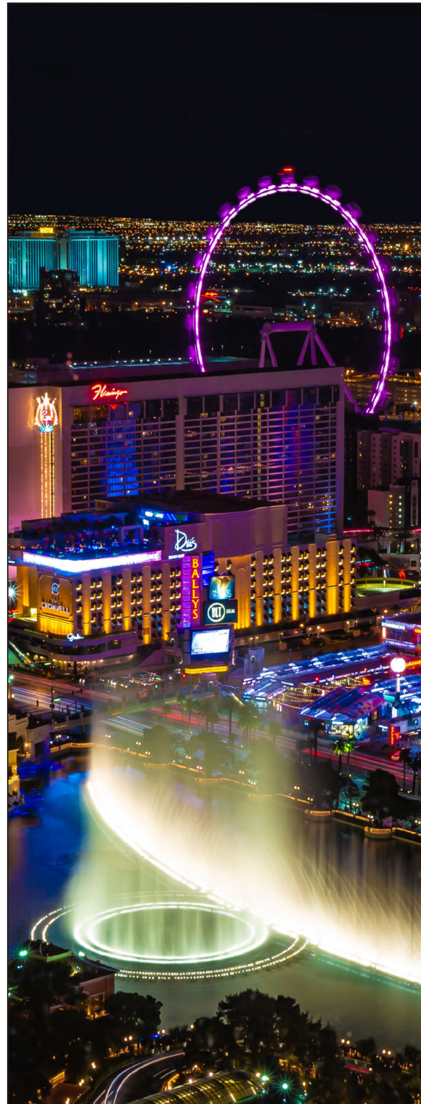
2023 AAB Conference and CRB Symposium Abstracts



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Biochemical Pregnancy Outcome is impacted by Biopsy Technician Skill

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Objective: To objectively evaluate the contribution and variability of biopsy skill as defined by rate of biochemical pregnancy with euploid embryo transfers.

Design: Prospective Study in a private assisted reproductive technology program.

Materials and methods: This study consists of 255 Frozen Embryo Transfer Procedures using euploid embryos, performed during January-July of 2022. Biochemical outcome is defined as serum beta Human Chorionic Gonadotropin (bHCG) levels ≥30 mIU/mL on the initial test, 10 days post-embryo transfer followed by a decrease of ≥10% on the second test, 12 days post-embryo transfer. Female patients included in the treatment were ≤37 years old using autologous embryos. Ongoing pregnancy is defined as at least 1 positive fetal heart beat documented on ultrasound performed between 7-9 weeks of gestation. Embryos were biopsied per routine standard operating procedure by the first available technician on day 5 or day 6 of culture during the patient's in vitro fertilization cycle and subsequently vitrified. All four technicians who performed the trophectoderm biopsies were trained and authorized to perform the trophectoderm biopsy procedure at the center with ≥5 years of experience in embryology. Only single euploid embryo transfer cycles have been included. Pre implantation genetic testing was performed by the same reference laboratory for all embryos included in the study.
Embryo grades at transfer were Hatching or Hatched with ICM and Trophectoderm graded B (fair) or higher per the SART embryo grading system. Per the center's standard operating procedures, the critical value threshold for biochemical pregnancy outcome was set to <10% as acceptable.

Results: The collective rate of biochemical pregnancy outcome was 13.33% (34/255) and the collective ongoing pregnancy rate was 61.2% (<35 years) and 56.8% (35-37 years) respectively, for procedures included in the study at the center. Technician specific results were 7.9% (3/38), 20.27% (14/74), 13.8% (13/94) and 8.16% (4/49), respectively. Age distribution of patients per technologist was similar. Technicians 2 and 3 performed embryo biopsies resulted in biochemical outcomes which were 10.27% and 3.8% higher than the established acceptable threshold limit for internal quality control. All technologists yielded similar blastocysts euploid rates (67.63%, 67.18%, 67.78% and 68.86%, respectively), collectively. Ongoing pregnancy rates by embryo warming technologist were also similar (59.9%, 54.3%, 57.4%, 59.7%, respectively).

Conclusions: There is a notable impact on biochemical pregnancy outcome directly related to the biopsy technician. While all technologists underwent standard training, controlled within the center, the variability in outcome demonstrates that the skill of the technologist significantly increases rates of biochemical pregnancies observed. The number of laser pulses, the length of time while the embryo is stretched during the manual manipulation of trophectoderm biopsy, embryo handling and time post biopsy to cryopreservation are all variables that are suspected to contribute to the overall skill of the embryo biopsy procedure. These variables should be evaluated in further studies to determine if remedial training is warranted. Furthermore, the skill variation within the IVF laboratory results in a significant impact on outcome which is often undetected since outcome measure is presented as a function of PGT laboratory as a standard. It is recommended that standardization of techniques within the laboratory and across all IVF centers are achieved to ensure all tangible variables are controlled and to offer the highest probability of success to patients undergoing blastocysts biopsy procedures.

Disclosures: Nothing to Disclose

Funding: None

Non-Invasive PGTA. First Year Preliminary Clinical Results.

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One of our current greatest challenges in IVF treatment is identifying the embryo with the best healthy pregnancy potential. A number of IVF laboratories count on pre-implantation genetic analysis (PGTA) as a key support tool to choose the embryo to be transferred, in an attempt to increase chances of successful pregnancy while reducing the number of multiple pregnancies.

OBJECTIVE: The purpose of this study was to compare KPI results of non-invasive Pre Implantation Genetic Analysis (PGTA) testing comercialy available for clinical use to those of traditional biopsied samples PGTA in assisted reproductive technology (ART).

DESIGN: A controlled, direct comparison retrospective analysis was performed, randomized by age and patient diagnosis, incubator type, performing MD, and culture medium type.

MATERIALS AND METHODS: Patients submitted to IVF treatment includding PGTA at one single IVF laboratory, during the year of 2021 were includded.

RESULTS: The results showed that for the non-invasive PGTA cases group, 73% of transfers tested positive for beta human chorionic gonadotropin (beta hCG) (N=11) , 77% implantation rate (N=13), 45% of transfers had a clinical pregnancy confirmed by presence of intra uterine gestacional sac and fetal heart beat. After a maximum of 2 transfers within one year post- egg retrieval, 72% of non-invasive PGTA cases had a healthy delivery, with one case of twins(N=7). The control group showed 64% positive beta hCG per transfer (N=11), 29% implantation rate per transfer (N=14), 36% clinical pregnancy rate per transfer confirmed by presence of intra uterine gestacional sac and fetal heart beat, and 38% of patients had a healthy delivery per egg retrieval after one year post egg retrieval procedure. No delivery complications, low birth weight (LBW) or abnormalities were present in any of the born babies. No errors in euploidy or gender were observed on the non-invasive PGTA group. Results were not statistically significant for any of the above paramaters, according to paired T-test analysis.

