Role of extracellular vesicles in stress-induced interactions between embryo and maternal Cells

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Introduction

- The embryo-maternal communication is a highly coordinated process mediated by different factors.
- Endometrial extracellular vesicles (EVs) influence the embryo, although the exact mechanisms of the action, and the changes in EV cargo under stress conditions, have not been investigated yet.

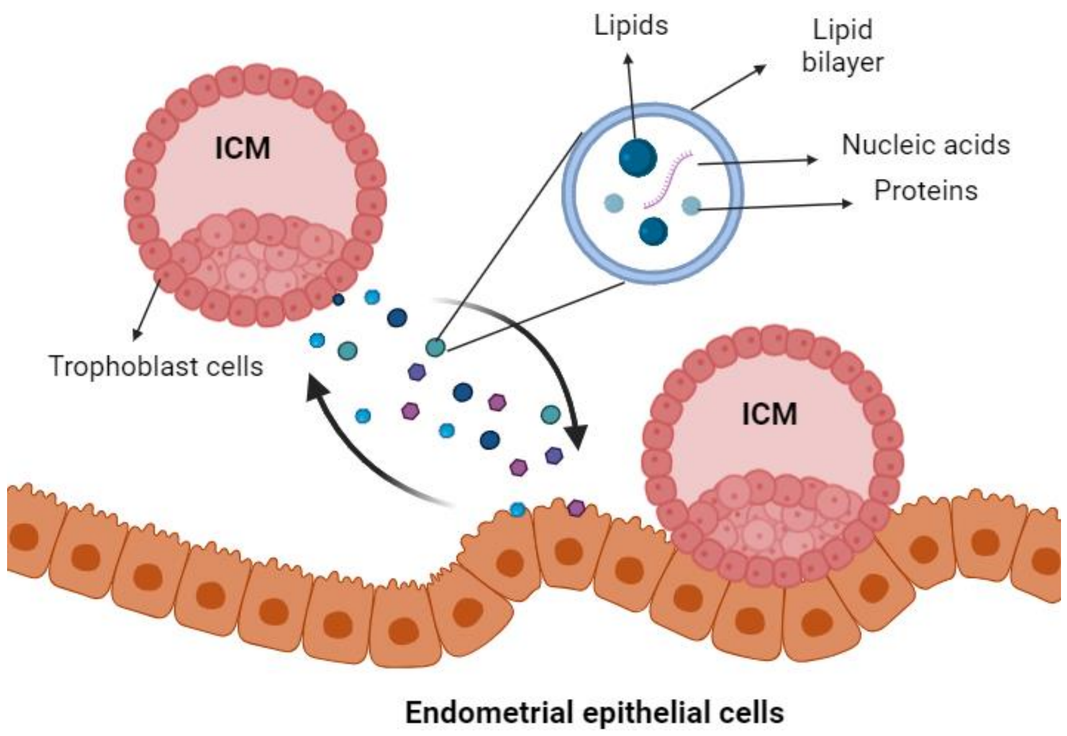

Figure 1. Role of EVs in embryo-maternal communication.

Objectives

- To determine the miRNA profile of EVs from stressed and unstressed endometrial cells (RI95-2) and compare the transcriptomic changes of the trophoblast treated with stressed EV.

