Tweaking Genes in Mini-Brains

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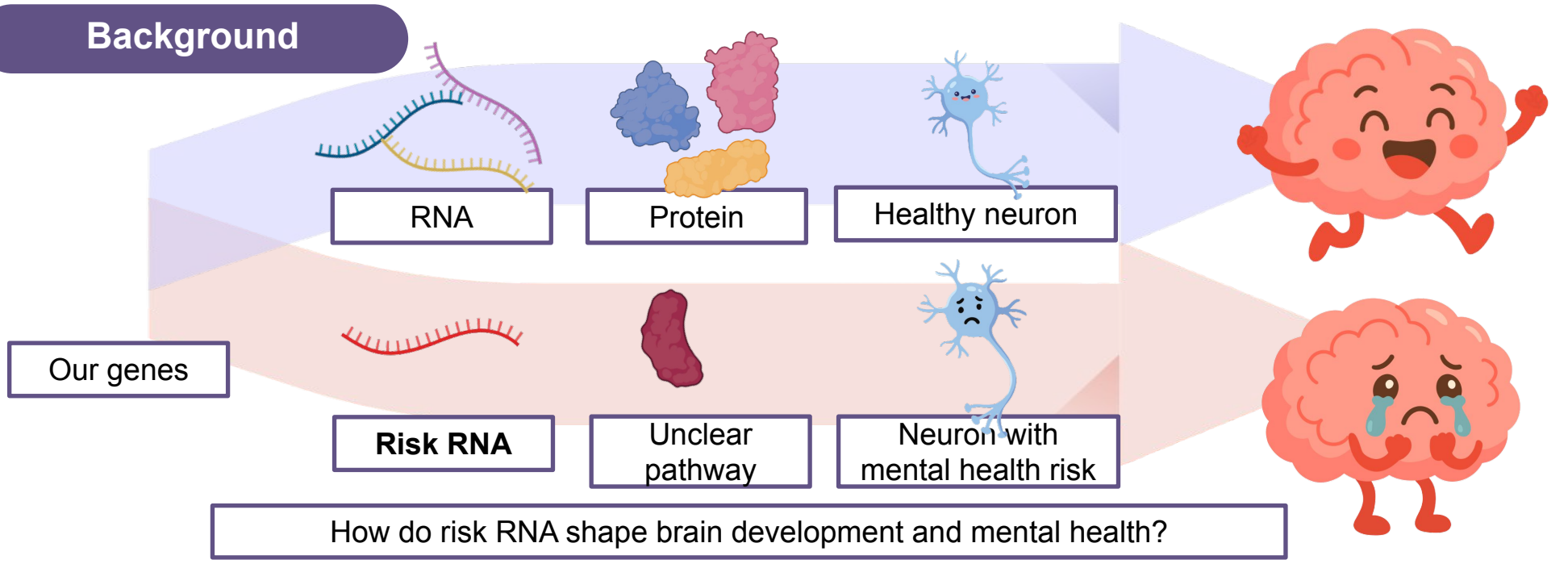
citizens of science

Background



Aim & Hypothesis

Aim: To alter the risk RNA in the mini-brains to provide understanding about the brain's process of development and mental health.

Hypothesis: Studying how risk RNA works can help us understand how the chance of developing mental health conditions might be predetermined before we are born.

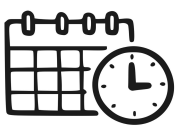
Method



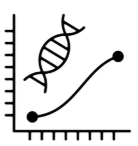
1. Design blocking molecules that target risk RNA.



2. Add the blocking molecules into the growing cells and/or mini brains.



3. Allow cells to grow for several days.



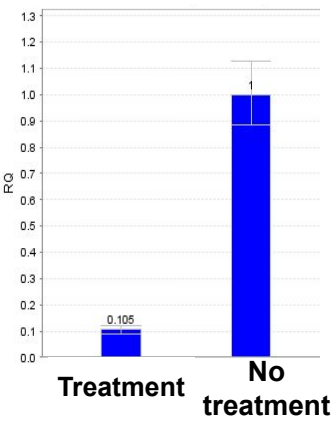
4. Use qPCR to make copies of RNAs and check whether blocking has worked.



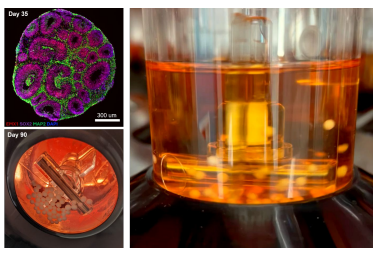
5. Observe changes in RNA and cell development after treatment.

Results

Risk RNA levels



'Mini-brains'

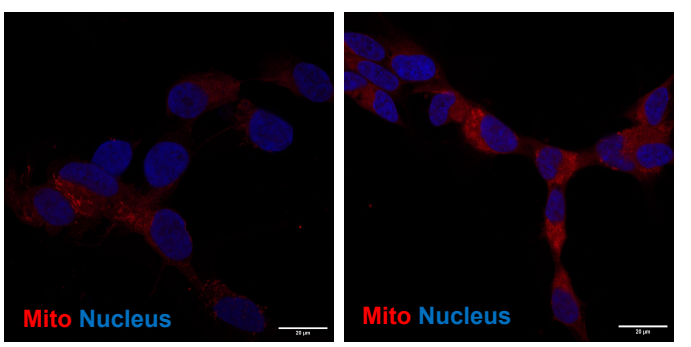


Cerebral organoids cultured and imaged by Dr Maria Giovanna Garone, Velasco Lab, MCRI

The blocking molecules successfully reduced risk RNA levels.

Further experiments are looking at the effects on mitochondria in cells and, later, in mini-brains.

Treatment | **No treatment**



Mitochondria: the cell's energy producers

Key Takeaways

1. Complexity of DNA-Genes-RNA-Proteins
2. The brain's basic hardware is built/developed before we are born.
3. Through manipulating risk genes in the cells, this research hopes to help understand brain development and eventually help reduce the risk of mental health conditions.