



OVARIAN CLUB (ASIA) 2024

14-15 December 2024

Room S221, Hong Kong Convention and Exhibition Centre



E-PROGRAMME BOOK



<https://ovarianclub-asia.org>

Organized by:



TABLE OF CONTENTS

- 1 ♦ WELCOME MESSAGE
- 2 ♦ ORGANIZING COMMITTEE
- 3 ♦ SPEAKERS
- 5 ♦ SCIENTIFIC PROGRAMME
- 8 ♦ ABSTRACTS
- 41 ♦ POSTER PRESENTATIONS
- 48 ♦ ACADEMIC ACCREDITATION
- 49 ♦ FLOOR PLAN AND LIST OF EXHIBITORS
- 50 ♦ MEETING INFORMATION
- 56 ♦ ACKNOWLEDGEMENT



WELCOME MESSAGE

Dear Esteemed Guests, Colleagues, and Friends,

Welcome! The Organizing Committee warmly invites you to the Ovarian Club (Asia) 2024, an exceptional event taking place on December 14-15, 2024, at the Hong Kong Convention and Exhibition Centre.

Our theme, “Through the Looking Glass,” invites you to embark on a journey of discovery into new realms of knowledge and imagination. Just as Alice ventured through her whimsical world, we encourage you to go beyond the ordinary and uncover the hidden wonders that await.

We extend our heartfelt gratitude to our esteemed speakers for their contributions to discussions on the latest developments surrounding the dilemmas and debates in embryo transfer, time-lapse imaging, preimplantation genetic testing, and the integration of AI in reproductive medicine. Their insights will provide a comprehensive perspective for reproductive clinicians, nurses, and psychologists, enriching our understanding of these critical topics.

Prepare to engage in a diverse program filled with thought-provoking discussions and visionary presentations. Explore the evolving landscape of reproductive medicine, where groundbreaking discoveries and advancements are shaping the future of fertility and reproductive health. Be inspired by an outstanding lineup of speakers, each sharing their unique insights. Examine important topics, including the latest in embryo transfer, advancements in egg freezing techniques, IVF add-ons, and the promising future of ovarian research.

We sincerely appreciate your unwavering support and look forward to welcoming you. Join us in Hong Kong as we navigate through the looking glass, discovering new ideas and possibilities together.

Yours sincerely,



Milton LEONG

On behalf of the Organizing Committee
Ovarian Club (Asia)



Jacqueline CHUNG

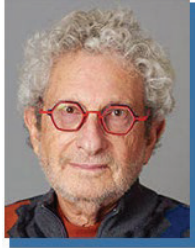
President
The Hong Kong Society for Reproductive Medicine

ORGANIZING COMMITTEE

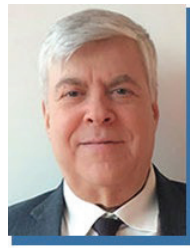
Co-Chairmen



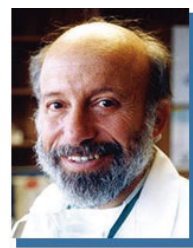
Milton LEONG
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Gerald SCHATTEN
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Zeev SHOHAM
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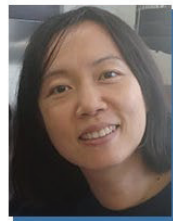
Council Members:



David CHAN



Judy CHOW



Shui Fan LAI



Emily LAM



Milton LEONG



Alice WONG



Jia ZHOU

SPEAKERS



Claus ANDERSEN
University Hospital of Copenhagen



Rodney BABER
The University of Sydney



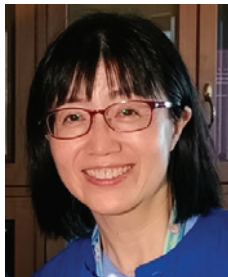
Priya BHIDE
Queen Mary University of London



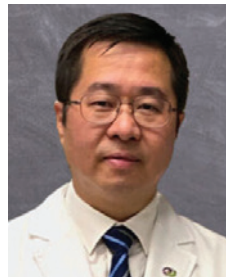
Zijiang CHEN
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William LEDGER
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Sydney*

SPEAKERS



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Virtus Fertility Centre, Singapore



Xingguo LIU
Guangzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences



Dennis LO
The Chinese University of Hong Kong



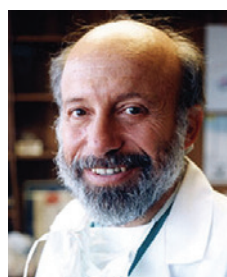
Jie QIAO
Peking University Third Hospital



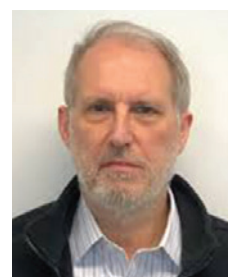
Gerald SCHATTEN
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Johan SMITZ
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Chii-Ruey TZENG
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Yikon Genomics, Suzhou



Qiong WANG
Sun Yat-sen University, Guangzhou



Ronald WANG
The Chinese University of Hong Kong



Huiyu XU
Peking University Third Hospital, Beijing



Su Ling YU
Alpha IVF Centre & Alpha Women's Specialists, Singapore

SCIENTIFIC PROGRAMME

14 December 2024, Saturday

08:30-09:00	Registration	
09:00-09:15	Opening Ceremony Jacqueline CHUNG, Milton LEONG, Zeev SHOHAM	
09:15-10:45	Plenary Lecture and Session 1 <i>Chairpersons: Prof. Milton LEONG, Dr. Jacqueline CHUNG</i>	
09:15-09:55	Reflecting on Inverted, Unfamiliar, Bizarre and Heretical Discoveries Governing Our Own Development as Humans	Gerald SCHATTEN <i>University of Pittsburgh School of Medicine</i>
09:55-10:25	Frozen vs. Fresh Embryo Transfer: Who will benefit?	Zijiang CHEN <i>Shandong University</i>
10:25-10:45	Q&A	
10:45-11:15	Coffee Break / Poster Presentation <i>Judges: Jacqueline CHUNG, Milton LEONG, Zeev SHOHAM</i>	
11:15-12:50	Session 2 - Emerging Technologies in Embryo Selection <i>Chairpersons: David CHAN, Catherine TAM</i>	
11:15-11:40	Clinical effectiveness and safety of time-lapse imaging systems for embryo incubation and selection in in-vitro fertilization treatment (TILT): a multicentre, three-parallel-group, double-blind, randomized controlled trial	Priya BHIDE <i>Queen Mary University of London</i>
11:40-12:05	3D imaging of the blastocyst and relating morphology with quality	Bo HUANG <i>Tongji Hospital, Wuhan</i>
12:05-12:30	Vacuoles as a Morphologic Sign of Blastocyst Quality and IVF Success	En-Hui CHENG <i>Lee Women's Hospital, Taichung City</i>
12:30-12:50	Q&A	
12:50-13:50	Lunch Symposium <i>Chairperson: Raymond LI</i>	
13:00-13:30	Innovative Management of Menopausal Vasomotor Symptoms <i>(Sponsored by Astellas)</i>	Rodney BABER <i>The University of Sydney</i>
13:50-14:30	Plenary Lecture <i>Chairpersons: Milton LEONG, Jacqueline CHUNG</i>	
13:50-14:30	Development of cfDNA-based cancer detection technologies	Dennis LO <i>The Chinese University of Hong Kong</i>
14:30-15:45	Session 3 - Transformative Trajectories in Preimplantation Genetic Screening <i>Chairpersons: Judy CHOW, Lydia LAI</i>	
14:30-14:50	Day 5 PGT/ niPGT	Richard CHOY <i>The Chinese University of Hong Kong</i>
14:50-15:10	Advancing Embryo Selection: Conjoint DNA and RNA Analysis in PGT	Cheng WAN <i>Yikon Genomics, Suzhou</i>
15:10-15:30	Utilizing AI for the identification and validation of novel therapeutic targets and repurposed drugs for endometriosis	Ronald WANG <i>The Chinese University of Hong Kong</i>
15:30-15:45	Q&A	
15:45-16:00	Coffee Break	
16:00-16:30	Plenary Lecture <i>Chairpersons: David CHAN, Jia ZHOU</i>	
16:00-16:30	Analysis of human embryonic development mechanism and healthy reproduction	Jie QIAO <i>Peking University Third Hospital</i>
16:30-17:45	Session 4 – Reflections on In Vitro Maturation <i>Chairpersons: David CHAN, Jia ZHOU</i>	
16:30-16:50	Clinical Application of In-Vitro Maturation	Tuong M HO <i>My Duc Hospital, Ho Chi Minh City</i>
16:50-17:10	Regulation of human oocyte maturation in vitro: release the break and press the accelerator	Claus Yding ANDERSON <i>University Hospital of Copenhagen</i>
17:10-17:30	Oocyte Quality and Maturation in Vitro (IVM)	Johan SMITZ <i>Follicle Biology Laboratory Free University Brussel</i>
17:30-17:45	Q&A	
19:00-21:00	Faculty Dinner <i>Ming Court, 2/F Great Eagle Centre, Wanchai</i>	

