

# IS TOO MUCH OF A GOOD THING BAD?

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## INTRODUCTION

Serotonin (5HT) is crucial for the regulation of sleep, appetite, stress and psychological disorders such as anxiety and depression within the mammalian brain.

Selective Serotonin Reuptake Inhibitors (SSRIs) act on the serotonin transporter (SERT) to increase extracellular 5HT. This can alleviate symptoms of anxiety and depression, suggesting that a depletion of 5HT may contribute to these disorders. 5HT has also been shown to play a neurotropic role in cell proliferation, synaptogenesis and pruning.

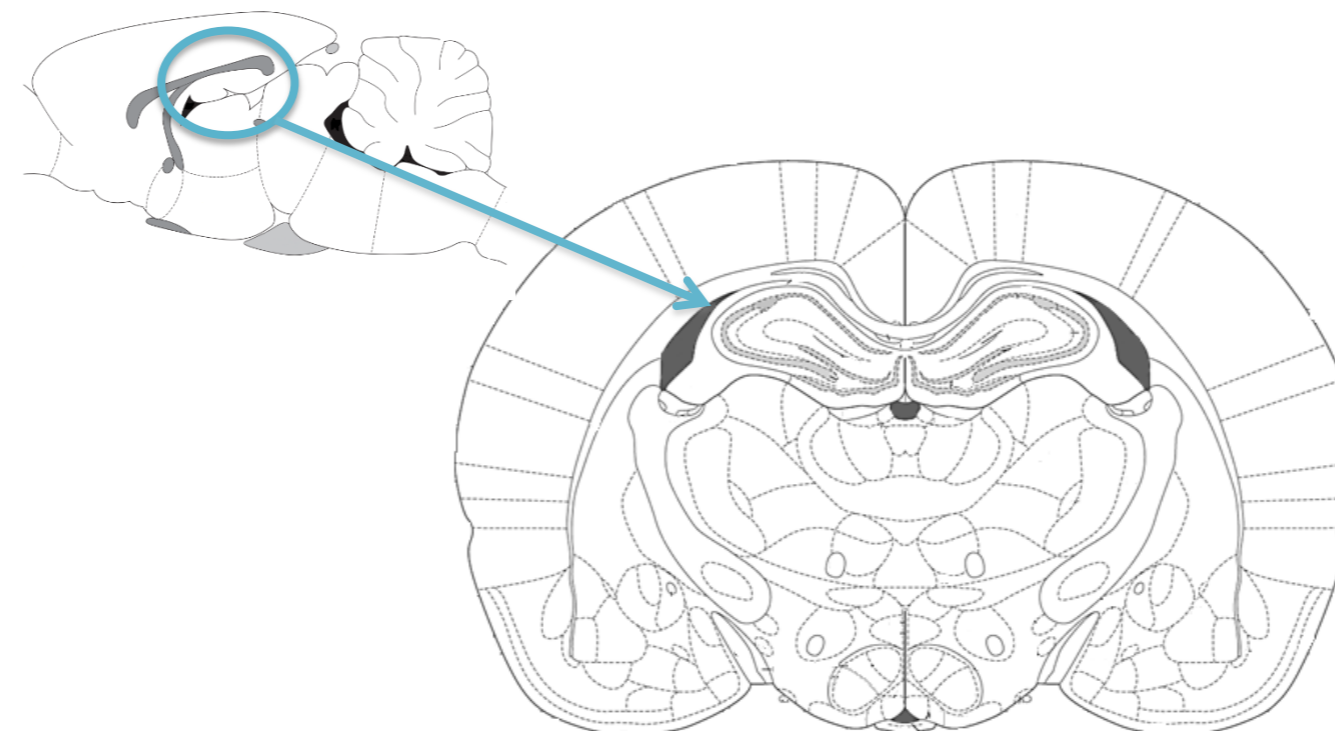
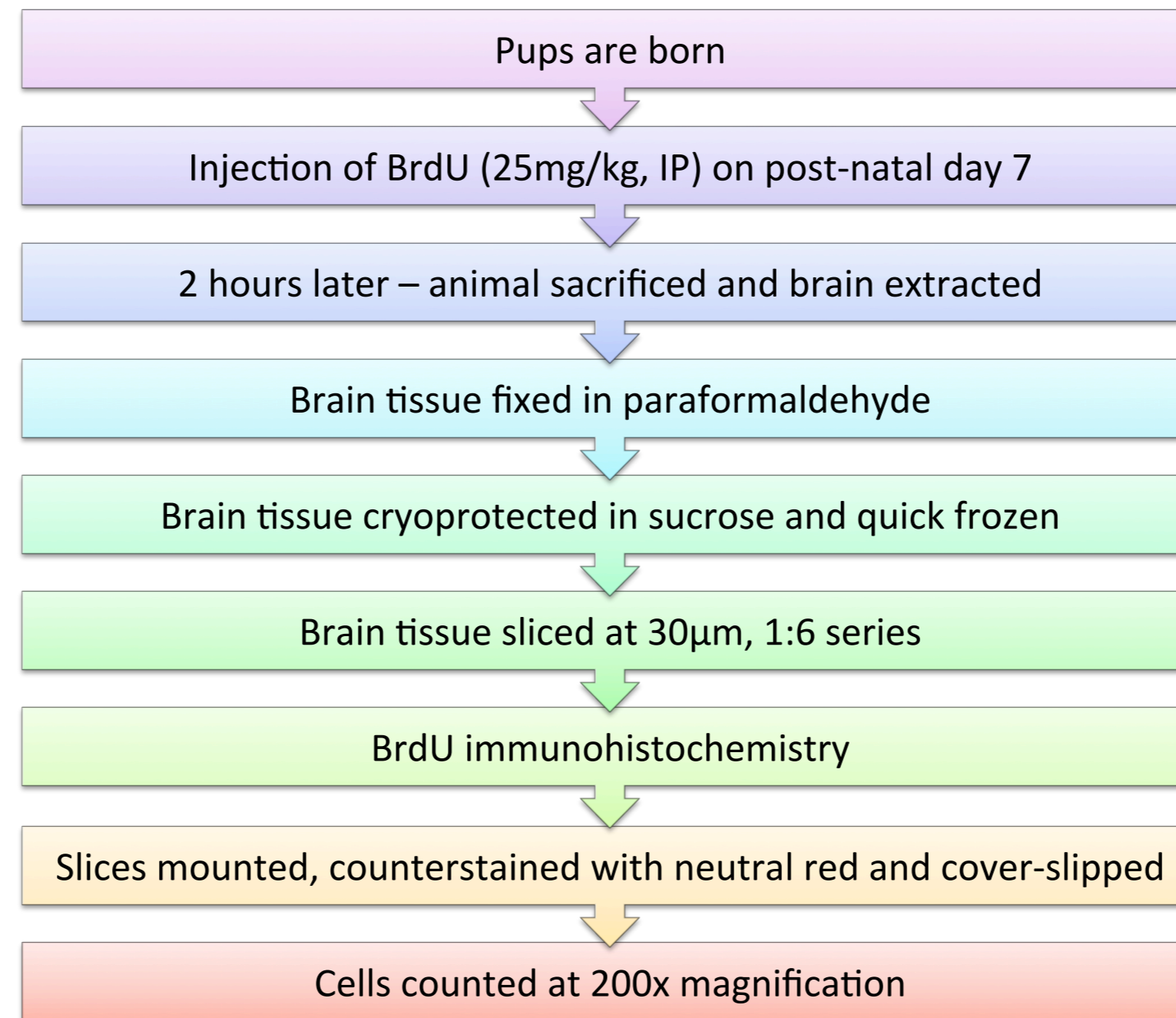
SSRIs administered during pregnancy can increase serotonin (Rampono et al., 2004) and affect brain development in offspring (Kepser & Homberg, 2015). Hence, *decreased* 5HT in adulthood and *increased* 5HT in infancy may contribute to psychological maladaptations.

