

MATERNAL STRESS EFFECTS on Brain Cell Composition

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Background

The stress experienced by the mother can lead to changes in brain cell proliferation in offspring which are born rather undeveloped. This makes it compelling to study the same effects in laying hens, precocial animals which are born ratherly more developed.



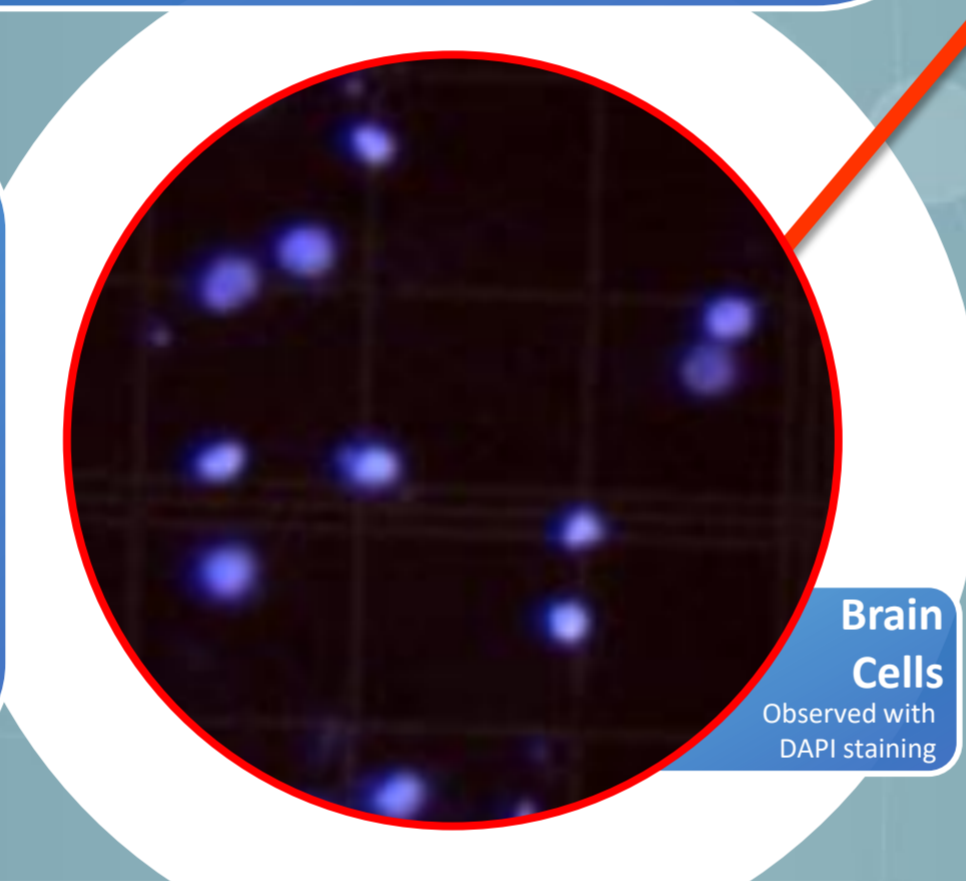
Since prenatal maternal stress in chickens exert its effect in a larger neurodevelopmental time window, we expect to find, as in mammalian studies, an amplified effect of this phenomena on brain cell composition.



Procedure

1. Brain of 82 chickens dissected and weighed.
2. Transform brain in a uniform soup of cells.
3. Staining techniques and microscope observation to count:

Brain Cells **Neurons** **Non-Neurons**



Brain Cells
Observed with
DAPI staining



Findings

Prenatal Maternal Stress in the...

- **...Telencephalon**
Significantly reduces **Mass** (in ♀) and marginally reduces **Non-neurons**
- **..Cerebellum**
Marginally reduces **Non-Neuron number**
- **..Whole Brain**
Marginally reduces **Proportional Mass**

Only in **Females ♀**

Brain Variables	Maternal Stress Effect
Mass (g)	
Whole Brain	=
Telencephalon	↓ only in ♀
Cerebellum	=
Proportional Mass (%)	
Whole Brain	↓ only in ♀
Telencephalon	=
Cerebellum	=
Neuron Numbers	
Telencephalon	=
Cerebellum	=
Non-Neuron Numbers	
Telencephalon	↓
Cerebellum	↓ only in ♀

Conclusion



Highlights

Importance of considering:

- **Sex Dependent Effects**
Prenatal Maternal stress can differentially impact the offspring neurodevelopment depending on its sex, corroborating with what was observed in physiological and behavioural studies.
- **Non-Neuronal Function**
Non-neuronal cells have a critical role in supporting neuronal function and so these findings might hold implications for understanding the long-term consequences of prenatal maternal stress on brain function and affective pathology.



Future

Integration of:

- **Behavioral Data**
To investigate long-term consequences of prenatal maternal stress.
- **Non-Neuronal Discrimination**
To investigate if specific non-neurons are more affected.
- **Egg Hormonal Allocation**
To investigate mechanisms of prenatal maternal stress mediation.