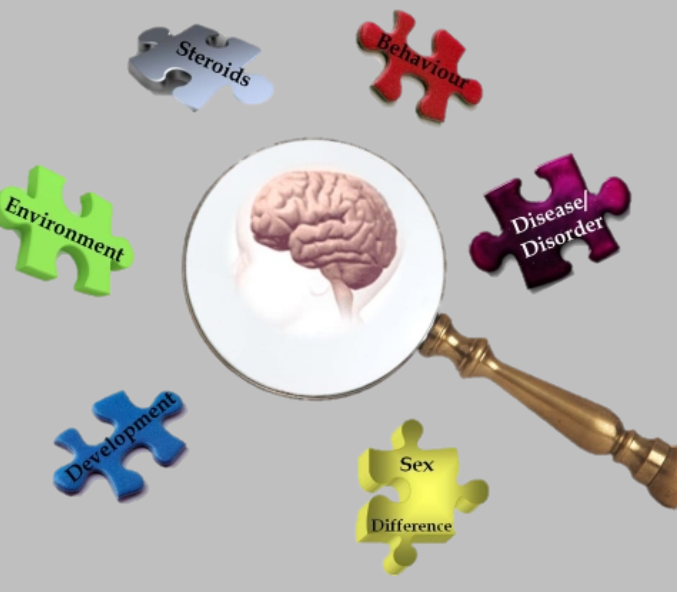


IS NICOTINE REPLACEMENT THERAPY GIVEN DURING GESTATION CONSIDERED SAFE FOR OFFSPRING NEURODEVELOPMENT IN A RAT MODEL?

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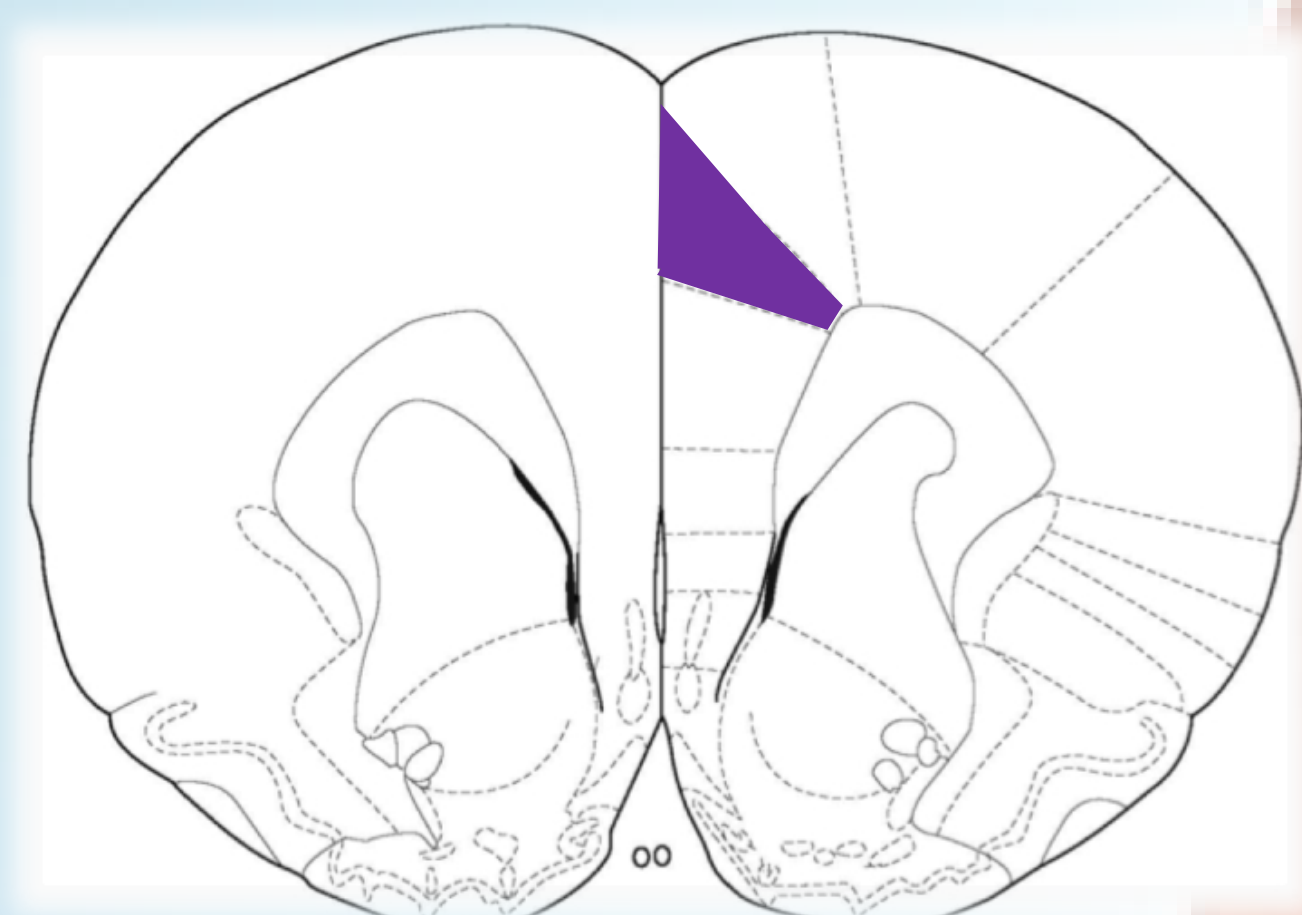
INTRODUCTION