These preliminary results suggest that non-invasive PGTA testing may offer an improved technology alternative and may offer benefits over traditional biopsy samples in ART. However, it is important to note that these results were based on a low sample size (N) and had low statistical power. Further studies with larger sample sizes and stronger statistical power are necessary to confirm these findings and fully understand the benefits of non-invasive PGTA testing.

CONCLUSION: In conclusion, this study found that the non-invasive PGTA test showed an overall higher success rate compared to the randomized by age and patient diagnosis control group subjected to conventional biopsy PGTA. The use of non-invasive PGTA testing in ART shows promise, but further research is needed to confirm these preliminary results and determine the full benefits of this technology.

DISCLOSINGS: The parts affiliated with this study had no conflict of interest and cooperation was not financially beneficial for any of the parts.

FUNDING: None.

Artificial Intelligence in ART laboratory: Can ChatGPT Help?

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Objective: To identify the capabilities of the artificial intelligence-based chatbot, ChatGPT, and to explore its possible use in an assisted reproductive technologies (ART) laboratory.

Design: Development of quality management, assurance, and related documents using artificial intelligence.

Materials and Methods: ChatGPT was given progressively complex tasks to generate routine quality management, laboratory management, personnel management, and quality assurance documents in andrology, embryology, and general laboratory. The complexity of the tasks was added by giving additional details, references, and contexts. ChatGPT-generated results were saved and assessed by the author for accuracy, consistency, completeness, and usefulness.

Results: ChatGPT was able to perform low-complexity tasks such as creating various types of forms (Patient questionnaires, Semen Analysis, Embryo transfers, etc.) that an ART laboratory uses, and most of them were accurate and usable. When prompted to give advanced versions with additional inputs, it generated comprehensive forms, similar to what our laboratory uses. It was also able to make safety and emergency plans for the ART laboratory. The chatbot was able to generate medium complex tasks such as a QA/QM policy document following ASRM and ESHRE guidelines. ChatGPT could write comprehensive SOPs for high-complexity tasks such as Semen Analysis, and Embryo Transfer, but struggled with other SOPs such as trophectoderm biopsy and processing TESE sperm. ChatGPT could create reasonable schedules for lab personnel but required several revisions and refinements, but got confused with more constraints. In all the trials, although ChatGPT was able to address most of the aspects by providing several subheadings, it was very generalized and lacking in details. Occasionally, it abruptly ended the generation of documents possibly due to technical glitches or due to its character limitation.

Conclusions: AI-based chatbot ChatGPT performed reasonably well in low and medium-complex tasks. Its accuracy and usefulness depended on the keywords used and the contexts provided. It is not able to perform the highly complex specialized tasks that ART laboratories use. Its ability to synthesize from the existing scientific literature is still in its infancy and lacks transparency. A specialized chatbot may be developed and refined to be used by medical professionals. However, its ability to learn and update depends on the algorithms that developers will use. The AI-based chatbots may one day be a great assistance to laboratory directors and administrators.

Disclosures: Nothing to disclose
Funding: None

Using External Temperature Sensors for Immediate Detection of Cryogenic Tank Failure

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Objective: To assess internal and external temperature during a simulated tank failure to assign optimal placement of external surface thermometers for immediate detection of vacuum failure of cryogenic storage tanks.

Design: Prospective experimental study performed within a private cryostorage facility.

Materials & Methods: A MVE CRYO4000 liquid nitrogen storage tank, void of specimens, was filled with liquid nitrogen to below canister level to simulate vapor phase storage. Placed within the tank were 2 RTD Thermometers monitored by HMT 140 data loggers– one within a canister (vapor) and one weighted to be fully immersed in liquid. Hampshire Controls Corp external surface temp sensors were placed at neck/tank intersection, shoulder, vacuum port, halfway between tank bottom and vacuum port, and 2 inches from tank bottom. At each location sensors were placed horizontally at the twelve (port), four, and eight o'clock positions. Drilling a ¼ inch hole through the vacuum port simulated tank failure.

Results: While surface temps at the neck dropped fastest (steepest slope), these probes were prone to damage. Placement with the most reaction was on the side opposite the vacuum port. Even though not significantly different, probes on the shoulder were next to indicate a change. Internal temps approached -150°C 4 hours from the first external probe alert, with an additional 6 hours after that to reach the critical glass transition temp of -130°C.

Conclusions: Cryogenic storage tank failures in 2018 made reproductive storage facilities and fertility clinics reassess systems monitoring reproductive cells and tissues. While interior temp monitoring with call-out features were commonly used, other methods were rarely in place. Early detection methods of storage tank failure can provide ample warning for detection to prevent loss of stored specimens.

When cryogenic tanks start losing vacuum, frosting on the tank exterior is one early indication of failure. Exterior temps of a storage tank also drop, reflecting this loss in vacuum. Determining best placement of thermometer to detect external temp drop relative to internal temp increase is crucial to the monitoring of drops in surface temperature.

Parameters for early detection of vacuum loss resulting in storage tank failure are: 1) routine testing of system operations and call-out feature and 2) adequate parameters to detect high/low limits.

Cryogenic storage tank failures can be prevented with ample monitoring systems, one of which is proper placement of external temperature sensors.

Disclosures: None

Funding: None

Extreme Non-Equilibration Vitrification and Rapid Elution of Human Oocytes: Use of a Germinal Vesicle (GV)-Model

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Objective: Assess the ability of human oocytes to endure extreme dehydration/vitrification with minimal cryoprotective agent(CPA) permeation (2min total exposure), followed by rapid elution(RE) post-warming.

Design: A prospective pilot cohort study was performed using exempt discard GV oocytes as a model to investigate sustained survival post-conventional vitrification(CV,n=25) or ultra-fast vitrification (UFV; n=50), in contrast to sibling fresh controls undergoing in vitro maturation(IVM;n=50). The apriori arrangement of treatments evaluated the effect of CPA equilibration time and elution times on initial post-warming survival rate and maturation rates over a 48h interval. Differences were determined by Chi-square.

Materials and Methods: 125 discard, sibling germinal vesicle(GV) stage oocytes were assigned to CV, UFV or control treatments 40-44h post-hCG, being evaluated at +24h and +48h IVM for degeneration (Deg), MI transition or MII maturation/parthenogenesis. Vitrification treatment included: CV: Kitazato method using 15 min progressive CPA equilibration before VS (1min), 1-3 eggs/cryotop and LN_2 exposure; whereas UFV treatment involved a non-equilibration 1min exposure in ES, followed by 1min VS/loading and plunge into LN_2. Post-rapid warming in TS at 37°C (1 min), UFV oocytes were directly placed into LG-Hepes+20%LGPS (5min, 37°C;n=25) or were transitioned in an intermediate DS exposure (6min) before isotonic equilibration(CE; n=25), similar to CV oocytes(CE; n=25). All IVM was conducted in LG media+7.5%LGPS+ hyaluronate under humidified tri-gas conditions at 37°C.

