Moreover, a particular diacylglycerol (*m/z*697.6557) was downregulated in the study group. This lipidomic panel was associated with high-density lipoprotein, triglyceride acyl-chain remodeling and canonical Wnt signaling pathway in enrichment analysis.

CONCLUSIONS: Our data suggest that the identification of lipids and pathways correlated with *in vitro* fertilization may be used for the improvement of current protocols of embryo culture. This study may contribute to further investigations, which aim to elucidate how *in vitro* culture, among other ART procedures, affects embryo development.

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DEVELOPMENT OF A CLINIC-SPECIFIC PREDICTIVE EMBRYOKINETIC MODEL IN AN ACADEMIC CENTER. L. Yang,[a] M. Peavey,[a] K. Kaskar,[a] N. R. Chappell,[a] L. Zhu,[b] D. Devlin,[c] C. T. Valdes,[a] T. L. Woodard,[a] P. W. Zarutskie,[a] W. E. Gibbons.[a] [a]Department of OB/GYN, Baylor College of Medicine, Houston, TX; [b]Rice University, Houston, TX; [c]Translational Bio & Mol Medicine, Baylor College of Medicine, Houston, TX.

OBJECTIVE: Non-invasive time-lapse microscopy (TLM) is used to monitor embryo development to assist embryo grading and transfer selection. Unfortunately, prior studies show conflicting morphokinetic parameters that predict clinical pregnancy and thus, the development of clinic-specific embryo algorithms have been proposed. This study examines the feasibility and development of a clinic-specific embryokinetic assay to predict clinical pregnancy rate.

DESIGN: Retrospective cohort analysis of TLM of embryos that resulted in either 0 or 100% clinical pregnancy at an academic fertility center.

MATERIALS AND METHODS: All embryos that underwent EmbryoScope™ TLM and subsequent transfer with either clinical pregnancy (defined by fetal heart beat after 6 weeks) or no clinical pregnancy were included from 2014 to 2016. All morphokinetic parameters starting from fertilization to blastocyst formation were annotated. Demographics data included oocyte age, anti-Müllerian hormone (AMH), peak estradiol, body mass index (BMI), and Society for Assisted Reproductive Technology diagnosis. Data were analyzed by multivariate analysis of covariance, Fisher's exact, Chi-square tests, and binomial logistic regression with SPSS.

RESULTS: A total of 215 embryos met inclusion criteria. Embryos that resulted in clinical pregnancy (n=94) in were faster in progression to 4-cell stage (37.8h vs 40.2h, p=0.057, OR 0.74), and advanced more slowly to the morula stage (64.3h vs 62.7h, p= 0.040, OR 1.113) compared to embryos that did not result in clinical pregnancy (n=121). The logistic regression model (Chi square=26.3, p=0.010) correctly predicted 70% of clinical pregnancy (sensitivity of 79% and specificity of 59%). A receiver operating characteristic (ROC) curve was developed and found to be significant with area under the curve 0.757 (95% CI 0.667-0.848, p<0.001). As predicted, embryos that resulted in pregnancy were associated with decreased oocyte age (35.0 vs 33.7yr, p=0.0057) and higher AMH (4.78 vs. 3.5ng/mL, p=0.049); therefore, age and AMH were controlled for in the analysis. No difference was found between BMI, SART diagnosis, and the annotator of the morphokinetics.

CONCLUSIONS: This study demonstrates the feasibility and development of a clinic-specific embryokinetic assay and predictive model with as few as 200 embryo outcomes. Shorter time to 4 cell and delayed morula appearance were predictive of clinical pregnancy rates, when age and AMH were controlled. Additional testing will be forthcoming and are needed to determine if the success of this model in prospective embryo selection.

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CALCIUM IONOPHORE TREATMENT AFTER ICSI IMPROVES BLASTOCYST DEVELOPMENT FOR MALE FACTOR INDICATIONS AS WELL AS PATIENTS WITH ONLY A HISTORY OF POOR BLASTOCYST DEVELOPMENT. S. McCormick, R. Smith, C. Pospisil, N. I. McCubbin, W. B. Schoolcraft, M. Katz-Jaffe. Colorado Center for Reproductive Medicine, Lone Tree, CO.

OBJECTIVE: To determine whether calcium ionophore treatment after intracytoplasmic sperm injection (ICSI) can improve the blastocyst conversion rate in patients with male factor infertility or a history of poor blastocyst development whose partners have normal sperm parameters.

DESIGN: Prospective intervention study.

