Differential Expression of Exosome-Associated Proteins in Seminal Plasma of Infertile Men with Unilateral Varicocele

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INTRODUCTION

- Seminal exosomes are involved in transfer of fertility modulating proteins to the spermatozoa. Though proteins associated with exosome function are involved in energy pathways, protein metabolism, cell growth and maintenance, there is paucity of information on the role of seminal exosomes on sperm function in general and varicocele in particular.
- The objective was to identify the altered expression of seminal plasma proteins associated with exosome-sperm fusion pathway in patients with unilateral varicocele.

EXPERIMENTAL DESIGN

- In silico analysis was done using Cytoscape and Metacore platforms to identify the top-most enriched pathways and DEPs involved in regulating the upstream transcription receptors respectively. Exosome-associated DEPs were validated by Western blot (WB) analysis.

RESULTS

- RAB27A, TF, TSPAN1, ANXA1, ANXA2 and KIF5B were identified as the nodal proteins associated with exosomal function (Fig. 4).
- ANXA2 a calcium-regulated binding protein responsible for fusion of exosomes was significantly upregulated (2.49-folds; P=0.0016), indicating impaired fusion of exosomes with spermatozoa in varicocele patients (Fig. 6).

CONCLUSION

- The first report on the DEPs in the seminal plasma of infertile unilateral varicocele patients with respect to fertile healthy men without varicocele.
- Aberrant expression of exosome function associated proteins hinders the transfer of exosomal elements/factors to the spermatozoa essential for maturation process.
- ANXA2 can serve as potential protein biomarkers of exosomal dysfunction in infertile men with varicocele.