Results: Only 1 UFV oocyte failed to survive (98%;CE group), which was not different to spontaneous Deg seen in fresh IVM controls (7%). Conversely, CV/CE oocytes experienced reduced ($P<0.05$) survival at 76% (24% Deg). Of the intact GVs, the UFV/RE group displayed similar MII maturation by +48h (52%) to fresh controls (53.2%) or CV/CE oocytes (47.4%), while UFV/CE experienced lower ($p<0.05$) maturation (33%).

Conclusions: As originally reported by Gallardo (2019), extremely dehydrated oocytes can effectively vitrify after UFV/CE treatment. We further verified the resiliency of oocytes to withstand RE treatment and continue to develop normally, with a maturation rate equal to fresh, stimulated oocytes. Not only does UFV/RE treatment significantly improve the time/labor efficiency of oocyte vitrification, it is hoped that this unconventional, extreme dehydration approach to vitrification will reduce batch and technical variation commonly observed with CV of mature oocytes over the last 2 decades. Our belief is that variation can be reduced by neutralizing differences in membrane permeation rates between oocyte batches and negating potentially toxic CPA loading effects.

Disclosures: None

Reference: Gallardo M, Saenz J, Risco R. Human oocytes and zygotes are ready for ultra-fast vitrification after 2 minutes of exposure to standard CPA solutions. Nat Res Sci Repts. 2019; 9:15986.

Time-lapse Imaging Analysis of Embryo Development: A Dynamic-Image-Based Prediction Model for Blastocyst Formation during Early 80 Hours Development

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Objective: The objective of this study is to develop a novel algorithm for context learning through time-lapse imaging and compare its performance with static learning for blastocyst formation prediction during the initial 80 hours of development.

Design: Time-lapse imaging was used to capture images of over 400 embryos between 19-80 hours of development. The study employed two network input strategies for blastocyst formation prediction, utilizing static and dynamic image-based prediction models. The experiment was carried out in a laboratory using a prototype system developed for this specific task.

Materials and Methods: The study collected time-lapse images of over 400 embryos, with a total of approximately 30,000 frames. Two network input strategies were used to predict blastocyst formation, including static-image-based prediction and dynamic-image-based prediction. The proposed algorithm for context learning through time-lapse imaging involves deep learning methods for identifying subtle changes in the embryo's developmental stages through the time series of images. The convolutional neural network (CNN) and long short-term memory (LSTM) methods are leveraged to extract features and maintain context over an extended time period from 19h to 80h after insemination.

Results: The study found that early-stage prediction of blastocyst formation was challenging, with both network input strategies achieving an overall prediction accuracy of 70%. However, dynamic-image-based prediction outperformed static-image-based prediction, with a prediction value of 75% compared to 68% ($p < 0.05$). Moreover, the dynamic-image-based model is more effective for detecting delayed blastocyst formation, with 45.5% of the delays (>2 days) being correctly predicted compared with 36.4% for the static-image-based model.

Conclusion: In conclusion, the study demonstrated that a dynamic-image-based prediction model utilizing the proposed algorithm for context learning through time-lapse imaging outperforms the static-image-based prediction model for blastocyst formation prediction during the initial 80 hours of development. However, predicting blastocyst formation during early embryo development remains a challenging task. The proposed algorithm enables a more comprehensive analysis of the embryos, considering subtle changes over time, which will enable improved prediction of blastocyst formation with more robust performance in the future. This study represents a significant step forward in the development of advanced data mining methods that can enable reliable and accurate predictions of embryo development during the first 80 hours.

Artificial Intelligence (AI) vs. Human: comparison of time-lapse blastocyst guided annotation and embryologists' grading

Aycock H[1], O'Leary R[1], Johnson D[1], Surrey M[2], Danzer H[2], Barritt J[1]
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[2]Southern California Reproductive Center, Beverly Hills, CA, USA

Objective: This study's objective was to observe how the Time-Lapse incubator graded/annotated at the blastocyst stage compared to the grading of embryologists at the same time point of development.

Design: A retrospective data analysis at a single large private fertility center.

Materials and Methods: Oocytes were retrieved and inseminated using standard clinical practice protocols. Post insemination, oocytes are placed in a Vitrolife Embryoscope+ (ES+) and monitored for the duration of the cycle. Embryologists grade embryos per laboratory protocol by assigning each embryo a grade of good (G), fair (F), or poor (P), along with the stage of development- hatching blastocyst or expanded blastocyst (HB or EXPB). The ES+ provided grades for the inner cell mass (ICM) and trophectoderm (TE) separately using A, B and C delineations. Estimates appear in bold when they are on or above the confidence threshold of 90% by AI. For this study we determined A=G, B=F and C=P. Embryos graded by embryologists at the level of at least EXBP-P and above were compared with the AI annotations.

Results: A total of 196 embryos were evaluated by both AI and an experienced embryologist with, 39% of the time the grading of the ICM matched the embryologist, 35% of the time the grading of the TE matched the embryologist, and 27% of the time the grading of both ICM and TE match the embryologist. In 30% of the samples, the ES+ was unable to provide data on the embryo grade. The AI estimates appeared in bold only 27% of the time for the ICM, 43% for the TE and only 20% of the time for both ICM and TE.

Conclusions: The ES+ Guided Annotation tool was unable to automatically estimate the ICM and TE about a third of the time, and the embryologists grading and ES+ annotation only matched around a third of the time. Additionally, the AI confidence of the gradings were low, never achieving better than a 43% confident prediction for a single characteristic. Therefore, the ES+ requires an embryologist to review the data and make grading edits more than 65% of the time. This study demonstrates that the use of the ES+ automatic grading/annotations have more development to undergo before they produce reliable and accurate results.

Disclosures: Nothing to disclose

Funding: None

Comparison of a Lenshooke X1 Pro and Manual Semen Analysis

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Objective:

To demonstrate the performance of the Lenshooke X1 Pro computerized semen analysis (CASA) and manual semen analysis.

Design: A prospective cohort study

Materials & Methods:

A total of 37 patients presented for semen analysis. Samples were collected in a sterile specimen cup and allow to liquefy at 37ºC for a minimum of 20 minutes. Once liquefaction was complete the analysis was performed on the Lenshooke X1 Pro. Volume, concentration, progressive motility, morphology, and pH were recorded. Following the Lenshooke, a manual observation was performed utilizing a Makler chamber under phase microscopy at 200X magnification. Concentration and motility were recorded. Morphology was performed under 1000X magnification under oil following a diff quick preparation of a morphology slide. Samples analyzed on the Lenshooke were blinded from students training while performing the manual counts. A students T test was used for determining statistical significance.