SCIENTIFIC PROGRAMME

15 December 2024, Sunday

08:30-09:00	Registration	
09:00-10:40	Plenary Lecture and Session 5 – Mirrors of Innovation: The Future of Ovarian Research <i>Chairpersons: Jacqueline CHUNG, Lydia LAI</i>	
09:00-09:20	Plenary Lecture: Early life health and the burden of adult chronic diseases	Hefeng HUANG <i>Zhejiang University, Hangzhou</i>
09:20-09:40	Precise assessment and early diagnosis: Innovative path to optimize fertility management	Huiyu XU <i>Peking University Third Hospital, Beijing</i>
09:40-10:00	Pregnancy for Patient with Malignant Tumor	Qiong WANG <i>Sun Yat-sen University, Guangzhou</i>
10:00-10:20	Ovarian Tissue Transplant for Menopausal women	Sherman SILBER <i>Infertility Center of St. Louis</i>
10:20-10:40	Q&A	
10:40-11:00	Coffee Break	
11:00-12:45	Session 6 - The Frontiers of Oocyte Biology and Plenary Lecture <i>Chairpersons: Carina CHAN, Raymond LI</i>	
11:00-11:20	Alice in AMH-land. Where does reality stop and fantasy take over?	William LEDGER <i>University of New South Wales, Sydney</i>
11:20-11:40	Assisted sperm fusion insemination: Pressing sperm onto the oocyte membrane	Shota HATAKEYAMA <i>Yanaihara Women's Clinic, Kamakura City</i>
11:40-12:00	Mitochondrial DNA in Ovarian development and aging	Xingguo LIU <i>Guangzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences</i>
12:00-12:15	Q&A	
12:15-12:45	Plenary Lecture: The Use of Low Dose Growth Hormone in Managing Difficult IVF Patients	Chii-Ruey TZENG <i>Taipei Fertility Center</i>
13:00-14:00	Lunch Symposium <i>Chairpersons: Alice WONG, Jia ZHOU</i>	
13:00-13:30	Oocyte and Embryo: Setting the Balance between Quality and Quantity <i>(Sponsored by Merck)</i>	Swee Lian LIOW <i>Virtus Fertility Centre Singapore</i>
13:30-14:00	Luteal phase support in fresh and frozen embryo transfer cycles – Singapore perspective <i>(Sponsored by Abbott)</i>	Su-Ling YU <i>Alpha IVF Centre & Alpha Women's Specialists, Singapore</i>
14:00-14:40	Plenary Lecture <i>Chairpersons: Milton LEONG, Zeev SHOHAM</i>	
14:00-14:40	Breaking Some Longstanding Dogmas in IVF	Norbert GLEICHER <i>Center for Human Reproduction, New York</i>
14:40-15:40	Session 7 - Nursing session <i>Chairpersons: Pauline NG, Kam Bik Crystal HUI</i>	
14:40-14:55	Psychosocial counselling for IVF couples	Tung Tess KWAN <i>The University of Hong Kong</i>
14:55-15:10	The vital role of nurses in providing emotional support for IVF patients	Wai Man CHEUNG <i>Queen Mary Hospital, Hong Kong SAR</i>
15:10-15:25	Does Artificial Intelligence (AI) have a role for IVF patients?	Kam Bik Crystal HUI <i>Union Hospital, Hong Kong SAR</i>
15:25-15:40	Q&A	
15:40-16:00	Coffee Break	
16:00-17:20	Session 8 - The Looking-Glass House: Embryo Transfer revisited <i>Chairpersons: Jennifer KO, Emily LAM</i>	
16:00-16:20	What is the best way to prepare endometrium for FET?	Tuong M HO <i>My Duc Hospital, Ho Chi Minh City</i>
16:20-16:40	Transvaginal Ultrasound-guided (TVUS) Embryo Transfer	Lili HUANG <i>Sun Yat-sen University, Guangzhou</i>
16:40-17:00	Revisiting Endometrial Injury: Novel Strategies for Improving Embryo Implantation Outcomes	Zeev SHOHAM <i>Hebrew University Jerusalem</i>
17:00-17:20	Q&A	
17:20-17:30	Award Presentation and Closing	



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1. Boron & Boulpaep. Medical Physiology. Saunders, 2012; 2. Casarini et al., Endocr Rev. 2018 Oct 1;39(5):549-592

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ABSTRACTS

Plenary Lecture and Session 1 (14 Dec 2024, 09:15-10:45)

Reflecting on Inverted, Unfamiliar, Bizarre and Heretical Discoveries Governing Our Own Development as Humans

Gerald SCHATTEN

University of Pittsburgh School of Medicine

Our Congress's theme, "Through the Looking Glass," invites us '...to embark on a journey of discovery into uncharted realms of knowledge and imagination.' Join Wonderland's Alice and me as we 'whimsically transcend the ordinary and uncover the hidden secrets that await' us, as gleaned from recent peer-reviewed publications. Let us "...embark on a journey through the looking glass, where realities merge with imagination and boundless possibilities await.

We'll "...begin at the beginning and go on till you come to the end: then stop." (As the King told Alice). Starting with gametes and embryos, to fetuses and abortions, onto our brains both during pregnancy and in Space, we will end considering aging as our mortal end, the timing of which can now be forestalled.

Our 'journey through the looking glass' encounters the embryo's challenges establishing its three-dimensional body axes (Dorsal-Ventral, Top-Bottom; Left-Right). Typically, our hearts are on the left and liver and appendix right, but Mirror-image reflections (Situs Inversus) seen clinically, confound general surgeons and us all. Clinically, COVID Stressors Trigger Staggering Rates of both Mirror-Imaged Fetuses and dreadful in utero Abortions of Male Twins.

After implantation nodal signals flowing to the embryo's left-right organizer leads to embryonic rotation. Messages are transduced leading to ciliary activity, surprisingly even with immotile cilia, generating mechanosensory cortical vortices, determining the body's plan. Coriolis-like reversals violate the norm resulting in inverted body axes – sometimes total and others partial mirror imaged reflections.

Pregnancy Shrinks our Brains as does the Weightlessness in Space (compared with the Astronaut's Earthbound Twin Brother), and the brain is asymmetric: The language center is in the left hemisphere in right-handers and half of left-handers. Aphasia (loss of speech) occurs with the more common left sided stroke. Because singing is stored contralaterally, singing therapy to re-educate the left side's language center is now a routine therapy.

Memory, Engrams and Consciousness are all consolidated during Sleep, the disruptions of which can be devastating. Innovative studies are ferreting out the fundamental nature of Memory, including the unanticipated discovery the extra-cerebral memories are likely stored in every bodily organ (e.g., muscle memory).

Heretical discoveries of chromosomal extrachromosomal DNA (ecDNA) force revisions of Mendel's Inheritance schema (they are responsible for ~20% of cancers and explain why therapies fail). We'll call for Lamarck's to be reinstated to his former prominence as truly the Father of Epigenetics and non-chromosomal Transgenerational Inheritance. EcDNA undermine the certainty of the Central Dogma (nuclear DNA → messenger RNA → cytoplasmic protein synthesis).

The End, albeit arriving prematurely, can be Slowed to Forestalled in those of us practicing Healthy Aging recommendations. Since Time's typically Rectified Trajectory, reset during Cloning, may extend Longevity for many of us. Remarkable studies of teenagers began in the 1920's actually predict who will develop Dementias now a century later.

We'll conclude with some self-reflections, where our Intelligence confronts its Artificial Counterpart; and; like the tragic Narcissus, we'll contemplate whether we are deluded by our reflected image while struggling with reality and its truths.

So, 'together, let us set sail on a voyage of discovery, where the extraordinary becomes the new norm.'

ABSTRACTS

Plenary Lecture and Session 1 (14 Dec 2024, 09:15-10:45)

Frozen vs. Fresh Embryo Transfer: Who will Benefit?

Zijiang CHEN

Shandong University

The establishment of embryo cryopreservation technology enables the storage of surplus embryos after fresh embryo transfer. Certain situations such as a high risk of ovarian hyperstimulation syndrome and preimplantation genetic testing entail the strategy of freezing all embryos and performing frozen embryo transfer. Over the last decade, there has been a rapid increase in the application of freeze-all strategy. However, it is still under heated debate who will benefit from freeze-all strategy compared with the traditional fresh embryo transfer. There has been several published results of randomized trial and also some ongoing trials on the freeze-all strategy in different populations.

In my presentation, I will review evidence on the benefits and risks of freeze-all strategy compared to fresh embryo transfer in terms of cumulative live birth rate, live birth rate after the initial transfer, as well as the risks of obstetric and neonatal complications. I will summarize the evidence-based indications for freeze-all strategy and the key elements that should be taken into account when individualizing treatment strategies. The potential changes in IVF practice with the application of freeze-all strategy, including a random start of ovarian stimulation, GnRH antagonist protocol with GnRH α trigger, the optimal number of oocytes retrieved will be predicted. The remaining research gap and future direction for research will also be discussed.

ABSTRACTS

Session 2 - Emerging Technologies in Embryo Selection (14 Dec 2024, 11:15-12:50)

Clinical effectiveness and safety of time-lapse imaging systems for embryo incubation and selection in in-vitro fertilization treatment (TILT): a multicentre, three-parallel-group, double-blind, randomized controlled trial

Priya BHIDE

Queen Mary University of London

Time-lapse imaging systems for embryo incubation and selection might improve outcomes of IVF and ICSI treatment due to undisturbed embryo culture conditions, improved embryo selection, or both. However, the benefit remains uncertain. We aimed to evaluate the effectiveness of time-lapse imaging systems providing undisturbed culture and embryo selection, and time-lapse imaging systems providing only undisturbed culture, and compared each with standard care without time-lapse imaging.

We conducted a multicentre, three-parallel-group, double-blind, randomised controlled trial in participants undergoing IVF or ICSI at seven IVF centres in the UK and Hong Kong. Embryologists randomly assigned participants using a web-based system, in a 1:1:1 ratio to the time-lapse imaging system for undisturbed culture and embryo selection (time-lapse imaging group), time-lapse imaging system for undisturbed culture alone (undisturbed culture group), and standard care without time-lapse imaging (control group). This unique three-arm design allowed us to assess the overall effects of the time-lapse imaging system, and to ascertain whether the observed benefit, if any, was due to both undisturbed culture and embryo selection, or undisturbed culture only, in a single trial. We recruited women undergoing IVF or ICSI with broad inclusion criteria. The primary outcome was live birth.

1575 participants were randomly assigned to treatment groups (525 participants per group). The live birth rates were 33.7% (175/520) in the time-lapse imaging group, 36.6% (189/516) in the undisturbed culture group, and 33.0% (172/522) in the standard care group. The adjusted odds ratio was 1.04 (97.5% CI 0.73 to 1.47) for time-lapse imaging arm versus control and 1.20 (0.85 to 1.70) for undisturbed culture versus control. There were no differences in the rates of biochemical and clinical pregnancies and pregnancy losses between the use of time-lapse imaging systems and standard care. The findings were similar irrespective of the female participant's age and use of fresh or frozen embryo replacement, for both primary and secondary outcomes.

Hence, in women undergoing IVF or ICSI treatment, the use of time-lapse imaging systems for embryo culture and selection does not significantly increase the odds of live birth compared with standard care without time-lapse imaging.

ABSTRACTS

Session 2 - Emerging Technologies in Embryo Selection (14 Dec 2024, 11:15-12:50)

3D imaging of the blastocyst and relating morphology with quality

Bo HUANG

Tongji Hospital, Wuhan

At present, the quality evaluation of blastocysts is two-dimensional, and there are relatively few evaluation indicators. There are now methods for exploring three-dimensional reconstruction of blastocysts, including fluorescence staining to obtain three-dimensional structures or artificial rotation to obtain images and restore three-dimensional conformations. However, one drawback of these methods is that they are far from true clinical applications. There are no reports on the reconstruction techniques that can be used in clinical blastocyst selection techniques, and there are no reports on the spatial conformational features related to them.

This study included 2025 frozen thaw single blastocyst transfer cycles at Tongji Hospital, Tongji Medical College, HUST from 2020 to 2021. We validated the model using the fluorescence reconstruction of human blastocysts as the gold standard (key indicator accuracy>90%). The obtained spatial conformational parameters of blastocysts include: Blastocyst: overall volume (BOV), cystic cavity volume (BCV), surface area (BSA); ICM: volume (IV), surface area (ISA), TE cells: number (TN), density (TD), distribution difference (TDD), TE cell roundness (TR), circumference (TC), area (TA) and variance.

The BOV, BCV, and BSA of the blastocyst were positively correlated with clinical pregnancy rate (CPR). The quartile results showed significant differences in CPR when the values were $>179 \mu\text{m}^3$, $165 \mu\text{m}^3$, and $25.8 \mu\text{m}^2$, respectively. In terms of ICM, there was no significant difference in CPR among the IV, ISA. In terms of TE, TN is positively correlated with CPR. The pleasing finding is that TC, and TA are significantly correlated with CPR.

This work provides a 3D reconstruction system for blastocysts that is closer to clinical applications and discovers new spatial features that are related to clinical outcomes. This enables the study of more dimensional biological characteristics of blastocysts, and our research further promotes the development of embryo reconstruction technology.