MATERIALS AND METHODS: Between January 2015 and December 2016, patients with either male factor infertility (n=25) or only a history of poor blastocyst development whose partners have normal sperm parameters (n=34), were recruited for oocyte splits and calcium ionophore treatment. Immediately after ICSI, half of the metaphase 2 oocytes were randomly selected and treated with calcium ionophore solution (Calcium group; A23187 calcimycin, Sigma) for 15 minutes followed by a three-step washing protocol before in vitro culture. The remaining metaphase 2 sibling oocytes were untreated and placed directly into in vitro culture (Control group). All normally fertilized zygotes from both groups were sequentially cultured to the blastocyst stage. Transferable quality blastocysts were either biopsied for comprehensive chromosome screening (CCS) and vitrified, or vitrified intact, for a future frozen embryo transfer (FET). Statistical analysis included Student's t-test, Fisher's Exact and Chi square test where appropriate, with significance at P<0.05.

RESULTS: On average 21.2±8.5 oocytes were retrieved per IVF cycle with mean maternal and paternal age of 36.9±4.5 and 39.9±5.8 years, respectively. Fertilization rates did not significantly differ between the sibling oocyte groups (67% Calcium versus 74% Control; ns). Likewise, cleavage rates to the 6-8 cell embryonic stage were comparable (97% with Calcium versus 96% Control; ns). In contrast further development to the blastocyst stage was significantly improved in the calcium ionophore treatment group (48%) when compared to controls (39%; P<0.05). In addition, there was a trend towards more blastocysts formed on Day 5 of embryonic development (21% Calcium versus 16% Control; P=0.06). A total of 38 cycles included CCS with a 43% euploidy rate from sibling oocytes treated with calcium ionophore compared to 44% euploidy rate for sibling oocyte untreated controls. To date, 29 patients have undergone an FET (n=12 SET Calcium group; n=12 SET Control group and n=5 DETs one blastocyst from each group) with an equivalent viable clinical pregnancy/live birth rate of 82.8% representing blastocysts from both groups.

CONCLUSIONS: In our study, calcium ionophore treatment after ICSI resulted in increased rates of blastocyst formation with no impact on chromosome constitution or clinical pregnancy/live birth rates for patients with male factor infertility or a history of poor blastocyst development with normal sperm parameters.

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HUMAN EMBRYO DEVELOPMENT CHARACTERISTICS MAY AFFECT LIVE BIRTH SEX RATIO: A TIME-LAPSE STUDY. B. Huang L. Jin. Reproductive Medical Center, Tongji Hospital, Wuhan, China.

OBJECTIVE: There was few study reported the relationship between these morphologic parameters and human embryo sex. Whether embryo development parameters affected the sex ratio or not is unclear. Nowadays, we could obtain more information on morphokinetic parameters of the embryo and identify any sex-related differences by using time-lapse technology. As far as we known, there were very few studies reported the relationship between live birth gender and embryo development kinetics. Therefore, the purpose of this study was to retrospectively analyze the time-lapse data from our IVF center and to determine whether implanted embryo development kinetics was associated with live birth gender.

DESIGN: Retrospective observational cohort study.

MATERIALS AND METHODS: The present research was conducted at Reproductive Medicine Center of Tongji Hospital between Feb 2014 and Dec 2015. A total of 743 patients were enrolled, and all patients gave written informed consent. All patients in this study underwent routine clinical and laboratory treatment at the center, and no additional intervention was performed. Embryos transfer resulted in <100% implantation or 100% implanted twins with two different genders (male/female) were excluded from the analysis. The precise timing of cell division and developmental parameters were determined: time of extrusion of second polar body (2pb), time of PN appearance (PNA) and fading (PNF), time of cleavage to two-blastomere embryo (t2), t3-t8. Additionally, the time duration of events were also calculated: PNA-PNF, PNF-t2, cc2 (t3-t2), s2 (t4-t2), cc3 (t5-t3), s3 (t8-t5).

RESULTS: A total of 134 qualified patients with 100% implantation and known live birth information were included in the analysis. There were 81 patients with 105 boys live birth (male embryos, n = 105) and 53 patients with 69 girls live birth (female embryos, n = 69). The time parameters of t3 and t4 among male embryos were significantly (p<0.05) earlier than those of female embryos. The time duration of cc2 in male embryos were significantly (p<0.01) shorter than those of female embryos.

CONCLUSIONS: Embryo development characteristics may be related with live birth sex ratio.