Results:

A total of 37 analysis were performed on the Lenshooke, where the concentrations ranged from 3.7 to 257 million per ml, and an average of 82.9 million per ml. Motilities ranged from 18 to 94% motile with an average of 59.1%. Morphologies ranged from 2% to 7% normal forms with an average of 4.2%. Manual concentrations ranged from 5.6 to 203 million per ml with an average of 74.6 million per ml. Motilities ranged from 31% to 86% motile with an average of 61.6% motile. Manual morphologies ranged from 2 to 6% normal forms with an average of 3.3% normal forms. There was no significant difference in the concentration, progressive motility and morphology between the Lenshooke and manual counts. $P<0.05$ in all 3 categories evaluated.

Conclusions:

CASA has been available for decades with marginal accuracy in the results. Lenshooke is the only CASA system approved by the FDA to perform concentration, motility, pH and morphology on the market. This study has shown that there is no significant difference between the manual counts and the CASA counts. The Lenshooke X1 Pro is FDA approved for Waived test under CLIA. This allows for personnel to perform these tests to have the equivalent of a high school diploma to operate.

Disclosures: None

Funding: None

DEVELOPMENT POTENTIAL OF LATE-MATURING MII OOCYTES

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OBJECTIVE: Oocyte maturity is an essential determinant of successful fertilization and development of the resulting embryo. The time needed for the oocytes to complete meiosis 1 (MI) and initiate meiosis 2 (MII) is approximately 38 h. During IVF, the most prevalent practice is to aspirate the oocytes 36h after the trigger injection, which allows time for the oocytes to mature but not spontaneous ovulation. However, nearly every pool of aspirated cumulus-oocyte complexes contains some oocytes that take longer to reach the MII state. This study aimed to assess the developmental potential of late-maturing oocytes that reached required maturity around 40 h post-trigger injection.

DESIGN: retrospective observational study.

MATERIAL AND METHODS: This study was carried out in a single IVF clinic and was compromised of 2945 oocytes and 193 patients (aged 25-43 years) undergoing cycles between August 2021 and June 2022. Ovarian stimulation was induced with a mixed gonadotropin protocol. The administration of a GnRH antagonist achieved pituitary suppression. Oocyte maturation was triggered and vaginal oocyte retrieval (VOR) was scheduled 36 h later. Assessment of oocyte development was performed at 38 h post hCG. Late maturing oocytes were re-assessed at the time of ICSI (40 h post trigger). Trophectoderm biopsy was performed on 34 late-maturing MII oocytes. The development of late-maturing oocytes was evaluated by assessing their fertilization potential, blastocyst formation, euploidy, and implantation rates.

RESULTS: Late-maturing oocytes were less likely to get fertilized (74% vs. 54%, $P<0.0005$) and yielded similar numbers of multinucleated (2% vs. 3%, $P=0.147$) and atretic zygotes (5% vs. 6%, $P=0.277$). Normally fertilized late MII oocytes were more likely to arrest at cleavage and had a diminished potential to form a blastocyst cavity (67% vs. 49%, $P<0.0005$) or yield freezable quality blastocysts (54% vs. 35%, $P<0.0005$). Trophectoderm biopsy results suggest that late-maturing oocytes are just as likely to produce euploid embryos as the control group (55% vs. 62%, $P=0.238$). At the time of abstract submission, two frozen embryo transfers (FETs) resulting from late-maturing oocytes have been attempted, and both resulted in ongoing singleton pregnancies.

CONCLUSION: Our findings support that late-maturing MII oocytes may have good reproductive potential leading to implantation and ongoing pregnancy. More research is needed to determine if this should be routine practice in the IVF laboratory or if it should be reserved for selected high-risk patients.

FUNDING: None

Does microfluidic sperm sorting preparation improves IVF outcomes compared to sperm preparation with density gradient centrifugation?

Stolakis V, Bertero MC, Liu H, Seepersaud D, Berteli T, Cruz Garza G, Iliadi D, Ullah S, Jaquez E, Vasquez D, Shamah, M, Kofinas JD.

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Objective: To investigate if microfluidic sperm sorting (MSS) method improves IVF outcomes compared to density gradient centrifugation (DGC) sperm preparation.

Design: Retrospective study in a private assisted reproductive technology (ART) program.

Materials and Methods: For this study two groups of patients were used. The first group (DGC-group, n=88) consists of patients that DGC sperm preparation performed and had fresh oocyte retrieval from April 2022 to July 2022 (Mean Age: 37.44 years). The second group (MSS-Group, n=90) consists of patients that MSS method was used and had fresh oocyte retrieval from September 2022 to December 2022 (Mean Age: 37.36 years). For each patient included in this study both insemination methods; intracytoplasmic sperm injection (ICSI) and standard insemination, were used. All semen specimen were fresh ejaculated samples that after preparation show optimal concentration, motility and progression score. Donor sperm and/or oocytes cases were exclude from this study. Two-tailed Student's t-test was used for statistical analysis.

Results: No statistically significant difference between the two examined groups was observed for: ICSI fertilization rate, Day-5 blastocyst formation rate and overall blastocyst formation rate. Even overall blastocyst euploidy rate was higher for MSS-Group compared to DGC-Group (44.44% vs 38.9%), this difference was not statistically significant. Standard insemination fertilization rate though was statistically significant higher for MSS-Group compared to DGC-Group (70.29% vs 54.30%, $p<0.001$).

Conclusions: MSS method significantly improves standard insemination fertilization rate and trending towards higher overall blastocyst euploidy rate compared to DGC sperm preparation. These findings may be explained by the lower sperm DNA fragmentation rate from MSS method compared to DGC sperm preparation that can improve the overall embryo quality. For this reasons, MSS method may be used routinely in sperm preparation for IVF cases replacing DGC sperm preparation. Limitations of this study are the modest sample size, the usage of non-sibling oocytes and the absence of morphology and DNA integrity data.

Disclosures: Nothing to disclose.

Funding: None.

Does the embryo have any right?

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Objective: This presentation firstly presents ART moral approaches briefly, especially regarding interventions in preimplantation-stage embryos in the laboratory, suggesting environmentally suitable laboratory conditions for this entity.

Design: Assisted reproductive technology program.

Materials and methods: Ever since the birth of the world's first test-tube baby in 1978 the altering scenery of human reproduction has produced public debate, moral questions and legal problems. From a realist point of view which pays close attention to the societal and cultural results of technological innovations three main issues can be distinguished: the shifting nature of medical practice, the creation of 'the embryo' as a new entity, and the differentiation of parenthood. All off these progresses are accompanied by shifts in roles and responsibilities which create new moral questions and problems.