ABSTRACTS

Session 2 - Emerging Technologies in Embryo Selection (14 Dec 2024, 11:15-12:50)

Vacuoles as a Morphologic Sign of Blastocyst Quality and IVF Success

En-Hui CHENG

Lee Women's Hospital, Taichung City

Embryo selection is crucial for successful implantation and live birth outcomes in in vitro fertilization (IVF). This study evaluates the role of vacuoles as morphological markers in predicting blastocyst quality and clinical outcomes. Vacuoles, small fluid-filled structures in the cytoplasm, may form naturally or due to artificial reproductive techniques and have been associated with chromosomal abnormalities as well as reduced implantation and live birth rates.

A retrospective analysis of 3351 blastocysts from 1743 IVF cycles was conducted, with live birth outcomes monitored in 167 euploid embryos. Blastocysts were classified as vacuole-positive or vacuole-negative, and chromosomal status was assessed using preimplantation genetic testing for aneuploidy (PGT-A). Logistic regression revealed that vacuole-negative embryos had significantly higher chromosomal normality, implantation, and live birth rates, while vacuole-positive embryos showed poor developmental potential, likely due to cytoskeletal compromise and increased cellular stress. In another recent retrospective study, we analyzed the relationship between PGT-A results and mitochondrial DNA (mtDNA) levels in 515 blastocysts.

The study examined mitochondrial DNA levels, quantified as MitoScore, as a molecular marker of embryo quality. Higher MitoScores were strongly correlated with increased chromosomal abnormalities and poorer clinical outcomes. These findings suggest that vacuole assessment and mitochondrial level analysis are valuable in embryo selection. Integrating these morphological and molecular markers with artificial intelligence may enhance embryo selection strategies, thereby improving IVF success rates. This study underscores the potential of combining advanced techniques and biomarkers to refine IVF outcomes. Further research is needed to optimize the clinical application of these findings, particularly in understanding the mechanistic role of vacuoles in embryonic viability and developmental competence.

ABSTRACTS

Lunch Symposium
(14 Dec 2024, 13:00-13:30)

Innovative Management of Menopausal Vasomotor Symptoms

Rodney BABER

The University of Sydney

Menopause is one of the inevitable life stages of all women. Almost all women suffer from different severity of menopausal symptoms on certain occasions but unfortunately the significance and distress of menopausal symptoms have been misunderstood or ignored by both the women and HCP for many years. Too often menopause and associated symptoms are regarded as trivial and of short duration whilst treatment options have been linked to increased cancer risks.

Menopause can impose significant burdens on women, particularly through vasomotor symptoms (VMS) such as hot flashes and night sweats. These symptoms are characterized by sudden feelings of intense heat, often accompanied by sweating and flushing, which can disrupt daily activities and sleep. Night sweats can lead to chronic fatigue and insomnia, further affecting mood and overall wellbeing. Vasomotor symptoms are associated with increased risk of cardiovascular disease, osteoporosis and fracture and mental health. The unpredictability of these symptoms can also anxiety and stress, impacting a woman's social, work, relationships and ultimately quality of life.

By enhancing our understanding of VMS, we seek to improve management strategies and quality of life for the affected individuals, promoting a holistic approach to women's health during the menopausal transition.

ABSTRACTS

Plenary Lecture

(14 Dec 2024, 13:50-14:30)

Development of cfDNA-based cancer detection technologies

Dennis YM LO

The Chinese University of Hong Kong

Pending

ABSTRACTS

Session 3 - Transformative Trajectories in Preimplantation Genetic Screening (14 Dec 2024, 14:30-15:45)

Day 5 PGT/ niPGT

Richard CHOY

The Chinese University of Hong Kong

Traditionally, embryo selection is based on morphologic assessment, but with limited clinical benefits. Such morphologic selection grades the appearance, fragmentation, and symmetry of the day 3 cleavage-stage embryos, and inner cell mass (ICM) quality, trophoctoderm (TE) as well as the blastocyst cavity expansion degree for the day 5 blastocysts. However, its limited capacity in reflecting the chromosomal complement of the developing embryos, weak correlation with pregnancy outcomes, and subjectivity nature have compromised its performance and application in IVF. This lecture will focus on how to prioritize embryos' development potential in a more objective manner, using preimplantation genetic testing (PGT). These include PGT for aneuploidies (PGT-A), and non-invasive PGT (niPGT) to enable the investigation of the cell free DNA and metabolites from embryos based on the genomic DNA of the trophoctoderm (TE) cells biopsied or spent culture medium collected from the Day 5-6 developing blastocysts.

ABSTRACTS

Session 3 - Transformative Trajectories in Preimplantation Genetic Screening (14 Dec 2024, 14:30-15:45)

DNA and RNA/transcriptomic for PGT

Cheng WAN

Yikon Genomics, Suzhou

At present, PGT-A encounters two primary challenges: selecting the most viable embryos to enhance clinical outcomes and addressing the false positive and false negative results due to mosaicism. Multi-omics approaches offer a potential solution to these issues.

In this study, we divided the lysate from biopsied embryonic cells into two portions to perform concurrent DNA and RNA sequencing on the same sample. By conducting a retrospective analysis of the clinical outcomes of euploid embryo transfers and their RNA expression profiles, we identified 280 differentially expressed genes between the successful and failed transfer groups. Integrating these findings with machine learning algorithms, we constructed a predictive model for embryo transfer potential, achieving a prediction accuracy of up to 0.87 in the validation cohort. Retrospective analysis revealed that the implantation success rate of embryos predicted as high quality by this model was significantly higher than that of lower quality embryos (88.5% vs 20.8%, $p < 0.01$).

This approach has the potential to improve implantation rates by refining the selection of euploid embryos for transfer, thereby adding a new dimension to clinical embryo selection and optimizing outcomes in assisted reproduction.

ABSTRACTS

Session 3 - Transformative Trajectories in Preimplantation Genetic Screening (14 Dec 2024, 14:30-15:45)

Utilizing AI for the identification and validation of novel therapeutic targets and repurposed drugs for endometriosis

Ronald WANG

The Chinese University of Hong Kong

Endometriosis affects over 190 million women globally, and effective therapies are urgently needed to address the burden of endometriosis on women's health. Using an artificial intelligence (AI)-driven target discovery platform, we identify two unreported therapeutic targets, guanylate-binding protein 2 (GBP2) and hematopoietic cell kinase (HCK), along with a drug repurposing target, integrin beta 2 (ITGB2) for the treatment of endometriosis. GBP2, HCK, and ITGB2 are upregulated in human endometriotic specimens. siRNA-mediated knockdown of GBP2 and HCK significantly reduced cell viability and proliferation while stimulating apoptosis in endometrial stromal cells. In subcutaneous and intraperitoneal endometriosis mouse models, siRNAs targeting GBP2 and HCK notably reduced lesion volume and weight, with decreased proliferation and increased apoptosis within lesions. Both subcutaneous and intraperitoneal administration of Lifitegrast, an approved ITGB2 antagonist, effectively suppresses lesion growth. Collectively, these data present Lifitegrast as a previously unappreciated intervention for endometriosis treatment and identify GBP2 and HCK as novel druggable targets in endometriosis treatment. This study underscores AI's potential to accelerate the discovery of novel drug targets and facilitate the repurposing of treatment modalities for endometriosis.

ABSTRACTS

Plenary Lecture

(14 Dec 2024, 16:00-16:30)

Analysis of human embryonic development mechanism and healthy reproduction

Jie QIAO

Peking University Third Hospital

Sexual reproduction is fundamental to human reproduction, which is beneficial for human genetic diversity, evolutionary advantage, and offspring adaptability. At present, the world is facing a severe situation of declining fertility rates, the total fertility rate in the world is declining for several decades. More than 40 years, Assisted reproductive technology (ART) has made significant contributions to human healthy reproduction. However, the technology is facing bottleneck issues, such as physiologic and pathological reproductive aging, increased incidence of adverse pregnancies and Limited means of ART intervention.

Reproductive development is the key link of human reproduction and ontogenesis. In view of this, we need to delve deeper into the mechanisms of human gamete embryo development, as well as the processes of embryo implantation and environmental regulation, which are also benefit for Individual precision prevention and treatment. Specifically, mechanisms research of both genetic and epigenetic regulation is a prerequisite guarding health from origin of life. By conducting multi perspective and multi-level research on the mechanisms of reproductive development, we have also developed accurate methods for embryo diagnosis technologies, which may further optimize assisted reproductive technology and improve pregnancy and live birth rates.

ABSTRACTS

Session 4 - Reflections on In Vitro Maturation (14 Dec 2024, 16:30-17:45)

Clinical Application of In-Vitro Maturation

Tuong M HO

My Duc Hospital, Ho Chi Minh City

In vitro maturation (IVM) is an assisted reproductive technology that involves the extraction of immature oocytes from small antral follicles and their subsequent maturation culture in a laboratory setting. Advantages of IVM over in vitro fertilization (IVF) include mild or no stimulation, lower medication costs and less patient burden. Despite these advantages compared with standard IVF, the technology did not become widely adopted by the profession, because clinical outcomes after IVM were initially suboptimal.

The basic principles of the biphasic IVM system involve maintaining the oocyte in the meiotically arrested stage, preserving the physical contact and paracrine signaling between the oocyte and cumulus cells, and creating an environment that supports the developmental competence of the oocytes. Data from a recent well designed RCT comparing biphasic IVM versus IVF treatment outcomes showed a noninferiority of IVM compared with IVF was. IVM indication might also be extended to women with high AFC, who might suffer similar risks of treatment complications and burdens in PCOS women.

Women undergoing fertility preservation may also benefit from IVM treatment. This treatment can be viable as it enables the retrieval and maturation of immature oocytes from the ovaries without hormone stimulation. Immature oocytes can be collected from the ovarian tissue after ovariectomy. Women with gonadotropin resistance ovary syndrome are other candidates for IVM treatment is gonadotropin resistance ovary syndrome (GROS). The development of IVM has provided opportunities for those women to have their own biologic children.

After more than 30 years of development, the recent IVM protocol has been proved to be a feasible, safe, effective, economic, and patient friendly technique. It would be a technique of choice for IVF patients with good ovarian reserve and has a potential to be applied in many other indications.

ABSTRACTS

Session 4 - Reflections on In Vitro Maturation (14 Dec 2024, 16:30-17:45)

Regulation of human oocyte maturation in vitro: release the break and press the accelerator

Claus Yding ANDERSEN

University Hospital of Copenhagen

Background: Oocyte maturation is a critical biological process enabling the transition of immature oocytes, arrested in the prophase of the first meiotic division (germinal vesicle stage), to fully mature oocytes arrested in metaphase II of the second meiotic division. Oocyte maturation is a highly coordinated process driven by bidirectional communication between the oocyte and its surrounding somatic cells, primarily granulosa cells (GCs) and cumulus cells (CCs) enabling successful fertilization and embryonic development. Despite significant advances, the molecular mechanisms governing human oocyte maturation remain incompletely understood.