• In Canada, around 20-30 % of pregnant women are smokers (1). In order to reduce the teratogenic effect of tobacco, these women are encouraged to use nicotine replacements therapies (NRT) to help them stop smoking.

• However, these alternatives still constitute a source of low levels of nicotine exposure. We have previously studied the effects of low-dose nicotine in the hippocampus and entorhinal cortex of rat offspring exposed perinatally.

OBJECTIVE

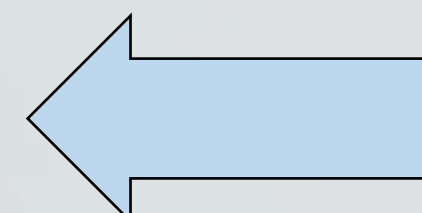
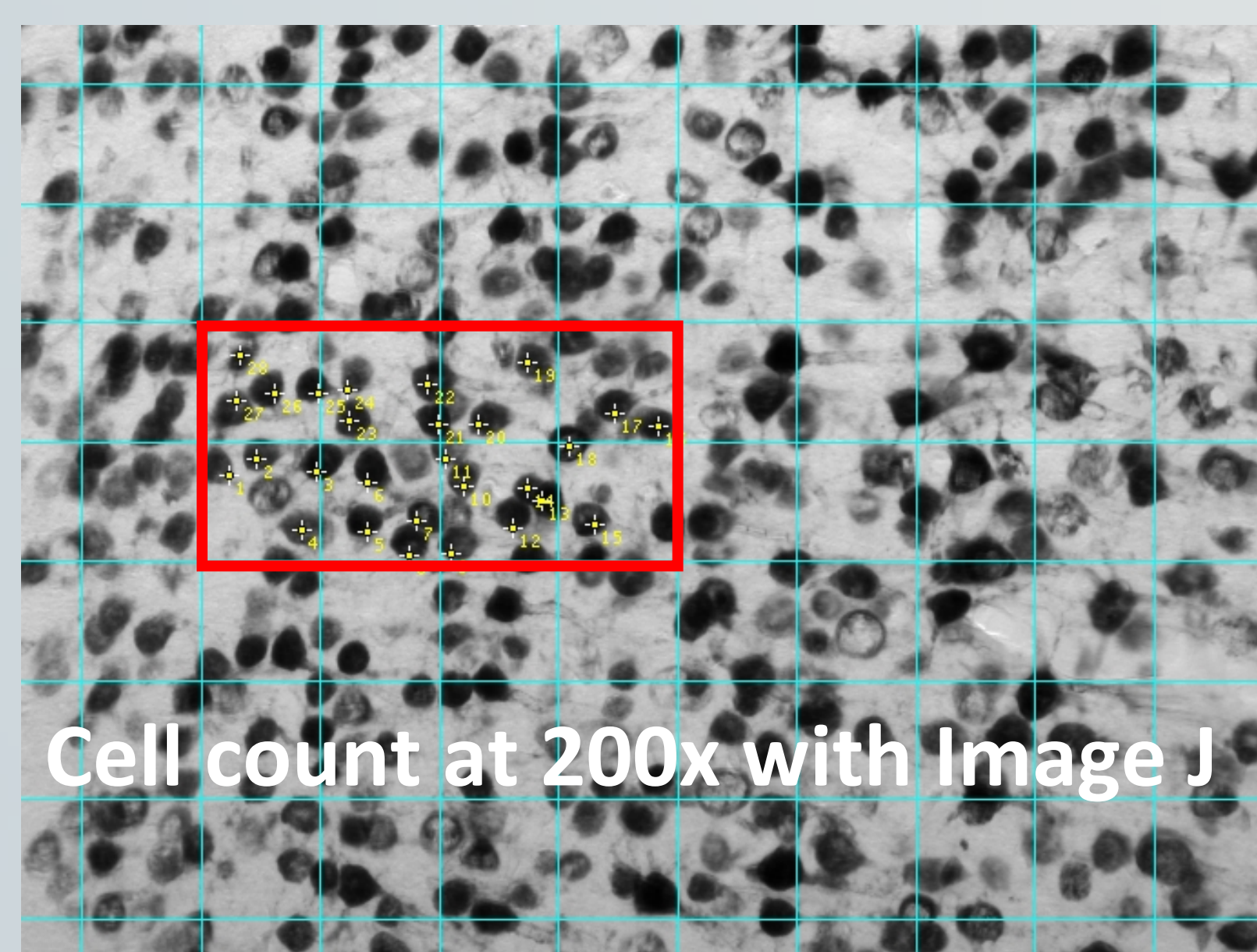
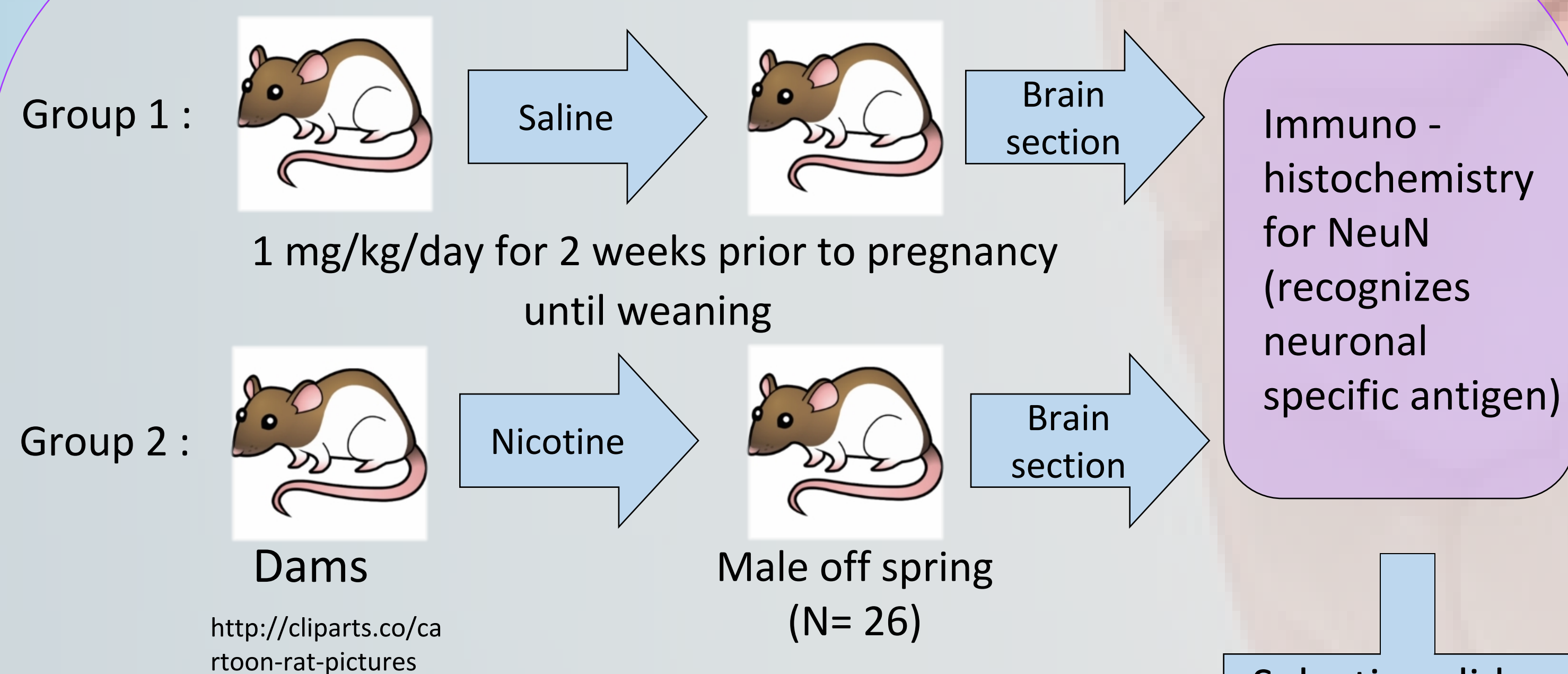
To assess the effects of low levels of perinatal nicotine exposure on neuron numbers in the rat cingulate cortex (Cg2), an important part of the limbic system.