Results: Embryology laboratory is a tentative mother for embryo. This means that if something is human, then it should be sheltered, and that should be the value of all actions. Embryos have human dignity and need protection.

Conclusions: Throughout this review, we defend the view that preimplantation embryos used in the lab deserve moral respect in some point.

Disclosures: Nothing to disclose Funding: None

Expanding the Liquid Nitrogen Freezing Window of Semen Samples Collected for Use in DNA Fragmentation Index (DFI) Determinations

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Objective: We have identified a specialized semen collection container, the Protex Thermal Semen Collection Container (Protex-CC; IVF Store, Reproductive Solutions, Inc) known to stabilize sperm for 48 hours allowing for accurate semen analysis without the need for a fresh sample.

In this study, we will determine if this semen collection container (Protex-CC) can provide a 24-28 hour post-ejaculation shipping window before freezing the samples in liquid nitrogen at the testing laboratory, without affecting the DFI scores when compared to the DFI scores of the same samples frozen in liquid nitrogen at the fertility clinic 2-4 hours post-ejaculation.

Design: Prospective multi-clinic study in a private male fertility diagnostic laboratory.

Materials and Methods: Ten fertility clinic patients collected semen by masturbation in a standard semen collection cup (Semen-CC IVF Store, Thermo Fisher). One ml of ejaculate was immediately transferred into the Protex-CC and mixed with 1ml of Sperm Wash Medium with HTF Hepes and HAS (IVF Store, InVitroCare, Inc). Both collection cups were kept at room temperature for 2 hours allowing for complete liquefaction. One ml of the semen in the Semen-CC was frozen in a 1 ml cryovial in liquid nitrogen 2-3 hours post-ejaculation and then sent to the testing laboratory in a Dry Ice Shipper. The Protex-CC was sent to the testing laboratory in a Cold Pack Shipper, and 1 ml of the Semen-Sperm Wash Medium was frozen in liquid nitrogen 24-28 hours post-ejaculation. All samples were thawed and analyzed in duplicate runs in the Sperm Chromatin Fragmentation Assay (SCFA) determining DNA fragmentation indexes (DFIs).

Results:	Semen-CC	Protex-CC
Mean DFI Score:	15.455	16.675

Correlation Criteria		Result	Bias
(%) < 15%		-7.893	CC
> 0.950	0.991		Slope 0.9 -1.1
	1.0250		The correlation

criteria were met for all paired samples.

Conclusions: Advanced sperm testing of sperm DNA integrity is used by fertility clinics to direct infertile couples to their best treatment options. Specifically, determining the DNA fragmentation index (DFI). Association of DFI scores with clinical outcomes in Assisted Reproductive Technology (ART) attempts at pregnancy has been well documented. The only downside to this testing, is the requirement that the semen sample be frozen in liquid nitrogen within 4 hours after collection, to limit reactive oxygen species (ROS) damage, and then shipping the frozen sample to a testing laboratory in either a Liquid Nitrogen or Dry Ice Shipper. To avoid the need for dry ice or liquid nitrogen at the semen collection facility, we have determined that the Protex Thermal Semen Collection Container can provide a 28 hour shipping window without affecting the DFI score.

Disclosures: David B. Brown, Ph.D., ALS(AAB), President and Owner, Male Fertility Diagnostics, LLC

Funding: None

Frozen Embryos Created In Your Laboratory Do Better Than Embryos Delivered From Other Centers. Homemade Is Better Than Delivery!

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Objective: To improve pregnancy outcomes for patients by encouraging FET transfers to be done in-house to maintain consistency throughout the IVF journey.

Design: A retrospective data analysis at a single large private fertility center was performed.

Materials and Methods: This study compared the pregnancy success rates of in-house created embryo FET to transported-in embryos from different centers. We further evaluated whether PGT-A normal embryos in both groups showed any differences in pregnancy rates after FET.

Results: A total of 1229 FET cases were reviewed. In-house created materials had a 25.62% increase in pregnancy when compared to transferred-in materials. This reached significance with $p<0.05$.

More specifically, even if both in-house and transferred-in materials had been PGT-A tested as normal, in-house materials had a 27.76% increase in pregnancy compared to transferred-in materials. This reached significance with $p<0.05$.

In-house frozen embryo transfers (FET) reflect significantly higher pregnancy rates when compared to transferred-in FETs. In-house FETs show a 25.39% value increase in positive pregnancies compared to transferred-in FETs. This was significant with a p-value of 0.0226 ($p<0.05$).

For in-house created embryos, FETs with PGT-A testing show a 33.95% value increase in positive pregnancies compared to non-PGT-A FETs. This was significant with a p-value of 0.0000 ($p<0.05$).

Conclusions: Overall, in this study, transferred-in materials did not do as well as in-house created materials for FET. While patients try to save on IVF cost or convenience, it might not be worth the decrease in pregnancy success to transport the embryos to another center.

Disclosures: none

Funding: none

Title:

Identification of Cancer-Testis gene *RHOXF2* expression in cleavage stage embryos and in the inner cell mass of human blastocysts, unlocking putative protective mechanisms for genomic reprogramming.

Authors:

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Objective:

RHOXF2 homeobox gene is selectively expressed in human germ cells but is also found in a number of tumors (1). The gene has been postulated to have a role in male infertility and more recently has been demonstrated in vitro to provide a defense against transposable elements (TEs) which are parasitic genetic units that lead to DNA damage, de novo mutations and cell death (2). The genome is particularly vulnerable to damage caused by TEs at genome wide demethylation and reprogramming as occurs in gametogenesis and in early embryonic development. The expression pattern of *RHOXF2* in human embryos has yet to be described in the literature.

Design:

Prospective cohort study on human embryos donated for research.

Materials and Methods:

The study included patients who donated fresh embryos at the blastocyst stage during an IVF cycle between January, 2016 and June, 2016. Embryos were biopsied, and approximately 2-4

cells were removed for preimplantation genetic testing for aneuploidy (PGT-A) by next generation sequencing (NGS) using the ReproSeq assay to assess copy number variants (CNVs). The remaining cells of the embryo were designated for RNA Sequencing. Read counts per gene were summed across embryo cohorts and normalized using the median of ratios. Differential gene expression between embryo cohorts was calculated using DESeq2, in order to estimate variance-mean dependence and evaluate differential gene expression using a negative binomial distribution. A likelihood ratio test was used to account for heterogeneity due to patient, batch, and ploidy and growth status (arrested/ongoing). The adjusted threshold for significance was $p<0.05$.

Results:

43 blastocysts underwent PGT-A assessment and RNA sequencing. 38 showed expression of *RHOXF2*, all 5 blastocysts that failed to show *RHOXF2* expression had no morphologically detectable inner cell mass. The expression of *RHOXF2* was further examined in 15 embryos, 9 were enriched (>90%) for trophectoderm cells (TE) and 6 enriched (>80%) for inner cell mass cells (ICM). *RHOXF2* expression was significantly higher in ICM cells than TE cells, where $P<0.0001$.

