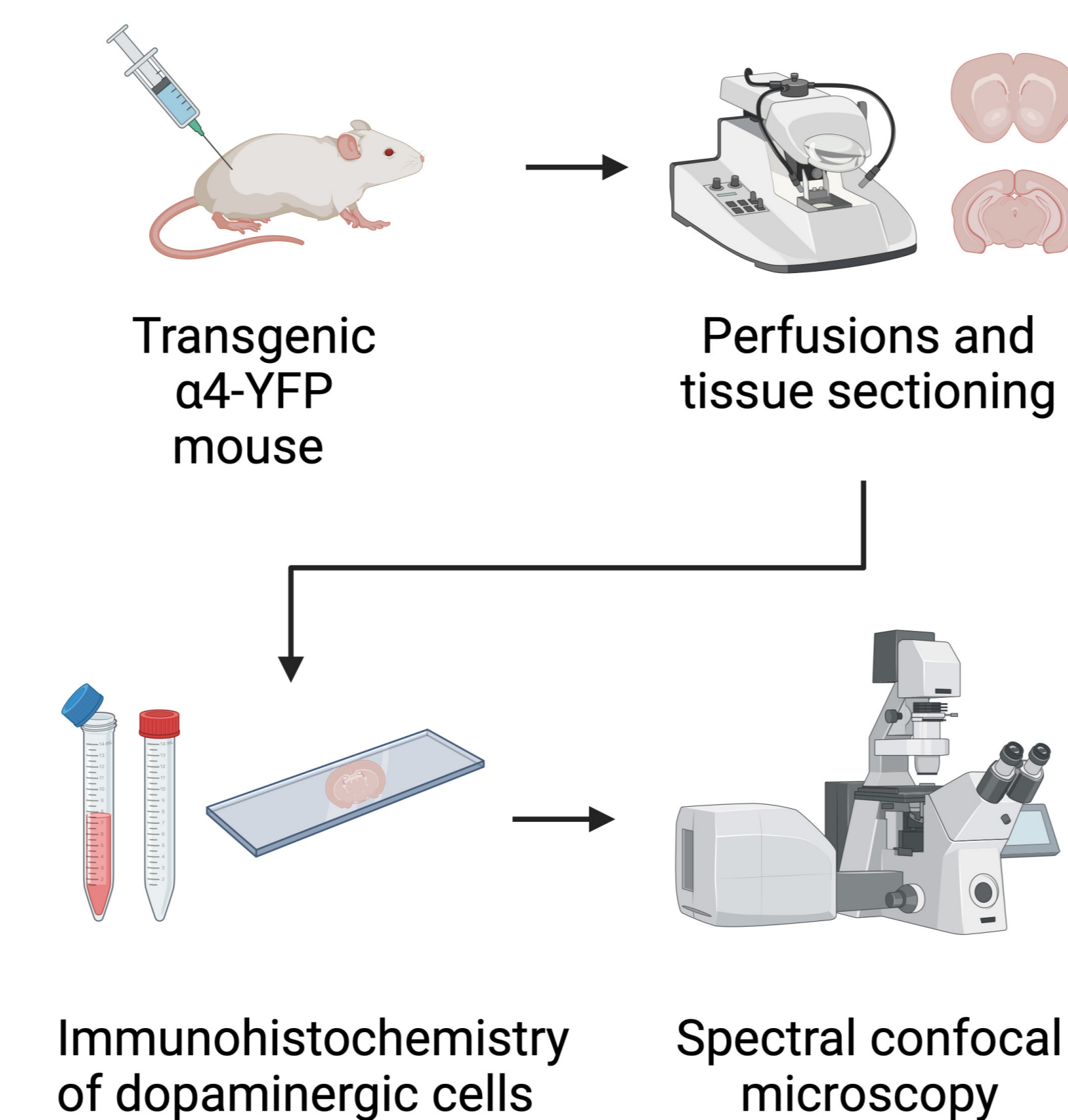