Cingulate cortex 2

<https://blogs.scientificamerican.com/scicurious-brain/sfn-neuroblogging-serotonin-and-food-motivation/>

METHODOLOGY



Pictures at 200x magnification

Selecting slides with Cg2 & eliminating those with ripped sections

Data analysis : independent sample t-test using SPSS software

Figure 1. Representation of the methodology; beginning from treatment to statistical analysis. Treatments were conducted at McMaster University as part of a collaborative effort. (2)

RESULTS

The results reveal **no significant effect** of treatment on the number of NeuN cells in Cg2 with $p > 0.05$ (0.076) with a $t(8) = -2.044$.

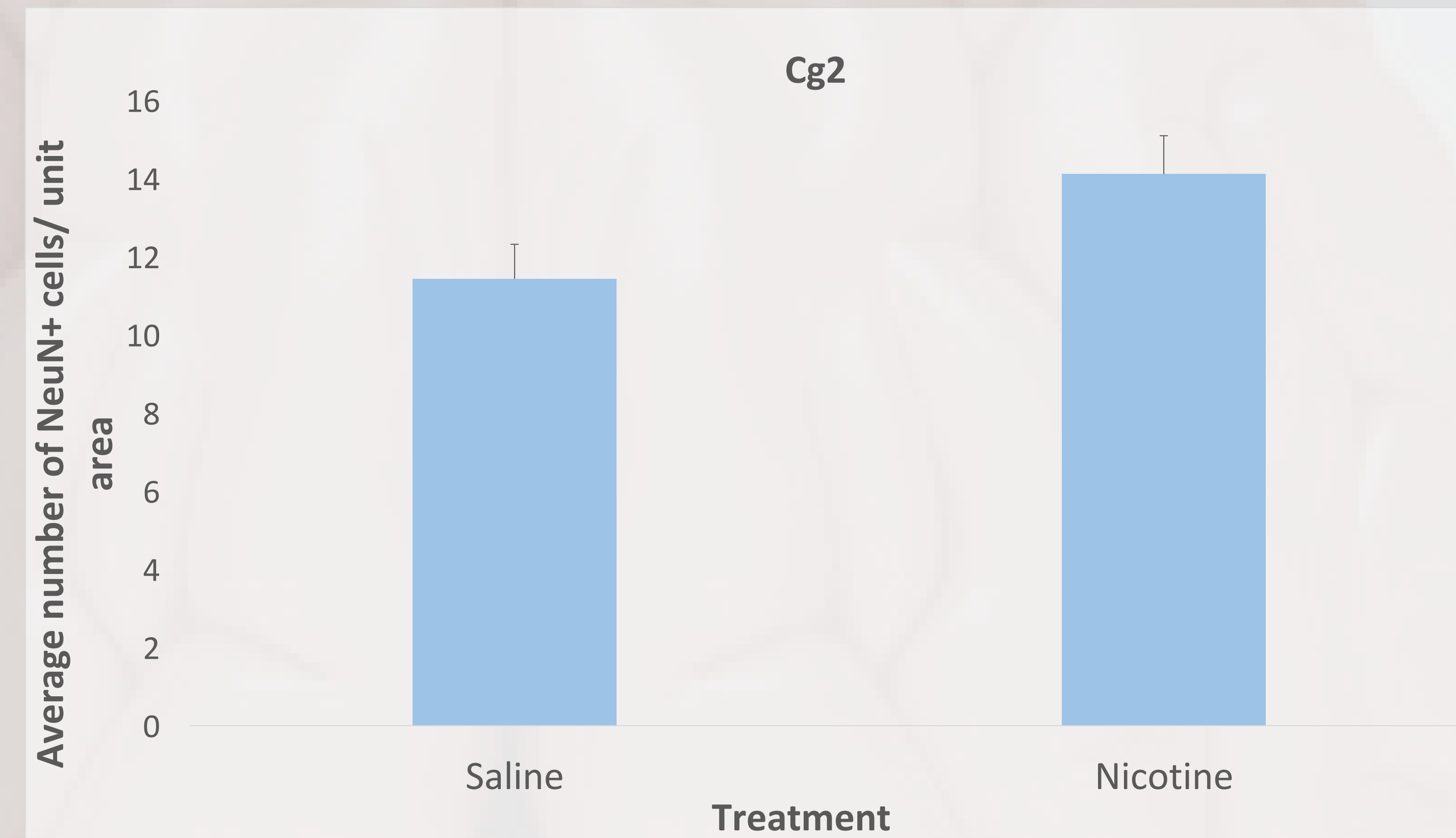


Figure 2. Average number of NeuN+ cells of adult male rats in the Cg2 by perinatal treatment.

DISCUSSION

- Difference of cell counts is too minimal to detect a statistically significant difference
- The treatment was given *in utero*, during neurodevelopment. Any early life effect would appear to be transient and no longer visible in the mature brain
- Possibility that the dose given was a safe approach for not causing any disruption in the neurodevelopment of the cingulate cortex

What does this mean?

- Potentially these findings suggest that low levels of nicotine given perinatally have **no long-lasting effects** on male rat brains.
- NRT therapies have low dose nicotine levels and the same conclusions may be made for humans
- Positive outlook for women trying to quite smoking

Future directions

- Larger sample size
- Examining the effect on younger male rats & including female subjects
- Examining other brain areas implicated in stress

LIMITATIONS

- Small sample size
- No positive control, or dose response
- Smaller sample size due to manipulation errors during mounting
 - Section missing
 - Rips
 - Uneven staining

CONCLUSION

- Perinatal NRT offers a low dose of nicotine, not found to affect the number of neurons in adult male rats cingulate cortex
- These results are interesting because they suggest NRT can be safely administered in pregnant women.
- This will help with compliance toward smoking cessation by reducing the stress associated with nicotine withdrawal

<https://deserthopetreatment.com/drug-overdose/nicotine-patches/>

REFERENCES

- (1) : Allemang-Grand R, Konkle ATM : Effects of Perinatal Nicotine Exposure on Neuronal and Astrocytic Markers in the Male Rat Hippocampus and Cortex
- (2) : Canada, H. (2007, November 22). Pregnancy. Retrieved January 03, 2018, from <https://www.canada.ca/en/health-canada/services/health-concerns/tobacco/smoking-your-body/pregnancy.html>

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