Methods

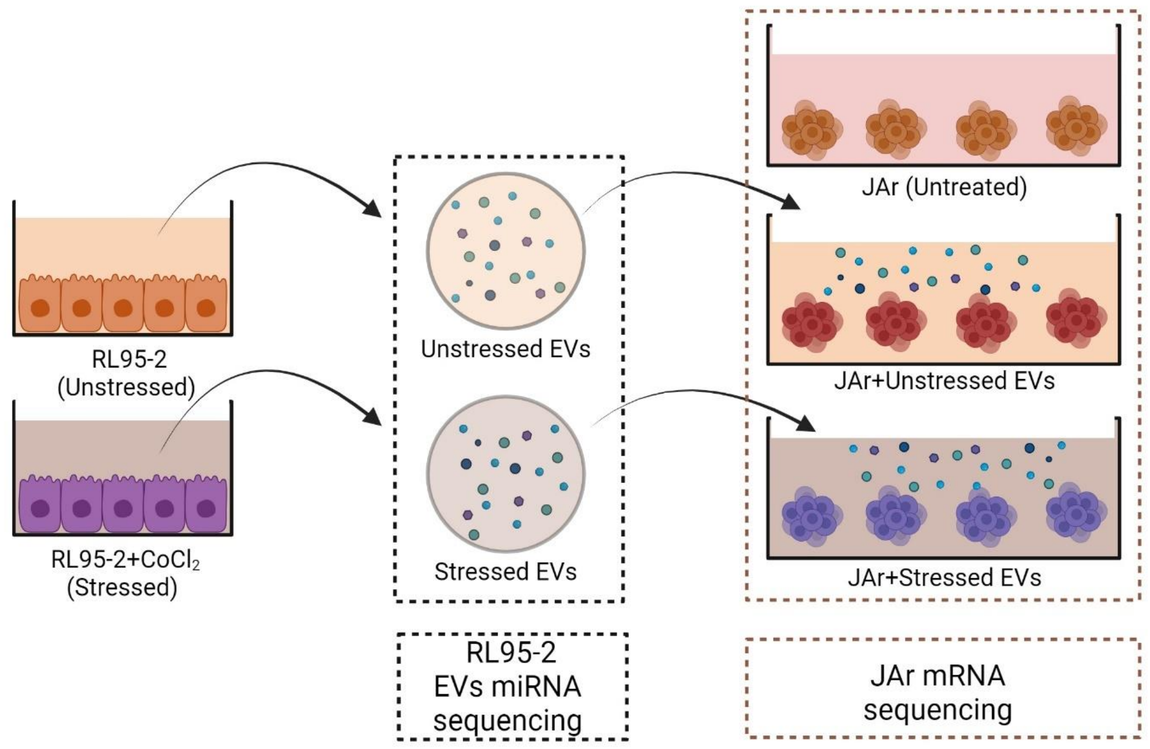

Figure 2. Experimental setup.

- Oxidative stress was induced in RL 95-2 cells by $CoCl_2$, prior to EV isolation.
- Sequencing analysis was performed for the miRNA profile of EVs.
- Transcriptome of trophoblast cells treated with EVs from stressed and Normal RL95-2 cells were analysed by sequencing.

Results

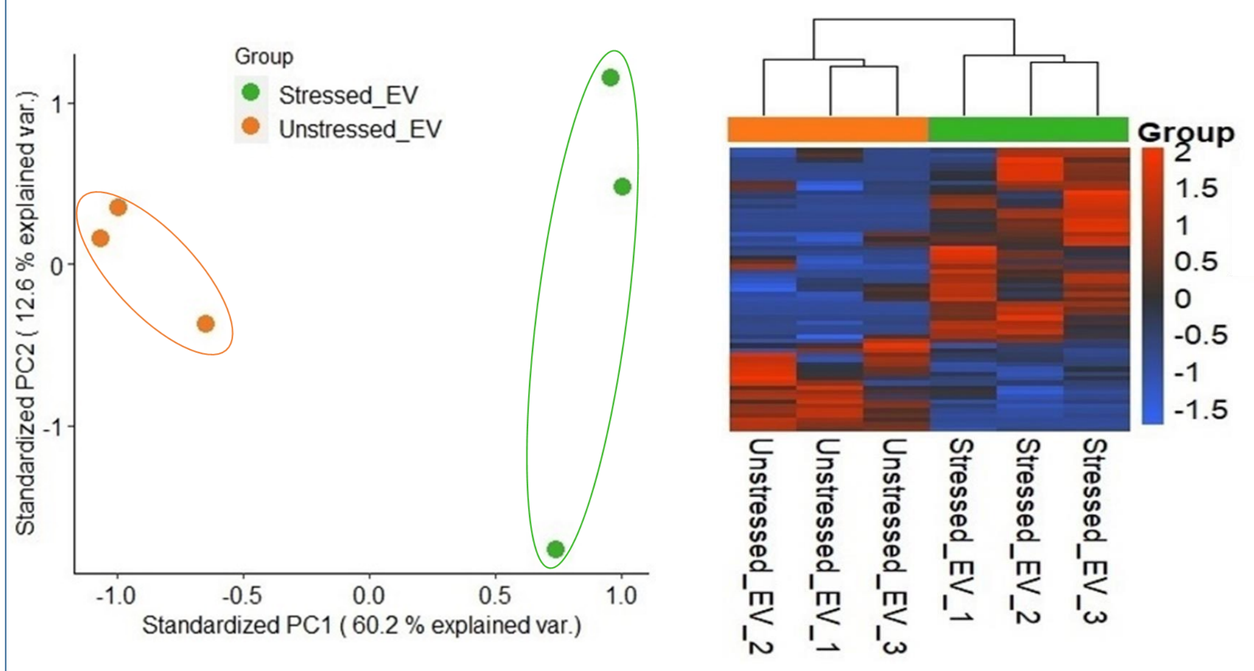

Figure 3. A) PCA shows the overall separation of miRNA profile of EV samples. B) Heatmap shows significant differentially expressed miRNA in EV samples.