Previous studies have identified numerous mediators within follicular fluid and somatic cells that are modulated by LH and FSH, including EGF family members: amphiregulin (AREG), C-type natriuretic peptide (CNP). Activins and inhibins. Midkine and follicular fluid meiosis-activating sterol, IGFs and GDF9 and BMP15. FSH and LH signal through surrounding somatic cells, as oocytes themselves lack functional gonadotropin receptors. GC and CC, however, mediate this communication by producing a number of these hormones that regulate meiosis resumption and cytoplasmic maturation.

Research Context and Objectives: Through our fertility preservation program, which involves the cryopreservation of ovarian tissue, we have obtained access to human immature oocytes from small antral follicles. This valuable resource enables us to investigate the molecular and cellular dynamics of oocyte maturation under in vitro conditions and compare them to in vivo conditions.

Role of Gonadotropins: Gonadotropins play pivotal roles in stimulating CC in vitro to produce essential hormones and signalling molecules, including AREG and inhibin's thereby creating an intrafollicular-like milieu within the IVM culture droplets, facilitating meiotic resumption and cytoplasmic maturation.

Somatic Cell Interactions: Cumulus-oocyte communication is central to oocyte maturation. Gene expression analyses reveal dynamic changes in FSH and LH receptor levels on cumulus cells, correlating with hormone production and oocyte progression to metaphase II. Spent media analyses indicate that mature oocytes (MII) produce distinct profiles of signalling molecules, such as inhibin's, activins, and oocyte-specific factors (e.g., GDF9, BMP15), compared to immature oocytes. A new hypothesis outlining a possible sequence of events leading to oocyte maturation in humans will be presented.

ABSTRACTS

Session 4 - Reflections on In Vitro Maturation (14 Dec 2024, 16:30-17:45)

Oocyte Quality and Maturation in Vitro (IVM)

Johan SMITZ

Follicle Biology Laboratory Free University Brussel

The global application of IVM practice in human has been limited so far, because of the lower clinical outcomes of it compared to conventional assisted reproductive technologies (Gilchrist and Smitz, 2023). Recently, significant advances have been made in the culture methodology, mainly based on new knowledge from animal studies and the translation of these approaches to the human fertility clinic (Romero et al., 2015; Franciosi et al; 2014; Sanchez et al 2017). The data in human produced with a biphasic IVM system (Capacitation abbreviated 'CAPA'-IVM), initially developed from animal experiments (mouse) and subsequently tested in oocyte donors with PCOS, demonstrated that the culture system allowed to mature the cumulus-oocyte complexes (COC) from follicles of 2 to 8 mm. Improvement of immature oocyte culture should yield more good quality blastocysts with a good implantation rate and a low miscarriage rate. Prospective randomised clinical studies learned that maturation rate and good embryo quality rate were systematically higher with CAPA than compared with standard (i.e. mono-phasic) IVM culture (Sanchez et al.,2019; Vuong et al, 2020). Clinical validation studies with CAPA-IVM in human proved successful transferability of the method to distant clinical partner labs in Vietnam, Japan, Australia, Russia, India, Peru and Spain. The follow up of pregnancies and children from CAPA-IVM prove its safety (Nguyen et al; 2022) . When using CAPA in infertile patients with PCOS, a recent prospective study in 120 patients has validated the concept of "Gonadotrophin-free" ART (Vuong et al;, 2024). In patients with rare FSH receptor mutations (Normal AMH and increased FSH in serum) CAPA-IVM has led to healthy livebirths (Le et al., 2021). In onco-fertility patients, the use of CAPA-IVM to culture the COC, dissected out of medullary ovarian tissue (OTO-IVM), increased the number of blastocysts obtained for storage (Kirilova et al 2021; Kashutina et al, 2024). In conclusion: an adequate culture system for oocytes-cumulus complexes from small follicles, could avoid burdensome hormonal stimulation, increase access to treatment and reduce the cost of infertility treatment and gamete banking.

ABSTRACTS

Plenary Lecture and Session 5 - Mirrors of Innovation: The Future of Ovarian Research

(15 Dec 2024, 09:00-10:40)

Early Life Health and the Burden of Adult Chronic Diseases

Hefeng HUANG

Zhejiang University, Hangzhou

With increasing global life expectancy, living long and healthy has become a major concern. The rising prevalence of chronic non-communicable diseases has made them the leading cause of death, significantly burdening global economies. Based on the DOHaD theory, our team proposed the "gamete and embryo-fetal origins of adult disease" hypothesis, shifting disease prevention to before embryo formation. We revealed embryonic-gametic origins of certain metabolic diseases. In 2012, we found that intrauterine hyperglycemia causes epigenetic changes in the offspring's pancreatic islets, leading to transgenerational glucose intolerance. In 2019, we discovered that insulin treatment for gestational diabetes still predisposes offspring to metabolic disorders under dietary influence. In 2022, we identified the oocyte TET3 insufficiency-mediated intergenerational mechanism of diabetes transmission. The WHO highlights the first 1,000 days of life—from pre-pregnancy to 24 months of age—as a window of opportunity. Our team is conducting the international, multicenter Healthy Life Trajectories Initiative (HeLTI) study, providing comprehensive follow-up from preconception through early childhood, and focusing on personalized interventions based on the nutritional status of parents and offspring to reduce childhood obesity and the incidence of chronic diseases in adulthood, which aligns with WHO's goal of reducing non-communicable diseases. In addition, genetic testing enables personalized and precision medicine (PPM), aiding both patient treatment and disease prevention in at-risk populations, thereby reducing healthcare burdens. We call for the establishment of a national genetic and health database, which is essential for improving public health in China and advancing global health research.

ABSTRACTS

Plenary Lecture and Session 5 - Mirrors of Innovation: The Future of Ovarian Research

(15 Dec 2024, 09:00-10:40)

Development and Clinical Utility of OvaRePred: A Tool for Personalized Ovarian Reserve Assessment and Prediction of Perimenopausal Onset

Huiyu XU

Peking University Third Hospital, Beijing

Background and Aims: Ovarian reserve varies widely among women, affecting fertility and menopause timing. Since women's aging often begins with ovarian aging, personalized ovarian reserve assessment is vital. To address this variability, we developed and validated OvaRePred—a tool for individualized ovarian reserve assessment and perimenopause prediction using data from our reproductive center. While based on IVF population data, OvaRePred ranks ovarian reserve according to poor response probability, reflecting the broader female population's distribution.

Methods: OvaRePred includes three models—AA (AMH and Age), AFA (AMH, FSH, and Age), and AAFA (AMH, AFC, FSH, and Age)—combined with an ovarian aging curve. These models were developed using data from 4,796 cycles and validated with 5,009 cycles. Predictive performance was assessed with AUC metrics and calibration. An ovarian aging curve was also created from data from 21,219 cycles.

Results: The AAFA, AFA, and AA models were tested for accuracy and calibration in assessing ovarian reserve. The AFA model showed strong predictive ability with an AUC of 0.882, effectively ranking ovarian reserve and aligning with clinical outcomes. The models demonstrated reliable calibration. OvaRePred also predicts perimenopausal onset by combining ovarian reserve estimates with an aging curve that accounts for 97.8% of the variance in predicted diminished ovarian reserve (DOR) with age.

Conclusions and Future Perspectives: OvaRePred is a breakthrough in reproductive medicine, offering effective ovarian reserve ranking and perimenopausal prediction. Its adoption across many hospitals in China demonstrates its impact on patient outcomes and informed reproductive decisions. Moving forward, integrating OvaRePred with factors like environmental exposure, nutrition, and dietary habits could further women's health research. By exploring these interactions, OvaRePred can support personalized strategies to delay ovarian aging and enhance longevity. Its potential in public health and at-home monitoring will expand its reach, providing accessible, individualized reproductive care globally.

ABSTRACTS

Plenary Lecture and Session 5 - Mirrors of Innovation: The Future of Ovarian Research

(15 Dec 2024, 09:00-10:40)

Pregnancy for Patient with Malignant Tumor

Qiong WANG

Sun Yat-sen University, Guangzhou

Treatment of malignant cancers had been well developed in recently days, and the recovered malignant cancer patients facing conceive needs for entail family. The fertility situation of patients with malignant tumors and which kind of patients have fertility difficulties is important for patients desired fertility sparing surgery or other fertility preservation methods. Furthermore, when was the best time for conceive for patients with malignant tumors and does pregnancy affect the long-term survival and recurrence of malignant tumors also need to be consideration.

ABSTRACTS

Plenary Lecture and Session 5 - Mirrors of Innovation: The Future of Ovarian Research

(15 Dec 2024, 09:00-10:40)

Ovarian Tissue Transplant for Menopausal women

Sherman SILBER

Infertility Center of St. Louis

Objective: To determine whether we can safely and successfully transplant an ovary tissue allograft from a nonidentical donor to her Turner syndrome sister.

Design: Transplantation of cryopreserved ovary tissue, as well as fresh transplantation of ovarian tissue between identical twins, is now well established with numerous reported successful cases. However, there have not yet been any ovary transplants between nonidentical women requiring immunosuppression (ovary allotransplant). This could be a much more common indication for ovary tissue transplantation if safe and reliable immunosuppression were available.

Patient(s): A 20-year-old amenorrheic woman with nonmosaic 45-XO Turner syndrome requested ovary tissue transplantation from her fertile 22-year-old 46-XX sister. They were an human leukocyte antigens match but were ABO incompatible, a well-known contraindication to solid tissue or organ transplantation. The Turner syndrome sister strongly preferred to be able to become pregnant naturally without donor egg in vitro fertilization and to avoid hormone replacement therapy. In her religious group, that would also be important for finding a marital match. Despite the poor prognosis associated with ABO incompatibility, an ovary from her 22-year-old nonidentical fertile sister was transplanted to her employing the immunosuppression protocol now used for kidney transplant patients in our centers at Washington University and Johns Hopkins.

Main Outcome Measure(s): Post operatively at 5 months she developed normal monthly menstrual ovarian function, and she became spontaneously pregnant with a normal infant girl. The relation between her post operation follicle stimulating hormone and antimullerian hormone levels continue to support the theory that tissue pressure controls primordial follicle recruitment. The fact that ABO incompatibility did not prevent success suggests that diffusion and not revascularization may be all that is required for successful long-term ovarian cortex transplant survival with spontaneous pregnancy.

Result(s): Ovary allotransplantation with safe immunosuppression allows natural conception, and also normal hormone function obviates the need for hormone replacement therapy. Orthotopic placement of the graft and surgical technique is critical for natural conception and a higher pregnancy rate.

Conclusion(s): Allotransplantation requiring safe immunosuppression, if successful, maybe a much more commonly used indication for ovary transplantation in the future than frozen ovary grafts or grafts between identical twins. We now have a series of 5 such cases that will demonstrate we can be successful even with unrelated ovary donors.

ABSTRACTS

Session 6 - The Frontiers of Oocyte Biology and Plenary Lecture (15 Dec 2024, 11:00-12:45)

Alice in AMH-land. Where does reality stop and fantasy take over?

William LEDGER

University of New South Wales, Sydney

“Why, sometimes I've believed as many as six impossible things before breakfast.”

