CHRD 2021: Abstract & Poster Submission Form

Submitter Name

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Research Category:

- ◉ Basic Science
- ○ Clinical
- ○ Community Health / Policy

What was your role in the project?

- ☐ Design
- ☑ Perform Experiments
- ☑ Analyze Data
- ☑ Write Abstract
- ☐

Presenter Status:

- ◉ Undergraduate Students
- ○ Masters Student
- ○ PhD Student
- ○ Post-Doctoral Fellows
- ○ Residents
- ○ Non-Trainee

Title

Characterizing the Transcriptional Regulation of Cardiac Fibroblast Activation

Background

Fibroblasts maintain a homeostatic microenvironment for tissues by creating and remodeling the extracellular matrix, secreting signaling proteins, and healing tissue damage. To heal tissue damage, fibroblasts are activated and adopt a contractile myofibroblast phenotype. Improper cardiac fibroblast function during development, including persistent fibroblast activation, contributes to congenital heart defect (CHD) formation, the most common birth defect worldwide.

Objective

This project aims to discover the role two related transcription factors, Zinc Finger E Box-Binding Homeobox-1 (Zeb1) and Zeb2, have in fibroblast activation to increase our understanding of mechanisms leading to CHD development.

Methods

Zeb1 and Zeb2 were studied in the mouse cell NIH3T3, a common fibroblast model, and primary rat cardiac fibroblasts (PRCFs) obtained from adult male Sprague-Dawley rats. NIH3T3 cells were used to verify reagents. PRCFs were isolated by enzymatic digestion and harvested either 48hr (n=3) or 96hr (n=3) after isolation. PRCF activation to a myofibroblast phenotype spontaneously occurred by plating on plastic and was measured based on levels of alpha-smooth muscle actin (αSMA) and periostin by Western blot (WB). Qualitative Zeb1 and Zeb2 levels in 48hr vs 96hr PRCFs was determined by WB.

Results

PRCFs were successfully isolated and activated. WB was used to detect periostin, aSMA, Zeb1, and Zeb2 proteins in NIH3T3 cells and PRCFs. The levels of these four proteins were compared between 48hr and 96hr PRCF samples (n=3). Levels of aSMA and Zeb2 increased at 96 hrs, indicating that Zeb2 increases with increased PRCF activation. In contrast, levels of Zeb1 between 48hr and 96hr samples were not changed.

Conclusion

Our studies suggest that Zeb2, not Zeb1, may have a role in fibroblast activation, as intracellular levels of Zeb2 increased as PRCF activation increased. Further research will include knockdown studies of Zeb1 and Zeb2 in PRCFs and embryonic mouse valvular cells to establish their role in CHDs.

Authors

- For each author, please click "**[+] Add Item**" and provide the author's information

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