

SNCRNA EXPRESSION PROFILE IN SPENT CULTURE MEDIA OBTAINED FROM EMBRYOS WITH DIFFERENT DEVELOPMENT POTENTIAL

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Abstract Body

Introduction: Small noncoding RNAs (sncRNAs) are key regulators of the majority of human reproduction events. Understanding their function in gametogenesis and embryogenesis will allow insight into possible causes of in vitro fertilization (IVF) implantation failure. Aim: To analyze sncRNA expression profile of spent culture media (SCM) on day 4 after fertilization and to reveal a relationship with gametes and resultant embryos morphofunctional characteristics. Materials and methods: Cell-free, embryo-specific sncRNAs were identified by next generation sequencing and quantified by RT-PCR in real-time. Results: Significant differences in let-7b-5p, let-7i-5p, piR020401, piR16735, piR19675, piR20326, and piR17716 expression were revealed between embryos with various morphological gradings. Statistically significant correlations were found between piR16735 and piR020401 expression with the oocyte-cumulus complex number, let-7b-5p and piR020401 with metaphase II oocyte and two pronuclei embryo numbers, let-7i-5p and piR20497 with the spermatozoid count, piR19675 with the percentage of linearly motile spermatozoids, let-7b-5p with the embryo development grade, and let-7i-5p with embryo implantation. According to partial least squares discriminant analysis, the expression of let-7i-5p (Variable Importance in Projection score (VIP) = 1.6262), piR020401 (VIP = 1.45281), and piR20497 (VIP = 1.42765) have the strongest influences on the implantation outcome. The expression of let-7b-5p, let-7i-5p, piR020401, piR16735, piR19675 differs significantly between SCM from morula which developed into good, bad quality blastocyst and from degraded morula. Conclusions: Let-7b-5p, let-7i-5p, piR020401, piR16735, piR17716, piR19675 and piR20497 can be predictive biomarkers for evaluating the effectiveness of IVF program based on their expression in SCM. Let-7b-5p, let-7i-5p, piR020401, piR16735, piR19675 are crucial molecules for early embryo development, particularly during blastulation.