Alice – from “Alice in Wonderland’ by Lewis Carroll

Measurement of Anti Mullerian Hormone (AMH) has been part of routine investigation of female fertility in Reproductive Medicine for over two decades. We have learned much about what AMH measurements can and cannot tell us about fertility potential and, that elusive term, ovarian reserve. However many diagnostic challenges remain and a vigorous and healthy academic debate continues about the utility of assessment of AMH for apparently healthy young women in their 20's and 30's who wish to defer childbirth.

Where we know AMH works in is ART. Many studies have shown how baseline AMH can be used to predict ovarian response to gonadotropins, allowing more precise estimation of dose of FSH necessary for safe and effective superovulation. Serum AMH has been incorporated into clinically useful algorithms that identify the optimum dose of FSH for an individual patient, in order to result in collection of a good number of oocytes without risk of OHSS (ovarian hyperstimulation syndrome).

AMH also works as a diagnostic for polycystic ovarian syndrome. The latest iteration of the ESHRE/ASRM Guidelines on Diagnosis and Treatment of PCOS allows that ‘either serum AMH or ultrasound may be used to define PCOM’. There is a fairly tight correlation between serum AMH an ultrasound measurement of antral follicle count (AFC), and this statement avoids the need for transvaginal ultrasound in some patients.

More controversially, what do we mean by “ovarian reserve” or “egg count”? Rather like ‘hostile mucus’ or ‘killer cells’, social media and the general public seem to know more than reproductive medicine specialists. The decline in number of primordial follicles with female ageing has been well documented, and oocyte yield after superovulation also declines with age, as does the more nebulous “oocyte quality”. We offer measurement of AMH to young healthy women as a means of helping them to plan their reproductive future whilst accepting and empathising that this is imperfect science.

“Curiouser and Curiouser: said Alice.

ABSTRACTS

Session 6 - The Frontiers of Oocyte Biology and Plenary Lecture (15 Dec 2024, 11:00-12:45)

Assisted sperm fusion insemination: Pressing sperm onto the oocyte membrane

Shota HATAKEYAMA

Yanaihara Women's Clinic, Kamakura City

In 2020, we reported that fertilization was achieved by pressing a zona pellucida-bound sperm onto the oocyte membrane. We designated this novel micro-insemination technique as assisted sperm fusion insemination (ASFI). To ensure successful fertilization, it is essential to improve the survival rate of oocytes. In intracytoplasmic sperm injection (ICSI), it is challenging to completely prevent oocyte degeneration, as the oocyte membrane must be penetrated to inject sperm into the cytoplasm, even when using the piezo method. In contrast, with ASFI, oocytes theoretically do not degenerate, since sperm is incorporated by fusion with the oocyte membrane.

This talk will cover the development of ASFI, the procedure involved, the clinical outcomes of ASFI in comparison to conventional ICSI, and current issues related to ASFI.

ABSTRACTS

Session 6 - The Frontiers of Oocyte Biology and Plenary Lecture (15 Dec 2024, 11:00-12:45)

Mitochondrial DNA in Ovarian development and aging

Xingguo LIU

Guangzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences

Whether and how mitochondrial DNA modulate fertility remains unknown. Here, we analyzed oocyte quality of young (≤ 30 years old) and elder (≥ 38 years old) female patients and show the elder group had lower blastocyst formation rate and more mtDNA point mutations in oocytes. To test the causal role of mtDNA point mutations on infertility, we used polymerase gamma (POLG) mutator mice. We show that mtDNA mutation levels inversely correlate with fertility, interestingly mainly affecting not male but female fertility. mtDNA mutations decrease female mice's fertility by reducing ovarian primordial and mature follicles. Mechanistically, accumulation of mtDNA mutations decreases fertility by impairing oocyte's NADH/NAD⁺ redox state, which could be rescued by nicotinamide mononucleotide treatment. We answer the fundamental question of the causal effect of age-accumulated mtDNA mutations on fertility and its sex dependence, and show its distinct metabolic controlling mechanism. We further demonstrate here that cytochrome b (CYTB), the only mitochondrial-DNA-encoded transcript among complex III, also encodes an unrecognized 187-amino-acid-long protein, CYTB-187AA, using the standard genetic code of cytosolic ribosomes rather than the mitochondrial genetic code. We generated a transgenic knockin mouse model of CYTB-187AA silencing and found that reduction of CYTB-187AA impairs females' fertility by decreasing the number of ovarian follicles.

ABSTRACTS

Session 6 - The Frontiers of Oocyte Biology and Plenary Lecture (15 Dec 2024, 11:00-12:45)

The Use of Low Dose Growth Hormone in Managing Difficult IVF Patients

Chii-Ruey TZENG

Taipei Fertility Center

Growth hormone (GH) increases the sensitivity of ovaries to gonadotropin stimulation and enhances follicular development. GH has been used as an adjuvant treatment in ovarian stimulation for IVF, particularly in poor responders (PR). Our initial findings indicate that co-treatment with low-dose GH (10–20 IU) in poor responders may yield satisfactory outcomes, including improved E2 levels, oocyte numbers, embryo transfer numbers, implantation rates (IR), and clinical pregnancy rates (CPR) in women under 40 years of age. The pregnancy rate in poor responders receiving GH co-treatment is comparable to that of normal responders (NR) without GH adjuvant therapy.

Furthermore, GH has been shown to enhance endometrial receptivity, increase endometrial thickness (EMT), and improve oocyte quantity. However, GH supplementation in normal responders does not result in significant improvements in IVF pregnancy outcomes. For women aged 40 years or older with diminished ovarian reserve (DOR), GH co-treatment can improve the number of oocytes retrieved, the number of embryos obtained, and reduce the cancellation rate, particularly in women aged 43 and above.

In contrast, frozen embryo transfer (FET) in older women using embryos from IVF cycles with GH supplementation does not improve IR or CPR. Only in cycles with fresh embryo transfer (ET) does GH co-treatment appear to increase pregnancy rates by enhancing endometrial function, although it does not reduce miscarriage rates.

In conclusion, our study suggests that in some difficult IVF patients, GH improves assisted reproductive technology (ART) outcomes by enhancing endometrial function and improving egg and embryo quantity, rather than the quality of embryos.

ABSTRACTS

Lunch Symposium

(15 Dec 2024, 13:00-14:00)

Oocyte and Embryo: Setting the Balance between Quality and Quantity

Swee Lian LIOW

Virtus Fertility Centre, Singapore

The management of oocyte and embryo quality is a crucial aspect of assisted reproductive technologies (ART). Achieving an optimal balance between quantity and quality is essential for successful conception and outcomes. Women have a finite number of oocytes that decline with age. In ART, ovarian stimulation (OS) protocols aim to produce multiple oocytes. However, overstimulation can lead to poorer quality oocytes. Oocyte quality is defined as the ability of the oocyte to achieve meiotic and cytoplasmic maturation, fertilize, cleave, form a blastocyst, implant, and develop an embryo to term. The hormonal milieu during folliculogenesis influences oocyte quality. Optimizing FSH and LH levels in OS are crucial in ensuring oocyte developmental competence particularly in women in advanced maternal age.

ABSTRACTS

Lunch Symposium

(15 Dec 2024, 13:00-14:00)

Luteal phase support in fresh and frozen embryo transfer cycles – Singapore perspective

Su-Ling YU

Alpha IVF Centre & Alpha Women's Specialists, Singapore

Luteal phase deficiencies (LPD) are disorders resulting from abnormal corpus luteum function associated with insufficient progesterone production, which results in a shortened luteal phase, causing implantation failure and pregnancy loss.

In considering types of hormonal support for HCG triggered and GnRH triggered fresh cycles, progesterone in all forms is recommended as luteal support for hCG triggered IVF fresh cycles. In GnRH triggered fresh cycles, small doses of hCG rescue therapy are possible with careful selection of patients.

Luteal support for Frozen Embryo Transfer (FET) cycles differs by the preparation methods of the endometrium for FET. Natural cycle is the preferred method as it lowers the risk of adverse perinatal outcomes, lower maternal complications, and better child health. In artificial/HRT cycles, low luteal serum progesterone level was associated with lower live birth rates, suggesting a role in rescue therapy using vaginal progesterone with dydrogesterone. Individualizing extra luteal phase support may help improve pregnancy rate for selected patients.

ABSTRACTS

Plenary Lecture

(15 Dec 2024, 14:00-14:40)

Breaking Some Longstanding Dogmas in IVF

Norbert GLEICHER

Center for Human Reproduction, New York

Every medical specialty has its dogmas, and REI is no exception. This presentation will address 4 such dogmas in REI: (i) The concept of embryo selection, likely the oldest dogma in IVF; (ii) Timing of ovulation trigger/oocyte retrieval, which since inception of IVF has been at lead follicle size of approximately 18-23mm; (iii) The believe that oocyte maturity grades MII, Mi, and GV have the same relevance at all ages; and (iv) That the occurrence of pregnancy represents an endocrine event.

The talk will – in order – make the point that embryo selection beyond standard morphology, as used in every embryology laboratory, is inefficient and does not further contribute to IVF cycle outcomes; that timing of ovulation trigger and, therefore, oocyte retrieval must be adjusted according to patients and/pr ovarian age; That MI oocytes lose ability to produce good quality embryos, while GV oocytes significantly gain in this ability; and, finally, that the establishment of pregnancy primarily is an immune rather than endocrine phenomenon.

ABSTRACTS

Session 7 - Nursing session (15 Dec 2024, 16:00-17:20)

Psychosocial counselling for IVF couples

Tung Tess KWAN

The University of Hong Kong

In this seminar, Ms. Tess Kwan, the Medical Social Worker at the Center of Assisted Reproduction and Embryology at HKU-QMH, will delve into the profound emotional impact experienced by IVF couples throughout the IVF journey in this seminar. She will provide insights into the pivotal role of psychosocial counseling for IVF couples in Hong Kong and share her experiences in offering psychological support to IVF patients, highlighting the collaborative efforts between the clinical team and counselors.

During the seminar, Ms. Kwan will shed light on the myriad losses IVF couples may encounter, including the loss of control over their sex life, the expectation of problem-free conception, and the feeling of time slipping away. Additionally, she will address the loss of confidence in one's body and health, the shattered dreams of starting a family, and the diminished hopes of achieving parenthood. These losses, coupled with challenges such as lack of information, reluctance to seek help from friends due to infertility stigma, and social anxiety, can profoundly impact the psychological well-being of individuals navigating infertility and assisted reproduction challenges.

Furthermore, Ms. Kwan will explore the common stressors faced by IVF couples, such as the decision-making process, social anxiety, treatment stress including fear of injections, and the hormonal changes associated with IVF procedures. By acknowledging and addressing these intricate emotional and practical challenges, Ms. Kwan emphasizes the importance of holistic support in navigating the complexities of IVF. She will underscore the significance of collaborative efforts between infertility counselors and the clinical team in providing compassionate care, fostering transparent communication, and supporting the mental well-being of individuals embarking on the IVF journey in Hong Kong.