Conclusion:

RHOX homeobox genes gained great interest as candidate targets for immunological cancer therapies (3). More recently *RHOXF2* has been shown in vitro to effectively prevent the incorporation of TEs into the genome in several cell lines (2). *RHOXF2* protein was synthesized based on *RHOXF2* mutations identified in men with severe oligozoospermia (2). Transfected into human cell lines the mutated *RHOXF2* protein was shown to have a loss of function and was incapable of preventing TE incorporation into the genome of the human cell lines (2). The mouse

homologue *Rhox2* has been shown to be expressed in placenta and in embryonic stem cells (4). Our current data is the first to show that *RHOXF2* is expressed in human cleavage, morula, and blastocyst stage embryos with significantly higher expression in the inner cell mass cells of blastocyst compared to trophectoderm cells. Current studies are focused on characterizing *RHOXF2* expression in cleavage and morula stage human embryos to further elucidate this gene's role in early embryogenesis.

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THE EFFECT OF ICM POSITIONING INSIDE OR OUTSIDE OF THE ZONA PELUCIDA ON PREGNANCY RATES OF PGT-A EUPLOID SINGLE EMBRYO TRANSFERS

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Objective: Embryos fully enclosed in the zona pellucida (ZP) may survive freeze and warm processes better than fully hatched embryos. The objective of this study is to discover if the position of the inner cell mass (ICM) inside or outside the ZP affects the embryo potential on pregnancy rates after freezing and warming when the embryo is not fully hatched. This comparison will find if the ICM outside of the ZP leads to a difference in embryo potential.

Design: Retrospective study in a private assisted reproductive technology program.

Materials and Methods: The study examines a total of 1,190 single frozen embryo transfers of PGT-A tested euploid embryos created with autologous oocytes from January 2019 to December 2021. At the time of transfer, it was noted if the embryo was fully enclosed in the ZP, if the inner cell mass was inside or outside the ZP, or if the embryo was fully hatched out of the ZP. The embryos were classified into 3 groups: (A) not fully hatched, ICM inside the ZP (N=847), (B) not fully hatched, ICM outside the ZP (N=230), and (C) fully hatched (N=113). The positive HCG (+HCG) rates and clinical pregnancy (CIG) rates were compared between the three groups of embryos. Patient age was examined for congruency between the groups and no difference was found. Aggregate data was analyzed and a p-value < 0.05 was defined as statistically significant, with a 95% confidence interval.

Results: No significant difference was seen between group A and group B for +HCG (64.6% vs 62.2%, p=0.535) or CIG (46.6% vs 45.2%, p=0.710). There was a significant difference when comparing group A and group C for +HCG (64.6% vs 46.0%, p=0.0002) and CIG (46.6% vs 28.3%, p=0.0003). There was also a significant difference when comparing group B and group C for +HCG (62.2% vs 46.0%, p=0.0054) and CIG (45.2% vs 28.3%, p=0.0032).

Conclusion: When the embryo was not fully hatched, a negative impact on pregnancy rates was not seen if the ICM was positioned outside the zona. A significant difference in pregnancy rate was only seen if the embryo was fully hatched out of the ZP. If an embryo is not fully hatched, the ICM position inside or outside of the ZP does not predict the likelihood of pregnancy from a single embryo PGT-A euploid frozen embryo transfers.

Disclosures: None.

Funding: None.

Meeting the Demands of the Growing IVF Industry: Development of a Hybrid Education and Training Program to Address the Workforce Shortage

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Objective:
The main aim of this study was to create a hybrid education program that blends conventional hands-on instruction in Assisted Reproductive Technologies (ART) with digital techniques that enable learners to: document procedural steps in a digital laboratory notebook, assess competencies, self-direct learning, evaluate knowledge, and create a digital and portable "knowledge passport" for verification of skills and knowledge. The secondary objectives included evaluating the viability of implementing the program and obtaining feedback from participants to identify strengths or limitations.

Materials and Methods:
A mixed-methods approach was employed in this study, incorporating a literature review, expert consultation, and pilot testing. The program was collaboratively developed by subject matter experts (ARTC Scientific Advisory Board), instructional designers (EmbryoDirector IVF Academy), and digital technology specialists. The program's learning objectives and content were derived from the literature review, while the hands-on methodologies were overseen by subject matter experts using the standard EmbryoDirector IVF Academy curriculum. Instructional design principles were then used to align the digital technology with the ART learning objectives and to provide engaging digital learning activities to complement the hands-on activities. The hands-on activities were designed to prioritize experiential learning, while the digital learning activities featured interactive and self-directed multimedia elements, such as instructional videos, simulated clinical decision making, and quizzes. Pilot testing was conducted with a small group of EmbryoDirector IVF Academy students to assess the feasibility and effectiveness of the program, with surveys and observations used to collect data.

Results

One on One Expert Hands-On Training	Paired ART Compass Digital Assessment	Digital Training Checklist and Competency Recording Assessment
Andrology	Male Reproductive System	Yes
	Sperm Function	
	Sperm Cryopreservation	
Embryology	All About Media and pH	Yes
	Live Cell Imaging and Microscopy	
	QC/ QA In the Embryology Lab	
Vitrification	Basic Cryobiology of Embryos	Yes
	Cryopreservation	

	Liquid Nitrogen Handling	
ICSI	Gamete Collection	Yes
	Gamete Biology, Fertilization, and Early Embryo Development	
	InVoCell IVC Devices	
Biopsy	Genetics of Reproduction: Preimplantation	Yes
Lab General	FDA Regulations	Yes
	Personal Protective Equipment	
	Blood Borne Pathogens	
	Hand Hygiene	
Clinical Decisions	Freeze or Discard?	Yes
	Choose Top Blastocyst	
	Oocyte Grading	
	SART Cell Symmetry	
	SART Blastocyst Expansion	

Conclusions:
Participants in the experimental group were asked to demonstrate theoretical knowledge through self -directed completion of qualitative assessments. This was not mandatory for progression in the hands-on training portion. Participants in the self-directed learning group provided the following feedback: increased engagement (95%), enhanced learning experience (95%), feeling better prepared to join the workforce (90%), personalized and learner-centered approach (90%) on the hybrid education program.

The development of a hybrid embryology education program and “knowledge passport” combining hands-on and digital methodologies is an important step towards addressing the challenges posed by the ART professionals workforce shortage. The findings of this study will inform the development of future embryologist educational programs and contribute to the ongoing conversation on the role of digital learning in ART education and training.

Disclosures: Shareholders: DG, DS, CC (AIVF, ARTC) and AA (EmbryoDirector).

