

Douglas Maternal immune activation early in gestation alters brain volume in mice

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Introduction

- Maternal immune activation [MIA] during pregnancy can increase the risk of neurodevelopmental disorders in offspring [1].
- · Experimentally-induced MIA in rodents alters behavior and neuroanatomy across the lifespan [2].

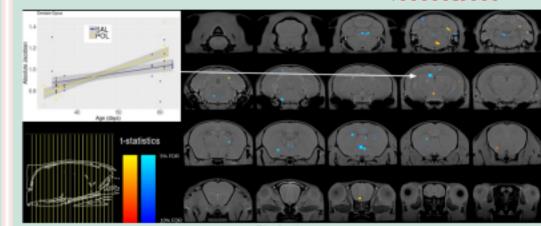
Goal: to investigate this relationship between behavior and neuroanatomy using magnetic resonance imaging [MRI] and behavioral assays.

Conclusions

- MIA induced with Poly I:C at gestational day 9 in mice alters brain anatomy in offspring during adolescence and early adulthood.
- Prepulse inhibition not statistically impacted, but trending sex-effects.
- Future directions:
- Investigate brain connectivity through functional MRI and chemistry through MR spectroscopy
- Integrate modalities with multivariate approaches

Results

Fig. 3 (above): Volumetric Changes-Left Subiculum Fig. 4 (below): Volumetric Changes-Left Dentate Gyrus



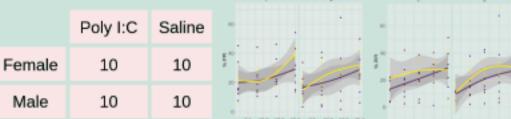
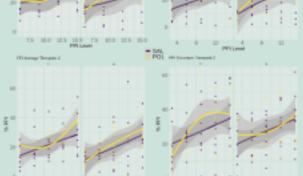
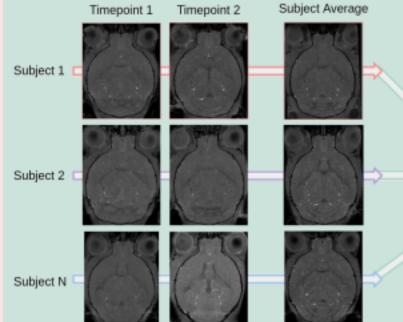


Fig. 5 (right): Prepulse Inhibition No significant treatment differences but trending sex differences (further information in figure link)



Behaviors

- Prepulse inhibition for sensorimotor gating
- MR Acquisitions
- •7T Bruker Biospec, cryogenic surface coil
- Anaesthetized with isoflurane
- •T1-weighted structural MRI (fast low-angle sequence, 70 µm3)
- MIA
- 5mg/kg polyinosinic:polycytidillic acid
- Gestational Day 9



Methods

Population Average

All Figure Links, Click Here

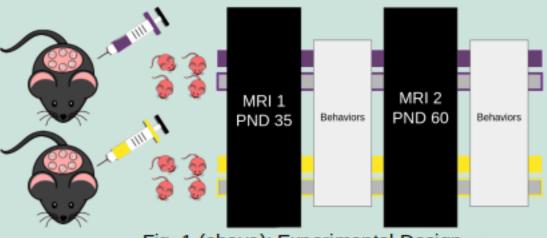


Fig. 1 (above): Experimental Design

Statistical Methods

- Linear mixed effects model
- Fixed effects: Treatment (Poly I:C/Saline); Sex: Age
- Random effects: Subject ID
- Multiple Comparison Corrections
- False Discovery Rate, 10%-5%

Fig. 2 (above): Formation of subject and population averages with deformation-based morphometry

2) Guma et al. (2019). The role of maternal immune activation in altering the neurodevelopmental trajectories of offspring... Neuroscience & Biobehavioral Reviews.





Estes, M. L., & McAllister, A. K. (2016). Maternal immune activation: Implications for neuropsychiatric disorders. Science.