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BIOL 294-Genetics

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Writing Assignment 4 – Summary of a Primary Genetics article

The research done for the article ‘Natural RNA circles function as efficient microRNA sponges’ was to show how Circular RNA (circRNA) can copy or be used to imitate microRNA (miRNA). The authors point out that this study was the first function analysis of naturally expressed circRNA (1). The researchers used ciRS-7 (circRNA) to emulate miRNA or miR-7. They used it because while it contains 70 or more miRNA target sites, it is also heavily associated with Argonaute proteins in the same dependent manner as a miR-7 sponge. Per the Hansen the circRNA is resistant to miRNA-mediated target destabilization and strongly suppresses miR-7 activity. In this study they used human and mice as test subjects.

The research was done conceptually to try and regulate mature miRNA. They studied miRNA target concatemers by overexpressing them to determine the loss of miRNA function and how it simultaneously increased levels of endogenous targets. They were able to identify a highly expressed endogenous circRNA in both human and mice brains. After they identified the circRNA they then demonstrated that it could be endonucleolytically cleaved.

The methods they used were with transfection to deliver RNA into the cells in baby mouse brains. They then used reverse transcription and studied the results. They also used constructs and transfections with Invitrogen with calcium phosphate or Lipofectamine in mouse brains and recorded the results.

The study continued using mice for the in vivo test and in situ hybridization. They recorded their results from the study. Showing a comparison of ciRS-7 and miR-7 at different stages.

Reference

1. Thomas B. H, et al., Natural RNA circles function as efficient microRNA sponges. *Nature* **495**; <https://doi.org/10.1038/nature11993> (2023)