Funding: None

Ultra-Rapid Warm: A preclinical comparative analysis of the effects of different sucrose concentrations on blastocyst survival, re-expansion and development post-warm

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Objective: To assess the viability of time-efficient, ultra-rapid embryo warming by studying blastocyst survival, re-expansion, and development following a 1-minute exposure to either 1.0, 0.5, or 0.25M sucrose solutions.

Design: An exploratory study designed to review time-efficient blastocyst warming and identify the optimal sucrose concentration to inform further clinical study.

Materials and methods: 153 human blastocysts previously vitrified using RapidVit Blast media (Vitrolife) and Rapid-i (Vitrolife) were used for this study. All blastocysts were consented by patients for research use by the laboratory and were of A or B (Gardner scale) quality at the time of cryopreservation. 51 blastocysts were assigned to each sucrose solution (1.0, 0.5 and 0.25M) from RapidWarm Oocyte kit (Warm 1, 2 and 3, respectively; Vitrolife). Vitrified blastocysts were plunged into a 37-degree Celsius warming solution containing a precise concentration of sucrose. Blastocysts remained in the respective solution for 1 minute before being transferred to a 20% protein blastocyst culture medium. Blastocysts were thoroughly rinsed through multiple drops of medium before being cultured in groups and assessed for survival, re-expansion (<3 h post-warm) and blastocyst development (24h post-warm).

Results: Cryopreservation survival was consistent with accepted lab standard among all sucrose concentrations. There were no statistical differences, but the trend was that 1.0M sucrose resulted in increased re-expansion and the best 24 hour post-warm development when compared to 0.5 sucrose and 0.25M sucrose.

	1.0M Sucrose (Warm 1)	**0.5M Sucrose (Warm 2)**	**0.25M Sucrose (Warm 3)**
# of Embryos	51	51	51
# Survived	51 (100%)	50 (98%)	49 (96%)
# Re-expanded (<3h post-warm)	49 (96%)	46 (90%)	46 (90%)
24h Post-warm Development	49 (96%)	46 (90%)	44 (86%)

Conclusions: Increased workloads and additional workflows of the modern IVF laboratory demand improved efficiency. This study tested an ultra-rapid, single step blastocyst warming technique. All 3 sucrose concentrations supported high survival and subsequent development. Of the three solutions tested, 1.0M sucrose (Warm 1) resulted in the fastest re-expansion time and the most promising post-warm development, although this observation requires further exploration and clinical outcome data. These results suggest that ultra-rapid warming in a high sucrose concentration warming solution shows an encouraging outcome to aid in improving lab workflow optimization and efficiency while maintaining or exceeding current laboratory standards for embryo survival, re-expansion, and post-warm development.

Disclosures: Nothing to disclose

Funding: None

Modifications of thawing protocol timing and incubation media post-thaw for frozen blastocyst transfer: is there a best way?

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Objective: We retrospectively analyzed how changes in the amount of time between thaw and transfer, and in some cases media incubation post-thaw, effect pregnancy outcomes.

Design: Retrospective data analysis at a single large private fertility center.

Materials and Methods: Standard embryo thaw protocol for this laboratory begins 2 hours before scheduled transfer time using Irvine Scientific Vit Kit-thaw media with the embryos placed in Vitrolife Embryo Glue (EG) right after thaw, remaining there until transfer time. The physician in this study made three possible changes in the protocol: (1) thaw right before transfer (no incubation time), (2) thaw more than 2 hours before transfer and place in Irvine Scientific continuous single culture-NX complete media (NXC) until being moved to EG 2 hours before transfer, or (3) thaw more than 2 hours before and transfer directly into EG for the longer incubation period. The physician chose which patients would use which protocol based on their Endometrial Receptivity Analysis (ERA). The three new protocols results, and the standard protocol results were tracked for positive, negative and biochemical pregnancy results. Statistical analysis was performed with a p-value of <0.05 for significance.

Results:

	Positive	Negative	Biochemical	Total #
Standard	73%	14%	13%	64
Right before	100%	0%	0%	2
>2 hours NXC	72%	25%	3%	36
>2 hours EG	71%	19%	11%	85

Conclusions: The positive pregnancy rates were very similar for the standard, >2 hours into NXC, and >2 hours into EG protocols. The thaw right before transfer protocol had the highest positive pregnancy rate, but should be excluded due to its very low sample number. More data would need to be collected and examined to see if any method truly is better than another as no category reached statistical significance. The standard protocol had the lowest negative pregnancy rate and the highest positive pregnancy rate; therefore it continues to be the standard protocol for this practice.

Disclosures: Nothing to disclose.

Funding: None

Physician Response to Pharmacogenomic (PGX) Recommendations

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Objective: To improve our understanding of PGX utilization

Design: Observational, non-interventional study

Materials & Methods: Healthcare providers were invited to participate based on their interest in PGX testing. Providers selected patients who met medical necessity, described as the following: 1) Previous Medication Failure(s), 2) Initiating New Medication(s), 3) Optimizing Dose of Medication(s), 4) Previous ADRs, and 5) New Doctor Visit. Type of healthcare provider, i.e. MD, DO, PA, or NP was recorded. Testing was performed utilizing TaqMan™ SNP genotyping assays in an OpenArray™ format on a QuantStudio™ 12k Flex instrument (ThermoFisher Scientific). The OpenArray™ included 56 SNPs across 19 genes. The SNPs were selected based on Level 1 and 2 evidence from the Clinical Pharmacogenetics Implementation Consortium (CPIC), U.S. Food and Drug Administration (FDA), and the Association for Molecular Pathology (AMP) guidelines and recommendations. Healthcare providers were contacted at least one month after report distribution to determine if changes in medications were made in response to the PGX report data.

Results: A total of 50 providers were enrolled in the study and 18 (36%) submitted at least one PGX test. A total of 68 PGX tests were returned to the laboratory. The most commonly reported reason for ordering a PGX test was Previous Medication Failure(s) (43/68, 63.2%). Clinically actionable variants in pharmacogenes relevant to the patients' diagnoses were identified in 67/68 of the submitted tests (98.5%). Despite actionable guidance being available for nearly all tested patients, providers reported performing a medication change in 26/68 of the ordered tests (38.2%). MDs were the most likely to submit a test (25/68, 36.8%), but the least likely to act on the results (7/25, 28%). Both DOs and PAs reported altering therapy in 50% of the tested patients after reviewing the PGX results, with NPs altering therapy in 37% of patients.

Conclusions: The most common reason for submitting a PGX test was a previously failed medication. Even when clinically actionable guidance was provided for 98.5% of patients, uptake of the recommendations (i.e. medication change) was reported in only 38.2% of tests. Likelihood to apply the PGX recommendations to therapy may be influenced by type of healthcare provider, i.e. DOs and PAs were more likely to adjust therapy based on PGX results when compared to MDs. Increased education and/or pharmacist involvement may help improve clinical implementation.

