Microglial Activation and T-Cell Infiltration to the CNS Following LPS Administration

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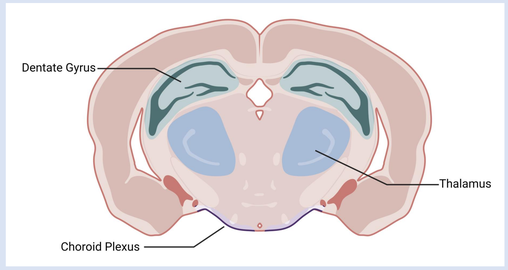
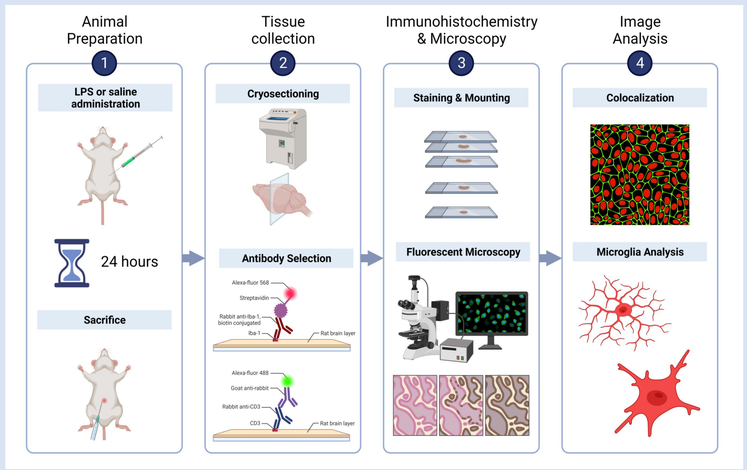
Introduction

- Microglia help regulate brain development, maintenance of neural networks, and injury repair
- In neurological disorders, microglia help increase blood brain barrier permeability allowing T-cell infiltration into the central nervous system (CNS)
- Understanding the mechanisms of cells involved in MS will help develop more viable therapeutic approaches and increase the early diagnosis of MS patients

Does LPS administration alter the morphology of microglia and cause T-cells to infiltrate the choroid plexus, thalamus, and dentate gyrus where microglia are localized?



Methods



Figures

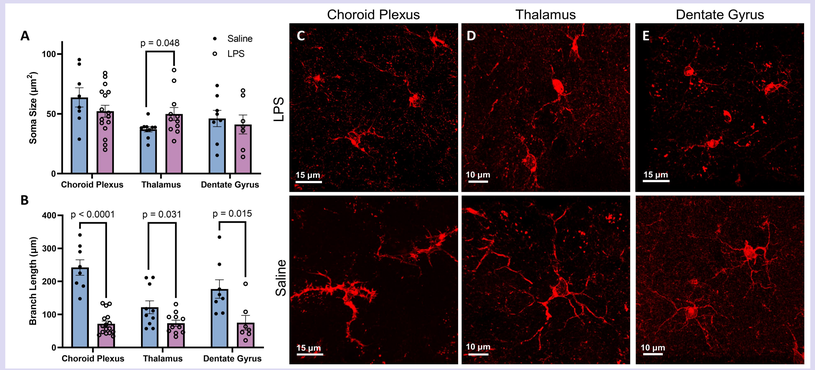


Figure 1. LPS administration decreases microglia process length but has less effect on soma size. LPS injection significantly decreased microglia branch length in the choroid plexus (CP), thalamus, and the hippocampus compared to the control group (A). LPS injection only significantly increased microglia soma size in the thalamus, with nonsignificant lower areas in the CP and hippocampus relative to controls (B). Representative images (63x) of microglia stained for Iba-1 in the CP (C), thalamus (D), and hippocampus (E). Five brain slices from each brain region of an LPS-treated and a saline-treated rats were used. Two-way ANOVA followed by pairwise t-tests were performed for statistical analysis ($\alpha = 0.05$). Error bar indicates SEM.

Figure 1. Widefield Images of a Saline Rat of DAPI, IBA-1 and CD3 for the Choroid Plexus, Dentate Gyrus and the Thalamus respectively. All images in each column are the same, but with different staining.

Results

- The average Branch Length for LPS-induced mice cells was smaller compared to Control Mice for all three ROI
- Soma size was increased in the Thalamus for LPS-induced mice as compared to control
- Some size was smaller in LPS compared to control mice in Choroid Plexus and Dentate Gyrus

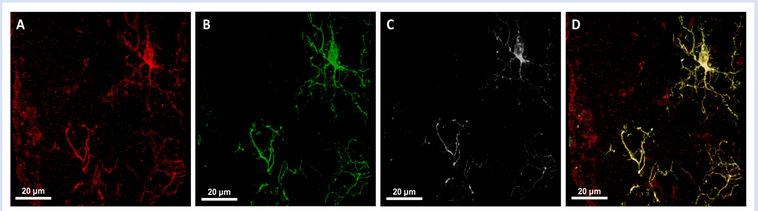


Figure #. Representative images of the colocalization of Iba-1 (A) and CD3 (B) in the choroid plexus of an LPS rat. Colocalization was analyzed (C), with the merged photo showing colocalization in yellow (D). Put labels over images (Iba1, CD3, Merged, coloc)

Conclusion

-LPS injection significantly decreased microglia branch length in the choroid plexus (CP), thalamus, and the hippocampus

-There was a significant increase in the soma size of the microglia in the thalamus, but not the CP or Dentate Gyrus

Acknowledgments

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