ABSTRACTS

Session 7 - Nursing session (15 Dec 2024, 14:40-15:40)

The vital role of nurses in providing emotional support for IVF patients

Wai Man CHEUNG

Queen Mary Hospital, Hong Kong SAR

Nurses play a pivotal role in ensuring that patients are well-prepared for their treatment journey by imparting knowledge on key aspects of IVF. In the upcoming seminar, Ms. Cheung will elucidate the crucial role of nurses in equipping patients with vital information essential for navigating the challenging journey of in vitro fertilization (IVF). Ms. Cheung will specifically focus on the emotional support provided by nurses to IVF patients within the clinic setting.

A fundamental aspect of the nurse's responsibility involves dispelling misconceptions surrounding IVF, creating a nurturing environment through the application of personalized care and empathy. This individualized approach enables nurses to establish profound connections with patients, facilitating the identification of unique needs and the provision of tailored support. Ms. Cheung will share her experiences in managing challenging scenarios in the clinic, such as delivering difficult news, and guiding nurses on introducing patients to counseling services to ensure ongoing support throughout the treatment process.

Moreover, nurses engaging with patients outside the clinical realm foster trust and fortify the patient-nurse relationship. Ms. Cheung will elaborate on her involvement in psychosocial groups and the promotion of open communication, empowering patients and establishing a supportive network throughout their IVF journey.

In essence, nurses play an important role in offering emotional support to IVF patients through education, dispelling misconceptions, and cultivating a nurturing environment. Their compassionate approach and personalized care significantly enrich patients' well-being and treatment experience, solidifying their vital role in the realm of IVF support. Ms. Cheung's insights shed light on the critical need for nurses to provide emotional support to patients undergoing IVF, emphasizing the complexity of the procedures and the importance of pre-treatment education and guidance.

ABSTRACTS

Session 7 - Nursing session (15 Dec 2024, 14:40-15:40)

Does Artificial Intelligence (AI) have a role for IVF patients?

Kam Bik Crystal HUI

Union Hospital, Hong Kong SAR

The presentation highlights the potential of artificial intelligence (AI) in enhancing in vitro fertilization (IVF) processes. AI, defined as the simulation of human mental processes by computer systems, is increasingly integrated into various sectors, including healthcare.

Current challenges in assisted reproductive technology (ART) include subjective treatment decisions, variability in patient outcomes, and the emotional and physical demands faced by patients. Infertility affects 1 in 6 couples, necessitating multiple ART cycles, which can be complex and stressful.

AI can address these challenges through innovations like AI-assisted home semen analysis. This method contrasts with traditional laboratory analyses by providing a more convenient and accurate approach. It allows for flexible sample collection, automated analysis, and faster results, thus enhancing accessibility and privacy for patients.

Key applications of AI in IVF include personalized treatment plans, optimized dosage and timing, and improved communication with patients via chatbots and virtual assistants. AI systems like the RFID-based IVF witness system ensure accurate tracking of samples throughout the treatment process.

However, the implementation of AI in healthcare is not without challenges, such as data quality issues and potential resistance from practitioners. The importance of maintaining empathy and human connection in patient care remains paramount.

In conclusion, AI presents significant opportunities for improving the efficiency and outcomes of IVF treatments, empowering both patients and healthcare professionals. Continuous education and adaptation to new tools are essential for maximising these benefits in reproductive medicine.

ABSTRACTS

Session 8 - The Looking-Glass House: Embryo Transfer revisited (15 Dec 2024, 16:00-17:20)

What is the best way to prepare endometrium for FET?

Tuong M HO

My Duc Hospital, Ho Chi Minh City

Advancements in embryo cryopreservation techniques (vitrification) have allowed the wider introduction of frozen embryo transfer (FET) into IVF, while maintaining good pregnancy and neonatal outcomes. Furthermore, for some individuals (for example, women with polycystic ovary syndrome or those with a strong ovarian response...), so-called freeze-all IVF cycles are the best approach due to a higher livebirth rate and lower risk of ovarian hyperstimulation syndrome. As a result, the number of IVF cycles that use FET has increased markedly.

In FET cycles, appropriate endometrial preparation is required to enhance this process. Several endometrial preparation approaches are used during FET in current clinical practice: natural or modified natural cycles with or without luteal phase support; artificial cycles with or without a gonadotropin-releasing hormone agonist; and mild ovarian stimulation using gonadotropins, clomiphene citrate, or letrozole. Of these, natural cycles, modified natural cycles, and artificial cycles are the most commonly used.

One major hypothesis around the risk of pre-eclampsia is attributable to the absence of a corpus luteum, which is associated with an impairment of maternal circulatory adaptations to pregnancy, results in a higher risk of hypertensive disorders of pregnancy and some other complications. Cost, inconvenience and flexibility... are the drawbacks of the natural or modified natural cycles.

Most of the recent analysed data included studies that included women with PCOS/ovulation disorders. Women with PCOS/ovulation disorders are at high risks of pregnancy loss, preterm birth, hypertension, GDM,... Actually, natural cycle can not be used for endometrial preparation in women with PCOS/ovulation disorders, artificial cycles were the common protocols for this group of patients. Current evidence from a large RCT showed that no significant difference in the livebirth rate, neonatal outcomes between different strategies for endometrial preparation in FET cycles for ovulatory IVF patients.

The relative risk for each individual patient and the respective advantages versus drawbacks of all endometrium preparation protocols should be considered to choose the best protocol. Individualization of endometrial preparation for FET should be practiced based on patients' characteristics, cost, convenience, center practice...

ABSTRACTS

Session 8 - The Looking-Glass House: Embryo Transfer revisited (15 Dec 2024, 16:00-17:20)

Transvaginal Ultrasound-guided (TVUS) Embryo Transfer

Lili HUANG

Sun Yat-sen University, Guangzhou

Embryo transfer is crucial in the IVF process, and its techniques have evolved. The clinical touch method is obsolete. Transabdominal ultrasound-guided ET (TAUS), despite being globally prevalent and ASRM-recommended, has limitations. Patients endure bladder distension discomfort, imprecise catheter tip imaging, and it demands extra waiting time and an assistant, affecting busy clinics.

Since 1991, transvaginal ultrasound-guided ET (TVUS) has emerged as an outstanding alternative. Its process relies on close physician-embryologist cooperation. Multiple studies have firmly verified its benefits like higher or comparable pregnancy rates, precise embryo positioning, suitability for special patients, no bladder distension, less uterine stimulation, no extra ultrasound help, and convenience for busy clinics. Overall, TVUS is a highly valuable technique in reproductive medicine.

ABSTRACTS

Session 8 - The Looking-Glass House: Embryo Transfer revisited (15 Dec 2024, 16:00-17:20)

Revisiting Endometrial Injury: Novel Strategies for Improving Embryo Implantation Outcomes

Zeev SHOHAM

Hebrew University Jerusalem

This presentation explores endometrial injury (EI) as a method for enhancing IVF outcomes, examining its evolution, underlying mechanisms, and ongoing debates. Originating over two decades ago, the concept of EI involves inducing localized injury to the endometrial lining to potentially improve embryo implantation. Despite its longstanding presence, EI's efficacy remains controversial, with varying interpretations across studies. The presentation reviews original studies on EI and describes how the endometrium responds to injury, highlighting the differing views and methodologies surrounding the approach.

A systematic review of 17 randomized controlled trials (RCTs) was conducted to assess EI's effects on IVF outcomes, drawing data from MEDLINE, Embase, Web of Science, and the Cochrane Library. These trials utilized diverse methodologies, with some performing the injury once or twice per cycle and one study performing up to four biopsies. The review revealed that EI practices have influenced clinical approaches, with approximately 73% of practitioners modifying their procedures based on EI research.

Additionally, the presentation addresses the cost implications of EI and its value compared to potential benefits in fertility treatments. It concludes by outlining suggested directions for future research, emphasizing the need to clarify EI's role in reproductive health and address persistent controversies. Overall, the presentation offers a comprehensive view of the current knowledge on EI, advocating for further investigation to determine its practical application and effectiveness in enhancing fertility outcomes.

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References: **1.** Rapkin AJ. vasomotor symptoms in menopause: physiological condition and central nervous system approaches to treatment. *Am J Obstet Gynecol* 2007; 196(2):97-108. **2.** Modi M, Dhillon WS. Neurokinin 3 receptor antagonism: a novel treatment for menopausal hot flashes. *Neuroendocrinology* 2019;109(3):242-8.



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Reference: 1. Duphaston Hong Kong PI 2. Schindler AE. Progesterational effects of dydrogesterone in vitro, in vivo and on the human endometrium. *Maturitas*, 2009;65S:S3-S11. 3. IQVIA MIDAS database Q3 2021 Release 4. Podzolkova N, Tatarchuk T, Doshchanova A, et al. Dydrogesterone treatment for menstrual-cycle regularization in routine clinical practice: a multicenter observational study. *Gynecol Endocrinol* 2016;32(3):246-9. 5. Tournaye H, Sukhikh GT, Kahler E, et al. A Phase III randomized controlled trial comparing the efficacy, safety and tolerability of oral dydrogesterone versus micronized vaginal progesterone for luteal support in in vitro fertilization. *Hum Reprod* 2017;32(5):1019-1027.

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POSTER PRESENTATIONS

2

Advancing Women's Health with a Simplified Novel Screening Tool for Early PCOS Detection

Dr. Huiyu Xu¹

¹*Peking University Third Hospital, Beijing, China*

Objective: Polycystic ovary syndrome (PCOS) is a prevalent endocrine disorder among women of reproductive age, yet its diagnosis remains complex and frequently delayed, resulting in missed opportunities for timely health management. This study aimed to develop and compare predictive models for the early detection of PCOS.

Methods: We performed a retrospective cohort study utilizing data from 21,219 ovarian stimulation cycles at Peking University Third Hospital from January to December 2019. Key predictors, including serum anti-Müllerian hormone (AMH), upper limit of menstrual cycle length (UML), body mass index (BMI), and serum androstenedione (A4), were analyzed using Least Absolute Shrinkage and Selection Operator (LASSO) logistic regression. Two predictive models were developed: PCOS-4, which includes AMH, UML, BMI, and A4, and a simplified model, PCOS-3, excluding A4. Model performance was assessed using the area under the receiver operating characteristic curve (AUC), sensitivity, specificity, and net reclassification index (NRI) across training, validation, and testing datasets.

Results: The PCOS-4 model demonstrated AUC values of 0.855 (95% CI: 0.838–0.870) in the training set, 0.848 (95% CI: 0.791–0.891) in the validation set, and 0.846 (95% CI: 0.812–0.875) in the testing set. The PCOS-3 model, which omits A4, showed very similar performance, with AUC values of 0.850 (95% CI: 0.842–0.858) in the training set, 0.851 (95% CI: 0.828–0.874) in the validation set, and 0.841 (95% CI: 0.826–0.856) in the testing set. Sensitivity and specificity were also comparable between the two models. The NRI results indicated a slight reduction in reclassification performance for PCOS-3 in the training set (NRI = -0.022; 95% CI: -0.035 to -0.009) but showed no significant difference in the test set (NRI = 0; 95% CI: -0.023 to 0.023).