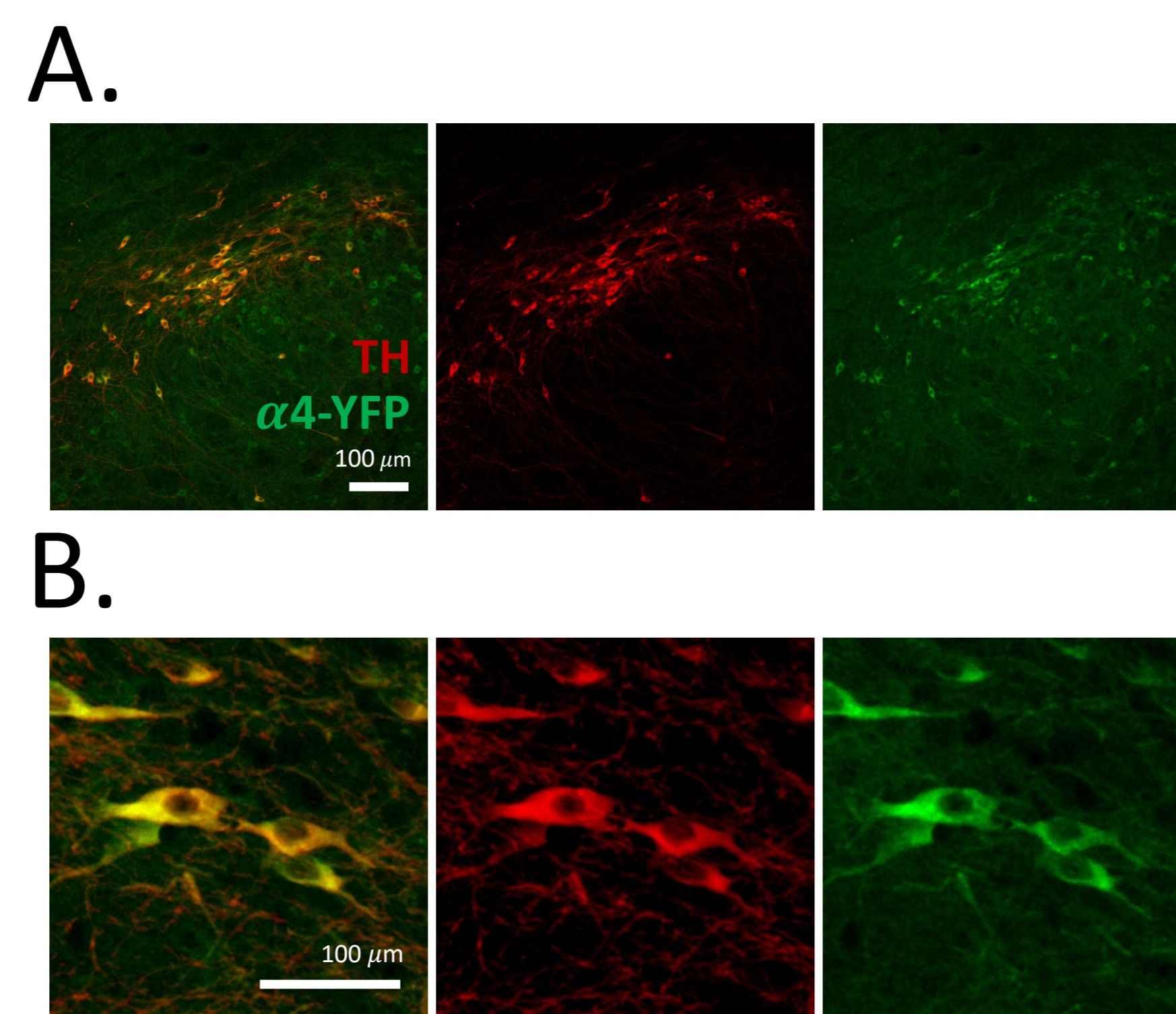


