“Long non-coding RNAs involved in cardiac differentiation are differentially expressed in iPSCs from Down Syndrome patients”

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INTRODUCTION

Down syndrome is a condition characterized by the presence of an extra chromosome 21 in the human karyotype, this leads to an increased risk of diseases such as cardiac heart diseases that affect to about 50% of infants with DS. The presence of an extra chromosome causes a genetic imbalance that disturbs the coding and non-coding transcriptome, and consequently various cellular processes, including cardiogenesis. LncRNAs are usually expressed in specific time periods and tissues, and lately have been described as important regulators of cardiac development. Also, it has been described that cardiac differentiation in cells derived from Down Syndrome patients (3S) is altered concerning to non trisomic individuals (2S). Given this information, the following hypothesis was proposed: ***"Long non-coding RNAs associated with cardiac differentiation are differentially expressed in induced pluripotent stem cells (iPSC) from Down Syndrome patients”.***

METHODS

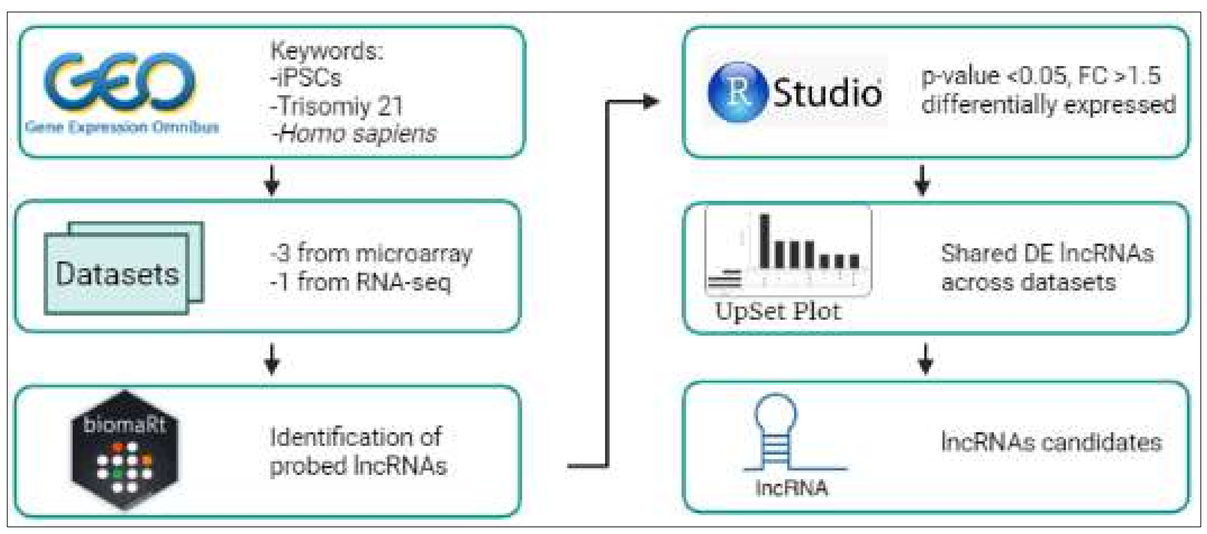

Figure 1. Experimental Design