Conclusions: Both the PCOS-3 and PCOS-4 models provide reliable and efficient methods for the early detection of PCOS in Chinese women. The nearly identical performance of the two models suggests that the simpler PCOS-3 model may be preferable for broader clinical application and better access due to its reduced complexity. By facilitating early diagnosis, these models can improve the management of PCOS-related complications, leading to better long-term health outcomes for affected individuals.

POSTER PRESENTATIONS

3

Development and clinical utility of OvaRePred: A comprehensive tool for personalized ovarian reserve assessment and prediction of perimenopausal onset

Dr. Huiyu Xu¹

¹*Peking University Third Hospital, Beijing, China*

Objective: Ovarian reserve is a key factor in fertility, with aging in women starting from ovarian aging. The wide variation in ovarian reserve among women causes differences in menopause age, making personalized assessment essential for effective reproductive health management. This study aimed to develop and validate OvaRePred, a model based on extensive data from our reproductive center, to provide individualized ovarian reserve evaluations and predict perimenopause onset.

Methods: The OvaRePred tool combines three models—AA (AMH and Age), AFA (AMH, FSH, and Age), and AAFA (AMH, AFC, FSH, and Age)—with an ovarian aging curve to assess current ovarian reserve and predict fertility milestones like diminished ovarian reserve (DOR) and perimenopause onset. The AA, AFA, and AAFA models were built using data from 4,796 GnRH antagonist cycles (2017-2018) and validated with 5,009 cycles from 2019. Predictive performance was evaluated using AUC in training, internal, and external validation datasets, with calibration curves comparing predicted probabilities to actual outcomes. The ovarian aging curve using a logistic growth curve model was developed from 21,219 cycles at Peking University Third Hospital.

Results: For assessing current ovarian reserve, the AAFA, AFA, and AA models were rigorously evaluated for discrimination and calibration. The AFA model showed strong predictive performance with an AUC of 0.882 in the validation set, accurately differentiating between levels of ovarian reserve. These models were thoroughly calibrated, with predicted probabilities closely matching actual outcomes (poor ovarian response or not), ensuring their reliability and clinical utility. In predicting perimenopause onset, the OvaRePred tool combined current ovarian reserve predictions with an ovarian aging curve. The aging curve explained 97.8% of the variance in predicted DOR with age, providing a basis for estimating the time interval between the current age and reaching the poorest ovarian reserve in ART populations.

Conclusions: OvaRePred is a pioneering tool in reproductive medicine, designed to meet the growing demand for personalized ovarian reserve assessments. Its integration of multiple assessment models and widespread application in dozens of hospitals in China demonstrate its effectiveness in improving patient outcomes and empowering women in making informed reproductive health decisions. However, its predictive accuracy, particularly regarding perimenopause onset, hinges on the precision of ovarian reserve assessments and the aging curve. Further clinical validation is required to confirm its efficacy in this area.

POSTER PRESENTATIONS

4

Efficacy of acupuncture transcutaneous electrical nerve stimulation (acu-TENS) to relieve stress during ultrasound-guided manual vacuum aspiration (USG-MVA): A pilot randomized controlled trial

Ms. Tsz Ching Yeung¹, Nikki May Wing Lee^{1,2}, Mandie Yan Hiu Ho^{1,2}, Yiu Leung Chan^{1,2}, Karen Ng^{1,2}, Patricia Nga Ping Ip^{1,2}, Olivia Sze Ying Chau^{1,2}, Jacqueline Pui Wah Chung^{1,2}, Chi Chiu Wang^{1,3,4}

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Background: Ultrasound-guided manual vacuum aspiration (USG-MVA) is a safe and effective alternative method for the surgical management of miscarriage. However, it can create a moderate level of pain and stress in patients. Where current pain management methods are mainly controlled by analgesia, stress during and after the surgical procedure has not been previously studied. Traditional Chinese Medicine has shown its potential in relieving stress in other medical conditions. This trial evaluated acupuncture transcutaneous electrical nerve stimulation (acu-TENS) in the reduction of stress experienced by women undergoing USG-MVA.

Methods: A pilot study was carried out at the Department of Obstetrics and Gynaecology of the Prince of Wales Hospital based on an on-going RCT of acu-TENS for miscarriage. Ten women undergoing USG-MVA for the treatment of early pregnancy loss before 12 weeks of gestation were randomized to receive acu-TENS or sham acu-TENS (control group) for pain alleviation during USG-MVA. Apart from pain score, primary outcome included stress levels measured by State Trait Anxiety Inventory (STAI). Secondary outcomes include correlation between pains score and stress level and also any adverse events of acu-TENS. Data analysis was performed using the Statistical Packages of Social Sciences (SPSS).

Results: The STAI of the acu-TENS group decreased by 8.5 ± 8.8 , with a stress-relieving effect of 14 times when compared with the control group (0.6 ± 6.3). The change of VAS pain score of the acu-TENS group and the control group were 28.8 ± 32.5 and 52 ± 35.6 respectively, which showed that acu-TENS gave a 44.6% reduction of pain experienced by women undergoing USG-MVA. No adverse effects were reported in any of the patients.

Conclusions: The encouraging results of this pilot trial warrant further investigations into the use of acu-TENS for stress relief in women undergoing USG-MVA for miscarriage.

POSTER PRESENTATIONS

6

Expanded carrier screening fails to detect mosaicism of a large CNV – a case report

Dr. Judy F.C. Chow¹, Kevin K.W. Lam¹, Andy L.C. Hui¹, Raymond H.W. Li¹, Jennifer K.Y. Ko¹, William S.B. Yeung², Ernest H.Y. Ng¹

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Introduction: Expanded carrier screening (ECS) aims to identify the carrier status and assess the reproductive risk for specific autosomal recessive (AR) or X-linked (XL) conditions in asymptomatic individuals. It is often advised for those planning to have a family and may impact reproductive management decisions. Here we reported an asymptomatic husband with a positive ECS result. Initial finding revealed heterozygous deletions of 4 AR genes on the q arm of chromosome 20, but eventually found to have mosaicism in a pathogenic copy number variation (CNV), only in somatic cells but not in germline.

Methods: A couple was referred to us for preimplantation genetic testing (PGT) because the husband was a carrier of at least 4 pathogenic gene deletions on chromosome 20, spanning approximately 9.2 Mb (20q11.23-q13.12) determined by ECS on saliva. Further pre-PGT workup was carried out by chromosome microarray analysis (CMA) and low-pass NGS. To further identify low level mosaicism, targeted PCR was performed to cover 10 heterozygous SNPs (4 inside the CNV and 6 flanking the region). Relative level of mosaicism was inferred by minor allelic frequency (MAF) after amplicon-based deep sequencing.

Results: CMA of the blood revealed a 14.09 Mb mosaic interstitial deletion in 20q11.23-q13.13 (30-40%). Low-pass NGS (read depth: 0.1x) was then carried out and the level of mosaicism in blood and saliva was determined to be 21% and 28% respectively. To our surprise, no deletion was detected in a total of XX sperms. Amplicon-based deep sequencing with read depth > 10,000x confirmed the low relative level of mosaicism in sperms (<5%). The relative level of mosaicism in blood and saliva was 28.8% and 37.1% respectively. After counselling, the couple decided not to proceed to PGT due to the low level of CNV in sperms.

Conclusion: This case report highlights two important challenges. First, ECS has a low sensitivity in detecting mosaic variants. Secondly, mosaic variants detected can complicate reproductive decision-making due to the uncertainty of the presence of the variants in the germline.

POSTER PRESENTATIONS

8

Exposure to polystyrene nanoplastics impairs ovarian function by inhibiting autophagy

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Objective: The extensive use of plastic products has led to the widespread presence of nanoplastics (NPs) in the environment. NPs, defined as microplastics with diameters < 100 nm, have a larger specific surface area and stronger cellular affinity, potentially increasing their toxicity to living organisms. Recent studies have shown that polystyrene nanoparticles (PS-NPs) can cause significant reproductive toxicity including impairing ovarian function. However, the underlying mechanisms remain unclear. This study aimed to investigate the potential biological effects and specific mechanisms by which 50 nm diameter PS-NPs deteriorate ovarian function in mice.

Methods: Female mice were divided into three groups: a control group, and groups receiving oral administration of 100mg/kg/day and 200mg/kg/day PS-NPs (n = 8 for each group). After 42 days of exposure, the mice were sacrificed, and their ovaries were harvested. Transcriptome sequencing was performed on the ovaries of control mice and those exposed to 200mg/kg/day PS-NPs. Additionally, ovarian morphology and follicular development were assessed using HE staining on serial tissue sections of entire ovaries.

Results: A significant reduction in body weight gain was observed in the groups exposed to PS-NPs (100 mg/kg/day and 200 mg/kg/day) compared to controls (1.917 ± 1.106 g vs. 2.832 ± 0.579 g, $P < 0.05$, 1.505 ± 1.194 g vs. 2.832 ± 0.579 g, $P < 0.001$). Similarly, ovarian weights were significantly lower in PS-NPs-exposed mice compared to the control group (2.150 ± 0.499 mg, 1.863 ± 0.267 mg vs. 3.675 ± 1.035 mg). Histopathological examination revealed a dose-dependent decrease in the number of primordial follicles and an increase in atretic follicles in PS-NPs-exposed mice. Transcriptome sequencing analysis of the ovaries from the control group and the group exposed to 200mg/kg/day PS-NPs revealed significant differences, with 715 upregulated and 1266 downregulated differentially expressed genes identified. KEGG enrichment analysis indicated that the expression of pathways related to autophagy, estrogen synthesis, and steroid hormone biosynthesis was significantly reduced in the ovaries of mice exposed to PS-NPs.

Conclusion: These findings suggest that PS-NPs can impair ovarian function and reduce the levels of autophagy in the ovaries, potentially leading to adverse reproductive outcomes in female mice.

POSTER PRESENTATIONS

9

Association of Serum Vitamin D Level with Ovarian Response in Women Undergoing In Vitro Fertilisation

Dr. Jennifer Ko¹, Tat On Chan¹, Kevin K.W. Lam¹, Raymond H.W. Li¹, William S.B. Yeung¹, Ernest H.Y. Ng¹

¹Queen Mary Hospital, The University Of Hong Kong, Hong Kong SAR

Objective: We have previously published a retrospective cohort study of infertile women undergoing their first in vitro fertilization (IVF) cycle showing that the cumulative live birth rate of the first IVF cycle was significantly lower in women who were vitamin D-deficient compared to those who were vitamin D non-deficient. The objective of this study is to further assess the association of serum vitamin D level with markers of ovarian response in this cohort.

Methods: This is a retrospective cohort study of women who underwent the first IVF cycle from 2012 to 2016 at a tertiary reproductive medicine centre. Archived serum samples taken before ovarian stimulation were analyzed for 25(OH)D levels using liquid-chromatography-mass-spectrometry. Vitamin D deficiency was defined as serum 25(OH)D levels <50 nmol/L in accordance with the Endocrine Society criteria. Ovarian stimulation parameters including the ovarian sensitivity index (OSI), follicular output rate (FORT) and modified FORT (mFORT) were compared between the vitamin D deficient and non-deficient groups. OSI was calculated by dividing the total dose of exogenous gonadotropins by the number of oocytes obtained at oocyte retrieval. FORT and modified FORT, were defined as the ratio between the number of follicles measuring ≥ 16 mm and ≥ 12 mm respectively at the time of oocyte maturation triggering and AFC at baseline and assessed the effectiveness of ovarian stimulation.