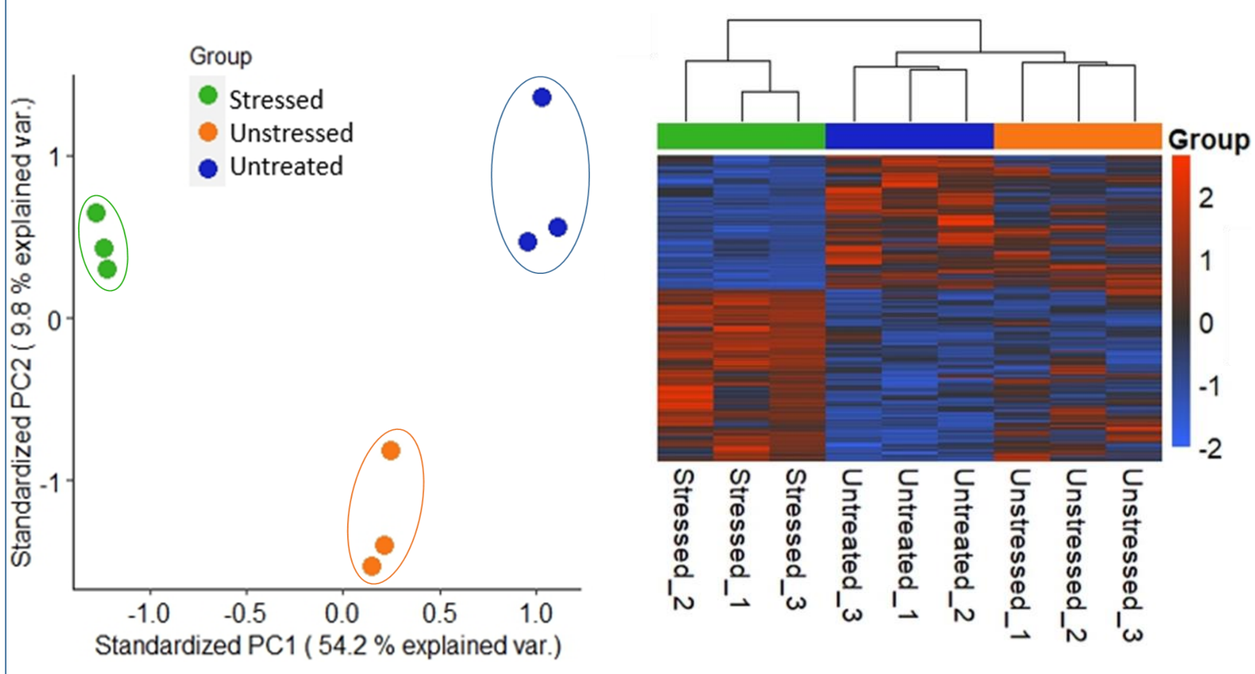

Figure 4. A) Overall separation of mRNA profile of trophoblast cells with different treatments is demonstrated by PCA plot. B) Heatmap of significant differentially expressed miRNA in EV samples.

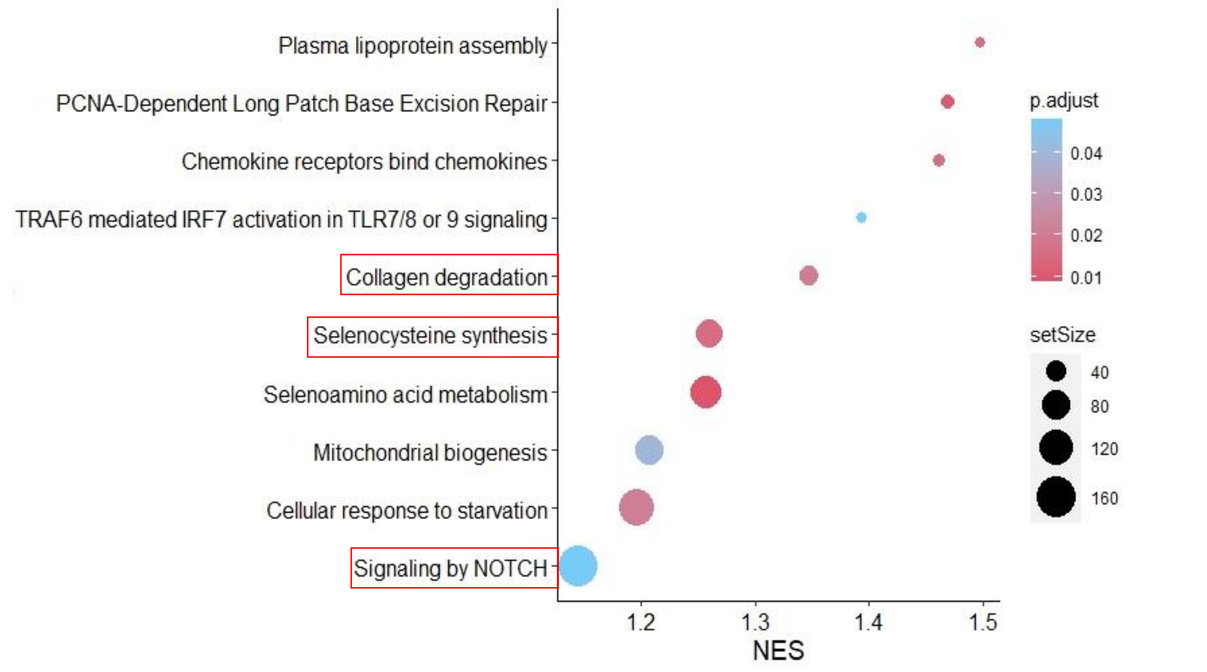

Figure 5. Stressed RL95-2-derived EVs modulate the molecular pathways related to the implantation in trophoblast cells.

Conclusion

- Oxidative stress affects the miRNA profile of EVs from RL95-2.
- EVs transfer stress signals from stressed RL95-2 to JAr spheroids.
- EV miRNA from stressed cells partially altered the transcriptome of JAr spheroids.
- Future approach is to investigate specific miRNA as the biomarker for stress status of the endometrium.

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