RESULTS

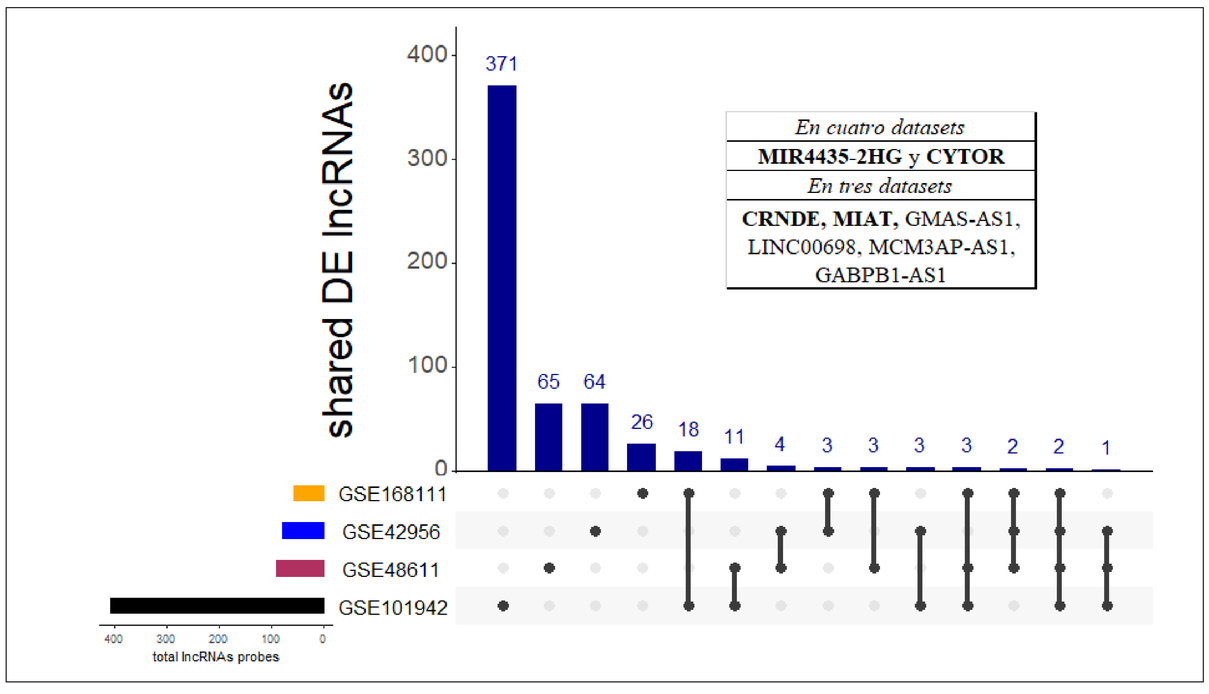

Figure 2. LncRNAs differentially expressed between disomic (2S) and trisomic (3s) iPSCs.

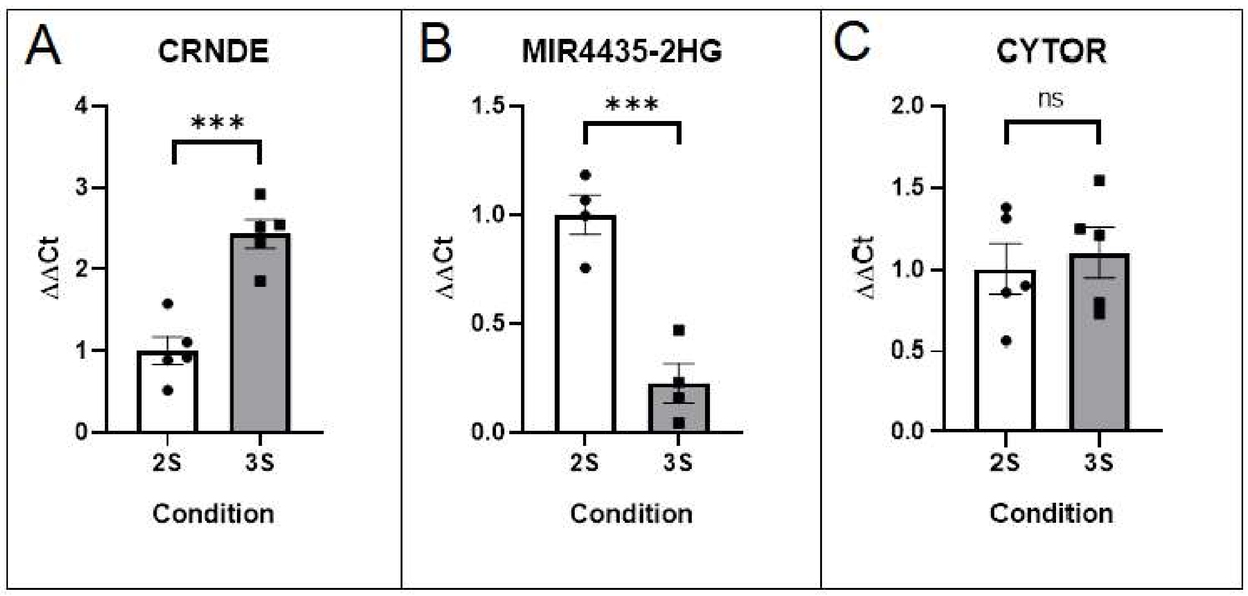

Figure 3. LncRNAs transcript level in 2S and 3S iPSCs. A: *CRNDE*. B:*MIR4435-2HG*. C: *CYTOR*. Data are presented as the mean ± SEM. ***p <0.001, ns: not significant.

CONCLUSIONS

- We found a total of eight lncRNAs systematically DE in all studies (shared DE lncRNAs), suggesting that they could affect 3S iPSC cardiac differentiation.
- Four of the candidates have been associated with cardiac differentiation, therefore the transcript level of these lncRNAs in 2S and 3S iPSCs were measured by RT-qPCR.
- *CRNDE* was shown to be increased in trisomic iPSCs, while *MIR4435-2HG* is decreased in 3S, relative to disomic iPSCs. For *CYTOR* no differences were observed between 2S and 3S iPSCs, while for *MIAT* no amplification was obtained (data not shown).

FUTURE PERSPECTIVES

Our next goal is to functionally characterize those lncRNAs involved in cardiac development and carry out experimental validations using cellular and molecular biology approaches.

ACKNOWLEDGMENTS

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