Figure 1. $\alpha 4$ nicotinic receptor expression in dopaminergic neurons



Results

Table 1. Experimental number of mice and cells

	Number of mice	Number of cells	Fields of view
Medial SNc	6 (2 M, 4 F)	825	11
Lateral SNc	6 (2 M, 4 F)	535	11

Figure 2. $\alpha 4$ nicotinic receptor expression in individual mice (1-6)

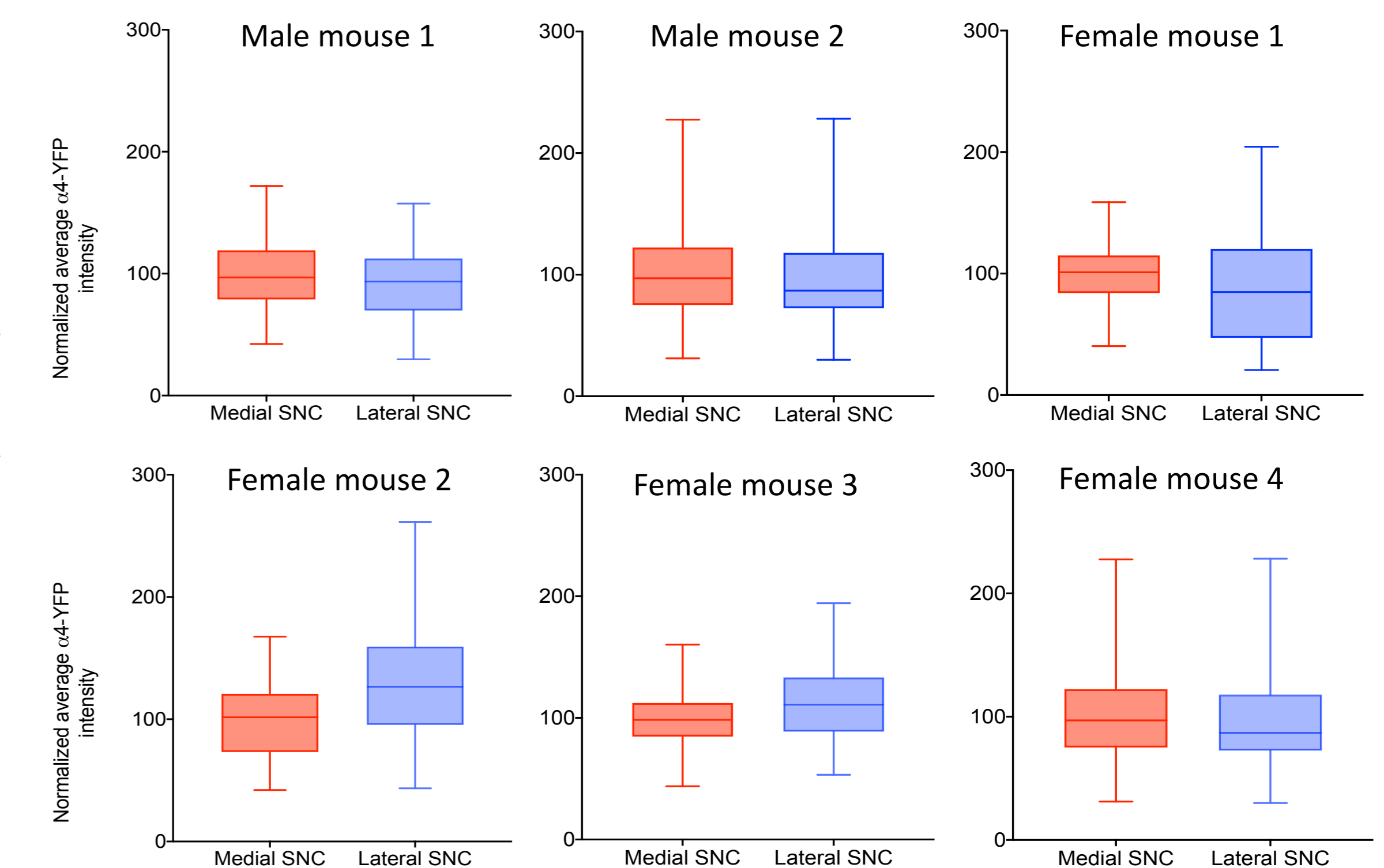
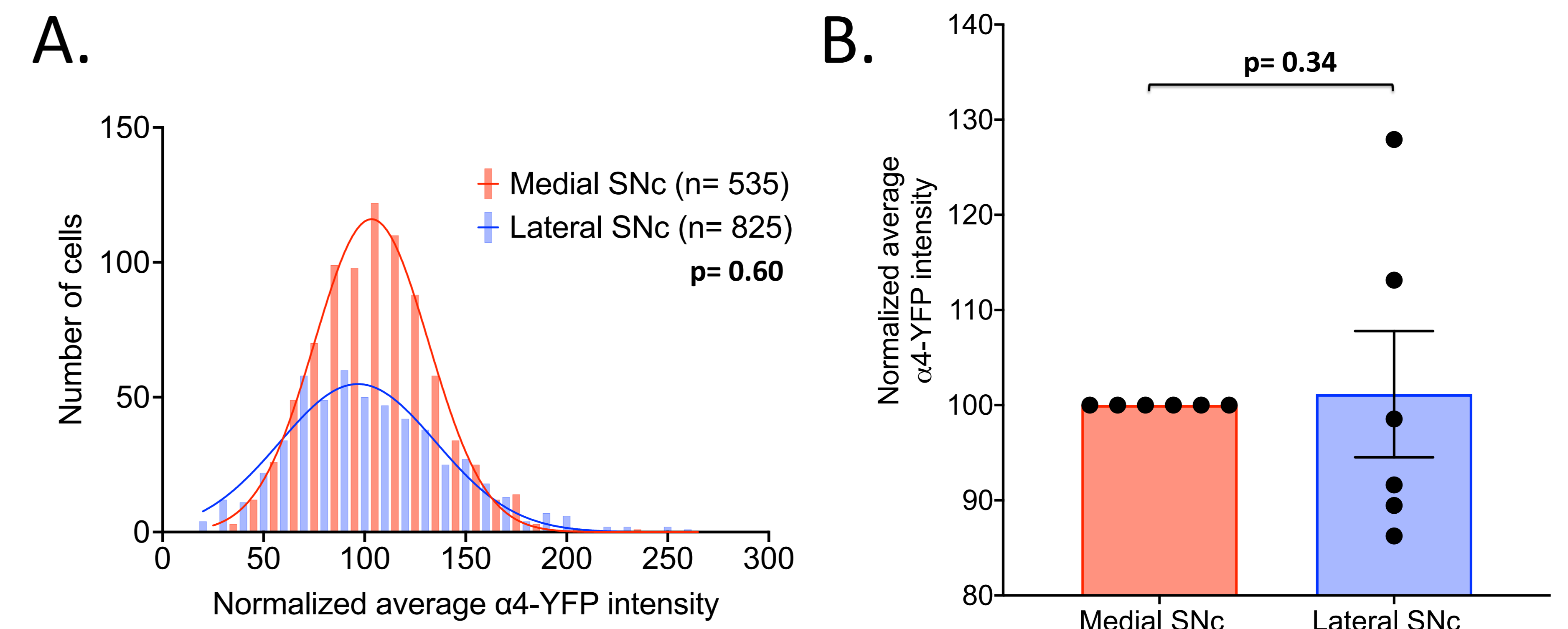


Figure 3. Quantification of $\alpha 4$ nicotinic receptor expression in the medial versus lateral SNc



Conclusion

No significant differences were observed in the normalized average $\alpha 4$ -YFP intensity of dopaminergic cells in the medial versus lateral SNc.

Acknowledgements: Animated figures were made using BioRender.com

Future directions

- Characterize the expression of $\alpha 7$ nicotinic acetylcholine receptors in the medial and lateral SNc.
- Examine the innervation of cholinergic synapses from upstream nuclei into the medial and lateral SNc.
- Examine if there are sex-related differences in the expression of $\alpha 4$ nicotinic acetylcholine receptors in the SNc.



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