Disclosures: Nothing to disclose.

Funding: None.

Rapid warming of human blastocysts: Is 1M sucrose the only choice?

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Objective: Over the last six months a new rapid warming protocol for vitrified human blastocysts has found to be equivalent to the traditional warming protocols, which uses decreasing sucrose concentrations over several minutes. The rapid warming protocol exposes blastocysts to 1M sucrose for 1 minute after which the cells are ready for transfer. The use of sucrose during warming protocols is to control the influx of water into the cell compartments. However, the abstract presented here investigated if lower sucrose concentrations are also capable of controlling the water influx. Lower sucrose concentration would allow a faster return of water and therefore physiological conditions.

Design: Retrospective study using human blastocysts donated by patients with signed disposition for research.

Material and Methods: Using Vitrolife warming solution of 0.5M (Protocol 1=P1) and 0.25M (Protocol 2=P2) sucrose, blastocysts were exposed for 1 minute to either concentration. Immediate post warming as well as 24hrs post warming survival and hatching/hatched rate were recorded. The Chi^2 was used to determine statistical significance between the two groups, with $P<0.05$ considered significant.

Results: A total of 202 blastocysts were rapid warmed. 102 blastocysts for 1min in P1, whereas 100 blastocysts were warmed for 1 minute in P2. There was no significant difference in immediate post warming survival between P1 vs P2 (97.1% vs 97%; p=0.99), as well as in the 24hrs post warming between P1 and P2 (95.1% vs. 97%; p=0.99). However, there was a significant difference in the 24hrs post warming hatching/hatched rate between P1 vs. P2 (77.3% vs 100%; p=0.0006).

Conclusions: This study provides evidence that 1 minute exposure to 0.5 or 0.25M sucrose can support survival rates equivalent to 1M sucrose. However, the data suggests that 0.25M sucrose could allow faster recovery as exhibited by the significantly higher hatching/hatched rate.

Disclosures: Nothing to disclose

Funding: none

Rapid warming of non-biopsied vs biopsied blastocysts: Is there a need for assisted hatching?

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Objective: Recently ASRM released guidelines in conjunction with assisted hatching, a procedure where the zona pellucida (ZP) of a blastocyst will be breached by employing a laser system. ASRM suggested to be more conservative using assisted hatching. However, recent publications have shown that especially cryopreserved embryos develop a change in their ZP structure involving the three ZP proteins also known as “Zona Hardening”. This phenomenon makes it harder for the embryo to hatch out of the ZP on their own. However, hatching out of the ZP is a requirement for an embryo to implant successfully. One way to look at it is comparing the ability of non-biopsied vs biopsied embryos and their ability to hatch on their own without employing a laser system post warming.

Design: Retrospective study using human blastocysts donated by patients with signed disposition for research.

Material and Methods: Donated human blastocysts were divided in group A (n=49; biopsied blastocysts) and group B (n=53; non-biopsied blastocysts) and were then rapid warmed for 1 minute using Vitrolife’s 0.5M warming solution. 24hrs post warming survival and hatching rate as well as the rate of completely hatched blastocysts were recorded. The Chi^2 was used to determine statistical significance between the two groups, with $P<0.05$ considered significant.

Results: After 24 hrs post rapid warming, survival in group A was 95.9% vs group B were 94.3%, retrospectively (P=.0.99). In addition, blastocysts in group A hatched at a significantly higher rate (91.4% than blastocysts in group B (64.0%; (p=0.001). Furthermore, looking at the rate of embryos completely hatched out of the zona, 68.1% in group A vs 22.0% of embryos in group B hatched completely ($P<0.0001$).

Conclusion: This study shows that human blastocysts regardless of being biopsied or not survive at a high rate after a rapid warming in 0.5M sucrose. While embryos in both groups maintain their ability to start hatching and completely hatch out of the zona, non-biopsied embryos initiated hatching or hatched completely at a significant lower rate compared to their counterpart, which suggests the consideration of assisted hatching in non-biopsied blastocysts to support their ability of a successful implantation.

Disclosures: Nothing to disclose

Funding: none

To Complete IVF Lab Paperwork without Typing a Single Word Using Excel

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Objective: The purpose of this abstract is to demonstrate live that the Excel can be used to assist lab paperwork, and systematize the lab routine such as communication, paperwork, inventory, labels, and summary report automatically. We try to inspire our laboratory colleagues to utilize the Excel in their practice since everybody has own format and way to conduct their routines.

Design, Materials and Methods: Embryologists conduct many tasks in IVF lab every day. There are two types of tasks: bench-top related, and paperwork related such as and many forms to fill out, many reports to be distributed, and many labels to be created. The paperwork load could account for 1/3 overall lab workload, and many human errors are associated with lab paperwork processes. There are many commercial EMR systems, but many are not lab-friendly, and provide no automation to streamline the lab procedures, while Excel is popular spreadsheet office application, many lab data are recorded in excel files. We use the popular MS office Excel, along with the built-in VBA programming to form one Excel template-eIVFLab. We use the template to create one Excel file for each patient's cycle. The Excel consists of many sheets that specify various lab tasks, and one sheet for data entry of the embryo development progress along with related treatments.

Results and Conclusions: eIVFLab, an Excel based application, utilizes the cycle related information, to generate one Excel file that contains sheets for the routine lab chart for each to record the lab activities, patient's labels for various purposes such as for labeling incubator chambers, tubes, dishes, cryo-straws and cryo-cane, and FDA related label for cryo-sheet. As the cycle progresses, the embryo development status is entered into one sheet with minimal key strikes. The daily report for clinical team can be readily sent via one click, and communication with patients can be achieved via patient's portal with detailed information on embryo progress and explanation, which is generated automatically. When the cycle reaches Day5 and Day6 when embryo biopsy for Preimplantation Genetic Testing (PGT) and cryopreservation occur, eIVFLab generates the biopsy worksheet for the testing lab and records the cryopreservation details into the inventory database. When the biopsy results are received, the results can be exported into the inventory, so the embryo cryopreservation and associated biopsy results are integrated, which makes the frozen embryo transfer (FET) planning much easier for the physicians and patients. For FET cycle, the inventory database is used to generate the transfer worksheet for the selected embryo, and the inventory is updated via marking the FET date as the straw-thaw-out date automatically. When the cycle is completed, eIVFLab generates one summary report containing all cycle related information along with cryopreservation and PGT results, and one PDF copy is created and stored at shared drive automatically for everyone in the practice, along with billing sheet for the cycle, and cycle database containing every cycle for SART reporting, lab KPI statistics.

Disclosures: Nothing to disclose

Funding: None