Results: 1178 women were included in the analysis. The median (25-75th percentile) age of the women in the cohort was 36(34-38) years. The prevalence of vitamin D deficiency was 42.2% (497/1178). Comparing to women who were vitamin D non-deficient, a higher total dosage of gonadotropins was used [2400(1500-3225) vs 2250(1350-3000)IU, $p=0.018$], the duration of stimulation was significantly longer [11(10-13) vs 11 (10-12)days, $p=0.032$], and less oocytes were retrieved [8(4-13) vs 8(5-14), $p=0.045$] in women with vitamin D deficiency. There were no significant differences in the FORT and mFORT in the vitamin D deficient and the non-deficient groups. The OSI was significantly lower in the vitamin D deficient group when compared to the non-deficient group [3.33(1.46–7.56) vs 3.81(1.73–8.52), $p=0.021$]. Using Spearman's correlation, the duration of stimulation, total dosage of gonadotrophin used and OSI were significantly correlated with serum vitamin D level. On multivariable linear regression, serum vitamin D was independently associated with the OSI [regression coefficient 0.123(95% CI 0.002-0.244), $p=0.046$] after controlling for women's age and body mass index.

Conclusions: Serum vitamin D level is positively associated with ovarian response parameters in women undergoing IV.

POSTER PRESENTATIONS

10

Embryo Assessment Approach: A Combination of Time-lapse Morphokinetic Analysis and Metabolomic Profile in Spent Culture Medium

Vivian Ching Man Lam¹, Jacqueline Pui Wah Chung¹, Richard Kwong Wai Choy¹, Mingpeng Zhao, David Yiu Leung Chan¹

¹Chinese University of Hong Kong, Hong Kong SAR

The success rate of IVF remains suboptimal with limiting factors including selection of the best embryo for transfer. Traditional selection approaches primarily rely on embryo morphological assessment and invasive biopsy for preimplantation genetic testing. In recent years, promising non-invasive techniques have emerged to address the current limitation. Metabolomic profiling of spent culture medium (SCM) by Raman spectroscopy followed by artificial intelligent assisted algorithms has been reported as a potential non-invasive tool in prediction of embryo ploidy. Moreover, Convolutional neural network (CNN) trained time-lapse imaging analysis focusing specific cytoplasmic and oocyte/zygote features were suggested to provide predictions on embryo developmental potential.

This study aims to evaluate the synergistic contribution of morphokinetic features, CNN prediction and metabolomic profiling on the prediction of embryo developmental potential and ploidy status; and to integrate an effective combined approach for embryo assessment.

A retrospective study was designed to collect data from 183 embryos during Mar 2023 to Mar 2024. All embryos were single cultured in the Embryoscope (Vitrolife, Sweden), time-lapse images and morphokinetic features were used for KIDscore annotation and CNN-trained morphology segmentation system. SCM were collected individually and tested by Raman system (Basecare Raman 200, China), target near-infrared region will be analyzed using Labspec 6 software to give embryo ploidy prediction.

Ensemble learning will be used to assemble all sub-parameters from the target data and re-allocate their weights by considering the strength of each as a classifier during the training. The algorithm established were trained using clinical pregnancy outcome and blastocyst formation as the 2 main index and validation of the ensemble MK-RS learning model.

A total of 183 embryos were included in the retrospective analysis. This study had combined various embryo selection approaches including KIDscore, CNN-trained prediction score and Raman ploidy prediction. All sub-parameters contribute around 30% in the XGBoost model. The mean cross-validation score and test set accuracy are 0.85 and 0.84 respectively, with area under the curve (AUC) of a receiver operating characteristic curve of 0.76 in an independent test set.

In summary, we have developed a machine learning algorithm based on embryo time-lapse sequences, CNN-trained morphology segmentation system and Raman ploidy prediction, with an AUC of 0.76. In order to test the effectiveness of the novel model, a prospective single-blinded RCT will be conducted in our Phase II study, comparing various clinical pregnancy outcomes from our novel ranking model with that of manual morphological assessment by clinical embryologists.

Acknowledgement: This research was supported by General Research Fund RCG Ref No. 14100822, Research Grant Council (RGC) of Hong Kong, China

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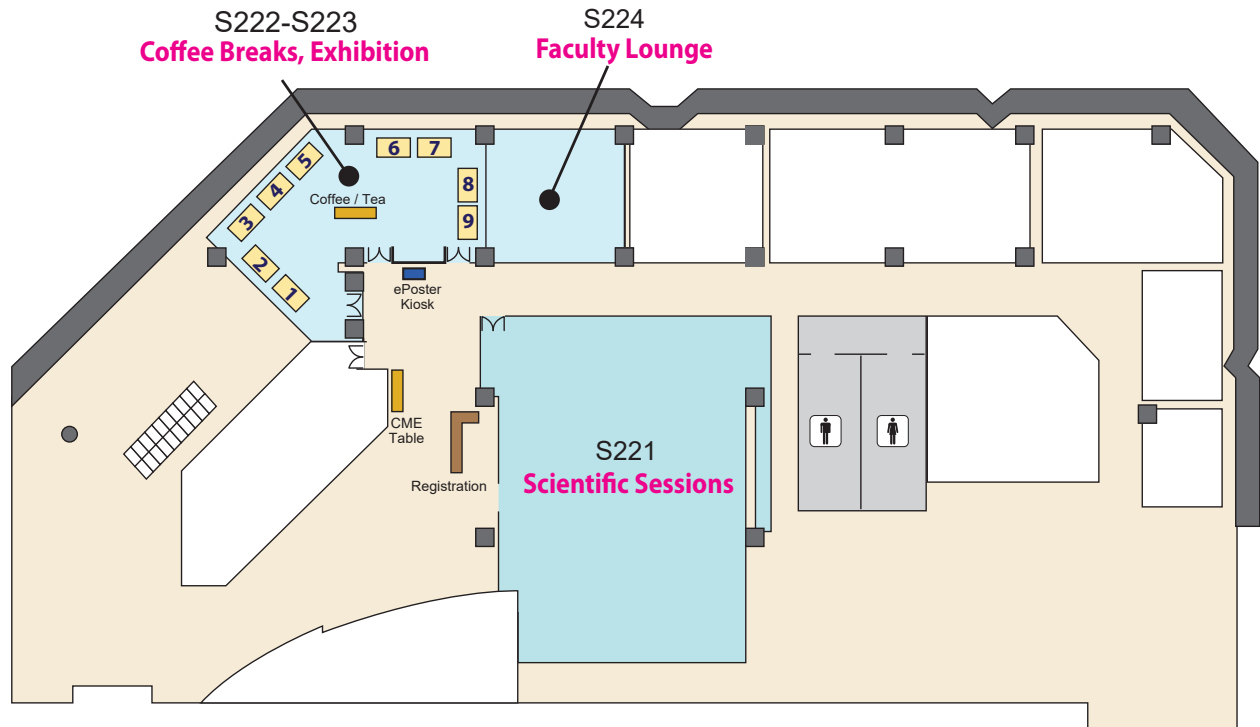
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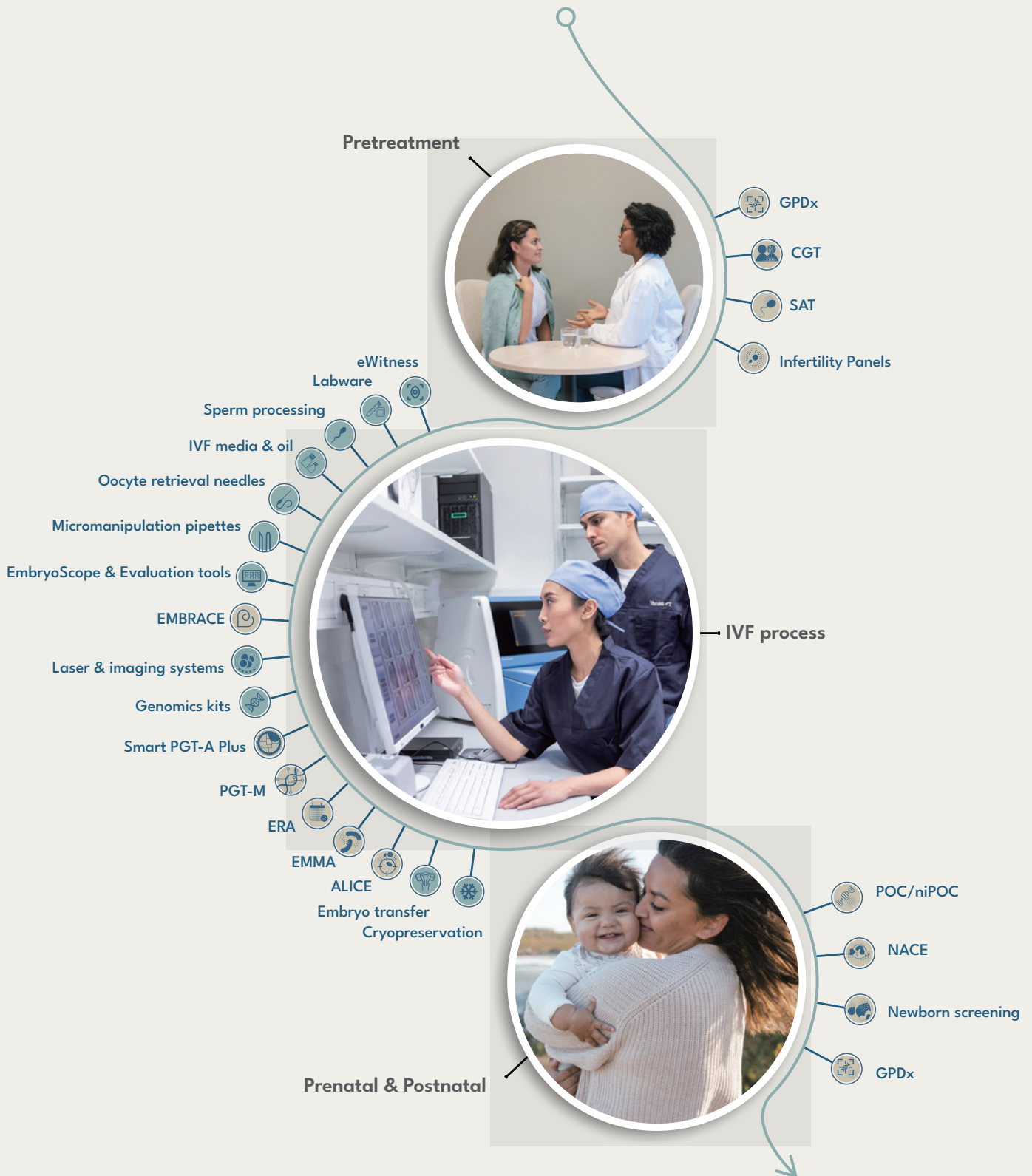
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