Using an animal SERT depletion model we can assess the effect of excess serotonin during gestation on cell proliferation. BrdU acts as a synthetic neurotransmitter that substitutes thymidine during the 's' phase of cell replication. By injecting BrdU acutely, we can count cell proliferation within the hippocampus.

It was hypothesized that increased levels of 5HT during early brain development results in increased levels of cell proliferation within the hippocampus.

## METHOD

36 wistar rat pups were used. Of these 7 were wildtype, 17 were heterozygous and 13 were homozygous for the SERT gene.



Representative location of hippocampus in rat brain. Image from Paxinos & Watson (2005). *Stereotaxic coordinates of the rat brain 5<sup>th</sup> ed.*

## RESULTS AND CONCLUSIONS

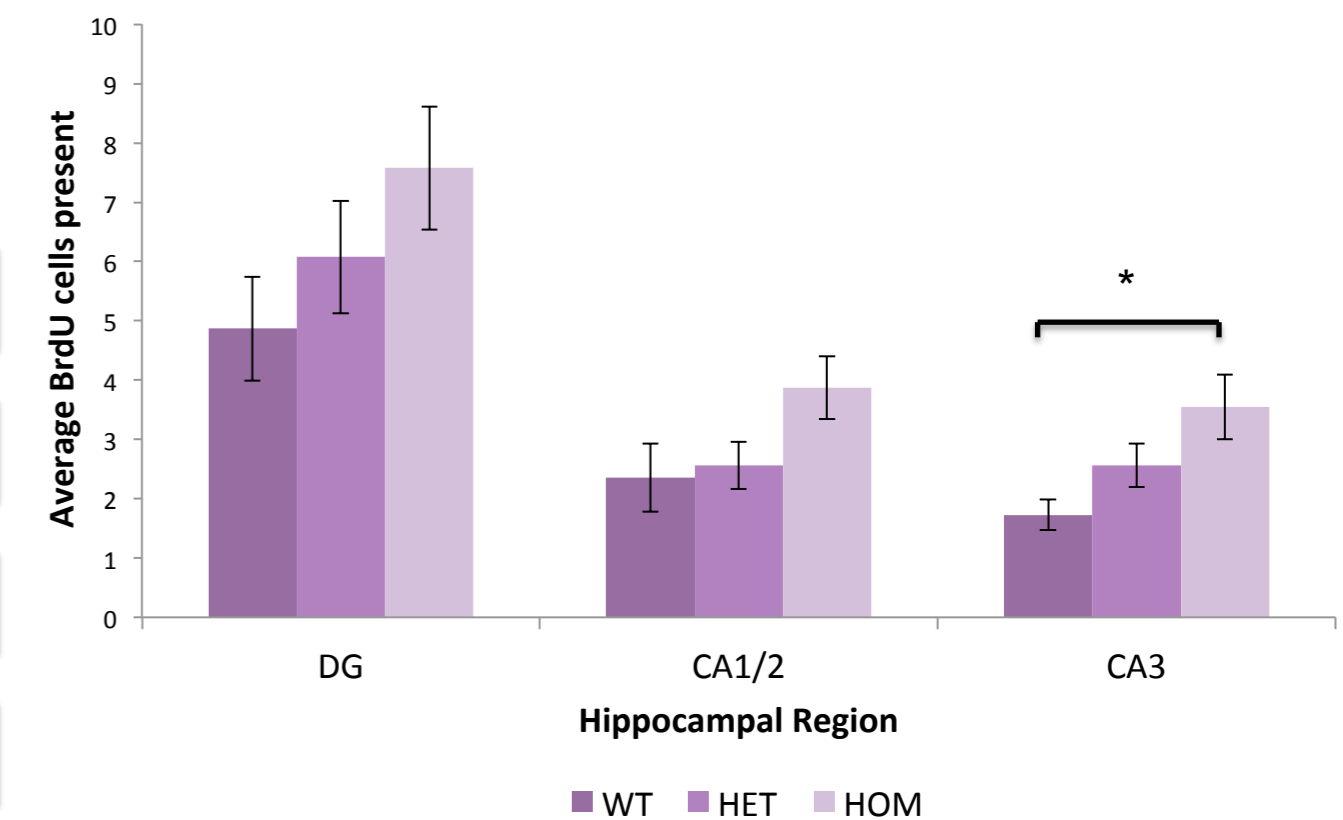


Figure 1: Number of BrdU cells present in each hippocampal region by genotype

A significant effect of pup genotype was found within the CA3 ( $F(2,25) = 2.96, p = .07$ )

Post Hoc test were done and significant differences were identified between HOM ( $m = 3.5, SD = 1.89$ ) and WT ( $m = 1.7, SD = .57$ ) pups.

The results of this study suggest that elevated intracellular 5HT is linked to increased cell proliferation. This may have implications on early brain development and long term psychological health.

## REFERENCES

Kepser & Homberg (2015). The neurodevelopmental effects of serotonin: A behavioural perspective. *Behavioural Brain Research*, 277, 3-13.

Rampono et al. (2004). A pilot study of newer antidepressant concentrations in cord and maternal serum and possible effects in the neonate. *The International Journal of Neuropsychopharmacology*, 7(3), 329-334