

P180. Exosomal miRNA profile in gestational diabetes – Potential role in placental metabolism

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Introduction: There has been an explosive interest in the role of exosomes highlighting its ability in mediating cell-to-cell communication and delivering bioactive molecules during gestation. The aim of this study was to determine the exosomal miRNA profile in women with gestational diabetes mellitus (GDM).

Methods: Samples were obtained from maternal plasma obtained from with GDM normal (control) pregnancy at the time of delivery. Exosomes were isolated through differential and buoyant density centrifugation and characterised by size distribution, enrichment of TSG101 and morphology using NanoSight, Western Blot and electron microscopy, respectively. Illumina TrueSeq Small RNA kit was used to construct a small RNA library. The resulting sequencing FASTQ file was analysed using miRDeep2, a program specifically designed to identify both known and novel microRNA's. Exosomes were incubated on placental cells and glucose metabolism was assessed by RT2 Profiler PCR Array Human Glucose Metabolism kit for gene expression of 84 key genes involved in enzymatic pathways.

RESULTS: The total number of exosomes and placenta-derived exosomes present in maternal circulation was higher in GDM compared to control. Statistical analysis using the DESeq2 package in R identified a range of miRNAs differentially expressed between normal and GDM samples. Gene target identification using CyTargetLinker of the top 40 miRNAs (sorted by increasing p-value) identified 968 gene targets. Gene ontology analysis shows that some of our candidate miRNAs regulate genes involved in insulin secretion in response to glucose stimulus, insulin receptor signalling and glucose homeostasis. Functional analysis using placental cells shown that exosomes regulates several genes involve in glucose metabolism and modifying glucose uptake in placental in response to insulin.

CONCLUSIONS: These results suggest that exosomes present in maternal circulation, which are higher in number in GDM, may play an important role in glucose homeostasis in placental cells.

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