FIRST TRIMESTER HUMAN UMBILICAL CORD PERIVASCULAR CELLS (FTM-HUCPVCS) CONDITIONED MEDIA SIGNIFICANTLY PROMOTES HUMAN GERMINAL VESICLE (GV) OOCYTE MATURATION IN VITRO

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Abstract Body

Introduction: Approximately 20% of oocytes recovered during oocyte retrieval are immature and routinely discarded by IVF laboratories. Live births have been achieved from *in vitro* matured oocytes, but these oocytes are known to generally yield less favourable outcomes. Our group has shown that FTM-HUCPVCs, a novel young source of mesenchymal stromal cells (MSCs), promote germ cell survival and/or regeneration through their paracrine properties. Studies from other groups have shown that MSC-derived conditioned media (CM) promotes oocyte maturation in animal models. To our knowledge, the ability of FTM HUCPVC paracrine properties to support human immature oocyte maturation have not been reported. Our objective was to determine if FTM HUCPVC CM can improve GV oocyte maturation when compared to standard media.

Methods: CM was generated from confluent FTM-HUCPVCs cultured for 48hrs in standard IVF media (Quines advantage fertilization media- Origio). With informed consent, 65 GV oocytes were collected from 14 IVF patients undergoing controlled ovarian stimulation. Sibling GV oocytes were divided between standard IVF media (control) and FTM-HUCPVC CM. Oocytes were examined by a skilled embryologist on the following day and maturation was assessed according to standard morphological criteria. The expression of 108 paracrine-associated transcripts was probed using targeted RNA sequencing of FTM HUCPVCs.

Results: In the CM group, 11 (33.4%) of the oocytes remained GVs after 24 hours, 8 (24.2%) transformed to MI, and 14 (42.4%) achieved full maturation (MII), compared with 19 (59.4%), 8 (25%), and 5 (15.6%) in the standard media group, respectively. Thus, the maturation rate increased approximately 3-fold with FTM HUCPVC CM when compared to controls (P=0.018). Genes known to play roles in the paracrine and autocrine regulation of folliculogenesis and oocyte maturation were found to be expressed by FTM HUCPVCs.

Conclusion: FTM-HUCPVC CM promoted maturation of human GV oocytes with increased efficiency when compared to standard media. FTM-HUCPVCs express many factors previously implicated in ovarian physiology and may be useful in assisted reproduction technologies such as in vitro GV maturation.

Abstract image

Table 1:

	MII	MI	GV	Total
CM	14 (42.4%)[a]	8 (24.2%)	11 (33.4%)[a]	33
r-IVM media	5 (15.6%)[a]	8 (25%)	19 (59.4%)[a]	32

[a] **P=0.018**

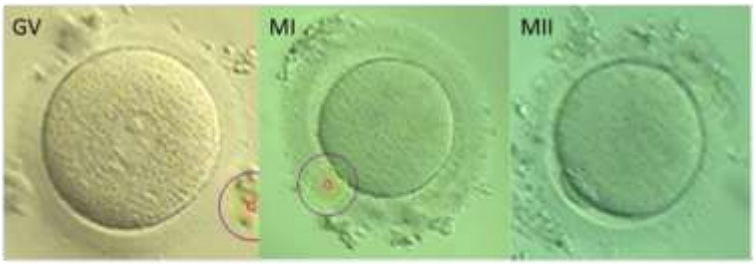

Table 1. maturation rate in the CM group and control group. (P=0.018)

Figure1: Representative images of HUCPVC-CM *in vitro* matured oocytes at GV, MI and MII stage taken using an inverted microscope.